OPEN ACCESS
OPUS AUGSBURG

Universität Augsburg
Universitätsbibliothek

Enacting Environments: An Ethnography of the Digitalisation and Naturalisation of Emissions

Ingmar Lippert

Angaben zur Veröffentlichung / Publication details:

Lippert, Ingmar. 2013. "Enacting Environments: An Ethnography of the Digitalisation and Naturalisation of Emissions." Augsburg: Universität Augsburg.

Nutzungsbedingungen / Terms of use: **licgercopyright**

Dieses Dokument wird unter folgenden Bedingungen zur Verfügung gestellt: / This document is made available under these conditions:
Deutsches Urheberrecht
Weitere Informationen finden Sie unter: / For more information see:
https://www.uni-augsburg.de/de/organisation/bibliothek/publizieren-zitieren-archivieren/publiz/



Enacting Environments: An Ethnography of the Digitalisation and Naturalisation of Emissions

Inaugural-Dissertation

zur Erlangung des Doktorgrades

der

Philosophisch-
Sozialwissenschaftlichen
Fakultät der

Universität Augsburg

vorgelegt von
Ingmar Lippert aus
Mainz
2012

Supervisors

Christoph Lau (Augsburg University)
Lucy Suchman (Lancaster University)

Date of Defence

12^{th} December 2012

Enacting Environments

An Ethnography of the Digitalisation and Naturalisation of Emissions



Ingmar Lippert



PhD Dissertation in Sociology

Augsburg University
Augsburg

Cite in a version of the following form:

Ingmar Lippert (2013). *Enacting Environments: An Ethnography of the Digitalisation and Naturalisation of Emissions*. PhD Dissertation in Sociology, University of Augsburg, Augsburg.

© Ingmar Lippert 2013

Typeset with LaTeX 2ε on Tuesday 8th January, 2013

Licence Copying is permitted only for private or the own scientific purposes of the person who performs copying (according to §53 of the German Copyright Act). This publication may not be edited or changed otherwise. Commercial, business lobbyism, military or policing use is not permitted. For any other type of use request permission from the author.

The author has no responsibility for the persistence or accuracy of URLs for external Internet Web sites referred to in this publication and does not guarantee that any content on such Web sites is, or will remain, accurate or appropriate.

Some material of this book has been published elsewhere: an earlier version of Section 2.1 can be found in *Ephemera* 12(1/2), 2012; segments across this book have been published in *Computational Culture* 1(1), 2011.

Abstract

Enacting Environments is an ethnography of the midst of the encounter between corporations, sustainable development and climate change. At this intersection 'environmental management' and 'carbon accounting' are put into practice. Purportedly, these practices green capitalism.

Drawing on fieldwork of day-to-day practices of corporate environmental accountants and managers, Ingmar Lippert reconstructs their work as achieving to produce a reality of environment that is simultaneously stable and flexible enough for a particular corporate project: to stage the company, and in consequence capitalism, as in control over its relations to an antecedent environment. Not confined to mere texts or meetings between shiny stakeholders co-governing the corporation – among them some of the world's biggest auditing firms, an environmental non-governmental organisation (NGO) and standards – control is found to be distributed across as well as limited to a myriad of practical work situations, involving spreadsheets and slide shows. Carbon accounting takes place in the midst of docile as well as dissident humans and nonhumans. As a result of this analysis, *Enacting Environments* establishes how carbon emission facts are produced and co-configure climate change realities. Ingmar Lippert argues: within capitalism, environment does not exist in the singular but in the plural; and these environments are not existing out there to be read off some anterior Nature but they are brought into social, economic and political existence in the practices of accounting for them.

Providing a portfolio of methods to study techno-managerial engagement with carbon, Ingmar Lippert shows how much is overlooked in received theories of corporate environmental accounting, theories of the performativity of environmental economics and, ultimately, the epistemic and ontic effects of fact-making in the heart of neoliberal capitalism.

Keywords: Science and Technology Studies (STS), environmental sociology, organisation studies, actor-network theory (ANT), apparatus, multiplicity, carbon accounting, corporate environmental management.

Ingmar Lippert is Residential Fellow in Tembusu College at National University of Singapore. Before his lectureship at Tembusu, he was a Research Fellow at the Institute for Advanced Studies of Science, Technology and Society, Graz and a PhD student at Augsburg University. His research focussed on the situated social and material practices in the doing of ecological modernisation as a techno-managerial attempt to green capitalism.

Outline of the Scholarly Argument

Capitalism manages to enact environments in the midst of its centres by means of keeping Other environments out. The fundamental practice which allows for this contradictory and generative move is that capitalist agents enact environments. Capitalism does not require a clear, neat, distinct, singular environment. Multiple, fluid, dynamic environments allow far better the tactical and strategical project of staging capitalism as having its destructive environmental impacts in control. That control is a decisive fiction sustaining the unsustainable.

These theses are the result of an ethnography, reported in this book, that scrutinised corporate carbon accounting practices as a site at which we are able to simultaneously explore two significant issues for the management of environments: on the one hand studying practices of corporate environmental accounting allows us to engage with *agents' practical work reality* by which capitalism seeks to render itself 'green' and 'sustainable'; on the other hand the focus on precisely how accountants achieve taking carbon into account is able to sharpen our understanding of how *quantifying* practices perform in a *non-substantial* area of business, such as engaging with climate change.

In the received view, corporate carbon accounting is about providing the facts and figures about the emissions which a company produces. Accounting for these emissions is supposedly a condition to take carbon into account – economists would call this process *internalisation*. The discourse which assumes that 'if only capitalist society is able to internalise its environmental problems' (like carbon emissions which are identified as the culprit of global warming and, in consequence, climate change) 'then capitalist society will be able to solve environmental crises' – this discourse is called ecological modernisation.

Within environmental sociology arguments over whether that discourse is actually materially reflected abound. Ecological modernisation theory proposes that capitalist organisations do get green(er). In the midst of debate, little attention, if at all, has been paid to those agents who are, supposedly, implementing the programmes of ecological modernisation, such as environmental management systems (EMS) and carbon accounting. This study contributes to understanding how capitalism organises its relation to environments by means of scrutinising the work practices of these agents. To conduct that study, I have carefully avoided to make assumptions about whether a particular organisation would be conducting greenwash. Much rather, the intentionally open question was: *what do agents of ecological modernisation do and how do they achieve it?*

With this orientation, this study turned to sociological theory and methodology which does not presume any overarching structure as determining agents. Instead, by means of methodological triangulation between ethnomethodology, actor-network theory (ANT) and Pierre Bourdieu's concepts of field and habitus, this study reconstructs by which specific practices and discursive action agents manage to make greening more central to capitalism. The decisive finding is that while agents do manage to bring environmental data into the heart of the corporation – the centre of capitalism – what that data is about (the things this data is related and presumably representing, the material hinterland of that data) is simultaneously distanced from the corporate core. This study, thus, shows how *capitalism manages* to enact a epicentral movement of 'environment' and, in parallel, *to ensure that environmental issues and concerns do not challenge or*

interfere in that centre. It manages by means of keeping the largest degrees of environments out.

The overarching thesis of this study is, thus, that environments, such as carbon, are not existing – for all practical purposes of corporate agents – out-there but, rather, they are carefully crafted and enacted into corporate, social and, eventually, economic reality. Environments are enacted. The plural matters. Within the organisational practices of capitalism, agents may imagine to refer to 'the' environment. Their everyday practices of taking environments into account, however, relate to specific materials, such as spreadsheets, pieces of papers, flip-charts. Environments exist through these multiple materials, in multiple versions; ontologically, thus they do *not* exist in the singular but they are staged as such. If the carbon emission fact of a company is established, that fact may well be out-dated a few micro-seconds or years later; it may differ several kilometres off or in a neighbouring storage unit in a computer. Any global fact is enacted in particular located situations. Emissions facts are not stable but fluid, flowing in and between myriads of situations. They are hold together by means of humans' material-discursive performances. And they shift with agents' practices just like with the dynamics in-built into materials, like a database. These processes produce artefacts, versions of environments. And these versions matter. What a society is dealing with when encountering a corporate emission fact is not Nature but a version of an environment. Next year, the same fact (as in, signifying the same imagined out-there) may have changed.

Vis-à-vis Science and Technology Studies (STS), my analysis of the effects of enacting environments is indicative of a potentially general characteristic in digital quantification practices – whether in offices or in laboratories: data flows are not that clean and under control. While workers may achieve staging being in control, in practice parallel versions of realities may proliferate – for the better or worse. What we find is that the reality of corporate carbon emissions is enacted as mutable, mobile and multiple. In the practical work of corporate fact finders, it is not necessary, albeit it is *deemed* required, that facts are singularised and immutablised. In consequence, social and economic reality is confronted with diverse carbon emission accounts, all implying universal truths. Societies and politics which resist engaging with parallel realities and insist on singular ones may not be well equipped to manage those crises that may be co-constituted by these parallel realities.

Ethnographic work underlying this argument involved participant observation over a period of twenty months as well as document analysis. The study took place at a Fortune 50 financial services provider positioned in a legitimising network involving one of the largest international environmental NGO's and one of the four largest auditing firms. The findings of this study are, thus, considered to point to practices indicative of widely organisationally accepted and shared realities within hegemonic modern capitalist culture.

Note: This text is NOT to be read by investors; especially not by those in the ethical investment business.

Disclaimer: Names and numbers within this text have been altered to guarantee anonymity of subjects encountered during the underlying field research. Numbers of the text have been designed to mirror realistically magnitudes and the claimed accuracies present in the actual field. However, in this book, seemingly accurate numbers serve merely illustrative purposes.

Language: This book has been written in British English. Quotes have been rendered accordingly.

The appeal of numbers is especially compelling to bureaucratic officials who lack the mandate of a popular election, or divine right. Arbitrariness and bias are the most usual grounds upon which such officials are criticised. A decision made by the numbers (or by explicit rules of some other sort) has at least the appearance of being fair and impersonal. [...] Quantification is a way of making decisions without seeming to decide. Objectivity lends authority to officials who have very little of their own. (Porter 1995, 8)

No doubt some of the things in the world can indeed be made clear and definite. Income distributions, global CO_2 emissions, the boundaries of nation states, and terms of trade, these are the kinds of provisionally stable realities that social and natural science deal with more or less effectively. [...] So what are the textures they are missing out on? (Law 2004a, 2)

The necessary point of departure for renewed socio-environmental theoretical elaborations [...] is the hyper-modernist, post-calculative, disembodied, entrepreneurial agent that represents the theoretical engine of neoliberalism and the primary responsible actant for the conflation of manufacture or assemblage and proprietorship in its politics of nature. (Pellizzoni 2011, 802)

Contents

1 Introduction **1**
1.1 Greening Carbon 4
1.2 Accessing Carbon 21
1.3 Doing Data 31
1.4 Researching Corporate Carbon 41
1.5 This Book 57

Interlude I: Contested Carbon **63**

2 Data Construction in a Basement **69**
2.1 Classifying Consumption 70
2.2 Constructing Consumption via Calculation 88
2.3 Commanding Carbon 107

3 Translating Data Into Sustainability **121**
3.1 Breaking Down Sustainable Development 123
3.2 Controlling Data Collection 142
3.3 Boundary Emissions 168
3.4 Extension of Carbon Coverage 179
3.5 Visionary Emissions for Sustainability 204

Interlude II: Normal Anomalies **227**

4 Situated Control Over Carbon **231**
4.1 Performing Qualities of Data 238
4.2 Failing the Market 256
4.3 Aligning Legitimacy with Carbon 279
4.4 Transforming the EMS 320
4.5 Meeting Data 344

5 Achieving Order **363**
5.1 Adjusting Data 364
5.2 Blurring Definitions 378
5.3 Betting on Bodies 395

5.4 Accommodating Mess . . . 405

Interlude III: Sustaining Labour Relations **421**

6 Carbonscape **437**
6.1 Boundaries . . . 443
6.2 Materiality . . . 457
6.3 Multiplicity . . . 474
6.4 Temporality . . . 488
6.5 Scale . . . 499

Interlude IV: Companion Tales **517**

7 Conclusion **531**

A Fieldwork and Methods **555**

B Analytic Materials **583**
B.1 A Comment on Relating Bourdieu and Science and Technology Studies 583
B.2 A Bourdieusian Analysis of Data Reporting . . . 587
B.3 Analysing the Relations between the Corporation and External Organisations . . . 601
B.4 Analysing the Structure of the Workplace . . . 605
B.5 Auditor's Critique of GFQ's Carbon Accounting . . . 608
B.6 Outsourcing Waste . . . 609
B.7 Materials on 3C Group's Carbon Offsetting Project . . . 610
B.8 Additional Field Materials . . . 611

Lists **612**
List of Field Note Extracts . . . 615
List of Artefacts . . . 619
List of Figures . . . 621
List of Tables . . . 623
List of Members' Names Anonymised . . . 625
List of Organisational Designations Anonymised . . . 627
List of Organisations . . . 629
List of Standards and Rankings . . . 631

Glossaries **633**

Bibliography **639**

Index **673**

Acknowledgements

This book would have not been possible without many people. First, I like to express credit to members of the company I studied (its pseudonym is *Global Finance Quality* (GFQ)): I am more than grateful for their time and their trust – access to their everyday work territory was invaluable; they shared their thoughts, happiness, joy and frustration. I am protecting the identities of these informants and, therefore, render their names and the names of most organisations subject to this study anonymous. Greatest thanks to Christoph Lau and Lucy Suchman who were providing me with enormously helpful scholarly and practical guidance, who were willing to supervise my engagements – with GFQ, sociology and STS. Christoph Lau made me ask how this study challenges social theory. Lucy Suchman carefully engaged with the nuances in carbon work situations that I reported and supported me to delve into the differences and resonances between my study and approaches in the conceptual reality of STS.

How to express the gratitude to all of you? Let me approach this by way of telling the story how the fortunate path to this book has woven through intellectual and practical land- and taskscapes. All people I met on this path enabled the journey. I am deeply grateful to you for accompanying me on that path, finding it, mapping it, showing me directions and supporting me in some many ways – too many to be named!

At Brandenburgische Technische Universität at Cottbus I had been familiarised with the hegemonic mode of approaching the management of 'nature' and 'humans'. Gerhard Wiegleb, Wolfgang Schluchter and Klaus Kornwachs supported the development of my critique on the hegemonic ways of studying environmental management. During my first semester at Boğaziçi Üniversitesi, Belgin Tekçe led my path towards sociology and it was there that I first engaged with the theme of environmental managers' agency that I scrutinise in this book. In parallel, the discussions with Susann Eisert, Lea Herberg, Gudrun Pollack, Anke Schaffartzik and Stephan Wolf opened the wider frame of questioning the limits of environmental management. Thanks to head librarian, Magdalene Frewer-Sauvigny, the library soon shelved critical management texts.

In the intellectual space spanning Lancaster University's Institute for Environment, Philosophy and Public Policy (IEPPP), the Centre for the Study of Environmental Change (CSEC) and the Centre for Science Studies (CSS) I developed the methodological and theoretical frame underlying this book. Noel Cass decisively classified one of the key objects of my study when he suggested to think of environmental managers as 'agents of ecological modernisation'. In conversations with Brian Wynne, Bron Szerszynski and

Claire Waterton I learned to scrutinise conceptual and theoretical spaces and deepen my interpretations. Helen Jackson (whom I explored Lancastrian environmental STS with, alongside Uli Beisel, Aurora Trujillo Peraire and Michaela Spencer) helped me to align my inquiries towards societally and politically productive struggles. All the staff and students I met at Lancaster have shaped this journey.

At Graz's Institute for Advanced Studies on Science, Technology and Society I met Anup Sam Ninan, Torsten Wöllmann, Corinna Bath and Kolya Abramsky with who I had generative discussions of how to operationalise critique in STS. At the intersection of the spaces of Lancaster, Graz and Cottbus soon formed the Environment, Management and Society Research Group – in which I intensified my engagement with Anup Sam Ninan and Niklas Hartmann. Their thoughts have been reassuring and critical throughout this study.

This study travelled. Parts of it have been presented at Graz's Institute for Advanced Studies on Science, Technology and Society as well as the city's social centre Spektral, at Nottingham at the UK Postgraduate Conference in STS, at the Amsterdam Social Technology Workshop, at the XVII World Congress of Sociology at Gothenburg, at Trento's conference of the European Association for the Study of Science and Technology, at the Workshop 'A Billion Gadget Minds: Thinking Widgets, Data and Workflow' at Swedenborg Society, London, at the Workshop 'Carbon markets and their future: A Social Science Perspective' at Hamburg, at London's Corporate Watch, at Lancaster's Centre for Science Studies/Centre for the Study of Environmental Change Mixture Seminar, at the Berlin Innovation in Governance Research Group's Lunch Seminar, at the Cardiff Interpretative Policy Analysis Conference, at Naples' Critical Management Studies Conference, at a Seminar of Berlin's Humboldt University's Institute for European Ethnology as well as the Berlin Frozen Flow Workshop and at Bielefeld University's Centre for Interdisciplinary Studies. So many helpful and encouraging voices responding to elements of this study! Among them the supportive discussions – some longer, some on the spot – with Steffen Böhm, Colin Brown, Günter Getzinger, Les Levidow, Adrian Mackenzie, Andrew Sayer, Arno Simons, Steven Yearly and all the respondents to my work at these gatherings. Others providing valuable comments on this study, at different phases, have been Judith Ancke, Rebecca Ellis, Joseph Huber, Elham Kashef, Reiner Keller, Alfredo Ramírez-Ogando, Peter Seyferth, Lydia Stiebitz, participants of the sociology colloquium run by Christoph Lau, activists of anarcho-sydicalist organisations and anonymous reviewers of an article published in *Ephemera* (2012).

This study would not have been possible without incredible amounts of support in infrastructure and reproductive work. In that respect I am thankful to my family, friends, the anarchist community, the couchsurfing network. The study was not financed by any organisation; still my work was supported with scholarships by the German National Academic Foundation as well as Hans-Böckler-Foundation and the Manfred-Heindler grant administrated by IAS-STS. Of course, I take responsibility for this text and hope errors and problems will be signalled to me.

CHAPTER 1

Introduction

7th of July 2009. We are in the heart of a Western metropolis, in one of the G8 states, on the third floor of an office block, hidden behind urban flats. The block which I am in houses the Head Quarters (HQ) of a multinational: *Global Finance Quality* (GFQ). I am in an office. The office is equipped with a flip-chart, a grey filing cabinet – on it, note the green leaved plant, neighboured by an event flyer; the flyer carries the logo of *The Club of Rome*. Turn around. More furniture: a small desk with two chairs and a larger desk. I am visiting a woman in an unobtrusive pantsuit. Her name was printed on that flyer. She must be *important*. Important – in Latin – means 'being of consequence'. Is she? Well, she occupies the boss's chair. We sit at the larger desk and look at a screen. Right-handed, she moves a mouse, connected to a computer. Synchronically a pointer takes its way on the screen. She presses the left button of the mouse. Click. A consequential digital change. It operates the 'ok' button at a website of a global carbon reporting organisation. Yeah!!! Triumphantly, she raises her arms. In the moment of pressing the mouse button to click onto 'ok' she released tens of megatons of *carbon emissions* into the global discourse of carbon, into an utopian atmosphere of green capitalism and techno-economic fixes to climate change.

It is people like her who bring carbon emissions into being. This book substantiates this thesis by way of visiting the specific work practices of her and her colleagues – those who collectively produce accounts of GFQ's impact on 'the' environment. Before detailing the book's position in relation to sociologies of the environment and unsustainability, to the debate of the performativity of economics and Science and Technology Studies (STS), I provide a quick sketch of the political concerns.

So-called carbon emissions were something many were concerned about while I was writing this book. Substantially, however, this book is not about carbon. It is about *practices* which bring corporate impacts on 'the environment' into social, economic and political reality. These impacts are now framed in terms of carbon; tomorrow they may be in terms of water, biodiversity, ecosystem services.

At a glance, this is the political discourse against which this book emerged: major play-

ers – such as governments, the United Nations (UN), multinationals, non-governmental organisations (NGOs) – figured out that 'we' need sustainable development. Companies are engaging with environmental crises, such as climate change. It is time to act. Whether this imperative is cast as hegemonic ideology (Gramsci 1971), symbolic violence (Bourdieu and Wacquant 2004), discourse (Foucault 1981), matter of concern (Latour 2004b) or of hope for business innovation (Giddens 2008) it is clear that humans and non-humans are framed as dependent on companies – to go green.

This is the prescription of the economist-managerial take: following governments, societies are to alleviate the problems by means of ecological modernisation. According to this approach, modern institutions have to use science – rational knowledge practices – to understand reality and develop technologies to repair institutions. Industrial and service sectors are main protagonists of greening: companies use so-called environmental management systems (EMS) to optimise their environmental conduct; climate change has become an issue of greenhouse gases (GHG) – carbon – which, unfortunately, was not *allocated efficiently* enough.[1] A market failure resulted; this failure can be repaired by economically internalising carbon emissions. 2011's markets internalised carbon, resulting in transactions worth 176 billion US$ (World Bank 2012, 10). The capitalist economy can be sustained if market participants are equipped with the required information to make decisions. Correspondingly, nation-states produce carbon inventories and companies provide environmental reports, detailing their emissions. The solution is carbon accounting. If only modern institutions internalise their emissions into their operations, economic consequences of climate change would be optimally allocated: *intelligent management* for a *green economy* (UNEP 2011, cf. Brand 2012). Or so the story goes.

These discourses also detail how exactly organisations are to account for carbon. They specify standards, measurement technologies, softwares, databases and quality assurance. If it comes down to it carbon accounting is carried out by particular people. Agents who are to put the narrative of ecological modernisation into practice. In heavily regulated and standardised workplaces, they have to figure out their organisations' emissions. Management technologies abound. Using specific conversion factors, calculatory techniques of extrapolation encoded into database functions, they produce a result. The solution to environmental crises is that such agents accomplish their job. Salvation depends on their practices of managerial-technological knowledge production.

This book offers a study of the practices around this workplace. It provides an account of carbon accounting – an account sensitive to the lived realities of workers, of the problems they coped with and the materials they were organising around. Carbon. Data. Corporate emissions, for all *practical* purposes – of carbon accountants – were data. I argue, first, that this quality of emissions has consequences for how we should conceptualise both, ontology and epistemology of carbon. Interwoven with this line

[1] Economist discourse can be understood as dealing with the distribution of resources and of damages within society. In their normative take, distribution (somebody distributes something to a location) and allocation (some location to which things are al-located) is to take place as efficiently as possible without causing damages to others. Labour unions share this discourse (The International Labour Foundation for Sustainable Development 2008; Allespach and Bartmann 2011).

of argument, we encounter how ecological modernisation is put into practice: I argue, second, that while ecological modernisation manages relations between organisations and some environments, mostly ecological modernisation increases the distance between organisations and other environments, resulting in a failure to engender environmental accountability. At the intersection of these lines, I argue, third, that digital knowledge practices unsettle the foundations of environmental economics and politics. My account of these practices adds to our understanding of a fundamental concern in our society: quantification-as-digital-practice.

Enacting environments means that what an environment is is not given but more or less carefully assembled by particular humans, their practices and their devices that mediate their relations to what they imagine as 'out there'. This book investigates how environments can be enacted by means of ethnographic analysis of such entities and their relations. GFQ provides us with a case of neoliberal enactment of particular environments. I argue, however, that what we can learn from this case points us beyond neoliberal enactments: we gain insight into infrastructural practices that any mode of modern capitalisms would need to utilise to take nature into account.

In the remainder of this introduction I provide a systematic account of the case study and I show how it relates to debates in sociology and STS. This takes five steps. (1) I begin by tracing the social scientific takes on the greening of capitalism to the subject carbon accounting. This section should provide a feel for how carbon accounting occupies a firm position in hegemonic unsustainable politics. Carbon accounting is about producing data. That data matters for managing carbon. Readers who are familiar with social constructivist takes in environmental sociology and studies of accounting may consider skipping this section. (2) An understanding of how capitalism relates to carbon accounting should allow to make sense of the position of the case study. In the second section I present the field in which I observed carbon accountants and my position in it. I will also draw out a frame of how the company I studied, GFQ, related to carbon emissions. (3) The third section introduces how data and knowledge are produced. This entails engaging with the plural of knowledge – for we all know things differently – and with how humans shape and produce reality through their practices. Readers who are familiar with feminist technoscience will not miss much when skimming over this section. (4) Following this, I circumscribe the apparatus which I mobilised for this analysis. This entails engaging with the rationale of this study, methodological assumptions and the analytical process underlying this book. (5) This Introduction ends by summarising what this book is concerned with, how it seeks to contribute to sociological discourse and I lay out the organisation of the argument.

1.1 Greening Carbon

Sustainable development, climate change and carbon economics The notion of sustainable development serves well as the starting-point of this book's narrative. Since the end of the second millennium, this notion has become a common reference point which agents have to mention when addressing the future of Humanity and Earth itself. The notion gained global momentum as a label for policies that promised to sustain economic growth while ensuring social justice and ecological equilibria.

In these discourses, commonly it is held that sustainability may be achieved when three systems are reconciled, the economic, the social, the ecological. Graphically, three circles, more or less overlapping, or a pyramid are employed to map sustainability. It is in the centre, in an area where the three so-called aspects overlap. Critique of this model, even on the very notion, is everything but new (Mebratu 1998; Dingler 2003). Yet, even if this label is privately seen as flawed, agents publicly reproduce it; it has became a decisive anchor in global discourses, *the* reference for powerful agents to exhibit doing good.

Hence, stakeholders, globally, in multinationals as in academia, in governments as in NGOs, all talk about the need to identify and employ workable transitions towards sustainability. Any such approach, in this discourse, requires some form of transition management: a goal-directive, learning-based more or less collective process. These processes, call them governance or management, need to be informed. With data. Realist data. These discourses do not provide much scope for constructivist agendas suggesting reflexive reconstruction of the priorities of economy, science and technology; there is not much scope for actually reorganising societal relations around 'what kind of human we aspire to be, and in what kind of human world' (Wynne 2002, 460). Much rather, realist data is used to determine what is best for the 'public good' – using economists' instruments, above all, markets.

Empirically, this book is about what was going on in the Sustainable Development Unit of the multinational GFQ. Whatever you think of sustainable development, to introduce this book's theme, it suffices to accept that this firm *related* to 'sustainable development'. In Chapter 3 I detail this relation and show that, indeed, the company did not only link to the label but also took part in reproducing the discourse, internally and publicly. Only at that point of my argument, it is required to engage in more depth with the sustainability debates, its history or major actors.

Interestingly, the discourse of sustainable development was (maybe only temporarily) overwritten by a new 'paramount environmental problem', *climate change* (Szerszynski and Urry 2010, 2).[2] Climate change was coded in a language of *carbon* equivalents, translated into emissions and emission reductions.

This framing was the effect a contingent history of climate science, policy and economics. For social scientists, it is of interest how climate change is played out

[2]Despite risks like nuclear power, exemplified in Fukushima in March 2011 while I was writing up the first draft of this argument, or, say, nanotechnology.

because descriptions of climate change entail normative prescriptions about society (ibid., 4). Above all, climate change is often seen as necessitating a social ordering which is able to 'master' climate by means of earth system governance including international treaties like the *Kyoto Protocol* – environmental management on all scales ranging to consumption pattern changes (Hulme 2008). All these instruments to conquer the climate assumably allow humans to model and mould it. However, the science making climate change readable for so-called decision-makers – that is, bureaucrats, governmental representatives, business and NGO functionaries – is organised as regulatory science (Jasanoff 1994). This means, it is oriented to its presumed application (Szerszynski 2010, 19), well exhibited in discussions of e. g. general circulation models shown to involve – for good reasons – political concerns in modelling itself (Shackley and Wynne 1995). Therefore, we cannot make sense of climate change science in simplistic notions of science and objectivity. What science, objectivity and, thus, knowledge means has turned into an open question. In Latour's (2004a) account, science and nature are political; yet 'moderns' pretend that politics and science/nature are distinct realms. Contra Latour, Asdal (2008) claims: the doing of nature-wholes explicitly opens spaces for politics. Eventually, Latour (2011b) points to climate change negotiations, e. g. at Cancun, as evidence of moderns' successful operational engagement with the concern that nature is political, i. e. not distinct. This book, accordingly, sets out from a position, which sees scientific arguments involving so-called nature as political. Here, then, is a concern with *how* 'objective knowledge' of nature is political. Yet, rather than theorising this, I ask empirically what kind of politics is black-boxed into 'nature', into 'carbon'.

The climate change narrative usually involves a technological reading. In Szerszynski's (2010, 10) account, it is the story's constitution that 'timeless truths of science will legitimate technological interventions'; science allows for reading climate change and suggests which so-called solutions are apt to write the climate. As it were, governments, business and NGOs agreed on specific marks to be written into earth's climate, such as a limiting average global warming to $+2^{\circ}$ C. In this rationality it was seen as straight-forward to identify the causal agent of warming. It was determined; GHG are the culprits, abbreviated as carbon. Below I return to a closer introduction of this entity. Right now, note that CO_2 has become the *enemy* (Swyngedouw 2010a, 223). The primary mechanism to delimit this enemy was the market; that is, capitalist economics organised to assumably allow the optimal allocation and reduction of carbon. This presupposed the privatisation and commodification of carbon emissions.

Ingeniously, governments inscribed this approach in international treaties – such as the Kyoto Protocol. This protocol proposed emission trading between entities as a rational mechanism to determine the best allocation of emissions and their reductions. For economists the idea is straight-forward – at least on paper. *Here is an exercise.* Take a piece of paper, construe three entities (it does not matter whether you imagine firms of nation-states; they are all the same – on paper). Entity A produces soy beans,

entity B manufactures military drones and entity C sells bank accounts. Three entities specialised on certain production. Now we copy this paper. As a result, you have six entities (label them A to F); two are competing within each sector. Here comes the sovereign (be it a friendly green benevolent dictator or an elected democratic head of state); governments set a limit: these six entities are to reduce their emissions by fifty hypertonnes. Now, who is to rearrange their production processes such that they emit less? The economist suggests that each entity calculates how much costs would result from measures to reduce emissions. Imagine a table: column (entities) and in the first row you note the particular costs for the means to prevent a first hypertonne of carbon to be emitted, for each entity; second row you inscribe the costs for the second hypertonne of emissions prevented – and so on. 'Obviously', the economist would predict, in different sectors and in different entities, different measures to reduce emissions would be *possible*, resulting in different costs. Now, for the economy involving all these entities, the optimal choice of measures would be, economics argues, to carry on with those measures, and only with those measures, which are cheapest.

Emission trading means this: an entity can buy reduced (saved) emissions from another entity. Say, entity B buys five hypertonnes of emissions reduced by entity A. On the balance sheet, then, entity B can subtract these five hypertonnes while entity A received, instead, financial compensation. A simple deal. Of course, this would only happen, if entity A can produce these – let's call them – *negative emissions* cheaper than entity B. Similar deals could happen with other entities. Eventually, entity B can declare having zero emissions, being carbon neutral. Figure 1.1 illustrates this calculation. Entity B has, say, 50 hypertonnes (h. t.) emissions. If it buys negative emissions from all the other entities, entity B's emission sum is zero.

Table 1.1: An illustration of a balance sheet with subtracted emission reductions

Balance Sheet: Emissions 2006 from Entity B		
Source		**Emissions (in hypertonnes, h. t.)**
Entity B: total emissions		50 (prior to offsetting)
Emission reductions bought from:	Entity A	5
	Entity C	10
	Entity D	5
	Entity E	10
	Entity F	20
Entity B: sum of emissions		0 (after offsetting)

Such trade can take place between existing polluting entities. And it can take place between existing polluting entities in the global North and not-yet-polluting entities in the global South. The latter is usually referred to as Clean Development Mechanism (CDM). Project developers in the global South can develop entities which have the only

purpose of producing negative emissions which, thence, can be sold. These negative emissions are called Certified Emission Reduction (CER) if they are produced under the allegedly heavily government supervised scheme CDM. In parallel, a voluntary market is developed, the Voluntary Carbon Market (VCM). On that market negative emissions could be traded voluntarily, according to a variety of idiosyncratic standards; these negative emissions are called Voluntary Emission Reduction (VER).

These markets are also called carbon markets. And they do not work well (Gilbertson and Reyes 2009) – yet, as some hope (Lederer 2012); whereas others question the foundations of these mechanisms (Lohmann 2005). Not only it is argued that the occupation with market construction drifts attention away from dealing with climate change (Lohmann 2009a, 27) but making climate change dependent on market mechanisms also involves the risk of what Friends of the Earth author Chan (2009) identified as the risk of a carbon finance bubble, *subprime carbon*. According to World Bank (2012), carbon markets are rapidly evolving; a high-volume market with corresponding systemic *opportunities*, framed by governments as problems, like 'framework loop-holes and criminal activities', fraud and cyber-thefts (World Bank 2011, 10). Climate change, thus, is related to not only through the rules set by governments but very much through what is going on in and around market participants (Bernstein, Betsill, Hoffmann, and Paterson 2010). Consequently, this book is based on the understanding that to make sense of how capitalism performs in governing climate change we need to actually study how carbon counts and numbers are brought about. It is these inner worlds of governance which matter, not just big talk. Then, this study should not only be of interest to those who invest their trust in these mechanisms to work; it may also be relevant for those who do not trust governmental regulations and market participants but locate the source for the required reactions to climate change in 'autonomous movements self-organising from below', workers who may organise the greening of production processes themselves (Abramsky 2009, 6).

Studies of carbon governance and the CDM trace these instruments back to the discourse of ecological modernisation (Ninan 2011; Bailey, Gouldson, and Newell 2011). While it suffices to revisit the discursive link between climate change and GFQ in Chapter 3, as the next step we need to narrow down what the discourse of ecological modernisation entails and how it frames carbon emissions. For now, the take-home point is this: accountants establish the link between an environment (in our case carbon) and the market.

Ecological modernisation and corporate greening Originally, the notion of ecological modernisation has been developed in Western European Countries as prescription of how capitalism might be reconcilable with an ecological or environmental rationality in the 1980s. Huber (1988), as one of the first authors to develop this notion, argues in favour of a new social-ecological order which would be characterised, *inter alia*, by ecologically modernising production and consumption. This should be achieved by employing '*new and more intelligent technologies*' such as Information Technology (IT)

in industry, office and home, improved energy and environmental technologies, solar technologies, genetic technologies, biotechnologies and their applications in agriculture (ibid., 174). Of that, the ecological modernisation of industry was the most important; he argues for *integrating* environmental protection into production processes rather than cleaning up afterwards. When, a couple of years later, Hajer (1995) published a discourse analysis of ecological modernisation's move into the policy world, he identifies several of Huber's (1988) postulations as having found their way into dominant discourse. In Hajer's (1995, 26-29) account, six conceptual shifts to ecological modernisation can be recognised:

From reaction to prevention Bureaucratic-judicial administration is criticised for being focused on 'react-and-cure'. The innovative solution against the former approach was 'anticipate-and-prevent'. In his reading, this lead to two consequences: integrated environmental protection became the new norm and, together with de-regulation policy, it lead to a discourse favouring economic incentives and market instruments for environmental protection.

A new science While he identifies earlier models of science with the *identification* of environmental problems, in ecological modernisation discourse science moves towards the centre of policy-making: scientists got the task to *predict* how much human load the planet could carry (the 2° C aim is a perfect instance).

Micro-economics Earlier models of economic behaviour of individual entities stressed that measures to protect against environmental damage implied 'costs' for this very entity. A new version of micro-economics argued that 'pollution prevention pays', i. e. that investment into measures would prevent damages in the future which the entity might have to compensate.

Macro-economics He also observes a shift in public households' and nation-states' economics. He sets a conception of nature as a free resource and sink for pollution against a new understanding of nature as a public good. If nature is a public good which, in principle, ought to be or is available for 'the public' then the state has to ensure that economic actors do not *externalise* costs, e. g. using nature as a sink without compensating 'the public'. The positive account goes like this: actors have to *internalise* the costs into the actor's economic optimisation.

Legislation changes Legal norms are also adjusted. In ecological modernisation discourses it is not anymore the damaged party who has to carry the burden of proof but the damaging party.

Participation Whereas for several years environmental groups staged practical opposition and engaged in direct action against environmentally destructive projects, with ecological modernisation a selection process takes place. So-called civil society (the civil components of it, i. e. those parts of the social movements that regrouped as NGOs) are invited into policy-making as stakeholders.[3]

[3]For the exposition of this last point I also draw on Bergstedt (2005).

Ecological modernisation is still the dominant *discourse* in environmental policy, among businesses and NGOs. The decisive question, which I am not alone in addressing, can be posed in this way: is capitalism able to innovate itself? And, if this discourse informs actual innovation processes: what are the consequences of such innovations? Seeking to contribute to such questions, this book shows how ecological modernisation takes place in work practice.

Crystallising in relation to the notion of ecological modernisation, an own school of thought has emerged: Ecological Modernisation Theory (EMT). This theory interprets ecological modernisation as primarily promising to reconcile capitalism with ecology. To test whether this promise holds, scholars study how the promises are reflected in policies, in corporations' accounts or in economic data. Proponents of EMT suggest that, indeed, ecological modernisation is taking place and that there is reason to expect that nation-states and corporations can become green in this way: deploying more, rather than less, market-driven science, technology and expertise (Buttel 2000).

To make sense of EMT, four issues seem relevant. (1) *EMT positions itself firmly against other environmental sociologies* which claim that industrial or capitalist societies create detrimental environmental problems; thus this theory takes an *optimistic* vantage point proposing that sustainable development is possible and that industrial or capitalist societies are approaching this utopia (Mol 2001).[4]

(2) There is *not yet enough* of ecological modernisation. Scholars argue that more eco-technical and eco-efficient innovations are needed (Huber 2008); these are understood as synonymous with ecological modernisation (Jänicke 2008, 558). Of course, these innovations have to spread. Huber wants to see a global diffusion of ecological modernisation. Jänicke (2008, 563) accepts that, unfortunately, the state has to intervene by means of ecological politics and regulation which is to render restructuring of industry as well as economy both 'socially and economically acceptable'.

(3) EMT scholars point to *two findings* seemingly affirming their theory that ecological modernisation is taking place. Macro-economically, they identify a decoupling of economic growth from resource utilisation in 'in most of the ecologically advanced nations' (Mol 2010, 23). Culturally and institutionally, they (re)cognise an economic and an ecological sphere becoming 'autonomous' from each other, allowing business to consider both spheres – semi-permanently and in parallel (Mol 2001). As Mol puts is:

> The basic idea of ecological modernisation is that, at the end of the second millennium, modern societies witness a centripetal movement of ecological interests, ideas, and considerations in their institutional design. This development

[4]Mol (2001) and other proponents especially struggled with those approaches which have leanings to (neo)-marxisms. These suggest especially two points: that capitalism could not be reconciled simultaneously with environmental and social justice; and they stressed that ecological modernisation cannot optimise capitalism at a scale large enough in order to cancel out the catastrophic effects of capitalist dynamics (Christoff 1996; Pepper 1998; Pellow, Schnaiberg, and Weinberg 2000; Blühdorn and Welsh 2007). Beyond statist approaches, except of Bookchin's (1993) work, not much academic anarchist thought has informed environmental sociologies (although anarchist direct action like other environmental social movement activities have repeatedly been studied). For a more detailed account of these debates, see e. g. Lippert (2010a) (as a critic of EMT) or Mol (2010) (as a proponent).

> crystallises in a constant ecological restructuring of modernity. Ecological restructuring refers to the ecology-inspired and environment-induced processes of transformation and reform in the central institutions of modern society. (2010, 23)

They treat as evidence for such changes e. g. the widespread emergence of environmental management systems in companies (ibid., 24). Such systems play a key role in this book – and I will get to them in a moment. Before, note a last general point on EMT, valid also for these corporate systems.

(4) Ecological modernisation is very much about *knowledge*. Jänicke (2008, 558) defines modernisation in economic terms as 'the systematic, knowledge-based improvement of production processes and products'. This entails also a risk: if ecological modernisation is about knowing and changing accordingly, it is also possible that actors decide *not* to learn, i. e. to ignore (ibid., 562). To ecologically modernise an institution, following various EMT accounts, 'the environment is reduced to a series of concerns about resource inputs, waste and pollutant emissions' (Christoff 1996, 485). Knowing environments in these ways is a prerequisite to optimise processes.

Studies of *how* exactly *environments are known* by those people who are to put ecological modernisation into practice, however, are missing. We may use EMT to show how social sciences allowed themselves to talk about evident changes in how seemingly modern institutions related to environments: they used data representing environments and corresponding data-generative mechanisms (like environmental management systems) to speak for these environments – which constitutes a realist take. With this take, social sciences also limit themselves.

This book seeks to employ an alternative epistemological take on environmental data and representation devices to engage with ecological modernisation's knowledges (and carbon is an example). Vis-à-vis EMT, this book questions their findings of decoupling and the centripetal movement of ecology into institutional design and suggests as an alternative a material-semiotic take (introduced below). The next step is to look more closely at corporate environmental protection, business's ecological modernisation take which is mostly called (corporate) *environmental management*.[5]

Even critics like Levy (1997, 131) recognise that environmental management 'is much more than ideological greenwashing that masks production and pollution as usual'. He finds that corporations can and do employ approaches like total quality management which allow them to 'profit from cutting resource use or disposal costs' (ibid., 132). Beyond profit, Hoffman and Bazerman (2005) argue, the for-profit sector has to act because companies have the knowledge about their internal processes and the environmental impacts they produce – and they have the power to change them. In this logics, where governments do not have the capacity to steer firms, firms have to steer themselves.

[5]The notion environmental management is widely used, beyond corporations. While this book emerged in reaction to my dissatisfaction with the unreflective and unreflexive stances taught in an environmental management degree programme (resulting in a research call to study environmental management in practices (Lippert 2010b)), here I focus on corporate environmental management.

Environmental management systems constitute the reaction to governments asking companies to ecologically modernise themselves (or were it companies which originally pressured governments to stop interfering in firms internal processes?). An EMS is supposed to satisfy both: interests in profit and in documenting vis-à-vis regulators that the company is 'indeed' ecologically modernising itself. It, thus, combines issues of capitalism, ecology and accountability which makes it an archetypical instrument of ecological modernisation (Buttel 2000, 58). How an EMS works in practice is a different question, of course.

In theory, an EMS is a standardised procedural package which an organisation may, voluntarily, adopt. It is advertised to managers as containing 'tried and tested principles' of corporate greening, reports Fineman (2001, 21); he finds it presented as 'forward looking, a "challenge", "strategic" ', rendering greening refulgent. If we open the box of promises we find more specific ideas of how it supposedly works. In Chapter 3 I show in detail how GFQ related to the idea of an EMS. For now, it suffices to point to a fundamental design characteristic shared by various prescriptions of how an EMS is to be implemented. This design characteristics is a circular structure representing an imagined causal and temporal *loop*.[6] In an EMS's loop, you would commonly find this order of elements: setting an environmental policy, planning how to implement it (devise measures), implementing measures, reviewing the outcome (US Environmental Protection Agency 2012). This order is standardised, for example, in a norm set by the International Standardisation Organisation (ISO) (14.000 series).[7] Relevant is that this cycle of steps is repeatedly gone through. That is, once the organisation has reviewed the outcome, it would revisit and potentially update its policy, set new commitments and the cycle starts anew. This promises 'continuous improvement' (ibid.).

Now, those environmentalists who would try to involve themselves in a corporation's environmental conduct would usually either attend to the corporation's environmental policy (in Chapter 4 I present an analysis of the reality of such attention) or they would turn to the actual measures taken by the company. For this book employs the climate change and carbon reality, I illustrate measures in terms of saving carbon emissions. The specific techniques to reduce carbon emissions would – in principle – be subject to the economic technique called cost benefit analysis, comparing various options to achieve the target: from (1) in-house changes to heating requirements (e. g. introducing better insulation) or (2) the substitution of carbon emission intensive coal-fired power plant generated energy by less carbon emission intensive and cheap nuclear power based electricity or even carbon neutral (more expensive) hydropower based electricity to (3) buying CERs. Thus, the company would select among various available measures to go greener – the most *cost-efficient*.

[6] Imagining work processes as designable loops is a wide-spread approach in business process modelling. For an illustration, see, e. g. Denning and Medina-Mora (1995); imagining humans as programmable in such ways has been criticised in-depth by Suchman (2007).

[7] In parallel to this norm, many other standards of how an EMS is supposed to work exist. This includes, *inter alia*, the European Union (EU)'s Environmental Management and Audit Scheme (EMAS) as well as several national standards (see e. g. Kollman and Prakash 2002).

So far for the shiny reality of EMS promises. We are approaching, though in small steps, the core concerns of this book. Reviewing the outcome of any measure which actually interferes with the business process requires actual measurements of the effects of the measure on the corporation's environmental performance. For the two latter kinds of measures (2 and 3), such measurements would not be needed for they could be represented easily on paper as indicated in Figure 1.1 (on page 6) (one may simply subtract saved emissions from the sum of emissions). Yet, wait a moment. The row stating 'Total emissions: 50 hypertonnes' has been the base for the calculation; but where did it come from?

This book revolves around a fundamental *presupposition* of ecological modernisation, of any EMS: to manage environmental goods and bads rationally, to ecologically modernise operations, one requires knowledge of the state of environmental impacts. This is a classic recognition which is of concern to environmental managers. An EMS requires what they would call *environmental data*, an ecological information system, to inform management (Richardson 1994; Birke and Schwarz 1994). In a management school approach to environmental management, such as implied by Schaltegger and Synnestvedt (2002), environmental data constitutes environmental performance data; and environmental performance may well be related (some hope, others fear; some agree, others disagree) to economic performance. To 'gather' such 'data' an organisation would employ some form of environmental accounting. More on this later.

We now turn to problems corporate greening scholars have noted. In a discussion with the field of industrial ecology (a compatible ecological modernist approach), Hoffman (2003) notes that in corporate environmental and resource management only natural and material flows are recognised. He criticises that values and social factors, more generally, are omitted. Even though he mentions that issues like 'waste' are both, social *and* technical, fundamental to his conception of corporate environmental reality is its existence in two separate systems, the social *and* the technical, *normally* clearly distinct. In this understanding, entities like any material or energy are non-social, non-cultural. Waste is the exception to the rule. The social, cultural, in his account, consists of values, beliefs, etc. They are *aspects*.

> Without an appreciation of these aspects, industrial ecology perpetuates an engineering mind-set that relies on input-output data without appreciating the social and political aspects of both how those data are developed and, more important, how they are interpreted and acted upon. (ibid., 82)

His take exemplifies the ecological modernist realism and ontology. Reality consists of the natural and the social. They are clearly distinct. Well, they are not. The social gets constantly back into the materials under management. This is what EMS scholars discuss when attending to so-called cultural and national variation in how environmental management systems are implemented and how they work. Baumast (2003), e. g., finds that environmental management is subject to cultural influences or Branzei, Vertinsky, Takahashi, and Zhang (2001) identify culture as a contextual

factor, which shapes values, serves as a 'context' guiding action and endorses ideologies. Though some of this literature recognises that environmental culture transcend national boundaries, it is always located external – off materials under management and, ideally, off the manager. Culture as an impact – it interferes.

Consequently, most sociologists will not be surprised, empirical studies find that neither environmental management nor restructuring business processes mirror the celebrated circles – and that they cannot. A study by Birke and Schwarz (1997), for example, reports that while an EMS can be easily sketched on paper, its implementation is a different matter altogether: environmental management is not determined by economic, technical or organisational prescriptions; much rather, environmental management is always confronted with multiple decision and development alternatives which are contested and contingent, 'conflict-laden, containing politics and, therefore, open-ended' (ibid., 195). Similar, Howard-Grenville (2006, 48) reports that corporate reactions to environmental issues depend on internal cultural interpretations, finding 'that multiple interpretations of a given issue can coexist in a given organisation'. As significant as these reports on multiple perspectives are, we need to go further. In relation to these stances, this book argues that it is a limiting approach to understand environmental management only in terms of *interpreting* reality. Yet, before we move on to extend this discussion of and beyond interpretation, we have to engage with those who position themselves *against* interpretation. In the received view, it is rare that divergent interpretations are accepted – let alone made recognisable. It is hoped, as the story goes, at least if we have all the facts on the table, then we can *add* our cultural beliefs, value-systems or ideologies; i. e. *subsequent* to fact-finding we can contest the meanings of data and the meanings of different measures.

That is, many do not like this unfortunate narrative of a reality which is interpreted – even if they recognise that, if it gets down to discussing what to do about certain information, they have to negotiate. They would stress again and again that an EMS is a *standardised* instrument, a meta-instrument; that is, they would stress that as part of an EMS one has to ensure that all the legal requirements, standards and other prescriptions are properly reacted and adapted to. After all, it is one of the 'basic elements of an EMS' that it ensures 'compl[iance] with legal requirements' (US Environmental Protection Agency 2012). And these standards put companies under pressure. Hoffman and Bazerman (2005) argue exactly this and suggest that standards allow governmental agencies to exercise oversight over companies. Governmental standards 'dictate', in their view, which corporate materials and wastes a firm has to control, how and how much. This take does not fit well with the interpretative findings noted above. Either corporate environmental management is determined by standards or its managers have same leeway in interpreting and acting on the world.

Now, neither business nor governments would want firms to appear as interpreting standards. Ecological modernisation provides a solution to this puzzle: allowing organisations to govern themselves. This is exactly what an EMS is about. With

an EMS, an organisation can set itself certain policies being '[i]n principle [...] free to choose its own procedure in order to achieve the given ends: a way of governing through self-government' (Asdal 2011, 4).[8] In a regime that allows for environmental management systems adopting an EMS is a *voluntary* act; although an organisation may experience economic effects if they do not adopt (such as more frequent governmental inspections, higher insurance premiums). The voluntary characteristic of environmental standards can be understood as laid out in ecological modernisation's emphasis on corporations to take voluntary preventive action. In this discourse it is often voiced that an organisation can gain favourite public attention by aligning itself voluntarily to a standard (assumably resulting in higher standard practices than without claiming to adopt the standard) (Lippert 2010c). Power (1996, 301-302) proposes to read such standards as splitting form and substance. In an EMS the substance (i. e. specific environmental conduct, impacts or material and waste flows) are not anymore directly governed; rather, through the EMS's form the organisation's approach to govern the substance is circumscribed. Drawing on Shayler, Welford, and Shayler (1994), he points to the 'unintended consequence of this division of labour [which] is that environmental performance has come to be closely identified with having an (auditable) system' (Power 1996, 302). In this rationality it follows that environmental performance does not need to be inspected on the ground but it suffices to check whether an EMS's policy is compliant with external regulations and whether some evidence can be found that the EMS is properly put into practice. This, of course, involves a further dimension of politics and interpretation: who would be allowed to audit environmental management systems, scientists or accountants; which and whose expertise would be recognised as apt to lend legitimacy to a firm's EMS (Power 1997)?

Of course lots of critique on corporate greening exists. Rikhardson and Welford (1997, 62), for example, call out: '[s]ooner or later the eco-modernist approach will be exposed as the "greenwash" what it is.' A new institutionalist take sees environmental management systems as a *rational myth* (Meyer and Rowan 1991), indicating that we can only expect myths and ceremonies from companies, mere green talk, rather than seeking real change (Boiral 2007). In this account, corporate greening statements are only loosely coupled with real activities. Even while, e. g., certified ISO 14.001 environmental management systems may 'project an image of rigour, objectivity, precision, and control borrowed from the exact sciences' (ibid., 130) it is clear that the work reality in a corporation may develop on a different trajectory than those of an *idealised* science. In Boiral's study, labels signifying that an EMS was run according to international standards like ISO 14.001 were seen, 'both within and outside organisations, as a formal acknowledgment of good practices' (ibid., 137). He found that business process were already imagined as good (enough); so they were not changed very much under the assumably strict and 'consistent control' (US Environmental Protection Agency 2012) of

[8] Social scientists may see the resonance of this statement with Foucault's (1991) notion of governmentality; a neoliberal version of governing subjects' and organsiations' conduct (Gordon 1991; Lemke 2001). This theme, however, is one which this book does not cover.

an EMS. My study was aware of such critiques; however, rather than engaging in such a, seemingly, evaluative discussion, I studied the nitty-gritty of day-to-day knowledge practices among EMS agents.

This interest in the day-to-day knowledge practices, in how these agents managed to sustain an EMS, was supported by the methodological considerations reported in some of the studies mentioned above. Burschel (1997, 309-310) concludes that structural takes to study workers were not sufficient to understand them. They call for methodologies which are apt to study agents' social processes.[9] Hoffman (2001) recognises the limits of survey-based research.[10] A large scale study, conducted by Gunningham, Kagan, and Thornton (2003), uses a mixed-method approach, involving qualitative interviews. Boiral's (2002) ethnography raises the question of how the requirements on knowledge for managing environments should be conceptualised. He points to tacit knowledge which would not easily fit organisations' preference for clearly definable information. Howard-Grenville (2006), based on an ethnography, identifies different subcultures within an organisation which configures the social reality in which environmental issues are interpreted. And Hargreaves (2008) shifts the methodological apparatus towards practice theory, which I discuss below, employing ethnographic sensibilities to recognise not only symbolic meanings but also procedures, skills, materials and technologies relevant in co-constituting agents' environmental practices. The approach labelled practice theory has also now been recognised in the centre of EMT. Spaargaren (2011) proposes to employ practice theory to study consumption practices. According to him this allows to conceptualise and investigate how ecologically modernised practices are. He identifies them as ecologically modernised if they incorporate

> objects, meanings – e. g. the 'ways of doing and saying' – which are important for monitoring, assessing, valuing, and improving the practice with respect to its environmental or climate performance (ibid., 816).

In that respect he clearly opens studies of ecological modernisation to practices and the objects which are part of them. However, the same concern which I noted above still holds: environmental performance and data is conceptionalised in a realist way – as if that data was waiting for the ecological modernist to gather it.

This review of ecological modernisation and corporate greening suggests that the concepts employed by these discourses (such as EMS, control, standards, implementation and, above all, knowledge, data and information) should be the object of analysis, rather than analytical categories, taken-for-granted and employed. In other words, this book claims that ecological modernisation should not be used analytically to understand corporate response to environmental and sustainable development crises or to climate

[9] While Asplen (2008) misses to observe managers, I read her, too, as calling for studies of practices.

[10] While Hoffman (2001) imagines ethnographic in-depth studies which would help to fill his variables with meanings, my study accepted the possibility that, indeed, the concepts through which corporate environmental management was thought, i. e. his variables, might have to be reconsidered.

change. Rather, ecological modernisation is a discourse which needs to be studied in ethnographic detail. This book does so.

Carbon In the following I link carbon economics to corporate carbon accounting and to a first conceptualisation of what carbon might be.

In environmental and ecological economics a fundamental idea is that market pressure selects *in* those firms which can perform better, economically and ecologically (especially if both dimensions causally relate). In other words, those companies which are neither green nor profitable would cease existing; and economists see this as better for society than sustaining an economically unsustainable corporation.

Now, unfortunately, market pressure does not always act fast enough. Polluting companies are still on the market, even the relatively more ecologically destructive ones in a given sector (this is not to claim that some firms have not been selected out). In economics, the failure of markets to allocate environmental goods and services (as economics would see it) is lamented. Unfortunately, the market did not perform well enough. Fortunately, repair is possible: committed consumers and investors can switch their consumption and investment choices to favour those products and producers which perform greener, or in any other way more ethically to their like. The corresponding discourse refers to these choices as Socially Responsible Investment (SRI). This book addresses SRI and its prospects to alleviate market failure especially in Chapter 4.

Another take to repair the market is the governmental construction of new markets. Carbon markets are an example for this (Callon 2009). And, as alluded to above, carbon markets do not work perfectly. Relating to carbon markets in this book is not so much necessarily meaningful in itself. However, engaging with how scholarly debate attends to the commodification and trading of environmental entities is useful to learn from – to inform future debates on the next version of environmental good or service.

In 2012, Mol publishes a new take on carbon markets, aiming to go beyond EMT. His account is illustrative for a more widespread lack of attention in seemingly critical takes on carbon economics. He engages with all kinds of what I see as negative carbon entities, 'carbon credits and reductions', and finds them to be 'increasingly abstracted and detached from on-the-ground time-place settings' (ibid., 17). And, of course, he is very right about this. He relates this abstracted and detached character to the deplored reality

> that the abstract carbon markets increasingly become subject to and partly dominated by instruments, practices and products of creative investors, banks, traders, brokers, and speculators who see these GHG emission rights and offsets just as financial products, as a means of profit making. (ibid., 18)

Similar to World Bank (2011), he finds that threats to the 'proper' functioning of markets exist. For example, he recognises that carbon markets may be subject to accounting scandals (Mol 2012, 20). However, even against this background he manages to sustain the optimism cultivated and exercised in EMT. He hopes that introducing

distinguishing indicators in the market, as (if) classifying some carbon products as 'gold standard' – i. e. high quality, particularly green carbon products – will help to manage carbon economy; for him the aim is 'to ensure that climate change mitigation rationalities remain the dominant logic in these new institutions' (ibid., 23). And he is not alone with such a hope. MacKenzie (2007) also sees a market (segment) emerging in which market participants are willing to pay higher prices for particularly green project credits. They reference their hopes to institutions like the 'Gold Standard', an organisation providing a voluntary standard for projects generating negative carbon emissions, i. e. voluntary carbon offsetting projects. GFQ, was only to buy carbon credits which were certified through the Gold Standard to ensure participating only in this very green carbon market segment. This book relates to these promises in Chapter 6.

In economic terms, these negative emissions, whatever their quality is, constitute *supply*. CERs and VERs are offered to customers, say a company, to offset emissions. Social sciences, hitherto, have underexplored these emissions. Economically, they are a significant factor in determining *demand*. A company will only buy so much negative carbon as they can actually add to their balance sheet to become carbon neutral.

Whereas EMT scholars, like Mol (2012), and poststructuralist critics of carbon markets, e. g. Descheneau (2012), miss to ask where emissions come from, businesses recognise that they have to take a stance on this issue, that is, on the ground of their emission offsetting activities. For example, The Climate Group (2008, 2), a finance industry sector group states as one of the principles to which signatories have to commit:

> We have measured a significant proportion of our operational GHG emissions using an internationally recognised or equivalent domestic standard and we disclose this information. (Principle 1.3)

Carbon accounting is consequential. Measuring emissions determines how much emissions an organisation 'actually' had. However, finding The Climate Group relating to this issue, indicates that these measurements are not self-evident. As this quote shows, obviously, different standards to measure how much emissions their business operations caused exist. MacKenzie (2007) relates to this problem:

> Measurement and independent verification, the foundations of any emission market, are getting better. There were a lot of difficulties in the first year of the [EU Emission Trading System (EU ETS)], simply as a result of companies' unfamiliarity with what they had to do, but I'm told that the 2006 measurements, currently being collected and aggregated, are better in that respect.

He also finds 'there is some room for "gaming" ', for example by deliberately underestimating emissions or using specific standards. He is optimistic though. 'Overall, though, such problems appear tractable.' However, he also recognises that how accounting works in practice is an empirical question. Correspondingly we find him calling for ethnographic studies of accounting (MacKenzie 2009b, 130) and Lohmann (2009b, 529)

wants us to engage with the limits built into carbon accounting. Indeed, we need radical research on environmental accounting, say Gray and Laughlin (2012).

Here we go. To start with, let me offer an indicative definition – one of the few ones in this book – on accounting. A shiny book for corporate environmental managers by Ditz, Ranganathan, and Banks (1995, 4) defines accounting as

> the systematic collection, organisation, and communication of information on an organisation's activities.

This gives us some orientation in what we are looking for: agents who do something; agents who (1) collect, (2) organise and (3) communicate – in our case – (4) carbon information. This book attends to the practical reality of all these four points. Above, in Figure 1.1 (on page 6), I sketched a segment of a means of accountants to communicate, a lower part of an environmental balance sheet☞, i. e. the sum of emissions produced in an organisation and the carbon offsets.[11] In this book we engage with the upper part of such a balance sheet and, thus, answer these question: where do emissions come from; how do they get from there to here; and what happens on this way?

MacKenzie (2009a, 447) declares that accounting is key to make any economic item, like carbon emissions, visible. If accounting is so fundamental we can expect environmental management scholars to comment on how accounting takes place. Indeed we can find their accounts on this. Hoffman (2010), for example, engages within the same article with the problem that metrics to measure performances are problematic (ibid., 298) and postulates on the succeeding page that a company should quantify or measure (he uses these terms synonymously) GHG emissions in order to understand what climate change means for the corporation. Engaging with this – often cited – scholar of environmental management reveals a differentiated understanding of environmental accounting. In 2005 he affirms the point that a company has to establish its GHG balance. But, he points out, it can influence how it measures its emissions; 'multiple methods' are possible. For example, emissions can be measured directly (laboratory based) or estimated (using fuel or material based calculations); but the latter is complicated by a variety of available methodologies (2007, 10). We may read him as indicative of a recognition among environmental management scholars that accounting for environmental management is not a simplistic issue.[12]

Burritt, Schaltegger, and Zvezdov (2011) published results of a study which attracted my attention for two reasons: I know one of the authors and am familiar with their research methods and the study sought to scrutinise how carbon accounting works in corporations' practice. Going beyond old-school survey research, they employed semistructured interviews carried out face-to-face or by telephone with environmental

[11] I use glossaries to briefly describe the meanings of acronyms as well as members' terms. Key concepts are introduced with this sign: ☞. See the appendix for brief explanations of such terms.

[12] Correspondingly, a wide variety of literature on the topic exists. Schaltegger, Gibassier, and Zvezdov (2011) and Stechemesser and Guenther (2012) provide a bibliometric literature review on environmental management accounting as seen from within their disciplinary affiliation in the management realm.

accountants and users of carbon information in several of the largest German companies.[13] This approach is of interest to this book because my study was based on a similar high-profile multinational as they have studied and we were interested in similar agents: those corporate environmental managers and accountants who were processing carbon data. Five notions reoccurring in their study are noteworthy.

Control First, they imagine that carbon accounting is well under *control*. According to them, designs of accounting systems are determined by 'managers seeking information for their decisions' (ibid., 83; referring to Burritt, Hahn, and Schaltegger 2002). This implies the design of the system is actually expected to be helpful to guide managers' decisions. In addition we may interpret them as implying that the accounting system could be shaped and controlled by all those legitimate users who want actually information.

Physical information as available Second, they claim that '*physical information is* more often than not *available* and kept for bookkeeping purposes and is thus available *even if no* environmental or carbon management *department is* officially *responsible* for the management of such information' (ibid., 86, added emphasises). Thus, their report claims that information about material operations of companies is normally existing, waiting for users to be taken into account.

Physical information as necessary Third, they argue that precisely such information *inevitably has to be collected* 'so that the economic linkages and effects are made explicit and thus manageable' (ibid., 87). This normative statement implies that management is not possible without knowing what it seeks to manage, i. e. without knowing carbon emissions.

Data collection Fourth, throughout the paper they employ a vocabulary suggesting that *data* or information (two concepts used synonymously by them) can be *collected* or gathered. I read this vocabulary as indicative of a simple realist ontology, consistent with EMT.

Data generation Finally, however, at two points of their article, they write that data is *generated* (ibid., 84) and *produced* (ibid., 91), respectively. The language of generating and producing data points to a constructivist understanding of data; data is not out there waiting for users but it requires some form of agent who does something which results in data.

While the first four points seem theoretically consistent, the last stands apart. A question poses, seemingly, itself: is data 'out there', waiting for its users, or has it somehow to be achieved? Where do carbon emissions come from?

Till now I used the notions CO_2, carbon, carbon emissions and greenhouse gases synonymously. And I will continue to do so. For a reason. In the fieldwork I undertook on carbon accounting, these notions were also used simultaneously. Who am I to imprint their world with another, a seemingly better or more legitimate way of

[13] I admit, I feel challenged to engage more with their study; but this has to be postponed.

drawing distinctions between these notions? If carbon accountants use these concepts interchangeably, we should take their day-to-day language use seriously and study what kind of entity these notions refer to.

If explicitly discussed, however, they would point to *the* formally correct statement. In their discourse, a 'correct' expression exists; when asked about these notions, carbon accountants would say they signify this expression when using any of the former notions: it is *equivalent carbon dioxide emissions*, abbreviated as CO_2e. The notion of equivalence points to several gases or groups of gases which are *legally recognised* in the Kyoto Protocol as contributing to globally warming the greenhouse (the earth's sphere); they are collectively addressed as greenhouse gases. *How* equivalent these gases are is defined by referring to the different gases' global warming potentials (GWP). These potentials are subject to change, depending on shifting scientific consensuses and on so-called politicians or other agents to refer to scientists' updated versions of GWP tables (Lippert 2012b). Thus, through the construction of GWP, different gases are made commensurable, which MacKenzie (2009a) describes as *making things the same*.

To state this clearly, this book's concept of carbon is *not* fixed. Rather than imprinting carbon accountants' work reality with a somehow politically-scientifically defined prescription of how carbon ought to be voiced, this book is about *how carbon is being voiced by carbon accountants*. Thus, I am not so much here interested in a chemical, physical or climatological discussion of carbon – or attending to the carbon molecule's exciting extraterrestrial occurrences, engaging with diamonds, etc. This book is about the social form of carbon, the material way of how it is 'collected'. The carbon accountants I studied did not use laboratories to discover their corporation's carbon emissions.[14] Rather, these workers used spreadsheets, calculators, databases, team-meetings to establish carbon emissions. For all practical purposes, for a company's environmental accountants carbon emissions are data, rather than some kind of molecule. MacKenzie (2007) establishes a first glance at this reality.

> In sulphur trading in the US, each smokestack is fitted with automatic measurement devices. European carbon dioxide emissions are measured less directly, using the method known as 'mass balance', in which gas-meter readings or invoiced quantities of coal or oil, for example, are multiplied by appropriate emission and oxidation factors.

I concur. But how do mathematical operations on 'gas-meter readings or invoiced quantities' turn into carbon emissions? Where is carbon? Rather than searching for molecules because natural scientists tell us that greenhouse gases are first of all natural entities, this book is based on searching for the ways through which carbon was made present and the materialisations of carbon in an actual company. Following Wynne (2010), scientists do not hold the singular authority to represent carbon facts but I

[14] And if they had utilised laboratories, surely, this would have turned into a wonderful story of carbon *laboratory life* (Latour and Woolgar 1986).

accept any spokesperson or entity *in the field* which claims to represent carbon facts and engage with these representations.

This book, thus, sets out from the conviction that at the intersections between sustainable development, climate change debates, EMT, corporate environmental management studies and carbon accounting we find an exciting practice of knowledge-making and materialisation: agents doing carbon.

STS scholar Blok (2010) provides us with an indication of what such a study might entail in terms of carbon: he finds that carbon does not fit a simple and singular topology. Earth's 'global' emissions are not out there in the atmosphere but on computer screens, at conferences, in articles. Accounting scholar Gray (2010) underlines that restricting environmental accountants to provide a singular account of how sustainable their company is will not represent well what is going on within the company. Consequentially, he wants us to accept multiple accounts of how sustainable a company may, or may not, be.

A clarification: studying how carbon accountants do carbon promises *empirical* contributions relevant to understand how agents of ecological modernisation actually go about their work and to understand the ontology of their products, emissions. If indeed making capitalist carbon green is 'experimental', as MacKenzie (2009a, 453) would have it, these 'experiments need "witnesses" [Shapin and Schaffer 1989], and those witnesses must be multiple: lay as well as professional, from many countries, and if they are academics from many disciplines'.

1.2 Accessing Carbon

Between late 2008 and mid 2010 I conducted ethnographic fieldwork in the multinational company GFQ. This name is a pseudonym.[15] GFQ, at that time, has been among the world's top 50 companies; it has been positioned there for several years, sometimes among the top 25 – listed in the magazine *Fortune*. Hence the expression, Fortune 50. GFQ is a global financial services provider – banking, insurance and other capital techniques. Contractually, the company was engaged with tens of thousands of customers and a workforce of over 10,000. The multinational could be found in over 50 countries; this book links to accounts from, *inter alia*, Australia, Columbia, Germany, India, Malaysia, Russia, and the United States of America (US). This corporate group performed well – economically. During one of my fieldwork years their accumulated profits summed up to over 7,000 millions United States Dollars (USD) and their assets exceeded 1,000,000 millions USD. These numbers have been rendered anonymous sufficiently.[16]

[15]Following Suchman and Bishop's (2000) approach, this pseudonym serves less to obfuscate the corporation than to mark the possibility that the study has not produced results that are idiosyncratic to GFQ but, rather, are emblematic of a more general direction in relations between capitalist accounting practices and doing nature.

[16]Find details on the material and data rendered anonymous in Appendix A.2 (on page 555).

Climate change and the finance industry In discussions of climate change, often biggest polluters are named (and shamed). Some discuss them in terms of nation-states (then they name the EU or US, e. g. Bachram 2004) others in terms of industries (then, one would point to oil and coal, e. g. Perrow 2010). The financial services sector is seldom named. If it is named, it is often addressed as an enabling industry; it is seen as enabling through its power to steer investments – investments into a low carbon trajectory, into sustainable development – or as enabling through its financial compensations for damages caused by climate change (e. g. Mills 2005; Kahlenborn, Dierks, Wendler, and Keitel 2010). However, the finance sector in general is also seen as especially at risk through climate change because its profits have to be reinvested in specific objects – investment, rather than keeping money for oneself, is the classical marker of capitalism (Marx 1887, Ch. 4); and these globally spread objects which attracted banks' and insurers' investments are at risk of climate change. Thus, financial investments at a global scale, draw climate change damages to the financial industry. Insurance is additionally burdened by climate change and other dynamics with damaging effects because they have to compensate the insured. Consequently, the financial services sector is financially interested in damage-adverse behaviour by insured parties or investment objects. Insurance logic dictates that customers should be pressured to invest into damage-adverse actions; and finance industry can threaten potential investment objects with switching their investment to less risked objects. For these pressures and threats to work, the financial services sector, especially insurance, is, arguably, interested in indicating to insured and investment objects that they themselves *take* environmental catastrophes and *climate change serious*. We could also consider less direct approaches – such as finding that financial services providers publicly signal pressure towards governments that they want strict climate change mitigation policies. Whatever the precise configuration of reasons for finance industry to fight climate change is, we find, as indicated with the above reference to The Climate Group (2008): initiatives in this sector express their concern for climate change and announce action.[17]

The finance sector, thus, has to go green. To go green, as the discussion on ecological modernisation showed, in managers' rationality they need to know their business's pollution. Now, engaging with complete life cycle assessments (LCA) of financial products is not an easy task.[18] Facing this task, another polluting source is easier trackable: the emissions caused by burning fossil fuels and all the indirect emissions linked to the products and services they buy to be able to operate their *offices and server farms*. Thus the finance sector can also reduce its carbon footprint in an easy way.

[17] For a well-accessible summary of the risks of climate change for the finance industry and some of their reactions, see e. g. Richardson (2009, 612-619).

[18] An LCA is a technique claimed to establish the environmental and resource implications 'attributable' to a product over its total life (Rebitzer, Ekvall, Frischknecht, Hunkeler, Norris, Rydberg, Schmidt, Suh, Weidema, and Pennington 2004). Usually imagined as a scientific, and therefore, objective approach, Molloy (2000) shows how, of course, the grand aim of objectivity cannot be realised and reconstructs 'LCA as politics by other means' (ibid., 2). This book does only at the margins address financial products and, thus, product ecology, explicitly (but, see Chapter 3 and Chapter 4).

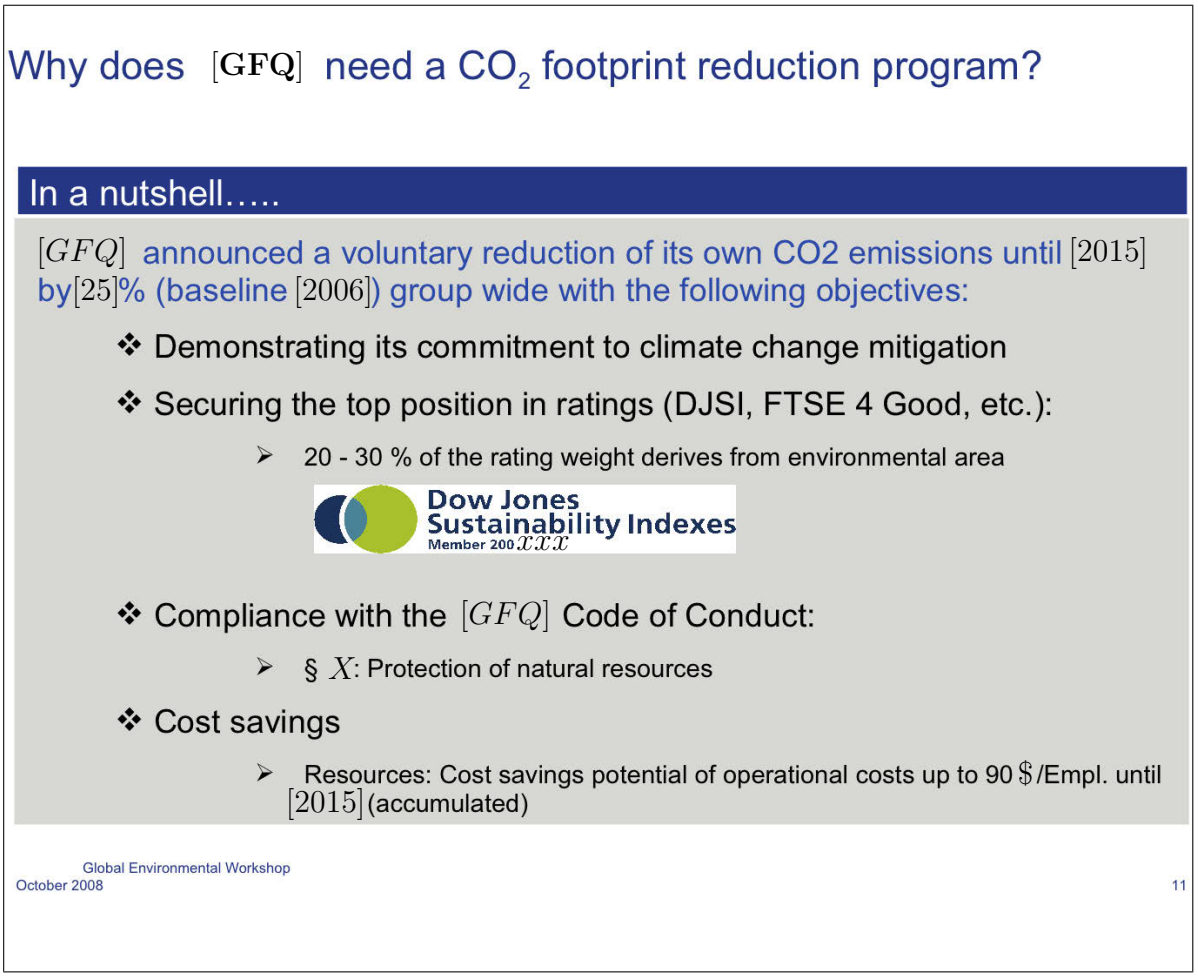
GFQ's take on carbon GFQ was approaching greening precisely in this way: running an EMS to establish their carbon footprint and devise actions to reduce it. And when asking GFQ *where* its EMS was, 'the company' would direct one to a specific office in the HQ, to the office which we encountered already at the opening of the Introduction. (Of course, if you were a mere citizen asking about GFQ's concern for 'the environment' you would, more likely, have ended up in the Public Relations (PR) Unit.) My narrative, sets out from that location to which I was immediately led when visiting GFQ the first time.

This office was neighboured by further offices. People in these offices were working on a huge variety of issues. Luckily, they had at hand resources, symbolic (a common designation on GFQ's chart of the division of labour), bodily (a common boss) and spatial (a meeting room), to imagine themselves as working together. Broadly speaking, their activities were concerned with what is usually called sustainable development, Corporate Social Responsibility (CSR) or corporate citizenship. We are in the unit of GFQ which was responsible to develop and operationalise new ways and products of how GFQ could 'be' a responsible actor in society while being a profitable actor in economy. Coordinating GFQ's carbon and environmental performance was part of this field. These people were to help GFQ to turn towards the grand aim of sustainable development. In the corporation's view, this included that GFQ had to engage with their carbon emissions (Lippert 2012a).

For my fieldwork I had to be *equipped* with the corporation's reasoning why they needed to worry about carbon at all. For this book, this reasoning provides a clear entry point to GFQ's carbon emissions. It has been materialised in several ways, on paper and digitally. I share this equipment – the materialised reasoning – with you. Right on my first day in the field (that is after access had been negotiated) I have been given a copy of a presentation which people of this unit had prepared for a meeting of their board of directors. The presentation was entitled 'CO_2 Reduction Concept for [GFQ]'. Some days later, I came across another presentation, called 'EMS for GFQ' (*EMS4GFQ*). Both included the same slide, 'Why does [GFQ] need a CO_2 footprint reduction program?' Well, they have not been exact copies. In the version for the board of directors the subheading is simply 'Rationale'. The other version is reproduced here (and rendered anonymous) as Artefact 1.1 on the next page.

I use this slide to make eight introductory points about GFQ's relation to carbon and, simultaneously, formulate how this book attempts to engage with these specific elements of their relation. Together, these eight points provide us with an outline of the shared *formal* reality of GFQ's carbon policy. That is, this reality had been shared between the authors of this slide (people in the Sustainable Development Unit), the board of directors and the audience of *EMS4GFQ*, – the environmental managers working in GFQ's subsidiaries all over the world. To make this interpretation traceable, I follow the textual inscriptions on the slide – mostly at least.

First, the heading's symbol 'CO_2' signifies carbon as greenhouse gases in relation to



Artefact 1.1: In a Nutshell: Making the Case for Carbon Foot-printing

climate change as a 'challenge' (as they would have it) of sustainable development. In GFQ's reality, CO_2 is a shorthand for this complex. Carbon and carbon dioxide need to be addressed by much more than what natural sciences can offer. This book argues that carbon is to be understood as a social and organisational achievement; it could, therefore, be otherwise; carbon is politics.

Second, the notion of carbon footprint indicates the discursive continuity between ecological modernisation and GFQ's take on carbon. Chapter 3 serves to establish this continuity in detail. Footprint refers to the idea that any activity requires resources and produces wastes. They are the trace of that activity on something. That something is, usually, imagined as Earth, Nature.[19]

Third, the subheading ('rationale'/'in a nutshell') announces the subsequent presentation as informing the audience efficiently (that is most effective given the limited amount of space on that slide) about what constitutes the need for GFQ to have a carbon emission 'reduction program'.

[19]The concept of footprint is closely related to the concept carrying capacity. To morally or politically judge ones footprint against another's footprint, a common metric has to be available. Earth's carrying capacity is imagined as apt to be employed for such a commensuration. A much cited entry point for this approach is an article by Rees (1992).

Fourth, we are provided with a single sentence which establishes the answer to the question (of the heading); we learn how GFQ links to carbon. This link is specified in several dimensions. The link exists because of a *past activity* of the company. It issued a statement. To whom we are not told on this slide. The slide can be read as implying that having made a statement requires GFQ to act accordingly. In fact, one of the audiences of that prior statement may very well have been the NGO that I call *Global Greening of Capitalism Association* (GGCA). GGCA and GFQ enjoyed a partnership agreement (see Chapter 4). I argue that the NGO was used as a legitimising agent in several ways. With respect to this slide, GGCA can be assumed to have made very explicit vis-à-vis GFQ that they *expected* the corporation to stick to their statement. The imagined presence of audiences legitimises the postulation that the corporation should adhere to its prior statements. So far for the reality of an announcement: it matters. How did it matter?

This statement was of a reflexive nature: it referred to itself as *voluntary*. The slide stresses with this notion that its link to carbon emissions is contingent on GFQ wanting to exercise this link. A technical reading would suggest that the heading's 'need [...] reduction' contradicts this statement's 'voluntary reduction'. But this book is not about evaluating the technical coherency of GFQ's documents or GFQ's worker's statements. Much rather, I propose to use the *friction* between both concepts as a generative force. Friction is a term used by Tsing (2005) to point to characteristics within capitalism in which the presence of conflicts allow capital to work – while at the same time hope for alternative realities remain. For friction implies movement and how things move cannot be exactly controlled. I argue that this friction between 'must' *versus* 'may reduce' is constitutive for the emissions which GFQ, eventually, emitted.

It is also made clear that the responsibility which has been announced was *bounded*. GFQ only committed to reduce 'its own', rather than anybody else's, emissions. This statement signals a *limit in ownership*. The slide's authors construe themselves as reasonably concerned. For many it might seem self-evident that GFQ would only take care of its own emissions. However, critics might postulate that GFQ – one of the largest corporations on earth – takes a bit more of responsibility on board: e. g., partial responsibility for clients' emissions that GFQ's financial services enabled. To rule this out, the limitation needed to be enunciated. Only GFQ's 'own' emissions are of relevancy for us. Chapter 3 shows precisely how these limits have been drawn. I show that the 'own' of GFQ's emissions were not self-evident.

We are then presented with a set of three numbers. And these concern us throughout the book. For they were significant calculatory reference points for carbon accountants. They also provide limits to the carbon reduction statement. Now the reduction aim is *limited* through two markings on a one-dimensional line of *time* and the aim is as well limited in *how much* they wanted to reduce. I changed the values of these identifiers in this book to ensure anonymity. Yet, in orders of magnitude these are correct numbers for the period of my field work. Nevertheless, these numbers have also been unstable over

time. Most noteworthy is that for half a year or so, GFQ had publicly committed to be carbon neutral. This marks an absence which is a significant part of this *present*ation. Observing absences and presences, following Mol and Law (1994), provides us with an analytical sensitivity which we may draw on to develop a fuller understanding of the phenomenon. Having provided me with this information, GFQ let *me* know that it did not, anymore, claim carbon neutrality as its aim. In this book we study how flexible these hard-core limits have been in practical work.

Further, the statement specifies the *extent* to which this statement is relevant for the company. It was not merely the HQ that was to reduce emissions but the complete corporate group. This means that emission reduction was to be achieved across the *complete* GFQ imperium, across all its subsidiaries. These subsidiaries were distributed all over the globe and were themselves quite complicated business constructs (some of which contained and owned even further companies; this means that GFQ owned not only companies but also – folded into GFQ – further corporate groups). This book identifies a subsidiary as *GFQ Corporate (Group) Entity* (GCE). And GCEs could be bought and sold. For this complicated and shifting organisational nexus, emissions across the totality of GFQ were difficult to establish. I make explicit the (im)possible qualities of such facts and of practices of knowing such a conglomerate's emissions.

Finally, the statement is specified in four further directions, politically, strategic-economically, legally and micro-economically.

Political demonstration Fifth, GFQ established its carbon reduction targets in relation to audiences vis-à-vis whom they manifest that they are committed to mitigate climate change. The wording is relevant: they did not imagine that climate change could be prevented; rather, they accepted climate change as happening. And the damaging consequences of climate change had to reduced. However, their relation to mitigation was mediated via two modifiers. GFQ had committed to mitigation, rather than started mitigation. They had voiced a pledge that they want to mitigate, but whether they were contributing to mitigation was not an issue. Furthermore, carbon emission reduction was not directly related to this commitment but to perform this commitment, i. e. to *show their dedication* to other parties. Carbon reduction, thus, was about showing audiences something rather than taking action to mitigate climate change.

Strategic economic positioning Sixth, GFQ wanted to position itself favourably in SRI ratings. These inform *investors* about how, *inter alia*, green a company performs. Dow Jones Sustainability Index (DJSI) and FTSE4Good are the labels of such ratings; 'etc' refers to further ratings carried out by e. g. OEKOM or the Carbon Disclosure Project (CDP). To be positioned at the top of such ratings, the authors of this slide implied, GFQ needed to reduce its emissions *or*, at least, have a footprint reduction programme. They specified that GFQ's environmental performance was influencing the positioning in ratings, i. e. that being green was not negligible. To bring the *promise* of such a high rating closer to the audience of the

slide, authors added a visual element, the DJSI logo,[20] which indicated that GFQ had been listed in that rating in the early 2000s (exact years deleted by me). This bullet point of the slide indicates a measurable target for GFQ. The corporation would be listed at a specific position and vis-à-vis this scale the company could measure and indicate its performance, including the performance of any carbon management by GFQ's carbon accountants. As a shareholder company, GFQ was dependent on investments by other parties. Greening economics presupposes that ethical investors actually switch their investments to green companies. In economics, the *function* of such ratings is that they *improve transparency* within markets. Only if investors know how green a company is, they can they channel capital to green targets. This book follows the information flow into the world of ratings and challenges the belief that ratings are able to produce this transparency; I argue that markets are systematically failed through these ratings (Chapter 4).

Legal compliance Seventh, a corporation like GFQ lives off the trust of publics that its operations are coherent, correct and to the norm. GFQ had inscribed into their *Code of Conduct* that the company was to engage in straightforward environmental protection. Governing itself through implementing its own rules is key to sustain public trust. Otherwise publics and governments might (have to) suspect that the company acts unaccountable, irresponsible, out of control; if a company does not even manage to follow its own rules, how could publics trust that the company follows publicly set norms? GFQ translated 'protection of natural resources' into reducing carbon emissions. The central empirical concern of this book is the monitoring of emissions. For anybody, GFQ or publics, to evaluate whether GFQ was complying with its rules knowledge of GFQ's emissions is required. I attempt to deconstruct that such a quality of control is possible.

Tangible micro-economics Eighth, the bottom (line) of the slide is very straight forward: even if all the above mentioned concerns do not work out, the company would still save costs. There is more to this point, however, than making micro-economics explicit. Making these savings this obvious was *safeguarding* the carbon footprint reduction programme. Whereas the other elements of this slide pointed to legitimate translations of environmental concerns into GFQ's rationality, the promise to save a couple of hundred thousands USD would also be appealing to actors not interested in 'the environment', let alone 'sustainable development'. This book positions the work reality of carbon accountants in relation to such actors. The following sentence contains a puzzle: I show how modernising carbon accounting led to move GFQ's carbon reality closer to profits and more distanced from 'the environment' and 'sustainable development' (see Chapter 4). The puzzle is how one can move carbon issues away from the environment. In this book I show how GFQ solved it.

[20] DJSI should be understood as a sign of enormous symbolic capital, i. e. a sign which can be transformed into economic capital if it is known by actors (Bourdieu 1989).

To summarise, I argue we can use GFQ's take on carbon to learn how carbon has become a promissory act, claiming to appease nature's representatives, investors, publics and management while, yet, increasing the distance between capitalism and environments. Fortune carbon fails. But, surely there must be hope!

I attempt to ground any hope in an analysis of actual practices. Any utopian project (whether they are called carbon accounting, corporate environmental management, ecological modernisation, greening capitalism or sustainable development) that fails to be grounded in understanding how current practices work buys into the risk of sustaining unsustainable routines. Therefore, any reasonable utopian project needs to be based in a critique (that does not signify shaming!) of the work practices governing the respective realm. I developed such a critical appreciation of carbon accountants by way of studying how they conducted their work, how they achieved determining GFQ's carbon reality.

Actors, access, materials and first-order data generation Pure luck, or privileged access, I cannot know exactly, provided access to GFQ. After two years of negotiating fieldwork access with various multinationals with limited success I let a contact at the *German National Academic Foundation* know I needed his help. He asked for a short description of the project. I replied with a couple of lines (I wanted to study the working conditions of environmental managers; using participant observation; I announced wanting to identify chances and problematic factors in their work); three days later GFQ's head of sustainable development got in touch with me. Her name was Victoria Miller. Three weeks further on I went to meet her at the HQ. (On some other day I figured out, my contact had sent a message to the very top of GFQ.)

There is only so much I can reveal about accessing the field. Well, probably you can get a high speed train to – imagine – one of the Western European metropolises, then catch the tube, change, another tube, exit, turn right, left, left and then: if you search for a huge building with big labels of the corporation, you will not find it. Rather, look out for a simple, decent, blackish glass front and lots of office workers – the males normally with suit and tie – wandering in and out, waving ID-cards with electronic chips at a post next to a door, which opens and marks the transformation of the human into a worker. Behind the doors I encountered a large reception desk staffed with security and a waiting area. It was the entrance area into a labyrinth of offices located in the midst of a block of flats. GFQ's offices, located in the block's courtyard, were concealed except for a small number of doors or gates through which one could enter from the streets. (Of course, also some representative buildings existed, making GFQ present in the city; but most of GFQ's HQ was built not to be seen.)

Inside GFQ's private office block, floors with fitted carpet led to standardised offices, meeting rooms, corners with vending machines providing coffee (to be paid for); workers wearing suits and pantsuits, gait often more strut than relaxed, heads up in the air, confident, no marks. I tried my best to adapt. Living during fieldwork periods with a

comrade, at daylight I turned into a, more often shaved than not, white-collar worker.[21] This physical transformation was part of learning the ways of doing GFQ.

GFQ was, precisely during these weeks when we first got in touch, looking for somebody to support them in managing their *environmental database*. Having been trained as an environmental manager and showing records of working in the IT business, plus being recommended to them by an officer at the top of GFQ, I fit their profile. Dissent from ecological modernisation was unthinkable. I got a contract for the database job. Access granted.

When first entering, my position was that of a low-paid worker. My job was to manage the database. It's designation was *Environmental and Social Data Reporting* (ESDR) – it is now a key actor in this book. This database was used by sustainable development staff to store and administrate all kinds of data, including workforce achievements, community engagement, green products and masses of consumption data, say electricity, from all over the globe. ESDR was GFQ's sustainability memory. My task was to analyse the current version of the database, co-ordinate updates and manage their implementation. As part of this job I was routinely in touch with users, their data, the database's programmers and GFQ's IT Unit. This job was providing legitimacy to my presence in the midst of GFQ's carbon data.

Within the CSR Unit everybody knew that I was a researcher. Early on, Victoria had introduced me to the team. She explained my technical role and then said that I also was doing doctoral research on cultural aspects of environmental management. My double role was accepted. When meeting new staff, Victoria repeated this narrative and, soon, I reproduced it. Within GFQ's hierarchy it was sufficient that Victoria (and her superiors) accepted my research activity. In addition to her consent I negotiated one-to-one research agreements with the central agents managing carbon data. Thus I was allowed to observe them during their work, take notes, gather and analyse artefacts under the condition that their identities are not revealed.

Most workers were incredibly busy with their work and they left me alone with my work. Occasionally some showed interest in my research. A few workers, however, took greater interest. Among them were a sociology as well as a political science student (both also employed as cheap labour) who became important informants for my field work. One of the key figures in this book was a close colleague, Dieter Klar. A historian by education, he had worked before with some of the theoretical resources I employed (actor-network theory (ANT), which I introduce below); at that time he was a distant-student of sustainability management and, often, we were discussing in depth the issues and practices revolving around GFQ's environmental management reality.

Researching GFQ's carbon accountants led me to a number of locations. While my main field site was GFQ's HQ, I also conducted studies at subsidiaries that conducted their business in Western Europe and in Western Asia. In addition I had an informal meeting with a contact of a rating agency. Fieldwork extended to 96 days across twenty

[21] Artefact A.1.1 (on page 556) provides an illustration of the visual appearance.

months. After this period I still had access to the field; this resulted in further data.

These are the sources and processes of first-order data generation: during the field work period I generally had free access to the offices of GFQ's CSR Unit, their meeting room and, especially, their carbon data (stored mostly in ESDR) and file server. Most generative has been participant observation in meetings of GFQ's carbon accountants and strategists at which I was receiving access to drafts of GFQ's shifting carbon policies and facts. During meetings I took detailed notes, visible to all participants. I further collected artefacts and carried out several informal interviews.[22]

As well as participant observation in meetings, working with members involved listening to colleagues when they carefully explained tasks such that I would contribute most effectively. Sometimes I joined members when they worked on their tasks and allowed me to observe them; I supported members when they met obstacles and joined colleagues for lunch, having a coffee or going for a walk outside the office in a nearby public park. Working alone on and with the shared materials used by my colleagues helped me to deepen my understanding of carbon accounting.

I generated digital field notes, following Emerson, Fretz, and Shaw (1995); sometimes this involved taking jottings on paper beforehand. Writing up field notes as the central body of data took place sometimes simultaneously to the unfolding of action (e. g. when others interacted and I was working on my research computer anyway), mostly after events took place (e. g. after a meeting took place or after returning from a fruitful discussion over lunch) or at the end of the day (with the consequence that sometimes I found Victoria to work even later than ten pm); and occasionally I was only able to formulate specific notes only many hours later (in these cases I prioritised writing up those field notes which seemed most relevant). This project's body of field notes, at the time of writing this sentence, includes 105 notes with an average of 1457 words (amounting to about 300 pages).

It occasionally happened that I have been asked to not reveal information about specific occurrences (e. g. concerning classified data and strategies or action non-compliant with GFQ's internal rules or decisions and opinions on specific individuals). While these occurrences have been included in my analysis this book does not detail them. Except for these cases in which I have been explicitly asked to not reveal data, this book is committed to faithfully representing the realities in which I participated. This ethnographic programme yielded a large body of data. My analysis has selected a tiny fraction of that data for in-depth analysis and presentation in this book (I discuss n^{th}-order data generation in relation to the wider methodology and analysis below).

Outlining GFQ's approach to establish its carbon emissions In the corporate rationality of an ordered reality, an applicable account of the structure by which they established their carbon emissions would involve a clear organisational hierarchy, imply clearly defined individuals and an unambiguous process description.

[22] I was also able to participate in a general introductory training course on what working for GFQ means; my general observations on GFQ have also been informed through their intranet.

Organisation GFQ used the CSR Unit as a broad container, ranging from charity, development of micro-finance policies to sustainable development. In this unit, a Sustainable Development-Team existed. Victoria was the Sustainable Development head (and my boss). Sustainable development involved environmental concerns and, therefore, she was politically responsible for the EMS within the HQ. Operationally, a coordinator of the EMS existed. His name was Frederik Steine. He had an assistant, Elise Richards. Frederik and Elise were the core staff responsible for carbon accounting. I was responsible to support the database they employed (ESDR). And Dieter was employed as a liaison between subsidiaries' environmental managers and the EMS. Together, we formed *the EMS-Team*.

Process Year-to-year the EMS-Team would use the same process of carbon accounting. The subsequent three points should suffice to give you a taste.

1. Towards the end of a year the EMS-Team would inform subsidiaries' environmental managers that they were to *collect data* on five groups of indicators (until a given deadline, typically end of January of the next year). These groups were called Key Performance Indicators (KPI) and the latter referred to water, paper, energy consumption, distances travelled and wastes generated. GCEs' agents were to collect facts from the office buildings of their respective subsidiary for these five groups; and, finally, they were to enter that data in the central database ESDR.
2. Following data collection, Elise would scan the submitted data and check for errors. After errors have been repaired, Elise and Frederik would *produce environmental balance sheets*, presenting a one-page summary of a GCE's consumption and emissions.
3. Using the data covering these subsidiaries, Frederik was then extrapolating further emissions for the remainder of the total GFQ group. This resulted in GFQ's *statement* on its *emissions*. Victoria would communicate it within the corporation and to rating agencies.

According to this story, data flows from consumption practices all over the world to ESDR and then to its audiences. This book follows this data throughout this flow, how it circumvented obstacles, how it sunk into storage devices, how it was cared for, cultivated, how it was torn apart, manipulated, repaired, restored, how it drifted into creeks, how it circulated corporate carbon canals, how it was ebbing onto distant shores. Digital data must be a peculiar fluid. Yet, what is its consistency, which forces soak into it? What is carbon data?

1.3 Doing Data

Studying carbon – the concern of environmental accountants and matter of global politics – requires to delve and dive into data. Orientation in that business provides us

the field of STS. The studies undertaken in and around this interdisciplinary field make available insights into knowledge-making *practices* in science, technology, accounting and many other fields. The common understanding developed in this field is that knowledge-making in *practices* looks very much different compared to textbook-versions prescribing how facts *ought* to be produced. In the following I point to the key conceptual resources which I employ to follow carbon-in-the-making. To open this process of reconceptualising carbon an example from a 'different' realm seems apt; it shall provide us a *sense* of the range to which reconceptualising is pursued in this book. The example is sex. Following this brief outline, I turn to analytical signposts concerning knowledge, practice, devices, reality and data. Step-by-step I introduce, illustrate and develop the way I use these notions throughout the book – presupposing least familiarity of the reader with them. Thus, for the following it should suffice if I limit myself to only sketch the relations of what it means to engage with how actors know, their practices, the devices they use, how they actually relate to reality and what the status of data will be.

Sex and gender as an eye-opener While certainly this is not the place to provide a complete history (and I would not be able to), my humble outline of what sex is (not) might set out from a widespread knowledge in Western societies: humans are either female *or* male. Immediately, some will intervene and point to the understanding that while this dichotomy is relevant for biology, human culture is more diverse. Human individuals can have much more complex identities and display much variation in how they culturally interpret sex. Luckily, how people live their sex is not determined by their biology. De Beauvoir (1953, 273), famously, states '[o]ne is not born, but rather becomes, a woman'. As a result of consequential feminist intervention, the differentiation between between sex and gender became accepted. *Sex* is then seen as pointing to a biological black-white pattern, a distinct invariant, while *gender* can be much more colourful variable; gender became unnatural, an issue of culture (Butler 1986, 35). Gender is socially, not naturally, constructed.

Now look at the natural, the biological, 'side'. In human population, in common sense, new borns are either male of female. However, if you recall science classes at high school, you may think of a Gaussian (often considered *normal*) distribution. Statistics are fundamental in biology. As most biological phenomena we can interpret the male/female dichotomy through such a normal distribution. Having been parented by two natural scientists, among them a human geneticist, this is a sensitivity which seems self-evident to me – a realist position: in empirical biology (field or laboratory studies) you rarely get 100 percent data; reality is not black/white but you find 'normal distributions'. For the statement 'humans are either male or female' this means that we have to expect that this dichotomous statement holds only for a largest part of a population, but *not* for the entire population. The curve also has margins; and at the margins Others are represented. In other words, if you take empirical natural science and statistics seriously you can expect that *not all humans fit the ideal of being biologically male or*

female. In fact, Blackless, Charuvastra, Derryck, Fausto-Sterling, Lauzanne, and Lee (2000) report that two percent of human live births do not fit this 'ideal'. Unfortunately, those who do not fit this ideal are often stigmatised through the very process which represents them as non-fitting. Science, medicine, societies often label them un-normal. Normality turns into an evaluative account. Those who do not fit the expectations have to be adapted, e. g. surgically. How societies treat those entities that do not fit their expectations is of highly moral and political relevance.

Some argue that even if naturally, and not only culturally, such diversity exist, this does not have to be accepted. Sex-ratios can be made subject to population control debates, making humans fit *desired social orders* (e. g. Parkes 1926). However, what constitutes the desired social order? Again, we may be pointed to natural facts – such as that 'we' need a monogamy between two and hierarchy among many, that this is the natural order of human interaction. What is the evidence for such claims? We are referred to a close species to us, non-human primates. They would, after all, organise themselves just as 'we' are supposed to – employing monogamic and hierarchical structures to order themselves. Historian of science, Haraway (1991b) has brought attention to the contingency of precisely such facts. In her analyses she shows how the knowledge produced by scientists on primate behaviour (on non-human primate social order) is dependent on, *inter alia*, particular assumptions and material arrangements employed in their studies. She reconstructs facts as not only linked to what scientists assumably study, say primates, but very much inextricably interwoven with the researchers themselves, their position in society and their epistemologies. She identifies claims to singular objectivity as shortsighted for one cannot see everything, see entire reality, but one can only put into practice *partial vision*. Whether in the field or in laboratory, facts are not a matter of the natural alone but also of the social – and, identifying the boundaries between both remains impossible.

Sex *and* gender are culturally constituted. The distinction looses analytical value. And humans are not inert. They put sex/gender into practice, every day, every hour. We learn to practice sex/gender in the right ways (think of sex education, pornography or simply, again, high school). Butler (1993) argues that humans cannot simply choose some kind of sex/gender but, rather, that their bodies are 'sexed'. Through constant *citation of the norms* to which humans have to submit *on and into the body*, sex/gender is materialised. Then, whatever we do changes, transforms or stabilises a particular phenomenon of sex/gender. Sex/gender is a life-long performance of actors. Sex does not simply exist but is *done*.

To sum up, the *natural fact of sex has been de- and reconstructed*. The self-evident correspondence of a signifier with a signified has been questioned as much as the adequateness of the imagined signified. This certainly is not a full account and many will produce a better one; but it fired my imagination. Hence this study sets out with a social constructivist *sensitivity*. This means that entities can be fundamentally questioned in terms of how precisely they are brought into, transformed and sustained in social

reality – be it scientific, marital or managerial. One of the core implications is that if I meet notions like fact or knowledge, that elevate certain claims as beyond the social (Hacking 1999, 22-23), I am prompted to question them. I question naturalisations.

On knowledge, objectivity, the real and their plurals Knowing something is often associated with taking a step back, and another step back, to know the phenomenon more fully, to encompass more of reality out-there. But, inevitably, by moving away from the object we also come to see less. More and less is not a helpful distinction. From different locations one sees differently. Seeing depends on perspective.

For a book contributing to the social studies of environments, an example from seeing environments seems appropriate. Latour (1993a, 219) provides us with a juxtaposition of two ways of finding orientation in space.

> [Latour's stereotypically imagined] hunter who covers dozens of square miles and who has learned to recognise hundreds of thousands of signs and marks is called a 'local'. But a cartographer who has learned to recognise a few hundred signs and indices while leaning over a few square yards of maps and aerial photographs is said to be more universal than the hunter and to have a global vision.

Two practices of seeing and knowing a space can result in significantly different, but both adequate, *knowledges*. One is labelled a local perspective and the other a global view. Often these labels entail an evaluation. Local knowledges are seen as inferior to global knowledges. In STS the recognition of the adequateness to conceptualise knowledge in the plural is is linked to Haraway's (1991c) feminist work on knowledge and objectivity. She positions herself firmly against both relativist (we cannot know and all knowledge is relative) and totalising (we know a phenomenon in its totality and can establish a singular correct way of seeing the object) stances and suggests as an alternative 'partial, locatable, critical knowledges sustaining the possibility of webs of connections called solidarity in politics and shared conversations in epistemology' (ibid., 191). According to her, relativism and singular vision share the denial of 'location, embodiment and partial perspective'. Following her account we find that '[v]ision is *always* a question of power to see – and perhaps of the violence implicit in our visualising practices' (ibid., 192). Vision, thus, loses its innocence. Whatever we make visible, we change it. Science, thus, cannot leave the nature out-there intact; Haraway points to entities like microbes and quarks – and surely we can add CO_2e – which are all produced under very specific regimes of making them visible, at particular places and in specific situations.

> They are momentary traces focused by force fields, or they are information vectors in a barely embodied and highly mutable semiosis ordered by acts of recognition and misrecognition. (ibid., 185)

In the laboratory as in the field, the objects 'seen' neither can be accessed completely, nor does a singularly correct visualisation technique exist. Knowledge of objects are traces

of specific configurations. Configuring the laboratory, equipping the researcher with measurements instruments in the field, yields the artefacts of this specific arrangement. The assumptions, recognitions and misrecognitions, about the object in question co-configures, to say the least, what will be visible. We cannot, therefore, fully connect to any object. Partial connection, however, is possible. Objectivity, then, requires giving accounts of the partiality of ones knowledge. In my engagement with STS, Haraway's (1991c) message has been accepted: *knowledges are always situated* in specific webs of relations among viewers. This has consequences for politics. 'Struggles over what will count as rational accounts of the world are struggles over *how* to see.' (ibid., 194) There is neither any neutral point of view nor do neutral, innocent and non-implicated technologies of vision exist.

Alas, this understanding of objectivity – while having ebbed into feminist, anarchist or queer social movements – has not spread into many scholarly debates and, least, into regulatory science. All too often, scientific statements are packaged into a specific genre, a genre of direct representation. Law (2004a, 88) writes:

> [i]f a statement in endocrinology (or medical sociology) corresponds to a reality out-there, if it simply seems to describe it, then this is because most of the assemblage within which it is located has been rendered invisible, Othered. The authorship, the uncertainties, the enactment of out-thereness, all of these have disappeared. The *appearance* of direct representation is the effect of a process of artful deletion.

Vision, in scientific practices, is embedded in collections of heterogeneous elements. In specific configurations of these, devices can be brought to *make present* specific visualisations. These are then published, e. g., in journals (Latour 1999a). The appearance of on object being out-there is the desired effect of this kind of scientific practice. However, this appearance is entirely contingent on the precise configuration of entities like measuring devices, samples, assumptions, scientists or cups of coffee. All these relations need to be deleted when aiming to represent the object in the 'correct' way. This is what students learn at university; a scholar is not to mention how they got basic results but to reproduce the textbook account of standard techniques. Law (2004a) proposes, therefore, to conceptualise such stories as a specific type of account. Direct representation is a genre in which only a select view relations are authorised to be made visible. And a story in this genre is carefully crafted. Knowledge claims are a matter of practice. And how specific enduring facts are brought into social reality is still underexplored (Doing 2008). At least we have an indication where to start our investigation: at knowledge makers' practices of describing some things as out-there.[23]

Out-thereness deserves a further introductory note. My study presupposes a reality. And here is not the space to develop a philosophical treatise on this question. But to make sense of this book, so much needs to be made explicit. Reality *becomes*. It

[23]In the sociology of knowledge further approaches to modes of knowledge exist. Wehling (2006) discuss a range of ways to *not* know. This study does not investigate knowledges in Wehling's terms.

encompasses every thing, every relation, every past, every future. Hacking (1999, 23) refers to a game of *Vish!* It refers to circular definitions. I do not want to play it.

To define a vantage point of the study, Wynne's (2002, 472) account of realism fits. It emphasises that reality is

- a natural–social–artefactual hybrid;
- contingent (ultimately in those classifications themselves, too);
- unfinished, always in the making; and
- forever incompletely represented.

This understanding informs my analysis as well as the status of this book. Thus, I assume that reality is neither entirely antecedent to human action, nor solely causally dependent on humans. While some form of reality may be independent of humans (the critical realist version of real), reality also consists of the imaginations and co-constructions of humans (Sayer 2000, cf. Law 2004a, 158). Any account of reality is partial. Statements signified as mirroring the real are partial. Alternative statements exist and are possible. Reality, while imagined as out-there, is always *also* a representation. As a consequence, not a singular but, multiple representations exist. I call them *realities*. This book shows that a carbon accountant's environmental balance sheet is as much a particular visualisation technique like a laboratory, that these techniques are linked to multiple realities and that this causes friction. What my account on knowledge-making provides, then, is not so much a suggestion to shame the problematic and frictional realities but to allow the reader to become familiar with the practices, assumptions and politics built into the knowledges produced.

Practices and performativity Producing environmental facts is a matter of practice. But what does that mean? I follow a question that Suchman's (2000, 316) study on the production of an environmental impact assessment (which is a statement of the impacts of an, e. g., engineering project on an environment) phrases well: '[t]he question [...] becomes how, as a practical matter (rather than only as a matter of faith, although I think it must remain that as well) do they do it?' Studying practices does *not only* consider the accounts of practices, such as a laboratory protocol, a standard's methodology of how to calculate certain carbon emissions or in an interview, but it fundamentally engages with all the elements that are part of practices by which members in a particular situation achieve some thing (while, potentially, failing in other respects). Studying practice in this book is about *how* some thing has been *achieved*, rather than about evaluating whether.

Setting out to study practices relies on an understanding that through actual, material, practices reality is shaped and transformed. This take breaks with both structuralist understandings (in which, say, class acts by itself[24]) as well as the rational actor paradigm (suggesting that actors have particular goals and calculate their actions). This take may be conceptualised as contributing to – what has been called – the practice

[24]Of course concepts like class can be *made* to act – with real effects. See Chapter 4.

turn. Schatzki (2001, 2) (aiming to meta-theoretically conceptualise various turns to practice in social theorising) identifies as the core of these turns: 'practices as embodied, materially mediated arrays of human activity centrally organised around shared practical understanding'. Turning to practice, thus, starts with a distinct ontology. Practice is through what this book understands carbon accounting.

Yet, saying we turn to practice does not make clear how we study it. I follow an accepted practice in STS that is to visit actors in particular *situations*. I refer to those humans who are part of situations as *members*. Members' action is situated. Suchman (2007) suggests to study situated actions by turning to how actors bring into their reality the resources they, then, can use to shape the situation which, simultaneously, shapes their actions. Resources may be material (e. g. a desk), conceptual (e. g. a plan) or social (e. g. a hierarchical relationship). These, however, are not managed by humans according to the rational actor paradigm but in *contingent*, that is neither in arbitrary nor structurally determined, yet patterned ways (Garfinkel 1967; Bourdieu 1990b; Amsterdamska 2008). This holds even for something as – assumably rational – as mathematical calculation, as shown by Lave's (1988) study of maths in a supermarket.

The practical production of knowledge (think of a laboratory) is not a simple, one-time act. Much rather, for knowledge to be produced 'things need to be done and redone to have a presence in the world' (Waterton 2010, 650). This means that for knowledge to exist, *repeated* engagements with elements are necessary that make certain things, say a species, thinkable and manageable. Thus, members' action of knowledge-making have effects. Statements do something; they inform members (Moser and Law 2006, 66). That quality of practice that makes things present, that changes things, is usually called *performance*. Like a marriage is performed through particular practices (Austin 1962), the status of the relationship between a company and their carbon emissions is performed. By way of publishing a sum of their emissions, e. g. in a CSR brochure, the company performs that number as a fact; the companies makes present their identity with the fact.

Studying the performance of facts means that we are concerned with members' practices. Of course, some will say, knowledge has to be performed vis-à-vis others; therefore, a study of corporate carbon emissions should attend to the greenwashing activities of a PR unit. I want to take another step. Not only is knowledge performed in relation to audiences of that knowledge, but the production of that knowledge is also a performance. Producing the knowledge requires skilled engagement with props (the mass spectrometer, the invoice). Only when practitioners manage to perform well, i. e. assemble props in a certain configuration, the desired effect (the knowledge product) will come into existence.

Mol (2002) calls this generative quality of performance *enactment*. She uses this concept because she wants to emphasise that, in her study on doing diseases in a hospital, there is no backstage to the performance. The notion of backstage refers back to Goffman (1959). He suggests that people, day-to-day, perform specific characters and masks vis-à-vis each other and that, however, behind the scenes another layer of reality exists:

the individual performer's true identity. In her version of theorising, realities are said to be enacted.[25] I take this notion to stress that reality does not consist of some objectively truer backstage area, but just of multiple stages. Nevertheless, in this book, I also address as *staging* those performances by members which are based on a stage-performance conception. That is to say: members sometimes perform performances; they may stage a reality in a way that does not correspond to their understanding of another reality that they consider more truthful. For such occasions the notion of staging seems helpful.

Members' performances are also constitutive of discourse. By means of, e. g., their speech, their textual artefacts and visualisations they produce, reproduce and proliferate specific patterns of understandings (Keller 2011b, 48-49). Gilbert and Mulkay (1984) stress that organisational internal discourse and their external presentation may differ. They make this case for science, showing that often multiple accounts of an object exist (ibid., 2). Most relevant for this book is that in the laboratory, when members were not struggling, the contingency of facts on particular arrangements and their fictional character were accepted. However, when accounts needed to be defended (e. g. in textbooks for students) scientists performed realist depictions. If these findings from science are indicative of the reality of carbon accounting we can expect that multiple discourses are maintained by members in the field.

Devices and the enactment of reality Imagining a study of knowledge-making practices – of particular situations in which facts are performed – inevitably involves noting material elements. Haraway (1991c) points to the role of human eyes for vision (and, she critiques the politics of making visible without marking who sees how). Eyes can be enhanced: using devices like a magnifying glass or an electron microscope. Behind the eyes we imagine a brain. The human brain is so limited (is it really?); we can support it with spreadsheets, we can extend memory to server farms.

ANT is an analytical toolkit, says Verran (2010, 101), which I made much use of for the analysis underlying this book. Chapter 2 introduces how I utilised this toolkit. Here, it suffices to *signpost* how it supports studying the doing of carbon data.

Latour and Woolgar (1986) study what they call *laboratory life*. Their understanding is that science is not so much revealing a reality which existed before; but rather that reality is a consequence of scientists' practical work, i. e. a micro-social phenomenon. Scientists' approach to reality is precisely to '*make* it a given' (ibid., 236). To achieve that, they enlist various resources. Every thing in the laboratory shapes the facts produced. The fact emerges as an *effect* of particular circumstances, the network of things in the lab. And producing certain truths, rather than others, is *simultaneously* about struggles with colleagues and about what counts as real. This approach to understand how reality is produced can also usefully be applied on other social reality, Latour (2005) argues. ANT, understood as politically naïve by critical carbon market

[25] I return to these theoretical discussions in Chapters 2 and 3.

scholars (Descheneau 2012), it is also recommended for examining how macro-social order is constructed at particular micro-social sites (Michael 1994).

Most significant for studying carbon accounting is that with ANT we can systematically trace and reconceptualise the *ontology and ontological status* of carbon. Like feminist work now recognises that sex is not pre-discursively given but is materialised (Butler 1993), this book argues that environment, and specifically, carbon is an effect of social and material practices shaping the apprehension, filling the latter with content.

As a resource for this argument I draw very much on Mol's (2002) work. She proposes that when studying the doing of a disease – her example is atherosclerosis – we find that at different sites at which the disease is enacted it can diverge. In one hospital unit atherosclerosis may be located in the leg; in another unit it is located in the population. 'Reality is *distributed*' (ibid., 96), it is multiple. Different devices enact different realities of the body. A singular patient's body is made to exist in multiple ways and the workforce within the hospital is needed to singularise them. Barad's (2003) account goes even further. She proposes that realities do not and cannot leave the apparatuses in which they are produced. In Chapter 6, in a first step of drawing together my analysis, I engage with how these notions help to understand carbon.

That environmental realities may well be complicated has now reached environmental sociology. Unfortunately, in the EMT proponent Mol's (2010) account of an environmental sociology of networks and flows a significant incoherence exists. Drawing on ANT he notes that '[t]he concept of nature as external to society is outdated' (ibid., 34) and sets as the paradigm for this new environmental sociology a study of flows:

> (a) by analysing flows of information, capital, goods and persons from an ecological rationality point of view (by looking at environmental information, green products, green investment funds, sustainable management concepts, environmental certifications schemes, flows of environmental activists, and their ideas); and (b) by analysing environmental flows as such, that is: energy, water, waste, biodiversity, natural resources, contaminants, and the like. (ibid., 30)

Arthur Mol takes a realist stance by assuming that these flows exist as such (where Annemarie Mol (2002), likely, would question their status). Pellizzoni (2011, 800) makes the same point. 'The ontological underpinnings of ecological modernisation theory are straightforward: nature and society are seen as interacting but distinct realms.' This book challenges this distinction by way of investigating how accountants enact a flow of data resulting in a flow of emissions.

Data and information In science but also in accounting, the production of facts involves data that is translated into information, interpreted; facts are the effect. That knowledge can be used, again, to inform others – a company, a government, an activist. Struggles over substantive questions, from the construction of a nuclear power plant to climate change or the insurability of potential damages through nano-technology, assumably, are translated into struggles over 'objective' information (Beck 1996). These

knowledges are often not well accessibly for many affected and, therefore, people have to trust the producers of data (Porter 1995, 214). In economist terms of knowledge production, one might say that information should be allocated optimally. Where no information is demanded, none should be produced. However, what happens to the argument if we zoom into what information is? We find that information is a contingent product, bound up in interaction – not static at all. Heath, Knoblauch, and Luff's (2000, 315) account of studies of knowledge workplaces underline this:

> information as a blanket term, to encapsulate a disparate and unbounded array of materials, matters, and the like, becomes untenable, as we turn analytic attention to the ways in which particular organisationally relevant information gains its significance and determinate character in actual courses of action and interaction. Information is inextricably embedded in practice and practical action.

The question we have to struggle with, then, is *how* information is enacted. What are the qualities of information? How can they differ?

Studying information we can expect more information. Depending on the position of a speaker, some information is *taken as given*; that information is called *data*. In knowledge production, members translate data into specific forms; for instance from a petri-dish into a table; from an invoice into an accounting form. The result, therefore, is called in*form*ation (Latour 1987). Accounting is all about this (Robson 1992). Engaging with such translations is a recurrent theme in this book. Thévenot (2009) underlines that any standardised methodology presupposes users to invest in specific forms and, by that, to disregard other potential forms of making sense of out-there.

Users of manifold information often employ second and n^{th}-order data formation devices: databases. These can range from collections of information incorproated in bodies (e. g. specimens in a museum (Star and Griesemer 1989)) to paper-based (e. g. an offices' filing system (Suchman 1983)) or digital devices (e. g. a representation of earth's biodiversity (Bowker 2000a, 2000b)) . These databases, in addition to the data they 'carry', incorporate even further histories. Databases are formatting what they store as well – which makes them less a storage than a transformation device. Waterton (2010, 648), therefore, argues 'that they obscure some fundamental realities: that all archives both reveal and hide, that all archives harbour their own tacit politics, histories, and powers'.

A decisive point that occurs when we study how information/data is produced and translated is that we come across incredible amounts of mundane work. The database designers, the cleaners of the server room. Their work enables the forms, the databases, to not break apart (think of the secretaries helping you to fill a form). Often this work is carried out by women. Feminists, thus, draw attention to the significance of this enabling and maintenance work which helps to keep things together. I refer to these qualities of work several times in this book. It is called articulation work (Strauss 1988; Star 1991); and database managers do precisely such work (Bowker 2000b). Important to manage data is the availability of data. Thus, an issue this book is struggling with

is how members engage with missing data. Porter (1995, 81) claims that while '[i]ndex numbers could never simply be observed; they normally involved extensive data collection and often difficult or at least tedious calculations'. He stresses that calculation, thus quantitative operations, and the existence of data are fundamental to number generation. However, Lampland (2010) argues that to get large scale quantification processes working, making up numbers which meet audiences' expectations of that data is well working in practice; effectively, numbers may be found to be *placeholders* (Riles 2010), i. e. they may be used as-if they represent some out-there well enough while some agents recognise that the representation is highly uncertain.

Doing data is also always about reading data, making sense of what one sees. Moser and Law (2006, 66) propose to conceptualise information as something that informs a decision; it 'is what is present and relevant'. While at first glance a useful hypothesis for a study of doing data, we also have to consider that the absence of information is highly relevant. Summarising facts means members have to classify the relevant from the non-relevant; *sorting things out* (Bowker and Star 2000) implies that certain narratives are silenced, deleted.[26] Their absence is highly relevant. Decisions could not proceed with all possibilities still on the table (Suchman 2000). Information, hence, should be seen as relationally constituted through what is made present *and* absent. It is not surprising then, that financial analysts and managers are interested in alternative narratives, rather than restricting themselves to accounting information, to form judgements (Davison 2008, 794). At the same time, uncertainty about out-thereness may sustain current modes of governing despite calls for the contrary (Pellizzoni 2011).

Indeed, whether more data, more information or more knowledge is helpful to solve problems in the assumably represented realm of out-there is highly contested. Hetherington (2012), for example, shows that more information about resources distribution does not solve struggles over resources. Adding more knowledge allows, much rather, for additional layers at which struggles can be plaid out. This, of course, may help some actors (and not others). Holmes (2010, 229) challenges the veil of transparency connoted with data. Showing off lots of data may well be used to stop people from asking uncomfortable questions. To me it seems, therefore, even more important in order to know which questions to ask, to understand what data is.

1.4 Researching Corporate Carbon

The credibility of (ac)counts of carbon emissions is a social, political and indeed a material problem. My aim in this book is to articulate a view of emitting as a practical achievement by workers who assembled and ordered heterogeneous epistemic, material and technological elements; my view is inspired by methodological reasonings of debates on ANT, ethnomethodology, grounded theory and by Pierre Bourdieu. With these I

[26] Bowker (2005) studies memory practices – different ways of remembering knowledges. My study does not closely relate to Bowker's account.

developed a multiply constituted ground for analysis. Thus, employing these approaches I secure the foundation of my account of carbon emissions. I do not claim to have woven these methodologies into a coherent toolkit, where different methodological devices are arranged into a neat division of labour. Much rather, being inspired by them means that I draw on sensibilities developed within their respective discourses. I use these sensibilities to triangulate workers' practices within my epistemic practice of knowing the doing of carbon counts. The credibility of *my* account of GFQ's carbon counts relies on making present that the foundation of my analysis has been multiply tested and strengthened. Employing *disparate* methodologies allows to underline the credibility of my account better than using a single streamlined methodology.

To make the logics of my study debatable, in the following I sketch my account of carbon as grounded in five parallel considerations: the rationale of the study, the selection of a case, a clarification of my central assumptions, the structure of the method-assemblage I developed to engage with GFQ's workers and the emissions they enacted and, finally, a technical account of the ethics involved in this project (I discuss the wider ethical-political ramifications as part of the rationale).

Rationale of the research project The choice to research day-to-day work practices of agents of ecological modernisation within a multinational has a clear fundament. At the end of my undergraduate degree in environmental management I worked on a programmatic vision of what kind of interventions in academic reality could help to make environmental management the object of study rather than the taken-for-granted aim (Lippert 2010b, Part I). I argued that a significant step would be to study these goal-directed practical activities (i. e. environmental management) as a social process which is conducted under certain conditions in a given context (ibid., 79). Along these lines and specified in the reasons laid out in the first section of this introduction (i. e. that to study sustainable development in its hegemonic form we need to turn to organisations' environmental managers) I conducted a study to conceptionalise agents of ecological modernisation (Lippert 2010a, Part II). This study concluded that their practices constitute an apt site to study how the hegemonic order of unsustainability is sustained and can be transgressed (ibid., 111).

In parallel to narrowing down this project's object, i. e. agents' practices, and constitutive of this focus was also an analysis of sustainable development and in particular greening activities in relation to Capitalism, Democracy and the State (ibid., 2010a, Part I; 2010b, Part II). Engaging with these relations and academic knowledge production made clear that not only was objective and neutral knowledge production not possible but also that knowledge production dedicated to emancipatory struggles would be well-advised to *connect* to those agents of change who are interested in conducting the radical transitions towards some form of reconstructed interpretation of sustainable development so much in need (cf. Lippert 2007).

Some of these agents connect with academic discourses. While engaging with respective discourses around feminist techno-science studies (especially Haraway (1991a),

Barad (2003), Suchman (2007)), marxism-oriented Critical Management Studies (CMS) as well as discussions of carbon political economy and of critical realism (foremost Levy (1997), Sayer (2000), Böhm and Dabhi (2009)) I turned towards debates in a particular branch of libertarian studies: an engagement which would be sensitive to multiple axis of domination (not only over women, workers and the environment) and which would *not* look for simplistic ways out of the crises that humans and non-humans, men, women and intersex people, rich and poor, are so differentially subjected to – such as proposing that 'the', or, 'a market', 'a government', 'a political party/movement' or 'the state' would be realistically able to *lead* the ways to the needed transitions. A political theory of democracy which seems well aligned with these criteria is *anarchism*. In response, this book intends to contribute to an anarchist sociology – a sociological study which does not presume that any of the existing dominant ways of societal organising provides the desired solution or needs to be sustained as an end in itself.

Now, anarchism, some may object, is a horrible approach – full of terror and chaos. Engaging with these kinds of discussions needs other texts.[27] It suffices to say that in the kind of poststructural anarchist theory, which I am interested in, revolutions are theorised as being concerned with the practical enactment of emancipatory relations among people and other entities. The archetypical anarchist is concerned with *prefiguring* the desired relations in the present (Franks 2006, 193) – 'revolution' is not imagined as a final moment but as ever continuing every-day *practice* (Gordon 2008), change towards the desired configurations of social-material relations. With respect to my field of study – studying technologies of carbon accounting – I should mention: a long history exists on differentiated anarchist engagement with technology – ranging from the Luddite uprisings (Grint and Woolgar 1997) via philosophy (Winner 1978) to gardeners and hackers (Gordon 2008).[28]

Thus, anarchist sensitivities informed this project. Similar to Fernandez (2009, 95) I am aware that academic knowledge production may be useful for social and corporate control. Therefore, rather than seeking detachment and developing conceptions useful for large-scale and top-down implementation projects (by a multinational, by a nation-state, by one of the globally working NGOs) I aimed to produce a knowledge useful for individual workers to understand their practices and its consequences, a knowledge useful to build a common ground for green-collar workers to connect and organise emancipatory movement. This knowledge is not to serve for *seeing like a state* (Scott 1998) and I aimed to avoid providing a grid which would deconstruct the field of carbon

[27] Introductory readings to anarchism... well, you are going to look at wikipedia first anyway. Go for it. If you are done, go to the website of the British Political Studies Association's Specialist Group for the Study of Anarchism, called the *Anarchist Studies Network* (www.anarchist-studies-network.org.uk). Obviously there are classical readings (on workers e. g. Rocker (1938), on women e. g. Goldman (1910), on nature e. g. Bookchin (1993)); yet I would rather point to Le Guin's (1974) *The Dispossessed* or the film *Land and Freedom* directed by Ken Loach and written by Jim Allen (1995) to dive into the wide range of historical and utopian considerations.

[28] Also, in general, anarchism is no complete stranger to anthropology (Graeber 2004; Morris 2005), sociology (Jaworski 1993; Ehrlich 1977) and STS (Winner 1980; Michael 1994). Much rather, as these scholars show, in these fields anarchist considerations were influential among these fields' 'founders'.

accounting as a normatively neutral space (Gibson-Graham 2006, 75). My intention is not to prescribe any particular regime of practices. Thus, this book is not followed by a list of check boxes.[29] Rather, inspired by STS's reconstructivist tradition, I hope this book acts as a *catalyst of change* (Woodhouse, Hess, Breyman, and Martin 2002) by way of helping agents involved in diverse struggles (inside and outside corporations) to learn from another. Following Mol (2002, 164) this book is not seeking to command readers but rather to point and lay out avenues for learning together.

Not only sociological theories and methodologies have followed a turn to practice; also poststructuralist political theory and theories for/of practical intervention in every-day affairs have taken paths towards engagement with practices. In May's (1994, 87) account of a poststructuralist political theory of anarchism practices are claimed as the 'proper unit of analysis'. He relates practices to 'goal-directed social regularity' and, at the same time, recognises 'that the goals people think they will achieve when engaging in such practices and the consequences they actually do promote are often very different' (ibid.). I like to rework his understanding of practice sociologically and contribute with this book to an analysis of practices which is not only of purely academic interest but is helpful to identify practices which are apt to inform social struggles seeking practices going beyond the dominant approach to sustain the unsustainable.[30]

Studying action imagined as rational or nearly scientific, like accounting, is of interest to anarchism for at least two reasons: first, anarchism has a long history of an utopia grounded in the possibility of reason, classical modern rationality, science (see, e. g., Bakunin 1916). Second, as Bakunin (1916) recognises, a society that is governed by scientists (such as imagined by Bacon (1626)) is well likely to reproduce oppression of many through few. Purkis (2004, 47) interprets Beck (1992) as saying that modern societies struggle with the consequences of their modernisation project. And Purkis questions the reaction taken by administrators of reflexive modernisation; i. e. he challenges that those institutions which created the social and ecological problems are asked by societies to solve them while not recognising 'the part that hierarchical structures and the profit motive have in perpetuating these problems' (ibid.). In my understanding, transitions towards any kind of utopia need to be grounded in an understanding of the enactment of relations in the here and now. Therefore I turn Purkis's (2004) critique into an empirical question: what are these institutional actors (who supposedly perpetuate these problems) doing and how do they achieve it?

Now, when engaging with hegemonic actors we find that they have huge claims to objectivity. Poststructural sensibilities, taken on board in anarchism, question claims to

[29] Drawing on Crozier and Friedberg (1979, 1), I suppose, this is an acceptable move in the body of literature on management.

[30] Goal directed practices link to issues of strategy and tactics. This is a main strand in May's thought. He views strategic political philosophy as focussing on singular goals. Actors may use tactics in every-day which may stand in complicated relationships to formal strategies. Often strategy and tactics are considered as distinct (see also de Certeau 1984). I am not following and reproducing this distinction to the letter because, in practice, doing strategy and tactical movement overlap.

singular truths and neutral relations of representation (Kuhn 2009).[31] A central notion in poststructural theorising, Deleuze and Guattari's (1987) *rhizome* deserves a comment before linking it to our debate. Deleuze and Guattari draw this concept from biology where it refers to horizontally growing rootstock entities of which smallest parts broken off can live and reproduce as clones. If you know plants, I would propose to imagine their concept in relation to *fungi* and the characteristic of *mycelia* to exist in all kinds of sizes (with some being considered as the largest living entities on earth) and the characteristic of *mycorrhizae* to form symbiotic relations with other life forms. Kropotkin (1902) would call it *mutual help*. Deleuze and Guattari (1987, 6-7) formulate it this way:

> A system of this kind could be called a rhizome. A rhizome as subterranean stem is absolutely different from roots and radicles. Bulbs and tubers are rhizomes. Plants with roots or radicles may be rhizomorphic in other respects altogether: the question is whether plant life in its specificity is not entirely rhizomatic. Even some animals are, in their pack form. Rats are rhizomes. Burrows are too, in all of their functions of shelter, supply, movement, evasion, and breakout. The rhizome itself assumes very diverse forms, from ramified surface extension in all directions to concretion into bulbs and tubers. When rats swarm over each other. The rhizome includes the best and the worst: potato and couchgrass, or the weed. Animal and plant, couchgrass is crabgrass.

And they extend the notion beyond the plant kingdom to animals and even further:

> to collective assemblages of enunciation, to a whole micropolitics of the social field. A rhizome ceaselessly establishes connections between semiotic chains, organisations of power, and circumstances relative to the arts, sciences, and social struggles. (ibid., 7)

Anarchists are inspired by this. Some authors interpret rhizome as an antiauthoritarian and micro-sociological approach, stressing that people are shaped by power relations and implicated in them (Purkis 2004, 50). Kuhn (2009, 23) sees poststructuralist informed anarchism (i. e. postanarchism) to be based, *inter alia*, in '[a]n uncompromising commitment to plurality and all that goes with it – rhizomes, cracks, shifts, fluidity, etc.'. Some, like Franks (2007), struggle to emphasise the long tradition within anarchism to recognise multiple vectors of struggle (I noted some above, sexism, class, religion, environment). The empirical question is how powerful which dynamics are.

Now, Law (2009, 145-146) suggests ANT as an empirical translation of poststructuralism. With ANT we are offered a toolset which does not presuppose an ordered society (like a properly functioning State, Marriage or Accounting System); rather ANT is to enable us to study rhizomes, 'the provisional assembly of productive, heterogeneous, and (this is the crucial point) quite limited forms of ordering located in no larger overall

[31] With Feyerabend's (1975) *Against Method: Outline of an anarchistic* theory of knowledge* anarchism is equipped with a text which is seen as a significant reference point far beyond anarchist debate. (The star '*' refers to Feyerabend's (1975) opposition to Puritanical seriousness and his embracement of 'joyful experiments' (ibid., 21).) See also Purkis (2004, 41).

order' (ibid., 146). The ontology assumed in poststructuralist thought is this: there is no pre-existing order but multiple, heterogenous, more or less extending relations and orderings. (For the biologist: think of *hyphae* as a metaphor.) Now, this kind of ontology breaks – with the classical self-depiction of the modern state, the separation of powers (*trias politica*), natural conceptions of class struggle, the self-evident existence of property rights, the natural dominance of men over women, a binary conception of sex/gender, any fixed conception of human nature. Poststructuralist ontology breaks with the fundaments of the State and, therefore, argues Koch (1993) can be considered systemically anarchist. Consequentially, STS scholar Michael (1994) advertises ANT in *Anarchist Studies* as a method to study phenomena like the State, to study how 'political inertia is maintained' as well as how change could be brought about. Studying these assumably powerful institutions, like a multinational, means *studying up* (Nader 1972). This approach may precede ANT but, nevertheless, practically has to go together. The urgency expressed in anthropologist Nader's (1972, 1) paper still holds: 'the quality of life and our lives themselves may depend upon the extent to which citizens understand those who shape attitudes and actually control institutional structures'. Among her original proposals was to study institutions like air pollution agencies. Now it is carbon. Staged as a global problem, enacted as emission rather than pollution (Asdal 2008, 126). Studying up is still relevant, especially in studying techno-science (Forsythe 1999). And it is clear: the perspective should not be locked in at studying up, we may also study down and sideways (Nader 1972, 8).

Case selection criteria and possibilities to generalise For this study (to my best knowledge) was to be among the first ethnographies of agents of ecological modernisation as such (based upon literature research for several years[32]) I intended to provide a detailed study of the practices of a few individuals and study how they achieve whatever they were doing. A case study in one corporation seemed fit.

Criterion 1 For EMT postulates (theoretically and politically) the global diffusion of ecological modernisation (e. g. Huber 2008) I decided to search for a *multi- or transnational corporation.*

Criterion 2 As some green niche company might well be able to satisfy a niche market, I wanted to ensure that the case would be representative of *leading capitalist practice* (criterion 2). The best way to specify this criterion was getting access to a Fortune 100 or 50 company, i. e. one of the globally largest corporations.

Criterion 3 Finally, studying agents of ecological modernisation in-depth required *access over an extended period and to, at least, large parts of their work practices.*

I started to search for field sites end of 2005. Initially, after only a couple of months search, I was able to forge an agreement with one of the world largest telecommunication

[32]My literature review was restricted to studies in English and German, unfortunately. I am very interested in contact with authors of similar studies in other languages – if you exist!

services providers to study them. Unfortunately, when I was ready to start conducting the fieldwork, this agreement had vanished (the gatekeeper had lost the position that would have allowed me to study their environmental managers). A new search started. About 18 months later GFQ answered to my call. The corporation fit the named criteria. The specification of the site 'GFQ – EMS-Team – carbon accounting – ESDR' seemed particularly interesting for it allowed even further generalisation drawing from this study. To introduce this study, four factors that allow generalisation are particular noteworthy: the techno-political category, the industrial sector, the state of techno-managerial development and the particular organisational relations GFQ enacted.

Techno-political category: Carbon Given a hegemonic discourse of climate change and ecological modernisation, carbon emissions accounting is relevant and present in businesses across many markets. Therefore, this particular techno-political instance of environmental management can be seen as an example of how capitalism enacts environments.

Industrial sector: Finance In the discourse of neoliberal climate change politics, free market forces are best suited to identify best practices. The finance sector was not, yet, regulated through the Kyoto Protocol (in terms of, e. g., the EU ETS) and is not identified as a culprit politically, which, I assume, means that this industry sector is less distorted by state 'interference' (than, say, the oil sector). Thus, the finance sector should generate good solutions (in terms of the market) to climate change (rather than solutions significantly shaped by the Regulator). With the finance sector we can identify what kind of solution to carbon accounting seems fit for the market. Does the market take carbon seriously?[33]

State of techno-managerial development: Before closure Closure means that consensus over the proper ways of saying and doing things has been established. The study of GFQ's carbon accounting system showed that their practices were highly evolving along a specific trajectory of change. This book analyses the trajectory of change within the distributed socio-technical apparatus of carbon accounting. Precisely because I was able to study a process 'before closure' I was able to analyse techniques of closing, i. e. the qualitative shifts enacted in the

[33]The practices observed revolving around GFQ's carbon accounting system may be significantly shaped by the fact that the financial services sector has not been addressed by the Kyoto Protocol as a polluter. Rather, the corporation participated in the VCM to 'offset' emissions. Under the EU ETS those polluters who are obliged to reduce their emissions are grasped through their installations. This book does not investigate the environmental and carbon accounting systems of installations' operators. These may be structured very different and, thus, may imply very different translation practices compared to the ones observed in this study. A companion study to this book might investigate what is materially black-boxed into measuring devices (e. g. ones which measure emissions at a smokestack). After all, however, my study speaks predominantly for the accounting processes *after* the 'measurement device'. Therefore, I propose, *this study is indicative for all those corporations which account for their indirect emissions*. If we can trust Hoffman's (2007, 11) statistics, then my study should be very normal for he found: 77 % of his sample companies measured indirect emissions (and so did GFQ) and 63 % of the companies have developed new IT to track GHG emissions (ibid., 13) (and so did GFQ). For GFQ seems to fit well into the pattern, I feel positioned well to argue that the practices I observed should be relevant to a significant part of companies producing carbon emission knowledges.

doing of carbon accounting to render carbon accounting docile and in control. We can assume that qualitatively similar techniques of closing have taken or will take place in other cases of carbon accounting.

Organisational relations: Well-linked to other institutions The carbon market is highly concentrated (Dorsey 2011). That is to say, a few actors dominate the field. Part of this ethnography are the links between GFQ and one of the most relevant ranking organisations informing this market (which I also render anonymous) and the links between GFQ and one of the globally largest nature conservation NGOs. In addition, this book covers the ways by which their carbon accounting practices have been governed by particular standards (including the Greenhouse Gas Protocol (GHG Protocol), a Global Reporting Initiative (GRI) standard and the Standard of the *Verein für Umweltmanagement und Nachhaltigkeit in Finanzinstituten* (VfU)) as well as how GFQ's implementation of these standards has been audited by on of the largest accounting firms (one of the so-called Big Four), one of the six largest consultancy players in the carbon market (ibid.). And Burritt (2012, 397) believes that accountancy firms are decisive in establishing corporate carbon footprints. In addition to these formal linkages this study covers how agents of GFQ rendered their practices comparable and similar to their competitors.

For these points I argue that albeit GFQ is only *one* multinational, *folded into the object* which this ethnography studies are capitalist solutions to greening, the finance industry sector, and key actors of the carbon political economy and GFQ's competitors. This book provides the evidence for this. A comparative analysis of carbon accounting in different organisations would show both similar patterns as well as differences. We will see that many of the statements I make do not only hold for this case. To give you a taste: extrapolating data is necessary in all sorts of empirical work; one often simply cannot gather data for complete populations. For the case of carbon this means that emissions are extrapolated. The analysis will detail the implications; and several implications do not only hold in GFQ but in general for any performance of extrapolating.

Assumptions Of course, no study can commence without a number of assumptions through which the researcher can think and use any senses. As Clarke and Star (2008, 116) put it: we cannot set out 'with the image of some sort of *tabula rasa*'. In addition to the introduction so far (that laid out and argued for the frame which I assume), four areas deserve further elaboration: my ontology, epistemology, the use of concepts in this study and methodological considerations.

As I said, this study sets out with a poststructuralist ontology, which is to assume no particular ontology except of, in my take, that a reality exists which is shaped and exists through natural-social hybrids, which is highly contingent and not stable. In this changing and shifting reality, things do not necessarily add up, they cannot necessarily be known through deterministic patterns and hierarchical forms. Law (2004a) calls

it *mess*. With him I argue that the ontology we are dealing with is outside of the area typically imagined by social science research, which is as he puts it, is 'that the world is properly to be understood as *a set of fairly specific, determinate, and more or less identifiable processes*' (ibid. 5). Showing the evidence for my argument takes the reader through the book itself. Necessarily to accept before reading the book is merely the open-mindedness that the world is not clear and definite. My analysis did not presuppose such clearness. However, to ease your stomach, I do find a number of clear elements and processes which I *am* able to satisfactorily and rightfully describe and analyse as such. This is to say that the ontology of the underlying study did not rule out deterministic patterns; I did not want to write them into 'my data' *a priori*.

A significant assumption I do entertain about reality is that many things are related; and that through their particular relations reality is changed and enacted. Of course, speaking of relations implies substances, or, at the least, containers or apparatuses; which one could iteratively zoom into. So, substances are relational effects; substances are '*made* real in practice' (Law 2009, 147). Vis-à-vis this logics I should point out that, again, making reality does not start with a *tabula rasa*; reality is not constituted right now in front of you. But relational effects sediment into history – and that history may be material, like sex, like a Nation. However, if performers stop performing nation-state boundaries, or their sex, much may change; and they may encounter resistances by others who profit from certain performances. So, the world is relationally constituted and the effects can be very *real* to its performers.

Also in terms of epistemology I employ a notion provided by Law (2004a): *method-assemblage*. He uses this term to suggest that through methods and techniques of vision we enact reality. This is certainly the case with this book. I make present a particular version of GFQ's carbon emission practices; I enact this out-thereness. Now, if we accept that the realities 'measured' are at least co-constituted by the methods through which they are 'measured' then the concept of triangulating can be either seen as flawed or of particular help. Triangulating the object-out-there seems to assume such an object to exist out-there; a realist stance which I cannot share. But, obviously, the constructivist realism I exercise assumes things and relations to be out-there at the same time. Yet, I cannot access them easily. To know them, then, better I employ several techniques of knowing them and, through that, try to develop a more balanced understanding of the phenomenon (and this *is* seen as triangulation (Flick 2007b); more on methods below). My understanding of research quality is that by using more method-assemblages we can develop a more saturated understanding – that is saturated with additional relations of accountability that my claims have to endure. The final understanding I develop is far more removed from the object (that I originally tried to engage with) for it is distanced through all the subsequent chapters.[34] Accordingly, to show *how* distancing was performed through my analysis I need to discuss the material

[34] As an example of distancing techniques, consider documents. In the field I produced field notes. Then I operated on and with these notes and produced further documents. The book is, hence, a product of specific ethnographic documentary-discursive practices. See also Riles (2006b, 17).

in-depth and iteratively throughout the subsequent chapters.

A significant implication of an open-minded ontology is that predefining *concepts* to signify entities out-there does not fit well to this study. To illustrate with Bewernitz (2005, 65): some ontologies would assume that 'workers' exist out-there; but what about managers? Analysing work relations around managers indicates that orthodox marxism would have to conceptionalise them as workers for their are paid and dependent on the owners of capital; but at the same time they may be paid to perform being a capitalist; they may also be provided some capital ownership.[35] Following Gilbert and Mulkay (1984, 2) I propose that defining *a priori* a number of concepts to make sense of members' realities does not allow accounting for the 'multiple and divergent versions generated by the actors themselves'. This precautionary relation to ready-made categories also extends to concepts provided by ANT. My analytical approach requires us to establish the applicability of ANT's concepts before using them (I do that in Chapter 2). Of course, I am not able to operate without concepts. The point of the argument is that the development of concepts, especially central concept like 'carbon' (its ontological status), is the result of this book, rather than the starting point.

I have pointed to four methodological bodies which influenced the *analytical design* of the study: grounded theory, ANT, ethnomethodology and Pierre Bourdieu's work. To emphasise, this study does *not* aim to reconcile all these bodies of texts. Nevertheless, the analysis has been influenced by distinct methodological assumptions which all add, I argue, to the quality of the study (and not criteria drawn from quantitative social sciences[36]). I briefly allude to the range of these assumptions; subsequently I spell them out in relation to a description of how I actually conducted the study.

Grounded theory influences This methodological approach shaped my research design in a distinct way. Grounded theory is about abstraction *from* and building theory *of* data collected in the field; it is *not* about descriptive accuracy but about theory generation which is freed from the particular circumstances, i. e. an 'abstraction from time, place and people' (Glaser 2002). I planned to generate data in the field. This data was to be qualitatively *coded* and first hypotheses were to be generated. Following that, I wanted to conduct *theoretical sampling*, i. e. focus on data generation in relation to specific categories of practices in the field. Accordingly the field study was to be organised in different phases of research with increasing focus on particular categories of practices. Analysis of data within these categories was to look at *diverse* cases including seemingly *deviant* cases. An analysis of a variety of, at the best, conflicting cases promises, according to grounded theory, a good chance to develop a theoretical account of what is going on in the field which *transcends* any particular situation. Rather than following

[35] Consequently, I argue against the understanding, e. g. by Katz (2004), that the researcher may not define concepts in order to impose the researcher's theories on the researched. It seems not applicable for my study.

[36] Criteria from quantitative research are reliability, validity and objectivity. Flick's (2007b) account of quality in qualitative research shows why they are not applicable for a qualitative ethnography.

grounded theory along all this study, my take emphasised also that I needed to *ensure descriptive accuracy to ground the theoretical conclusions* of the study. Beyond Glaser's (2002) account, the research design was particularly influenced by Emerson, Fretz, and Shaw (1995) who draw on grounded theory.

ANT My study was shaped by ANT's dictum to *follow the actor* (so well exemplified by Latour (1999a)). This meant that I expected to follow environmental managers around and see how they did what, follow the entities they engaged with and zoom in even further. The ontology laid out above suggests 'the need for methodological humility. If the world is messy we cannot know it by insisting that it is clear' (Law and Singleton 2005, 350). Drawing on earlier work of mine (Lippert 2010a, 76) I expected that using visualisation techniques might be of help to gain instructive perspectives on the relations on the field. Trying to visualise what is going on in the field can never show everything (for the best model of the world is the world itself); but particular graphs have been productively employed in ANT (Latour and Woolgar 1986). ANT approaches were to be used throughout my study.

Ethnomethodological considerations Ethnomethodology especially influenced the fundamental orientation of my study and the opening question I posed: *what do environmental managers do and how to they achieve it?* Garfinkel (1967, 1) posits that members use the same activities to 'produce and manage settings of organised everyday affairs [and] for making those settings "account-able" '. Correspondingly my study was based upon the general assumption that whatever members did, I was considering their actions *competent*. And the study was about, in a circular logics, what competent members did and how they made accountable to others that their actions have been accountable.

Bourdieu's concepts This study was also drawing on the concepts *capital* and *field* as laid out by Bourdieu and Wacquant (1992). Based on them the study was to reconstruct how members *constituted* through their practices a structure/field and simultaneously members' rules and possibilities as well as the structurated mechanisms of how positions within that field could be taken and changed, how the structure could be transformed.[37]

With Flick (2007b, 41, 73) we can understand this combination of approaches as *methodological triangulation* (triangulation version 1). It means that a fuller picture of the phenomenon can be developed by studying the phenomenon through the productive facilities of each of these approaches. Methodological triangulation is one of the techniques through which this study's quality has been secured.

Method In the following I make explicit how I combined methods which generated data and how I analysed that data. My study of GFQ's carbon accountants took place over many months with several periods of persistent observation. This approach

[37]Compatible takes *might* have been as well Giddens's (1986) or Crozier and Friedberg's (1979); which I did not choose. And this book does not aim to theoretically compare their takes.

contributes to securing the quality of my analysis (Flick 2007b, 19). During these periods I was granted access to follow members and their activities. I focussed my observations on the EMS-Team, their shared activities and, more to the point, their relations to carbon. My field work has been structured into two phases: first I was trying to collect data on virtually everything. Later, I narrowed down what issues and themes to focus on – until I arrived at the focus which this book has taken.

Throughout these phases I undertook fieldwork at several locations (a *multi-sited ethnography* (Marcus 1995) in principle, but the focus was on the HQ-based EMS-Team). During this work I have engaged with members as *institutional actors*. This means I have not followed them outside their work life (which renders this work not into a multi-integrative ethnography (Weber 2001)). Throughout the interactions I was not aware of me struggling intensively with members over resources (as Forsythe (1999, 9) describes it); rather, because my income was secured independently of the work for GFQ, I did not have to struggle over the economic positions within the corporation.[38] Throughout field work I conceptualised the observations, in Hammersley's (1992) terms, both as ethnographically 'realist' as well as 'methodist'. This means that I was quite relying on my perceptions in the field as making available the relevant circumstances for members. For members accepted me as another member we can assume that my schemes of perceptions and action (which Bourdieu (1989) would call *habitus*) fit the field well. I was a methodist in so far as I structured both observations and analysis in a specific way, allowing me to orient the research process according to clear temporally constrained ordering prescriptions throughout the study. The following paragraphs serve to sketch these orderings (both the pre- as well as descriptions).

(1) As mentioned above, *first order data generation* was focussed on fieldnotes. Emerson, Fretz, and Shaw (1995) explain: '[f]ieldnotes are accounts describing experiences and observations the researcher has made while participating in an intense and involved manner.' These notes, of course, act as a filter (Flick 2007b, 80) for not everything can be inscribed into these notes. I used a relational note editor, *Tinderbox*, to author and organise these notes.[39] I tried to leave these notes as intact as possible in this book – in that sense this book is full, as Mol (2002) would say, of snapshot-stories. I have sketched the body of notes above but I did not yet clarify what data I generated in addition to these notes. First to mention are 28 drawings of architecture of sites at which members practiced their work and of their interactions (e. g. gestures). Also independently of specific interaction I documented (shifting) office architectures of relevant members. I 'collected' and catalogued 281 artefacts of members' work, such as flip-chart slides, and of their work context (ranging from wastes to PR materials they equipped their offices with). I prioritised data generation for the EMS-Team and then (in lessening importance) other Sustainable Development workers, the CSR unit, the office block and the total corporation.

[38] Throughout this project I received a research grant. I also received a small wage by GFQ for the months helping them with ESDR – similar to an intern.

[39] Tinderbox can be found at `http://www.eastgate.com/Tinderbox/`.

In addition to this first order of data generation, the analysis process entailed ten further orders. The first two (orders 2 and 3) of them took place well in the midst of the field research period. The others followed subsequently.

(1.5) This is serious and a joke: of course during field work I was already starting to analyse the data and tried to gain or keep oversight of what I was learning. There was so much, I could not keep track.[40] I soon decided to focus on the quality of fieldnote generation and to leave second order data generation to a dedicated time period.

(2) After the first phase of field work I retreated from the field (bodily anyway; I was staying in touch with members via one of GFQ's ThinkPads). I coded all the fieldnotes and associated artefact descriptors in terms of, *inter alia*, members' practices, members' themes, their terms, their emotions, the entities they operated with, ESDR (and research reflections). 435 codes resulted. Coding has been conducted using the application Text Analysis Mark-up System (TAMS), developed by Weinstein (2006).[41]

(3) These codes did not allow me to gain oversight fast enough over what categories of practices I had identified. The solution was to organise the codes in terms of product-related practices.[42] Ten potential foci to zoom into resulted.[43] I decided to focus my observations in the second research phase on six foci: (a) on carbon and the database ESDR; on the link between carbon and an (b) auditor, with an (c) NGO as well as with (d) a ranking agency; (e) on quantification of qualities and finally (f) on a schooling device they employed to train further environmental managers. These foci should be understood as a first move to theoretical sampling. I aimed to focus subsequent data collection on these entities.

(3.5) During that phase I was, again, trying to analyse the relations in the field, to map practices. I mention this for these mapping exercises shaped my emerging understanding of how messy organisational realities of carbon accounting have been.[44]

(4) Towards the end of the second field work phase I started to outline how I would engage with an in-depth analysis of the data.[45] Roughly this is also what I have done – albeit, the path was a bit more bumpy.

[40] For example, right within the first week of in-depth study I tried to map the formal and practical work relations of those members I encountered. Figure A.1 (on page 557) shows the first structure I reconstructed. However, this did not represent the reality well enough, so, soon afterwards, I developed another representation, Figure A.2 (on page 558).

[41] The highly programmable and open-source qualitative data analysis software application TAMS fit my needs throughout this project better than alternative softwares I tested for this research project.

[42] I derived the categories of products directly from a list of all codes. *Before* that, however, I engaged in a mapping exercise. I organised the codes into a wide variety of code sets. As one could expect, members' practices around products were not neatly separated. Rather, very economical, they allowed themselves to prepare several products by shared practices. As a result, when I organised data into code sets, these sets shared some codes. Say, the practices around the EMS Handbook (one code set) shared with another code set on the product environmental database (ESDR) the code '[ESDR] > handbook'. Therefore these code sets have been linked in a particular way. Figure A.3 (on page 559) indicates what I was up against.

[43] Figure A.4 (on page 560) provides an impression of the structure of these foci. They were all linked to each other.

[44] Figure A.5 (on page 561) is an example for this period. The example revolves around material now shown in Chapter 2.

[45] See Figure A.6 (on page 563) and the corresponding explanation for details of this plan.

The in-depth analysis started with open coding, which was trying to capture various readings of the data. I engaged with the data by way of asking *questions* on members' practices, terms and understandings, their assumptions as well as on my characterisations of what was at stake, which actants I found and how I described my research practices.[46] Coding resulted in 1704, fine-grained, codes; each code provided an answer to a question. I used code definitions to use the codes distinctly. (However some of the codes surely overlapped.) Much data was classified through coding to relate to several questions. In parallel to coding I generated 89 memos, producing first theorisations grounded in the material. Consequently, I created groups of codes around both, members' as well as analytical STS questions. For that I organised the codes into 67 'code sets' (in TAMS nomenclature), i. e. groups of codes.[47] Each code set was then linked to memos. I called specific combinations of a code set and memos a *theme*.

(5) As a next step I selected which themes the subsequent analysis was to focus on.[48] For that I arranged the themes into an even further level ob abstraction, called *core themes*.[49] In discussions with peers I developed the decision to focus on ten core themes which I was able top group under the question: *how did member's practices configure carbon emissions?*[50]

(6) The next step was to analyse the data represented by this question (by retracing the abstraction 'backwards'[51]). Trying to 'completely' map the actor-networks represented by my data ('under' the question I posed for this book) failed.[52] Instead I scanned through all the data instances represented through the research question (this referred to 3,390 data instances), *summarised* each instance (with respect to the question which its theme asked) in a file which was to be the first phase of this book. Subsequently, I rearranged the summaries and made introductory notes on the new groupings. Through

[46] This approach was inspired by Emerson, Fretz, and Shaw's (1995, 146) questions. See Figure A.6 (on page 563) and the corresponding explanation for the list of questions I asked specifically.

[47] In addition I produced ten lists of diverse classes of dimensions through which I could access the data. A list of the code sets can be found in Appendix A.3 (on page 562).

[48] Again, I mapped the relations between code sets and codes in TAMS. The result was highly unreadable (both, in small as in Figure A.7 (on page 565) and in large (several metres wide)).

[49] This process entailed transforming the TAMS map of code sets into a map in which I could link the sets to the memos (see Figure A.8 (on page 566), Figure A.9 (on page 567)) and group these themes into sets of themes, i. e. core themes (see Figure A.10 (on page 568), Figure A.12 (on page 570)). These graphs had about 174 nodes and 666 relations (edges). A human-eye-readable and, thus, usable version of this order of data was black-boxing the content of each core theme, showing, thus only the core themes and remaining code sets and memos which 'did not fit'. The result can be seen in Figure A.11 (on page 569).

[50] Find a visualisation of these ten core themes and the themes which they integrated in Figure A.13 (on page 571).

[51] See Figure A.14 (on page 572) for an illustration of how the higher level representation are linked to fieldnote fragments.

[52] I started mapping by way of using nodes as representatives of both, actants and their relations and drawing all the links. Figure A.15 (on page 573) shows a segment of such a map. While this is readable for this small number of entities involved, I was not able to handle a much larger number of actants and relations. Figure A.16 (on page 574) shows the extent of a resulting map for only a few observations from fieldnotes. One way to relate to this problem was in terms of time and schedule. In Appendix A.3 (on page 575) you can find a (slightly edited) reflection of mine on the decision-making process of how to analyse the data. I made frequent research process notes in text, image and video to make the research process development traceable.

a process involving printing, cutting, distributing these summaries over several square metres, I was able to identify eighty data instances in fieldnotes which represented well the heterogeneity of the material (that is, these fragments included highly different types of observations and seemingly non-fitting cases).[53] These eighty data fragments built the core of this book: after linearising the networky relations among them, I turned them into fieldnote extracts (which you find throughout the book).[54] This allowed to analyse them in-depth and structure the book around their relations.[55] While grounded theory demands a constant comparison of all data, this did not seem feasible; in practice I was only able to perform partial comparison, *partial connections* if I may draw for that on Strathern (2004). Vis-à-vis Flick (2007b, 32) I would maintain that honesty about the reality of partial connections seems to generate a higher quality than a (potentially even less than) superficial comparison of all data. In any way, the comparisons I enacted add up to another version of triangulation (version 2) for different cases have been compared for the same issue; and different issues have been used to triangulate an answer to the book's empirical question. Throughout the book you find evidence of the comparative and iterative analysis at work: I use a sign, '↪[56]', to point to analysing, unpacking, material differently and, thus, a comparison enacted.

(7) While analysing the selected fieldnote extracts in comparison to other fieldnotes or by zooming into the situation, several times I came across further artefacts or for explanatory reasons I had to dig in the situation's history. Thus, at the order of data generation I was adding additional data fragments from the case repository to the elements through which my account of GFQ's carbon emission practices was to be constituted. Following Flick (2007b, 42), this constitutes data triangulation (version 3) This newly added data, presentations, letters and the like can be understood as *traces of past practices and processes* within GFQ (Flick 2007a, 90). To analyse the data I employed partial mappings of the situations observed. These mappings accompany the discussions across the book.

(8) The next phase of the book was shaped by bringing the analysis into a conversation with STS, accounting, ecological modernisation and sustainable development and CMS literature. I, thus, exercised a triangulation through theory (version 4).

(9) The final book emerged in relation to imagined readers (see Van Maanen 1988, 25-33). It involved editing materials to render the argument more coherent.

(10) This final book phase was also influenced by another order of data generation: a validation process. Through communicative interaction with core EMS-Team members I have been developing consensus over interpretations. This book has also been validated

[53] An impression of this process can be gained from Figure A.18 (on page 577).

[54] Flick (2007b, 45) argues that high quality qualitative research should allow readers to understand the research setting in its own terms. I react to this call by providing as *least* edited fieldnote extracts as possible. Especially, this involves keeping signs of my temporal identification with the work setting that I researched visible; you will encounter occasional 'we's and 'us's in the notes. These collective identifiers refer to GFQ or EMS-Team members. In the analysis, I restricted 'us' and 'we' to denote the collective of author and readers of this study. For a list of extracts, see the appendix.

[55] The relations of these extracts are shown in Figure A.19 (on page 578).

[56] The following discussion is relating To itself; in Section 1.4 (on page 55).

through other techniques, such as peer debriefing and passing as a member.[57] In addition I exercised a validation situation by way of sharing my interpretations with students of the field of environmental management.[58]

In conclusion of this account of methods underlying this study I wish to underline two relevant characteristics. As the mass of prior footnotes indicated, this method – and, especially, the intensive use of visualisation techniques – was an experiment, trying to make the mass of data manageable without giving up the claim that my account is based upon a *systematic* engagement with the data which I have generated. To me, at least, the visualisations have provided added value: they allow to exercise additional perspectives. Most relevant, however, is that the technology of mapping repeatedly brought to my attention missing relations.[59] Following a clear methodic outline, the most recent version of my programme can be found in Figure A.22 (on page 581), was making sure that this study's account is traceable to its ground. This seems to be, after all, one of the most significant demands on social scientific contributions.

Ethics Most of the significant points on the ethics involved in this book have already been made. There is a technical point: I conducted the study in line with the International Sociological Association's *Code of Ethics* (ISA Executive Committee 2001). Beyond that, I need to recap. I do not claim access to any superior or omnipotent perspective to members' practices. Thus, rather than performing what Haraway (1991c) calls the god-trick, I intentionally do not constrain my voice to an invisible passive actor or an 'we' (even though I also use these voices); often I exercise reflective and reflexive writing; all over 'I' remind(s) the reader of my presence, in the book and in the field. However, as this book is likely to be read as about GFQ's carbon accounting practices I try to not indulge myself in excessive postmodernist reflections.

I engaged in very specific agreements on anonymity with informants. Our relations have been governed by a contract (me as an employee of GFQ) and in addition to that by subsidiary agreements (verbal and by email). I received consent by the core subjects engaged with in this book to study them. Some people asked me to reveal the identity of members or of the corporation.[60] Besides the specific agreements with members and the *Code of Ethics* it is precisely the anarchist take, if I may rephrase Williams (2011),

[57] See Flick (2007b, 16-18, 33, 35) for accounts of validation. Regarding passing as a member, I can report: my work performance was perceived as native and well enough, resulting in the effect of superiors asking me to work for a longer time in their unit. Thus, we may assume that my position and observations therefrom fit well into the field.

[58] For an artefact of this exercise, see Figure A.21 (on page 580). I performed an analysis for the students to test whether they would accept the reasoning.

[59] I should note that the *visual inscription devices* (Savage 2009) which I developed do not claim to be linked to Clarke's (2003) cartographic work. Against Lynch (1991) I would maintain that the maps employed in this book add something to the text.

[60] Indeed, my take has been challenged by pointing to the 'banality of evil' or what Platform (2010) calls the deskkiller, in German *Schreibtischtäter*: office workers have to be held responsible even if only they *act-at-a-distance* (Latour 1987). However, as problematic as I consider the particular carbon enactment practices covered in this book, I would not see them as close enough to the immediate fascist crimes as shown by Arendt (1963). Towards the end of the book, I explicate normative discussions.

suggesting that not any, say, particular manager is the problem, but the relations within society. This book is not fighting with individuals but seeks to contribute to wider social change. From the same position I have to reply to Flick's (2007b) concern with ethics and data protection. Yes, of course, most sensitive data has been encrypted; but the risk that so-called democratic police forces seize engaged researchers' data seems, to me, higher than the risk of burglary. This excursus to formal defence shall end with the most important point: I engaged in repeated feedback and validation interactions with all the key members under study. The constructivist take stressing the contingency and fluidity of emission realities did not alienate practitioners. It primarily alienates those holding on to the belief that practitioners' numbers *can* represent reality precisely.

1.5 This Book

This book is concerned with *carbon emissions*. If a company says they emit 1 tonne (t) of CO_2e emissions then they have to construct this statement. They do not say *they represent* their carbon emissions *as* equalling 1 t; but, rather, they claim that their *emissions* really *equal 1 t*. The phenomenon this book is dealing with is how they construct such a particular *reality*.

They would reply they employ a technique called carbon *accounting*. A study of what that means also promises being informative for engaging with similar accounting instances: environmental, sustainable development, CSR management accounting, scorecards or, even, national inventories. Therefore, what this book tries to shed light on, is not only how capitalist actors account for carbon but, wider, for environments. In that respect, this book is about a phenomenon classical for reflexive modernisation: a modern project of transparency formally committed to modernise the damaging dynamics of capitalism; studying carbon accounting is a post-structural project of radical reflexivity, questioning the universalising project of transparency.

In order for corporate carbon emissions to exist, agents need to be equipped. I ask: how on earth do carbon emissions turn into existence if their emergence cannot be explained with a rational actor paradigm, EMT or with the reality of the emissions out-there? What this book provides is an ethnographic account, built on techniques of observation, writing and sociological analytical methods. Thus, this book is not about thought experiments by practitioners or academics on how carbon facts might or ought to be produced, it is not about presenting results from a survey and it is, not at all, about bashing workers.

In this book I consider some new resources for thinking about, and acting within, the space of agents of ecological modernisation, their tools and environments. The first shift which this book proposes is located within feminist techno-science and involves reconceptualising the implicated and interwoven relationship between the social and the material with implications for digital quantification practices. The second shift which this book engages in is from ecological modernisation to a feminist techno-science-

inspired postanarchist sociology and involves rethinking the grounds on which control over environments and imagined Society-Nature relationships can be exercised. For that the book draws on ongoing explorations within relevant areas of STS, environmental sociology, CMS and anarchist theory, each of which is heterogeneous and distributed in themselves; and for none of these I can do full justice here. I hope nonetheless to trace out enough of the lines of debate – that these fields of research and scholarship are committed to – to indicate the generativity of employing these ropes and threads, specifically with respect to rethinking and creatively enacting prefigurative relations between humans and their social and natural environments.

My account is grounded in a sustained period of field work and emerged in interactions with members of the field as well as with critical practitioners, activists and peers. The stories of my account travelled; to Amsterdam, Augsburg, Barcelona, Berlin, Cardiff, Göteborg, Graz, İstanbul, Lancaster, London, Singapore, Trento.

Doing an ethnography is promising because it allows to go beyond the focus on entrepreneurs or intrapreneurs of the company. The method is involving also their assistants, their machineries, their drafts of techniques, their successes and failures. An ethnography of carbon allows to bring to light the invisible work required to keep carbon emitting. If that stopped, what would happen to climate change discourses?

My concern is not to evaluate any particular quality of the numbers enacted in the company. Rather it is to show how the representational convention of carbon reporting (which give the reports distinctive advantages) also are sources of trouble for members, and, potentially of catastrophic consequences for social and ecological justice.

This book speaks to three groups, scholars of science and technology, of accounting and to environmentalists of all colours, including corporate, NGO, academic and autonomously organised agents. Broadly speaking, this book is concerned with how globally distributed environmentalists are positioned to relate to the producers of carbon emissions. They relate to each other through intermediaries – accountants, corporate databases, greenwashing PR reports. Most carbon knowledge is knowledge utterly transformed on the way from the site where it 'originates' to the environmentalist. In public discourses, nearly no ethnographic data is available about carbon knowledge producers, corporate agents of ecological modernisation. Whether to inform regulation, consumption or direct action, environmentalists cannot, at the moment, be aware of the ground which they employ to make their strategies work, that is about knowledge of how carbon is actually woven. This book is about the lore and practices of agents at the centre of carbon knowledge production. It problematises the division of labour and the assumptions of who has what knowledge and who is entitled to what knowledge and control. Instead I provide a vision of mutual learning and partial translations. I hope this book will also be a point of crystallisation for environmental management practitioners, open-minded to changes at the rootstocks of ecological modernisation.

Contributions The site 'GFQ's emission enactment' built a great ground for my argument. As one of the largest companies on Earth, it allows us to empirically ground

our understanding of the relation between Nature and natural sciences with finance and capitalism. This link was shaped by common objects, like spreadsheets or software by SAP. And this book involves an account of how GFQ optimised its practices to account for carbon. Thus, I believe, the case allows to not only enter sociological theoretical territories but also into the territories of greening capitalism.

This book attempts to contribute in four areas: in STS, in sociologies of work, accounting and economy, in environmental sociology and environmental management studies as well as in qualitative research methodology.

In STS, the sociology and anthropology of science, technology and society, of quantification and knowledge production my contribution circles around *digital quantification practices*. The phenomenon of *digital labour* (Burston, Dyer-Witheford, and Hearn 2010) and *practice* poses, indeed, reasons to elaborate the enactment of materials like carbon. Rather than posing the multiplicity of accounts of carbon as a scandal I take it serious. This leads me to retrace much of Mol's (2002) work on multiplicity. I go one step further, I believe, in so far as I was never imagining that there was a singularity out there to which a singular account was to be linked. The notion of multiplicity which I develop exceeds Mol's; for her a *singular* body matters and it is *multiple*. I argue that carbon, for corporate purposes, is data. Carbon-as-data in itself is a multiple which is enacted differently and in parallel in multiple practices. (As for molecules: if they are at all, the signified is outside environmental management practices; 'real' molecules do not matter.) I underline also that GFQ itself is multiple and, thus, multiple multiples shape the knowledge maps through which (reflexive) modernity must fail to navigate. Anarchist sensitivities add to our engagement with this situation. As an outlook, I explore how decision-making might be organised in a way which would prefigure socially and ecologically just relations among humans and with (not *their*) environments.

With this work in STS I do not simply challenge any particular numbers but, more profound, the situatedness of these numbers. This constitutes the ground to contribute to sociologies of work, accounting and economy. For quantifications are among the foundations of modern control, the situatedness of quantification results in *situated control*. In a circular organisation of accountabilities between GFQ, their auditors, standards, ranking agencies and an NGO, I show how 'being in control' and 'rule-following action' is successfully performed by members: how members and collective actants manage to *stage* numbers as controlling realities. This challenges not only intra- and interorganisational potentials to control but also destabilises the ground on which market-based policy instruments are positioned.

By introducing the situatedness of numbers and control to environmental sociology and environmental management studies I question not only the grounds of ecological modernisation and EMT but also the realist foundation of Mol's (2010) environmental sociology of networks and flows. In a manner of hypothesising, consider this case: in some closer or more distant future, an institution like the IPCC would figure out that environmental realities on Earth are inextricably stuck in a trajectory of climate

chaos. At the same time the World Business Council for Sustainable Development (WBCSD) would state that the IPCC must be overstating the seriousness because, WBCSD's member organisations report that business has reduced emissions globally by 500 %. This book shows how such *disparate realities* are not only possible but likely to occur within the current configuration of actors, regulators and environments. Thus, I establish how the practical discourse of ecological modernisation allows to *not* engage with problematic issues, like core business or providing useful accounts for society about corporate greening. Ecological modernisation is discursively stabilised as an idea while its effects are not those which are claimed by ecological modernisation. Carbon market governance might provide bold statements of the reality of carbon emission reductions. In realist terms, the carbon they are dealing with is not closely linked with Nature. I show that engagement with that link is not in the interest of capital.

Finally, by way of not jumping from this introduction right to the conclusions, but by making visible how my analysis forms the emerging understanding, this book contributes to methodological concerns of qualitative research. I show in detail how members' practices are situated within discourses and how they reproduce, sustain and shape discourse trajectories. The book, thus, *links members' practices with macro-phenomena*, like 'the market' or 'sustainable development'.

Organisation of the Argument Rather than dedicating a disjoint discussion to theory and method after this introduction, I work iteratively. In each of the following five chapters I mobilise theory that helps me interpret the data or suggests fruitful methods to direct my inquiry. Interspersed are four interludes that establish relevant signposts along the paths of studying GFQ's emission practices.

Chapter 2 (entitled *Data Construction in a Basement*) investigates data construction practices on the ground. It traces the work by agents of ecological modernisation in a GCE and suggests that practices are to a distinct degree under the control of these agents while they are oriented to prescriptive statements by superiors. Empirically, this chapter engages with three of the fundamental practices on which carbon emission statements rely: the correct classification of data, the correct quantitative engagement with data and the ability to command data practices. Rather than simply showing that, as many might expect, data handling practices were not correct, I argue for their necessarily *generative character* which socially and materially construct carbon emissions. In that account, correct or false numbers do not matter as much as the point that practices establish how data turns into carbon matter. At a methodological level, this chapter introduces the reader to how an ANT account of knowledge practices can be performed. This involves pointing to some qualifications of how I bring ANT to bear in analysing fieldnotes.

Sceptical readers will want to challenge that my account of practices observed in the subsidiary can be generalised to the level of the multinational and, indeed, to ecological modernisation and sustainable development. In response, Chapter 3 (entitled *Translating Data Into Sustainability*) provides an analysis of how, materially, GCEs,

GFQ's HQ and the global discourses of climate change, environmental management and sustainable development *hang together*. For that I trace how these discourses have been translated into the company, reproduced, shifted and given direction to, and, finally, released into the public sphere in a consequential configuration. I make members' categories, practices and artefacts within the corporation visible as clearly part of hegemonic techno-managerial carbon discourse. I show how, in specific translations, some concerns of sustainable development and ecological modernisation discourses were silenced within GFQ. This explains why these discourses are not apt to conceptualise what happened as part of members practices. The chapter establishes that ecological modernisation reality cannot be understood adequately through its own discourse. Through practices, GFQ managed to signal publics that they are in control over their emissions. However, internally, it was well recognised that they were 'out of control'.

Discourses of sustainable development imply that corporations are able to control their own conduct and that market forces can be used to govern corporate governance. Chapter 4 (entitled *Situated Control Over Carbon*) attends closely how carbon accountants' work has *sedimented in* particular *structures* of their work places. With the help of Bourdieusian sensitivities, I inquiry into the possibilities of their, thus, structured work to be in control by anything or anyone. The chapter claims that the practical reality of control can be best grasped as *situated control*. I argue for this claim by way of presenting an analysis at five levels at which carbon emission enactment has been structured. Consequential for that enactment is that situated control allows for multiple diverging practices to be present in parallel. However, members still would maintain they aimed at putting GFQ's carbon account to order.

This points us to focus on particular ordering practices. Chapter 5 (entitled *Achieving Order*) approaches these practices with ethnomethodology as an issue of practical achievement and doing of accountability. The study of methods and practices by which members attempted and managed to order their social environment and, in effect, also the corporation's carbon emissions points to four core findings. Members routinely used their agency to adjust data – either by changing quantifications or by changing definitions. For all these practices were struck with obstacles and friction environmental managers tried to repair and optimise all kinds of elements, human and non-human. Whilst automatisation was always a grand hope, members practically resorted to insert human bodies into the carbon accounting machinery as creative problem-solvers; the EMS bet on these bodies to repair the near-breakdowns caused by techno-managerial configurations. After all, yet, disorder remained. Carbon data was shifting and uncertain. Consequently, members established ways to work-around and accommodate the messinesses they were confronted with.

Chapter 6 (entitled *Carbonscape*) reconceptualises the ontology of carbon and proposes to rethink carbon from a punctualised fact to a fluid landscape. The notion of carbonscape, then, is the result of drawing the discussions of this book together, arguing that the enactment of carbon can well be conceptualised by way of turning to five key

perspectives: boundaries, materiality, multiplicity, temporality and scale. Rethinking carbon through these lenses serves to grasp how members' practices constrained and made possible carbon. I argue that modernist oligo-dimensional accounts of carbon can only fail to consider the pattern of phenomena emerging from members' distributed tactical but always messy engagement with carbon. Politically, this means that any intervention targeted at sustainability needs to address practices in this multidimensional socio-material universe. And it means that any responsible account of carbon emissions ought to engage with those elements and issues which did not fit into the picture. Silenced practices, masses, effects floating and taking place within carbonscape need to be detailed, in response to this reasoning.

In conclusion of this book's argument I draw together what it means to discuss the enactment of environments. For that I focus on the conceptualisation of apparatuses by means of which environments are enacted. This analysis indicates that enacting environments is inherently and constantly political and that such enactment work is only appropriately interpretable and accountable for in situated contestation of that situated enactment. Doing carbon, I generalise, is an instance of enacting environments. And enacting environments is systemically a troubling activity in need for political reconfiguration. For this political implications of the argument I turn to normative scenarios and investigate how useful they may be in allowing democratic engagement with the enactment of environments. I show that none of the hegemonic – neither markets, the state, environmental management systems nor the professionalisation of agents of ecological modernisation – is promising. Alternative ways of relating humans and environments, I propose, may be imagined by looking at resources at the intersection of feminist techno-science and anarchist political theory.

Interlude I

Contested Carbon

This interlude establishes a hint of HQ mentality. Mostly it will puzzle the reader. That is why this interlude is located here. Within only a couple of pages we find that GFQ's capital practices are linked to carbon accounting.

GFQ worked on the premise that climate change *is* taking place. Actually, the corporation was publicly outspoken about that; they appeared on stages in the policy-arena (e. g. around the Kyoto Protocol Follow-Up conference at Copenhagen in 2009), portraying their corporation as a so-called *good citizen*, caring for the environment and looking into climate change issues.

This book is not about PR. Therefore, I have not concentrated on publicly accessible trajectories of GFQ, but rather on their internal practices and how the effects of their practices surfaced to wider publics.

I introduce the empirical discussion of this book by running through moments of strategising and contestation among GFQ's CSR staff and the EMS-Team. I set out by linking climate change to GFQ's core business – capital. Subsequently I turn to a discussion of a specific technique of carbon emission reduction, that is, offsetting. I conclude this interlude by showing how the prior narratives link to the concern of this book, i. e., carbon accounting.

Economising climate change Nearly everybody was present; the room was crowded. Some of the young males have been sent off to get further chairs. The air was sticky, torrid. We are at the outset of a team meeting of the CSR Unit. Victoria and her boss, Herbert McJames, discussed the natural science of climate change: what are the tipping points? Are the collapse of the Gulf Stream and loss of sea ice in the Arctic all related to global warming? What is the role of fresh water in this? Soon afterwards, three guests entered the meeting. Working at the fringes of the CSR Unit, they were involved with GFQ's insurance section and their climate change policy. They introduced the CSR team to the economic reality circulating around that policy. It was made clear to the meeting, GFQ's engagement with climate change can be reduced to a fundamental question:

Field Note Extract I.a (Climate change policy: trading off)

> *'What do we save' if we put policy into practice – in contrast to what do we pay if we have to compensate damages by hail? GFQ is perceived as a natural partner in the politics of climate change mitigation and prevention because we are able to save money.*

In this meeting, climate – the atmosphere – was construed as an object in a rational process of trading off: what was cheaper for GFQ – mitigating and preventing climate change or paying for damages. It is clearly recognisable already now: for GFQ, the 'right' approach to climate change was depending on numbers. Relevant for them were figures representing two alternative sets of economic costs. *Losses* GFQ's insurance section would experience as a consequence of climate change versus the *costs* GFQ would have to bear when they would address climate change as a corporation.

This moment can be used for hypothesising that a widely shared assumption about the nature of capitalism holds also for GFQ: within the firm the regime of the 'sayable' is driven by cost considerations. Additionally, it was considered likely that publics would perceive GFQ's new role as *trustworthy*. Knowing that publics frame GFQ as a capitalist entity, they assumed, a policy which would promise savings would be considered as a genuine interest of the multinational. When the meeting continued, they pointed in more detail to the implications for the insurance branch of GFQ:

Field Note Extract I.b (Climate change: investment as solutions)

> *[...] one can 'technically' relate to climate change: by excluding specific risks or raising deductibles. [...] In general the following is valid: 'insurability [...] is questioned'. One option to that is a technical solution. Another option are green investments. Frank Jones: 'thus, we require a definite framework', to be provided by politics, in order to know whether it is worth to buy certificates and reduce carbon. Victoria: the 'charme' of an investment is that it behaves like a normal investment.*

These statements elaborate the beginning of the meeting: they considered it rational to not ignore the accumulating effects of climate change, i. e. to not sideline the issue to merely legally ensuring their position against the immediate effects of climate change. Rather, they wanted to perform action against climate change. The preferred means for such action were green investments because the latter could be dealt with just like any other investment – which was the core of GFQ's business practices. Additionally, to be able to move within the realities of climate change and carbon economies, the corporation needed definite fixed points in the political-financial realm. The latter would involve, e. g., definitions of carbon, a predictable price structure in the VCM and a legally reliable frame of how carbon calculations were to be conducted.

In GFQ's approach to climate change, the essence of this problem could be extracted from natural science and contained in micro-economics. Climate change was translated into an informational problem: what are the figures?

Contesting carbon offsetting I now turn to how micro-economics was rendered complicated in the reality of the EMS-Team. When I started my work for GFQ

officially, I have been introduced by Victoria to all the significant issues. One of the key coordinates for their work was GFQ's emission reduction target. Unfortunately, different authoritative voices of GFQ ventured varying targets for the reduction of carbon emissions.

Field Note Extract I.c (How to accomplish carbon reductions?)

> *Meeting the goal of carbon reduction is difficult to achieve, Victoria told me. Until recently, the aim was 25 % reduction of GFQ's emissions. However, now, that amount is to be doubled. Thus, the board of directors wants us to cut emissions by 50 %. Victoria suggests: 'we won't manage'. Those emissions, which are not reduced, will have to be offset.*

The reduction of carbon emissions can be created through two strategies: on the one hand, emissions can be physically reduced (which I explain in a moment). On the other hand, the corporation can buy certificates which would offset the emissions caused by its practices. This means emissions of GFQ can be swapped against negative emissions offered on the VCM. These negative emission could be sourced from a CDM project; GFQ was neither legally bound to offset at all nor to buy CDM CERs if they were buying. Thus, GFQ could source negative emissions from any other project as well. In fact, GFQ had the policy to only buy negative emissions if they have been produced under the so-called *Gold Standard*. I zoom into this standard at a later moment.

Fundamental to offsetting was, of course, the willingness to buy negative emissions at all. This willingness, however, was contested. We switch into a strategy discussion of the EMS-Team. Next to Victoria, two other participants were present: Elise and George Kruger. George was an internal consultant with many years experience on environmental issues within GFQ. The discussion revolved around a service which GFQ offered to its customers. It was called 'green mobility'. When buying this service product customers were offsetting some of their personal mobility-related carbon emissions. GFQ's partner, GGCA, demanded that the corporation follows a strategy favouring the 'actual' reduction of emissions. In that policy, second to these imagined 'actual' reductions was substitution of carbon-rich consumption activities by less carbon intensive consumption. Only as the last option, did the policy accept offsetting. Hence, 'green mobility' was supposed to not be used; it was *not* considered an 'actual' reduction. Later, their discussion was rendered more complicated by this characteristic of GFQ's Environmental Management System (EMS): GCEs were allowed much freedom in their environmental decision-making.

Field Note Extract I.d (Nature of offsetting)

☞ discussion at Section 4.3, Section 6.5

> *Elise suggested to reduce emissions through 'green mobility'. Victoria opposed this immediately. The discussion with GGCA did show that we should not do this 'at full-scale'. George replied: this 'is irritating me a little: [...] if certificates do not save anything' this constitutes selling of indulgences. We do not want this. However, he had a look at where they money goes to. People ensured that the projects work out properly. George was convinced: a 'solid process' is in place at these offsetting projects, guaranteeing that these emissions are actually saved.*

The approach of George indicates that offsetting carbon emissions through CDM (or equivalent) projects can be considered as the right and effective approach to get the atmosphere right. However, Victoria pointed out that the NGO would not like GFQ to use much offsetting. How were members dealing with these contrasting approaches?

Field Note Extract I.e (A technical problem?)

George argued: it 'is only a moral-ethical problem, isn't it?'. We should separate this from environmental problems. 'We should not link [the practical dimension] to norms.' Victoria replied: we want reduction to take place as much as possible. Only afterwards offsetting should take place. George: 'I want to move away from the debate about norms. [...] We have a technical *problem': if a GCE plans buying a new heating system – at this point a debate about norms is appropriate: buying green electricity or a better heating system? We should not 'demonise' offsetting. The issue at hand is not whether or not we use offsetting, but rather: when do we start with it?*

Interestingly, while George implied a conflict over the normativity of GFQ's approach to accomplish their carbon emission reductions, Victoria referred to the external authority, the NGO. She then elaborated her appeal to authority and included a link within the argument to the responsible member of the board of directors, Ivo Hampson.

☞ discussion at Section 4.3

Field Note Extract I.f (A political problem?)

Elise contributed again: 'green mobility' is our 'own product'. Why shouldn't we use it? Victoria immediately: GGCA 'is our partner' [...]. That's a [four million dollar] partnership. Victoria, George and Elise were having quite a heated discussion. Victoria: 'GGCA articulated precisely: no.*' Both, Ivo and GGCA communicated: reduction rather than offsetting. Elise and George: Employing our own product indicates our credibility. George: 'if there is a global problem', one needs to solve it globally, rather than locally. Of course, one should not merely buy a way out, George said.*

Finally, by evoking the mighty board member, Victoria successfully established order: even though George and Elise disagreed with the boss, they accepted that reduction should be carried out before buying negative emissions. Victoria, in this discussion, performed a counter-hegemonic stance to emission management. This is of interest because it may provide the analyst with some hope that not the complete environment is turned into a simplistic economic calculus. While this hope will accompany us throughout the book, here is the dominant discourse in plain text: Hoffman (2010, 296) agrees with George as a matter of fact. 'The coal burned in Ann Arbor, Shanghai or Moscow has an equal impact on the environment we all share.'

Carbon management If carbon emissions were to be reduced, the corporation's approach to that was to quantify its emissions and reduce the latter. Who was responsible for these quantifications? Environmental managers. Early on in my fieldwork:

☞ discussion at Interlude IV

Field Note Extract I.g (Carbon managers)

Dieter emphasised again and again: 'They are actually not environmental man-

agers, but rather CO_2-Managers'. The only job is to save CO_2. He reconsiders and adds: this is about reducing CO_2 emissions, save costs and deliver data for the footprint.

Thus, these agents were supposed to reduce emissions and by that costs – and in for preparing reduction of costs, they had to deliver data about the environmental effects of their GCEs. The actual reduction of emissions would take place through so-called 'measures'. For instance, these included buying carbon neutral car fleets or hydropower. However, how much was to be reduced, eventually, depended on how much emissions GCEs had in the first place. Thus, GFQ also needed to establish the amount of their carbon emissions.

In a swift movement we covered some ground between climate change and GFQ's environmental managers. The HQ wanted to produce a carbon footprint. With Latour (1987, 185) we may ask the defenders of GFQ's carbon footprint knowledge: 'what are their proofs, who are their witnesses, how is the jury chosen, what sort of evidence is legitimate?' The answer lies in Dieter's statement: GCEs' environmental managers' job is to provide data. That data is the proof the HQ would always resort back to. The subsequent chapter opens the black box of that data. By that I establish what delivering data to the HQ – into the hands of Dieter, of Elise, Victoria, mine – meant.

CHAPTER 2

Data Construction in a Basement

Data is constructed. Get down to earth: visit the engineers, working in the basement of office blocks. Find how carbon takes its form and you will 'see'. This chapter draws out a constructivist understanding of carbon emissions. To start our investigation, I provide a detailed account of the underlying practices at GFQ that were part of the construction process of carbon emissions. That is, I turn to the practical groundwork of constructing the data which was to be translated into emissions. Taking place at a subsidiary (I call subsidiaries GCE), the practices presented in this chapter introduce us to members, their means of production as well as their relations to the making of data. Empirically, this chapter reacts to Burritt, Schaltegger, and Zvezdov's (2011, 89) concern that carbon accounting research has no access to 'how climate-related information is input [and] who provides the input'.

More precisely, we engage with near-first time encounters of subsidiary staff with the data collection and classification approach as devised by GFQ's HQ for the Environmental Management System (EMS). Ethnomethodology suggests that it is useful to follow first time users of classification in order to study the disclosed work required to make the system work. Hence, I focus on users' practices of classifying data and entering it into the EMS's central data collection database, ESDR. Unbracketing the practicalities of the encounter between the request for data and the GCE's staff promises to reveal key characteristics of the data emerging from that very encounter (Mol 2002, 163). The specific take I employ to study and discuss the practices at this GCE is using actor-network theory (ANT). Following Bowker and Star's (1996) thrust, if an organisation is particularly good at delegating and distributing, ANT is well positioned to trace and reconstruct how activities have been coordinated. Thus, in this chapter I argue two points: (1) the configuration of activities delegated and prescribed by GFQ's HQ to its subsidiaries are decisive to understand the quality of emissions (and that latter were simultaneously rendered 'dis-coverable' through the subsidiary's provision of consumption data); (2) an ANT-inspired analysis of the material is fit for the job of critically engaging with the stuff of which carbon is made of.

Here is *a* beginning of the story: my boss, Victoria, had asked a Western Asian country's GCE to welcome me in order to support my study as well as to ensure that the GCE participates in the data collection process. The latter was key to the EMS: from members' point of view, without data, the EMS did not have any base to know GFQ's emissions. Specifically, the aim of my visit to this GCE was to learn about how a GCE environmental manager would gather the piecemeal data about the environment. Reconstructing the practices yielded three modes of engagement with data. Consequently, this chapter is organised into three sections, each of which serve to allow appreciating the hard work undertaken at the subsidiary: this work allowed that data to exist and to be available for being subsequently employed at the HQ for calculating carbon emissions. First, we trace how staff classified specific kinds of consumption related artefacts, such as invoices, into environmental data categories. While reconstructing the classificatory practices I establish that an ANT take on analysing the construction of carbon emissions is apt. Subsequently, I turn to the decisive quality of the way how data was treated – as quantities. Hence, the second section looks at what it meant to do calculations – visiting the literature of the performativity of economics and the emerging sociology of calculations. Finally, I visit a meeting in which decisions were taken. This allows us to clarify what was needed to command the carbon construction process.

GFQ's EMS was delimiting its scope of data gathering to five so-called Key Performance Indicators (KPI). In the course of this chapter I introduce and illustrate several types of these environmental indicators: in the first section I approach three of them – electricity, paper and water consumption; in the second section travel; and, in the final section, waste. For each type I reconstruct a case of data collection. In conclusion I draw out the generalisability of the findings, suggesting how to take a critical distance to the notions of consumption data and facts: data is not anyhow given and found but it is made; behind simple facts performed as number–unit–account lurk wide landscapes of heterogenous qualities and assumptions.

2.1 Classifying Consumption[1]

Thus, I travelled to the GCE. After arriving in the city and settling in for a couple of days, soon I was to visit GFQ's local offices. Going by bus, down a large street, many people crossing busily in front and behind, I saw a huge sign of GFQ on top of a building on the right hand along the street. After leaving the bus, crossing a smaller street and the GCE's forecourt, I entered through its revolving door and went to the information desk – clearly the point to go to. After recognising that we were not able to communicate in our disparate versions of English, one of the porters wrote on a small piece of paper something along the line of 'I want to speak to Mister: . . . '. I entered the name of this GCE's head of the EMS, Simon Jacobs. The porter talked on the

[1]Parts of an earlier version of this section have been published under the title *Carbon Classified? Unpacking Heterogeneous Relations Inscribed Into Corporate Carbon Emissions* (Lippert 2012a). The present analysis establishes an elaborated argument.

phone and, soon afterwards, Simon's assistant came to meet me and lead me to the manager. He had been the addressee of my boss's request to welcome me. As one of this GCE's top officers he was occupying a large office, with a glossy wooden desk and several square metres of windows at the top of the building.

Early in our meeting Nick Xi joined us and presented a list of numbers to Simon. Later on I learned: Nick was the office site's head engineer. Simon had asked him to collect the environmental data which the HQ was seeking. Subsequently, Nick showed me around at the site, and, eventually, we went to his office, located in the building's basement. The practical responsibility for environmental data collection, I soon came to recognise, had shifted with our way down, from the top of the building to the basement: from whom the HQ had responsibilised to an agent responsibilised at this GCE. It was at the basement that I learned about the practices by which this GCE came to know the data requested from the HQ. Interestingly, I came to know, Nick had only been ordered to gather that data a week before I arrived. Within the week, then, he had been running around, calling people, to acquire some data to deliver to the HQ and present me with.

This section introduces three cases; each helps us to understand the range of elements required to be in place for the desired data to exist and the effects implicated in the classification of this data. Thus, we reconstruct how the numbers that Nick had later on shown upstairs to Simon have come into being. I start off by introducing a seemingly clear-cut case – a case in which all the elements were assembled in a smooth manner. Next, we turn to engage with a case of contestation: data was not naturally given but was emerging through practices of sorting out tensions. Finally, this section shows how the classification of data involves room for resistance in the midst of accounting practices.

Electricity: A Clear-cut Case The windowless room was populated by round six work places. Nick's beige desk was equipped with two land line telephones, a computer screen, mouse and keyboard. An opened guideline issued by the HQ prescribed the parameters of environmental data reporting. Some of the words were neighboured by scribbled translations into Nick's native language. The wall behind his red chair was supporting (or supported by?) a picture of the national leader. He offered tea; and I asked where he got those numbers from (that he had earlier presented to his boss). As a response he got out a file folder. Opening the folder, Nick presented its content:

Field Note Extract 2.1.a (Measuring electricity consumption)

> *Electricity invoices of 2008 and 2009. He pointed out that the invoices include the amount of kilowatt-hour (kWh)s consumed by highlighting the data. Thus, he had seen the numbers, not only calculated.*

This presentation of electricity supply invoices indicates several key elements, which we need to keep in mind to fully understand their social and environmental implications. This GCE consumed electricity for which it had to pay. An invoice listed the amount of consumption for which the GCE was charged. By showing the invoices Nick pointed out that he relied on measured data of the consumption (rather than on what he

would imagine as a calculation; see below). Within GFQ it mattered whether data was designated as 'measured', rather than 'calculated'. I was interested in this distinction because the HQ based EMS-Team was observing – what they called – 'data quality'☞. In order to engage with this object I exercised, and jotted down, how to classify them with the HQ's data quality filter. This filter consisted of a ranking: the EMS-Team considered measured data to be of higher quality than calculated data. The guideline, opened on his desk, was supposed to orient Nick: it included a hierarchical order of data qualities, depicted verbatim as Artefact 2.1.1. The object 'data quality' is central to the discussion in this book; therefore, Chapter 4 focusses on its existence.

Level of data quality:

3 = Data based on exact measurement
2 = Data based on calculation / detailed estimate
1 = Data based on rough estimate
0 = Data not reported

Artefact 2.1.1: Data Quality

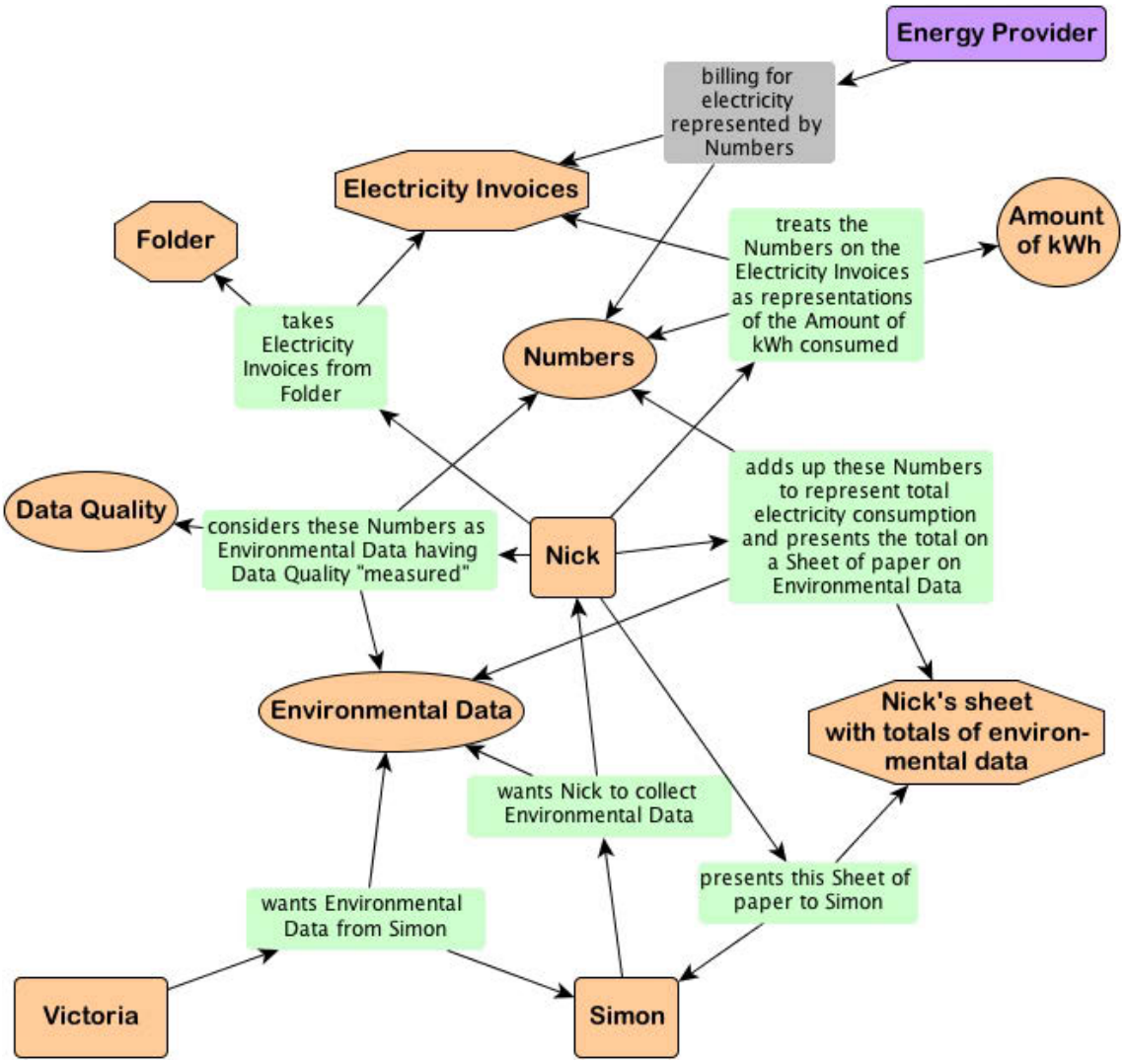
When I had asked Nick about the source of the numbers, he got out the invoices. For him, the numbers printed onto the latter constituted an appropriate reply to my question. Picture an invoice. He had highlighted those data representing the kilowatthours consumed which had been billed for. Thus, the measurement had neither been carried out nor observed by Nick. Rather, he must have assumed that these numbers were pertinent to the data request by the HQ. Therefore, in my reading, it was acceptable for him to copy these numbers and present them as data to Simon.

Using ANT, we are able to unpack the relations involved in this transfer of data from invoice to boss. The extract above provides us with a range of diverse actants having diverse qualities. Using a graph editor, I visualised them in Figure 2.1 on the next page.[2] This figure serves both to *illustrate* the relations implied in this transfer of numbers as well as to *document* a perspective in which the elements *appear* as positioned at equal level, corresponding to ANT's postulation of a 'symmetrical and tolerant description' (Callon 1999, 81). The following discussion, in consequence, analyses the figure, and results in a reconstruction of the power relations which does not presuppose *a priori* that humans, or entities like 'society' and 'nature' determine the situation.

First, we encountered Simon who acted as the environmental manager of the GCE. His task was to report environmental data to the HQ, represented by Victoria. To do this he had asked Nick – an engineer – to collect the respective data. Thus, Nick started to check where he may get the data from. He found data in invoices and provided selected information of these to Simon. To legitimise the numbers presented to Simon, Nick pointed to the 'facts' shown on the monthly invoices. Following Latour (1987, 23)

[2]This figure – as well as those below – indicates actants through the colour orange, a description of their relation in green. Actants which I have not directly observed are shown in violet, their relations into the field under study is represented in grey boxes. A rounded rectangular depicts human actors and organisations. I use octagons to point to (digital) materials and ellipses to informational actants.

Figure 2.1: Using amount of electricity billed for to speak for environmental effects



a so-called fact is something which does not invite to question 'ownership, construction, time and place'. Further, he suggests: 'A sentence may be made more of a fact or more of an artefact depending on how it is inserted into other sentences. *By itself a given sentence is neither a fact nor a fiction; it is made so by others, later on.*' (ibid., 25) In the case we are exploring Nick had enlisted the authority of the invoices to speak for the consumption of electrical energy. By that, he gave more weight to an element of the electricity provider's statement while deleting contextual information from the facts, which enacted a dichotomy of content and con-text. Thus, he had screened the documents and classified the information into different groups. Nick quoted the class, quantities and the units – but did not refer to the author of the consumption counts nor did he investigate how these counts were constructed. The invoices, thus, were a carrier of a range of information, some of which was translated to the sheet which Nick had used to present the number to his boss. Latour conceptualises the context

of a statement as its *modality* (1987, 22). A modality is a qualifying and, by that, modifying statement associated to the former statement. Another take on Nick's act of demodalising is to understand it as a form of *purification* (Latour 1993b). The invoices' offers of text were processed by Nick: first by purifying its information, resulting in a single number for each invoice, its unit (kWh) and class (electricity consumption generated by hydropower); then by adding the numbers up and copying this to Nick's sheet which he used to collect the environmental data. The effect of purification was that traces of the hybridity (in this case e. g.: authorship, materiality, historical position and economic relation between provider and customer) of the entity in question were silenced. GFQ was asking data collectors, i. e. Nick in this case, to assign the numbers reported a value for data quality. Thus, later he continued altering the modality of the statement by assigning the number the data quality signifier '3: measured', so signalling the HQ that the number has been read off a measuring device – or at least that it could be traced back to some form of document certifying the information. Throughout this process of altering the modality, Nick had to classify his own data access practice according to the list of data qualities. He had linked the information by the energy provider to the category measured, thus adopting this category to qualify the prior relations between provider and the invoice's numbers.

Following Latour (1987, 109-121), the set of relations performed by Nick can be understood as *translation*. By using a single number to represent the electricity consumption Nick created a fact which all other actants had to use. No actor attached to GFQ's EMS who had as a goal knowledge about this GCE's electricity consumption would look again at the invoices or look out for alternative facts. Nick's translation to the sheet made his fact indispensable. He became the macro-actor on top of the black-box called electricity consumption (Callon and Latour 1981, 284). This has politically non-innocent implications. Any translation is rendering two statements equivalent and, thus, shifts their meaning.[3] Law (2007, 4), therefore, points out that translation also implies a dimension of betrayal. According to this then, analytically, Nick and the electricity consumption number can be understood as allies. He allowed the energy provider's statements to circulate even further in the world and used his power to translate the invoices into a single number. And the invoices allowed him to translate some of their elements such that he could consider his job done. No doubt then, Haraway's (1991c, 195) finding that '[t]ranslation is always interpretative, critical and partial' can be confirmed: it was Nick making sense of the information which he transferred; he was only partially having access to the reality represented in the invoice and was only carrying over selected elements of the invoice; thus, he engaged in an act of deleting information which had the critical effect that Simon would be presented with a clear-cut figure without explicit authorship.

How did this information gain the possibility to travel? Latour (1987, 68) uses the concept of inscription to rethink the material foundation for the mobility of information.

[3]This equivalence is achieved for all practical purposes and is not necessarily assumed as given. The same holds, of course, for the translations undertaken by the author of this text.

The energy provider inscribed some selected information into the invoices sent to the GCE. An invoice, thus, can be understood as the 'visual display' of the electricity consumption. Latour refers to anything or any institution which provides such displays as inscription devices. Nick inscribed the electricity consumption number onto a sheet of paper, thus performing a further inscription device. Or, seen the other way around, Nick's environmental data sheet transformed – as Law (2004a, 20) points out – the material, i. e. here the invoice's information, into a purified form which was more apt to usage for the worker. The effect was simple enough: only traces of the originally rich invoices was left for the next level of translation. Most information inscribed in the invoices was not carried over by Nick's application of this specific inscription device. Such information got lost, was deleted from further consideration, muted. The associated implicit claim was that the product of the translation represents the reality of the GCE's electricity consumption. Latour (1987) points to two further competences of a statement which would strengthen it: combinability and stability. The invoices' numbers were easily combinable by Nick; he had to perform the mathematical operation called addition. At the same time, these numbers were stable. Neither was there a reason to question them, nor did they seem prone to erroneous copying.

This discussion showed that the simple administrative practice of adding up numbers provided by invoices in order to represent the total amount of kWh billed for has to be understood as consisting of constitutive and emerging relations giving rise to a specific configuration of power: among these was Nick gaining the power to construct, a fact which was not questioned in itself anymore.[4] This analysis, thus, suggests that the agent who identifies, classifies and translates data has much more power over the forming of the informational basis for constructing carbon emissions than the invoice itself. The latter could not force Nick to translate it in any specific way, it seemed.

While this first case did not question the class onto which the kWh consumed were to be mapped, next we look into Nick's practices and the relations he co-performed when he and Simon had to deal with the question of what type of environmental data some numbers were related to.

Paper: Classification Contested When Nick had joined Simon in his office, I introduced them to the database which GFQ used to collect environmental data. It was called ESDR. While I felt that I should introduce them to the details of the accounting technology, Simon reacted by stating 'in ten minutes we will be done'. I had just started to show the structure of an ESDR form to enter paper consumption data, when Simon interrupted me and decided to use this category as an exercise or showcase. Whether or not he actually intended to show that his GCE had no problems with entering data, Simon effectively employed the KPI paper as an example.

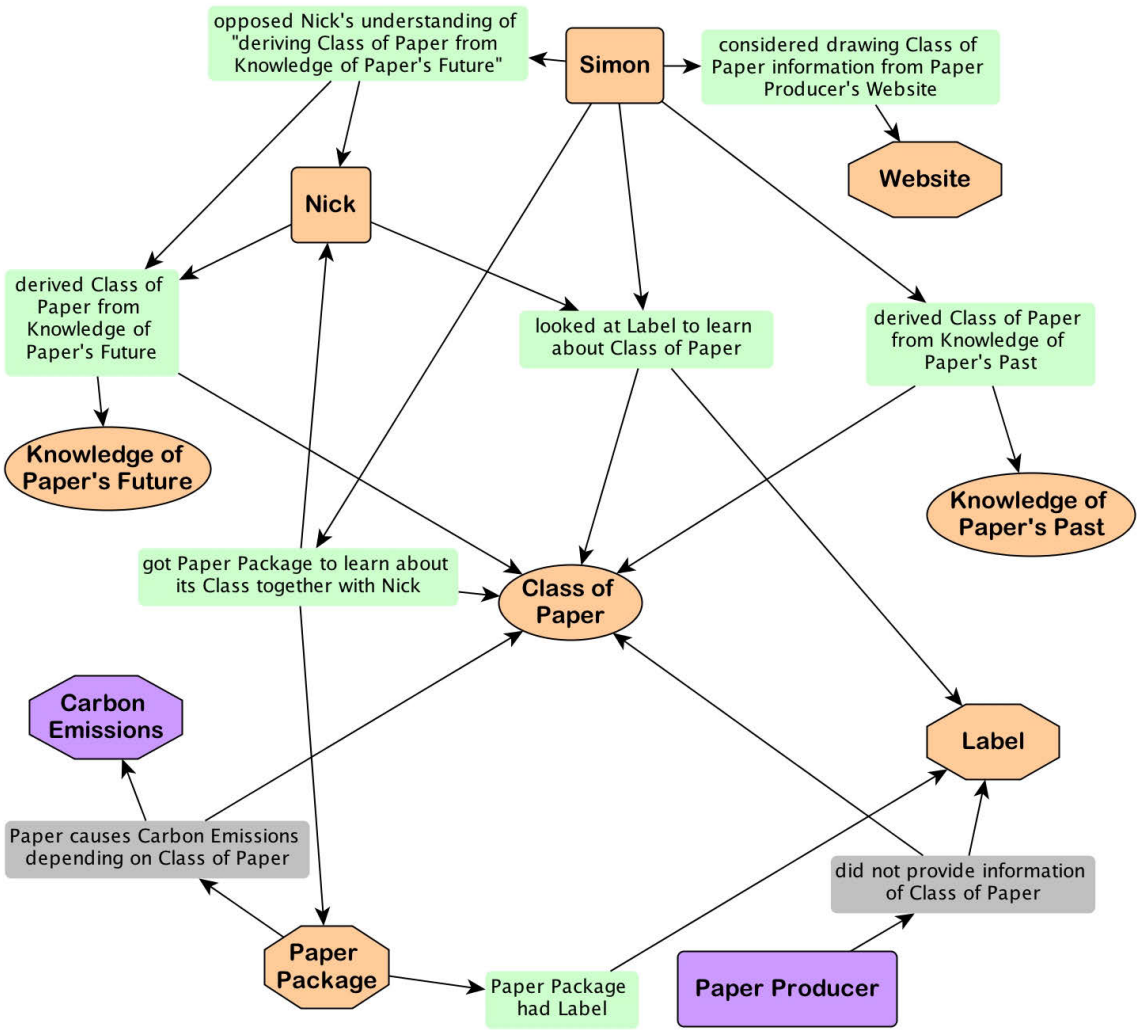
[4]To be more precise: the fact has not been altered during my field work and I see no reason why it should be; except, maybe, if this text sheds light to its conditions of existence.

Field Note Extract 2.1.b (Paper case)

> *Simon was getting up and fetched a 500 page package. He asked: what paper is it? And he looked at the labels but could not find much information. Then Simon suggested looking at the producer's website. They failed to identify the required information. After a short while, Nick claimed it to be recycled paper. Simon replied: no. This isn't recycled paper. We will recycle it. [...] Finally, Nick agreed.*

Paper does not necessarily equal paper. Different production processes and kinds of disposal are associated with different emissions. GFQ, thus, differentiated several types of paper, e. g. chlorine-bleached and recycled paper. Simon and Nick undertook an act of classifying the paper they normally used. For that, Simon briefly went to his secretary, getting a package of paper.

Figure 2.2: Establishing the Class of a Package of Paper



The very aim of Simon's move to get the paper package was to relate a local object to the database, central to GFQ's environmental universe. To translate the paper package existence into ESDR, they had to determine the package's class. It was this class which

was at stake in this situation, illustrated by its central position in Figure 2.2 on the facing page. Simon and Nick tried to ascertain the correct class of the package, choosing one of the classes offered on a list of available ESDR forms. Thus, a normative orientation was existing from the start: the local object was to fit the existing classification scheme. This likens the observation by Waterton (2002, 186) in her study of the classification of natures: she found that field ecologists are trained to fit their observations to existing categories. Troubles with lists of available classes and what they imply are a classic theme. Law and Lynch (1988) point, for example, to the problem of classifying entities for which no classes are available in the classification scheme or to the problem that the specification of classes cannot be applied by the agent who is supposed to apply them. An application of ESDR's classification presupposes that agents check which class a consumption belongs to. The problem is that classification schemes do not work as scripts which would determine members' classification practices; much rather – drawing on Waterton (2003, 126) – within the situation members have to improvise in order to determine any class. The way by which the scheme's prescriptions can be replicated in the encounter with paper package is contingent on the situation. Latour (1987, 89) suggested that in science in action things are 'defined by their performances [where] each performance presupposes a competence' (quoted without emphases).

In our case the material object had not been assessed by members based on some form of scientific or laboratory analysis, but rather, they questioned the object in two senses; the paper package's performance was questioned with respect to globally and temporally distributed competences: first, Simon asked the object's label to reveal its class, and when that failed, he suggested retrieving the required information from the producer's website. Second, Nick enquired into the near future of the object and found it will be recycled.[5] While Nick concluded, thus, that the object were to be classified as recycled paper, Simon opposed Nick's understanding. Thus, temporarily Simon and Nick were allies to competing claims: they considered the paper package to be the case of different classes. Following Beunza and Stark (2008, 272), we may expect that members would make a case for their respective claims. So, how was this struggle resolved? Rather than using the object's future as the indicator of its class, Simon implied, we should categorise the object based on its past. None of the two competing claims can be considered intrinsically right. Instead, drawing on MacKenzie (2009b, 26-30), we may conceptualise categorisation through finitism. A finitist take allows focus on the factors constraining the in-principle flexibility of classification-in-the-making. In this case, the constraining factor may be interpreted as the combination of formal authority of Simon in relation to Nick and the recognition of Simon's better understanding of English language. In both respects Simon was able to exhibit control because he related closer[6] than Nick to the sources of formal authority within the company and to the

[5] A note for the Northern/Western reader: In this particular culture it was not self-evident what the English term 'recycled paper' conventionally refers to.

[6] I recognise that 'closer' is not qualifying the relation in detail. Chapter 4 engages in depth with the power relations in the field and the relevancy of formal assignments of authority.

language in question. Thus, they moved on to inquire backwards in time. As they did not find any hint of the paper having been produced using recycled materials, they finally concluded the act of classification by deciding for the class 'new fibres elementary chlorine bleached'. In effect, having this particular paper package linked to the latter class of paper emerges as a result of specific (re)cognition and inscription practices. Hence, to classify elements, they need to be rendered as knowable, made the object of enquiry and the result needs to be attached to a category.

Yet another effect of their interaction is one we may call enculturation. With Latour (1987, 201) we are able to think of disputes over classification claims as signifying the boundaries of a culture: '"culture" is the set of elements that appear to be tied together when, and only when, we try to deny a claim or to shake an association'. In our case, Simon performed a boundary of a culture offering Nick to join. The former tied together the term recycled paper to a temporal view, i. e. determining whether a given paper object is recycled paper through its past. Under the circumstances of capitalist work-relations, Nick probably did not have much of a choice as to whether to accept his superior's offer. His application of the classification scheme was disciplined in the situation. In this new culture it is possible for a Nick to be green by means of switching from chlorine bleached paper to recycled paper. Porter (1995, 42-45) points to the significance of such effects. An accounting category may transform business practices such that the company performs well in this new dimension.

Finally, I employ this extract to emphasise a key assumption in the field: using paper, just like electricity, or engaging in any other consumption activity *causes* carbon emissions. Figure 2.2 shows how the conversation between Nick and Simon was related to carbon emissions. Here we approach the central concern of this book: the classification of the paper they used was linked to carbon emissions which they were about to construct as being caused by their paper usage. Depending on the class, different emissions would be constructed as the effect of this GCE's paper consumption.

This analysis suggests a number of effects: the particular choice for classifying the paper, Nick's enculturation, the possibility that members encountered a new possibility to render GFQ green(er) and the impact on the amount of carbon emitted. All these effects can be considered political. Clearly, then, categories have politics (Suchman 1994a). The classification scheme disciplined its users and its users disciplined each other in shaping their relation to the scheme. The 'correctly classified' consumption object presupposes the discipline of users and of the objects themselves.

Water: Classification Complexities The final case focuses on the mode of existence of carbon emissions. Above, we learned that to file an object it needed to be classified first. This implied giving voice to some modalities while black-boxing alternative ones. What happens if the available system of classification fails? This discussion opens a view onto the hinterland (Law 2004a, 27) of classification implications. The encounter between Nick and the class 'Water' allows us to unravel the implicit

assumptions and realities further: towards relating the practices at GFQ to external worlds of carbon fact production, in this case, Life Cycle Assessment (LCA).

When Nick approached filing water consumption, he diligently gathered data from different sources of water consumption, including a well, tap water, and, a huge amount of drinking water. However, then I had to interrupt his endeavour:

Field Note Extract 2.1.c (Water)

> *15:50: I told Nick that Elise was saying that drinking water* **is** *tap water. Nick asked: What shall I do? I replied: I can only inform you. I cannot decide. You have to decide. I told Nick that the HQ does not need the drinking water data that he had collected. But, I suggested, he could collect the data for his GCE.*
>
> *Then Nick was calling the canteen and cafeteria to ask how much drinking water they use. He added this information in the ESDR form for water drinking water.*

What had happened? GFQ used ESDR to collect environmental data from all over the globe. Members of the EMS-Team administered the database. Nick, as a local agent, put data into the database – by means of a form referred to as 'task', reproduced and anonymised as Artefact 2.1.3 on page 81. At the HQ, superior, in terms of the EMS-Team's hierarchy, members were able to access the data. Elise was one of them. I had stayed in close email contact with her in order to ensure the data which Nick constructed during my visit fitted the EMS's requirements. At 14:50 I had sent her an email differentiating the consumption of water according to different types of sources (a well, bottled water, tap water). At 15:01 she replied and dealt with the different classes of water. Her email provided, firstly, a quote from my original email to her, and secondly, an answer (a verbatim, anonymised extract):

[My text:] They are having a) a well (natural water), b) drinking water (in large cans – in heaps), c) tap water. What is tap water – which account are we supposed to use?
[Her reply:] Drinking water in cans is not included into the calculation, merely the water got from taps ([use the account] drinking water). Well water is natural water. This account is correct.

Artefact 2.1.2: Email at 15:01: Drinking Water defined

Key to understanding this email is first of all recognising the means which Elise and I drew on: accounts. ESDR can be understood as an effect of an accounting and audit society (Power 1999). Within this, 'environment' is managed through an accounting system which associated each consumption data set to an account. Such an account was characterised through an 'explanation', drawing out, i. e. defining, the class – indicated in the database form, Artefact 2.1.3, as mark 'A'. Elise, interpreting the definition, thus, specified that water received by means of a system of pipes, rather than by means of transportable cans, had to be filed in the account 'drinking water'. Water received through cans was to be excluded. Yet, after I informed Nick at 15:50 about Elise's filing prescription, he decided to collect the data on bottled water anyway. At this time it was significant that in Nick's culture water to be drunk was normally not obtained through a system of pipes, i. e. tap water, but through bottles and cans. This understanding

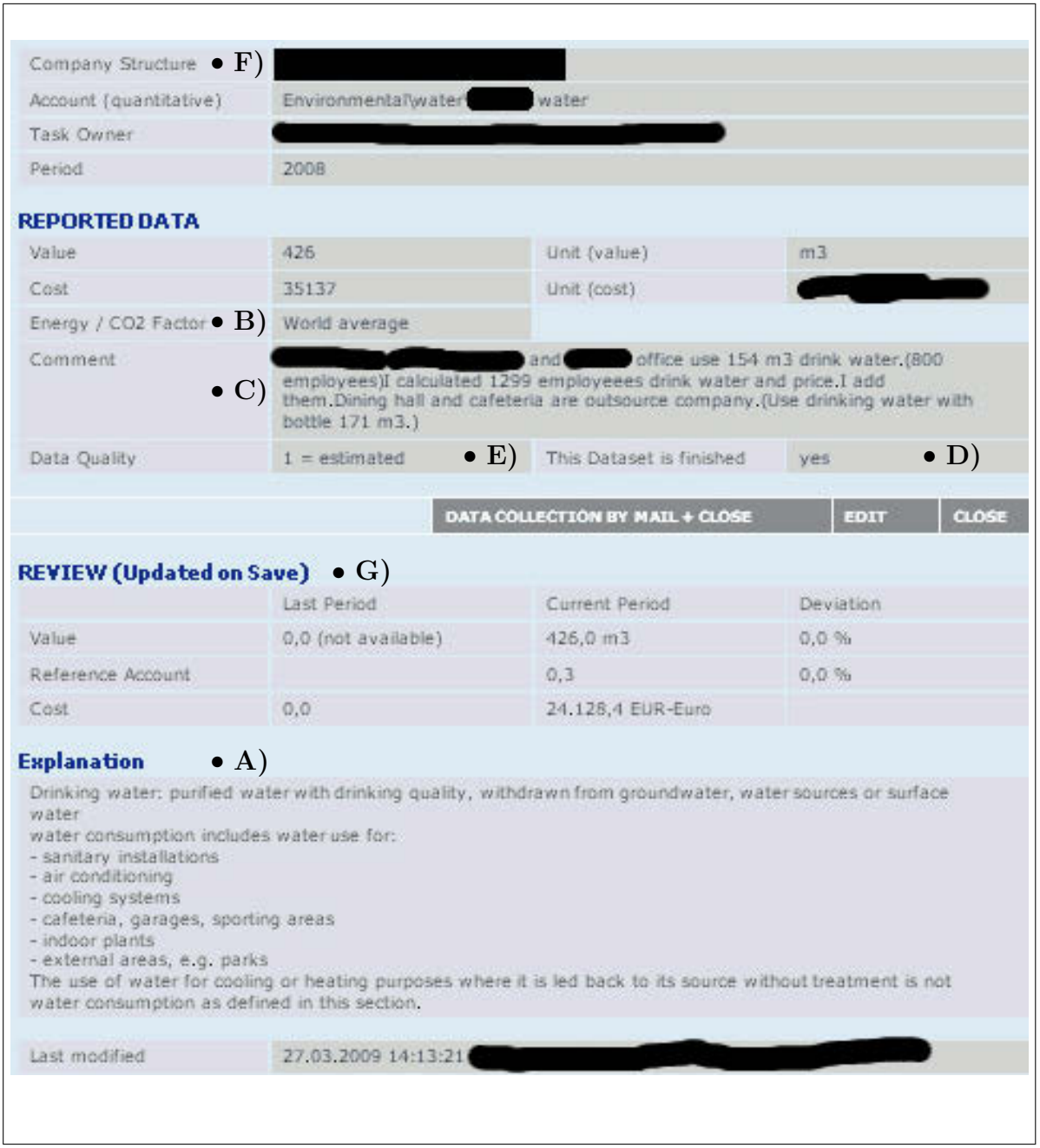
was not shared between Elise and Nick. Their approaches to how elements were to be associated with the term 'drinking water' exhibited a discrepancy. Culture is, thus, key to understandings which are drawn on in the practices of classification.

Any definition needs to be translated into the intended practice to produce the targeted effect. However, actual practice is informed and hold together culturally which may contain HQ prescriptions but is not determined by them. While Bowker (2000b, 659-660) generalises the effect of convergence – realities being fitted into the classification scheme, disciplined by it – and claimed that, because of this effect, databases can be expected to represent political economy well, Nick's treatment of bottled water questions challenges Bowker's interpretation: similar to Waterton (2002, 188), we find that, actually, an effect of convergence is precarious, contingent on how entities are translated into the database.

Another key element inscribed in the ESDR data entry form was its relation to a carbon conversion factor (mark 'B'). The respective factor stored in ESDR for the drinking water account was 0.3747 kilogram (kg) of so-called scope-3-emissions for each consumed cubic metre. This refers to indirect emissions caused in the life cycle of a product. Where did the number come from? GFQ was referring to the voluntary industry specific environmental reporting standard called VfU. This is a standard organised by several large international banks and insurance companies and is freely available to everybody.[7] Study of this document reveals that the number displayed is the sum of two factors, 0.283 and 0.0917. The former factor was presented as being derived from the emissions associated with a waste water treatment plant in Switzerland and the latter factor with the production of drinking water. These factors are prime examples for Latour's (1987) immutable mobiles. The documents refers to two sources, 'Althaus (2003)' and 'Doka Gabor (2003)'. These authors managed, by reducing their local investigations to factors, to make their judgements mobile (Almklov 2008, 876). The factor as the result of their calculations was not entirely isolated. Doka Gabor also made accessible information on the methodology of data construction. However, as he let me know, more details associated with the factors were only accessible commercially, at 1,800 Euro (EUR) plus taxes. The detailed contestation of carbon factors is out of scope of this book.[8] Following Mol (2002, 49), I do not question that somehow such records may be related to the bodies they refer to: like a patient record is very much the effect of heterogeneous elements like buildings, knives, administration work *as well as* a body, carbon emission factors may be assumed to be related in a complicated and contingent web of relations with the realities they aim to represent. If authors of carbon emission factors of, e. g., a water treatment plant, however, were to include the emissions associated with the financing of the plant, its insurance or investments, then, the authors should be recognising that they are relating back to their own work. These are intransitive relations (ibid., 120-121): GFQ's carbon report included the factor

[7] I discuss this standard in more depth below. See Section 4.3.

[8] For that see, for example, MacKenzie (2009a).



Artefact 2.1.3: Task for Water Consumption

which should (if they were to take the emissions associated with the treatment plant's finance world into account) include GFQ's report. Mol emphasises that when looking at work practices, such intransitive relations can be found. Nick's act of classifying water consumption as drinking water linked GFQ to emission factors which themselves should have been informed by GFQ's carbon reporting.

Doka Gabor presented himself as an LCA practitioner based in Switzerland and was aware of the contingencies of the facts he mobilised. This, at least, is the gist of his statements on ethics. His comment on epistemology (a verbatim copy from doka.ch/ethics.htm, accessed 2010-11-28) is particular relevant for our analysis:

> Contrary to popular belief an LCA study is never objective or provable. Subjectivity occurs in all phases of an LCA study. In that struggle I always take the side of the environment. With precaution I strive to make sure potential burdens are not lost from view.

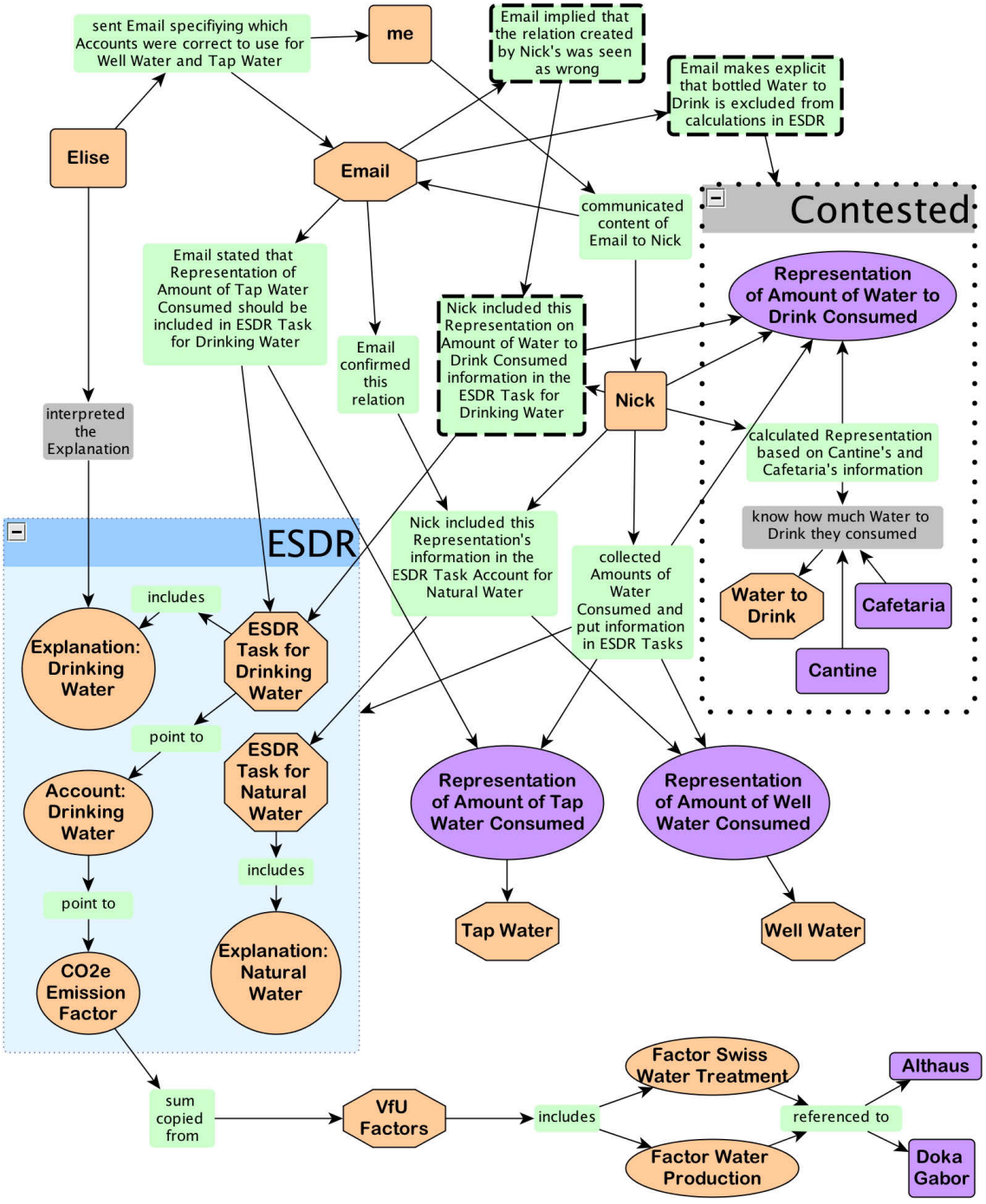
Artefact 2.1.4: Fragment of the Ethics Statement on Fairness

This author of carbon emissions factors, thus, did not imagine his work as free of values and politics. The modality lent to his factors was one which invited caution. Whatever GFQ was doing in carbon accounting, the emission factors linked their consumption to carbon emissions. And this link was not regarded from the point of view of the author of the factors as a positivist relation to facts-of-nature.

The specific configuration of Nick's classificatory act, furthermore, was resulting in a significant constraint. While the carbon emissions assigned to drinking water production and sewage treatment were included in the factors, the covering of the additional emissions of bottled water (implied within bottles' material and transport cycles) was uncertain in two ways: the emissions were multiply out of scope for GFQ because, first, Elise asked for excluding water from cans and, thus, emissions associated with this water. Second, this exclusion also led to not accounting for the emissions caused by the synthetic cans. Thus, while GFQ tried to account for its water consumption, their particular classification scheme's design could not access the emissions associated with packaging of bottled water. Bowker and Star (2000, 304) draw on Haraway's (1992) notion of *monsters*☞, referring to those elements which are considered exceptions to natural law, to emphasise how classification schemes necessarily imply that some elements do not fit and, therefore, cannot be clearly accounted for. GFQ's classification scheme did not allow to account for this exceptionalised water consumption; the latter can, hence, be understood as monstrous.

I mapped the water case in Figure 2.3 on the facing page; note the contested area. The highlighted (dashed black-boxes) relations were those performances which were giving the ultimate shape to what water consumptions were filed in the database, ESDR. This shape exists now as carbon matter. Law (2008, 10-14) refers to practices which perform such shapes as *mattering*, enacting matter. Nick's practice matters because through it carbon matter was ultimately presented as emitted by GFQ. The reality perceived is shaped by effects of performances of mattering. Struggles over the real are inherently political. Thus, doing classification implies 'ontic' political action – politics

Figure 2.3: Establishing the Right Choice of Accounts to File Water Consumption



of what metaphysics of water come into being, politics of, understood with Verran (2010, 109-113), what is. This practical politics of making things matter did *not* require explicit debate about the ontology of drinking water – ontological politics (Mol 2002; Law 2004a, 162). This is *no* harmonious ontic ethics-politics, in which agents recognise 'that different practices do different metaphysics', i. e. that things can exist differently, respect this finding and make it explicit (Law 2010, 127). More precisely, Nick inscribed one reality of water into ESDR, rather than others, while he recognised that this implies different meanings of what drinking water is. Like other databases (Verran 2010), ESDR decisively constrained this ontic action.

By my act in the field of asking Nick to decide about the inclusion of bottled water I tried to prevent too early a closure of the dispute. Rethinking this moment with MacKenzie's approach to finitism allows a view of how an implicit decision necessary to carry out the act of classifying has gained the possibility to play itself out more explicitly. Thus, in Artefact 2.1.3 (on page 81) Nick hinted in a 'Comment', mark 'C', that he added 171 cubic metre of bottled water in the account. Thus, the 64 kg CO_2e emissions assigned to this water (however, maybe not those to the bottles) were, eventually, included in GFQ's carbon emissions count. In that respect, Nick acted as a dissident (a phrase suggested by Callon 1999). That is, because classification is a practice, an engagement with classes opens up interpretative spaces which can be appropriated (Waterton 2002, 193). To classify, members have to draw or reproduce boundaries. This implies they can select meaningful things to count into the bounded area (Almklov 2008, 880). Nick could dissent from the classification scheme's intention because resistance to given categories is possible (Suchman 1994a). Nick did not let himself, and through that the product of his translation (the reported amount of water consumption), become enrolled by Elise; a betrayal took place – and I was an accomplice. Elise's act of purification was not completely successful. While she had the formal authority within the organisational structure of the EMS to interpret the definition provided in the form and to inscribe its application in a directive email to me, the relations involved did not lead to the prescribed effect. And, now, one might ask who or what was betrayed? Several actants are thinkable – among them the imaginary actant of GFQ or Nature. Analytically seen, the network of Nick, his data sources represented in various inscription devices, ESDR, me and our collective performance constituted an Obligatory Passage Point (OPP). Any water consumption fact of this GCE had to pass through the classification and translation filters of this network. From the point of view of the HQ actants this network would normally only be perceived in a *punctualised* form (Callon 1991). This resembles the punctualisation referred to by Law (1992, 5) who suggests that normally a television is perceived in a punctualised form; the network producing the TV effect remains behind the stage.

In Figure 2.3 on the previous page we are more specific than in the prior figures: what we previously referred to as 'Environmental Data' we are now detailing as 'ESDR tasks', i. e. ESDR task-forms☞ in which the data was contained. ESDR was a significant

part of the *machinery* (Lippert 2011a) in construing carbon emissions. The accounts were linked to conversion factors, which were used to calculate the amount of carbon emissions for the amount of water consumed. These conversions factors, as in the case of paper, were often specific for each class of material consumed, i. e. in this case differentiated for three types of water. The statements produced by the Swiss LCA practitioner Doka Gabor had been enrolled by an enterprise which was in charge of producing the nitty-gritty for the VfU standard.

This case followed the chain of translations further than the prior cases and, in this course, came across an exciting modality of ethics, which has been completely neglected in the public statements of GFQ: an author of carbon emission factors pointing out that these factors should not be interpreted as an objective and neutral entity. Classifying consumption into classes, thus, does not link consumption to some independent carbon reality but to authors of yet another informational entity.

♢ *End of Section* ♢

This section discussed the work required to classify the consumption of – as GFQ would have it – environmentally relevant goods and services into GFQ's central database. Following a subsidiary's environmental agent, we came across a range of elements and relations required to be in place for the desired transmission of data to the HQ.

With Bowker and Star (2000, 310), we could conceptualise the work observed as *articulation work*: this concept refers to managing overheads, i. e. those entities which do not fit the established categories of an organisation. This is the work of secretaries, parents, airtraffic controllers and nurses. Just like them, the agents entering data into carbon databases do invisible work. In Bowker and Star's words, 'articulation work [... is ...] work done in real time to manage contingencies'. This work matters because it is continually achieved by Nicks and Simons, agents working all over the globe. It is their work which gives rise to new facts about the carbon pollutions of the multinational. These facts still perform and can be expected to continue performing – as part of the corporation's emission history tables. At GFQ, carbon emissions have been computed based on consumption data. In this section I have established three key points.

Partial translation: consumption data was the result of partial and always interpretative translations. While data was found and translated, its authoredness was rendered invisible. Only because of this was it possible to present clear-cut, pure, facts. By cutting, the con of the con-text has been deleted. The human actant, Nick, seemed to have much power in translating consumption representations into environmental data: these powers have been entities like invoices, telephones, emails, pieces of papers, calculators and his own body. In general, we found him to not have made data. Much rather, his work consisted of bringing consumption statements into relation with each other, rendering them considerable as data. I argue that his approach was distinctively structured by the availability of these statements: he con-figured and con-texted them in ways which allowed him to pull out a folder of invoices or open a file, indexing the *sources* of *his* data. These sources were claimed to be representing specific pasts.

However, pasts are always indeterminate. They can only be reported and interpreted based on current acts of experience, conceptualisation and classification (Bowker and Star 2000, 40). The translation of statements into seemingly mere numbers allows for both, application of quantitative classes (and respective further quantitative operations) as well as the ignorance or reconfiguration of 'much of what is difficult or obscure' (Porter 1995, 85). If pure facts emerge from such translation of past consumptions into present environmental data, later political attention to the facts is unlikely, if not impossible (Bowker and Star 2000, 325).

Classification as a political activity: we found that classifying objects presupposes that the latter are rendered threefold, as knowable, as known and into an inscribed relation to a category. Through the last act, the attachment of a quantity to a category, a further relation is achieved: the quantity is linked to the carbon conversion factor which, in itself, is attached to the category. If emitting carbon is a politically relevant activity, then linking consumption to carbon renders this linkage political itself. Precisely because of the political – and economic, as I will show – relevancy of this link, the choice which categories to relate to quantities can easily be subject to contestation. Classification is contested. I showed how an organisation which has an idea of what is the 'correct' classification of an object presupposes the disciplining of the classification scheme's users. The latter have to realign their understanding of what *is* to the scheme's (or its representatives). In effect, 'local' conceptions can be marginalised through disciplining. With Riles (2010, 799), however, we find that statements were not existing so much as immutable mobiles (say, the invoices) that were disciplining the user (as Latour (1987) could be read). Rather, we may propose, it were the abilities of those actants that the data entering agents had to go through, i. e. the OPPs (such as databases and bosses, but see Section 2.3), that were decisively disciplining.

A monstrous enterprise: this section established also that culture is a key for members to conceptualise consumed entities and categories. While the corporation's HQ tried to prescribe how classification was to work, in practice this control was not possible: some prescriptions' intended effects could not materialise because they were not translated into work practice. This relates to the problem that, as MacKenzie (2009b, 120) put it, even 'the most detailed rulebook will on its own be insufficient to determine the practice of bookkeeping and accounting'. Even though Nick was accompanied by the HQ's set of prescriptions as well as by myself (also acting as HQ's representative in this case – and I did honestly voice HQ's prescriptions) it was he who was supposed to and managed to enter consumption data into the database. I am glad for this – yet in most organisations, humans cannot be totally steered by their superiors. With Latour (1993b) we can summarise: there is no such thing as the modern bureaucracy in which workers are merely cogs in the machine. They are creative, interpretive actants. Through their relational engineering achievements, they manage to link consumption to carbon emissions. In the course of this, the emission conversion factors are cited and recited, effectively strengthened (Lippert 2012a, 158). At the same time, however, they

are positioned even more precariously. If the factors also start to, or already, include the emissions attached to the financial relations in place for productions, i. e. if products' and services' conversion factors internalise the emissions 'caused' by their necessary financial overhead work, then a circular structure exists: factors are black-boxed into emissions and these emissions are black-boxed into factors. In many respects, then, Nick's practical work of categorising consumption mattered – and it still matters. Also black-boxed into the carbon matter, now linked to GFQ, are the meanings which members attached to the entities they needed for their work. As we have seen, however, meanings have been contested. Some meanings could not materialise. The water case provided a complicated story: while neither the HQ could ensure that their version of water determined which carbon emissions would be produced by Nick nor he himself had total control over the emissions, the conversion factors emerged as even more relevant. Nick could increase the quantity linked to a category and the respective factor, but he could not reconfigure the factor in itself. Some more emissions resulted than the HQ wanted, and some less than would have been appropriate for Nick's wish to represent bottled water consumption. Thus, in the midst of multiple meanings, some emissions became invisible. Bowker and Star (2000, 310) call these monsters. The latter emerge when the multiplicity of meanings cannot be accounted for. The bottled water may only just be a monster, maybe an imp; but are there meanings than are not categorisable?[9] Nick's boss made clear he did not want all the meanings made explicit – the boss wanted pure facts. Juggling meanings is what Bowker and Star call *categorial work*. A question which we have to follow throughout this book, then, is where monsters are constructed, how they come into being or are rendered explicit. One way of attempts to balance out monsters was enabled through the quantitative character of the data. The combinability of quantitative facts provides for possibilities to add numbers quite freely: a data-entering agent can simply increase numbers as translations of imps into emissions. Another way is the one this book takes: re- and alter-modalising emissions. This includes pointing to the non-positivist relation of the author of conversion factors to his products: if a factor's author tags his products as subjective, it seems monstrous for an enterprise to get rid off such a statement.

Two positions need stressing. Agreeing with Bowker and Star (2000), classification is a practice configured in a heterogeneous network that does *not* produce neutral facts. From this analysis, classifying consumption emerges as a fundamental issue of the politics of what is counted as reality. Also, tracing Waterton's (2002) argument, at the same time, a classification scheme cannot be expected to produce orderly effects: because it is an issue of practice, its effects cannot be predicted through an engagement with the history of the scheme. While the scheme influences how consumption is linked to carbon matter, human actants' classification practice can dissent from prescription, such as the subversive calculative operations as seen by Nick. In the following, therefore, we turn to how numbers and calculative work was performed by him.

[9] I am grateful to Lucy Suchman for making me aware of the difference between things that are uncategorisable (monsters) vs. those that are translated across normative differences (that I call imp).

2.2 Constructing Consumption via Calculation

In the prior section, we encountered Nick classifying quantitative data and, thereafter, translating that data into account forms provided by GFQ's database ESDR. For these successful translations he had carried out three simple calculations; two of these even did not seem noteworthy. In this section we revisit these instances and wonder about the quality of calculations. It immediately comes to mind that calculations are different from classifications because the former is concerned with quantitative information. More precisely, whereas classification implies that entities are sorted into groups, calculation presupposes a common metric allowing commensuration (Espeland and Stevens 1998, 316). Similarly, carrying out calculations also translates some things into other things (Latour 1987, 239). How does this kind of operation matter? This section shows that maths matters, that the practical reality of calculating constructs emissions.[10]

For our understanding of society and economy, calculations matter a lot. According to Köhler (2010), modern institutions are fundamentally characterised by people being convinced of the calculability of societal phenomena, organisations and issues. Following Weber, he argues that modern administration uses numbers and their rational calculable transformations to translate social processes into expectable-predictable orders. Accounting is one of the main calculative mechanisms orientated at that goal. Callon (1998b, 23) reads Weber as suggesting accounting to be a 'key prerequisite of modern capitalism'. And for Guattari (1995, 34-35) 'formulae, equations and calculations' may be part of the machines which populate our universe and shape our relations. If indeed number operations, their translations into accounting systems, are of such importance, then we need to investigate how they are practically performed and what is silenced in that process. Callon (1998b), continues, by calling for studies of this 'humble, disclaimed and misunderstood practice: accounting and the tools it elaborates'. By that, he carried over the proposal of Latour (1987, 246), to follow the calculators and how they tie together information, into making the economic sphere a sociological object.[11] In this book, I draw on their approaches to study the inside of an economic actant, GFQ.

In the edited volume *The Laws of The Markets* (Callon), Miller (1998) argues that accounting shapes what it measures. For the accounting practices shown above, as they incorporate various instances of classifications, we can comprehend this: we saw that classifying performed water, paper and electricity consumption. In this section we broaden our perspective by engaging with this quantitative type of translation. Some readers might wonder: calculation should be left where it belongs: in the realm ob abstract cognitive engagement. Calculation is to be studied (and developed) in high school or at university. However, Lave (1988), in her study of supermarket best-buy decisions, pointed out that mathematics in practice is a very different enterprise

[10] For this argument, I am not engaging with a sociology of mathematics (as an academic discipline). The latter has been undertaken by e. g. Heintz (2000). I use the word calculation to refer to a practical and material activity by humans, rather than to a disembodied mathematical logic.

[11] This theme resonates with further texts (e. g. Hacking 1990; Porter 1995), here not in focus.

compared to high school problems.[12] She shows that it makes a difference whether you solve a 'going to the store' problem in high school (in which the store is actually not relevant but you need to do the maths 'correctly') or if you are going to the store (and need to buy things). In the latter case, in actual practice, people have different aims compared to the classroom; they act within a physically structured space and they gather local knowledges about the shopping space as well as about the organisation of prices. If we are to understand how calculation practices affected the construction of carbon emissions, we need to study the 'actual calculative practices of actors at work' (Beunza and Stark 2008, 253). This requires to do a sociology of calculation.[13] Following Kalthoff (2005, 70), I read calculation as a type of epistemic practice through which new objects are performed. By investigating four calculative instances, this section contributes to this field.

First, we revisit the additive calculations which we glossed over in the prior section. This allows us to situate the rationale of these translations. Second, the section turns to calculations in which Nick used cost information to derive consumption. By studying this example we draw out the analytical implications for understanding calculations. Third, the story follows Nick in a combination of calculation and classification practices. This allows us to study the materiality required to render the issue calculable. Correspondingly, fourth, we engage in a conversation about purifying a calculation from unwanted information. In conclusion to this section, I draw out some cautious suggestions for an ethical reconsideration of the received understanding of calculations. The prime case discussed below concerns the determination of 'kilometres flown by Nick's GCE's employees'. To produce a fact about this distance Nick had to construct a complicated network of relations between data and assumptions, rendering specific fragments visible or invisible. Figure 2.6 (on page 105) sketches these relations which I iteratively introduce.

Above, we encountered Nick who was engaged with mapping representations of environmental consumption onto accounts provided by the Environmental Management System (EMS). For example, he made electricity invoices speak for the electricity consumed at that particular site of his GCE at which he was working as an engineer. He needed to check the monthly invoices for the relevant information, the amount of kWh billed for, and added them up subsequently. Later, he qualified the year's consumption sum which he put into the database: he inscribed into ESDR's form for 'data quality'☞ that the amount of consumption had been 'measured' (rather than 'calculated'). However, from a naïve point of view, we should wonder now why he designated this modality to the number. After all, adding up can easily be understood to be a mathematical operation. ↪[14] For the case of water consumption, he also added up several consumption information (in this case in cubic metre). However, in this

[12] See also Verran (2001).

[13] A sociology of calculation is usually implicit. However, Kalthoff (2005) and Cochoy (2008) use this notion. I read them as compatible with the work following the paradigm of Callon (1998c).

[14] The following discussion is relating to Artefact 2.1.3 (on page 81).

situation he qualified the numbers as 'estimated'. If we revisit Artefact 2.1.3, we find right of mark 'C' a so-called comment, provided by Nick. The comment can be read as proposing that 800 employees used 154 m^3 of drinking water. The amount of employees was relevant because he knew that at his site of his GCE 800 employees worked. I did not ask where the number came from; and at another situation I asked whether he were sure about the number. He was not. However, the 800 employees number was adequately correct for all intentions and practical purposes of the situation. Both of us shared, thus, the *judgement* that it was right to enter a false number under the specific circumstances: a couple of workers more or less did not make what members would consider a 'significant' difference). This finding resembles Lampland's (2010) account of false numbers in the context of rendering quantification routines acceptable. Note, the situation, in terms of present humans, was immediately shaped by himself. I was merely present as a support worker and researcher. Thus, I did not constitute a dangerous challenge to the number. Nor would I want to challenge it now in ethical or evaluative terms. I draw attention to this fact in order to argue for the situatedness of the calculation we are dealing with. A calculation can only be understood by engaging with the situation in which it was present.

The number was not present by accident but for particular calculatory purposes. Rather, Nick drew it onto the scene in order for it to do work and speak within the following continuation of the calculation: he implicitly argued that if 800 employees consume 154 m^3, 1299 employees would consume 250 m^3. The premise was that he can apply the same level of consumption that he calculated for the 800 workers to people somewhere else. This is a further order of qualification – a judgement about offices and workers whose consumption rate he did not have immediate information about. Nick's practical solution to the lack of information was, thus, the construction of a generalising calculus: with it he could remove the site-specificity of the data he already had. This calculus required further assumptions. The 1,299 employees were taken as the amount of employees of his total GCE. By dividing the local consumption (154 m^3) by the amount of consumers (800 employees) he derived a drinking water consumption factor of about a fifth cubic metre, surmised and immediately assigned as average consumption of employees. He then multiplied this factor with the amount of all employees, a calculus called *extrapolation*. In this way, he inscribed the estimation that the employees at his site consumed as much drinking water as those located hundreds of kilometres away. Then, in friction with HQ advise, he added the water consumption amount he had gathered from the cafeteria. Thus, this case is one of calculations and judgements being built upon other calculations and judgements – focussed precisely on the building and entangling *with* the organisation, rather than disentangling numbers from the organisation and scrutinising them in isolation.

This description differs very much from Kalthoff's (2005). He had carried out field work; in the financial services sector, too. However, he focusses on risk analysts. They made their business by questioning the data they received in order to evaluate the risk

reality supposedly represented by various forms and tables. The rationale was that better checking would result in a more reliable understanding of the economic reality represented. Thus, they were orientated towards an external actor (e. g. a firm which wanted to borrow money from their bank). In my case, however, the figures produced by Nick were directed at *internal* actors who did not have any reason to question the data. The figures were not linked to the core business of GFQ. Rather, they were seen as an add-on which Nick invested only a few days in – his boss, Simon, would not have wanted otherwise. The rationale of the figures produced by Nick was to account for his GCE's environmental consumption reality. He would try to give a good and defendable account. However, he did not have to be interested in uncovering the reality underlying the invoices or the water consumption reality far away from his site. He could safely assume that any of the calculations and judgements he was performing would not alter the objects' characteristics (Kalthoff 2002, 29). I, thus, propose that by referring to the orientation of a calculative agent we understand better whether the agent would focus on opening black boxes or, rather, closing, stabilising or sealing them.

Translating Costs into Consumption We just encountered that Nick had inscribed the generalised consumption of abstract employees into the sum of drinking water consumption. He had assumed them to, on average, consume the same amount of drinking water. What do such generalisations entail? I turn now to another instance of generalisation to spell out the steps needed to perform such a calculation.

Early on during my visit to Nick, I had asked him how he had gathered the data. He provided this overall narrative:

Field Note Extract 2.2.a (Collecting data)

> *First he sent emails to the secretaries of the managers at [corporate sites at three other cities]. He expected an answer from them soon. Further, he took data from the accounting department, asking them: how much money did they pay for water, gas and electricity. He told me the prices for these commodities. 1 m^3 of water equals 2.3 EUR, 1 kWh of electricity equals 0.08 EUR and 1 m^3 of natural gas equals 0.033 EUR. I asked whether getting the data was a problem. His reply was straight forward: no. Second, he said, I wrote and calculated. Nick suggested that it would be great if the accounting department would provide a programme/software for this calculation. His completion of the narration was: this is the story.*

In this extract we learn about how Nick mobilised data and transformed them into consumption data. According to Barry and Slater (2002), we should ask on what calculativeness depends in this case. Prior to relating numbers to each other and transforming them in any way, Nick had to gather data. He requested that specific data from other organisational actors. In this set-up, he would accept the data delivered by these other actors, i. e. the secretaries (of other sites of his GCE) and his contacts at the accounting department of his GCE's site. By that he used these other actors each as a version of, as I will argue, an Obligatory Passage Point (OPP). While in Latour's (1987,

245) account, centres of calculations appear as focussed OPPs, collecting, reviewing and creating more abstract forms of data, when following the flow of data at GFQ – from consumers via secretaries to Nicks, Simons to the HQ – each of them can be considered as a point through which data has to pass. As a source point and control centre at the same time, depending on from which direction in the imagined flow you are looking. In the account of Nick, we find his ability to enact a centre of calculation to be dependent on the distributed OPPs through which data was passed on to him; at the same time these source points were dependent on Nick to pass on the data to the HQ. They enacted the punctualised sources of data for him. For him, to request the appropriate data, he needed to know what data counts.[15] His practice of requesting data can be understood as initialising a process fundamental to calculations in general.

Callon and Muniesa (2002; 2005, 1231) propose that as a first of three steps to any calculations, 'the relevant entities are sorted out, detached, and displayed within a single space' (Callon and Law 2005, 719), i. e. classified into the account. In Nick's case, the sorting was performed at the moment of requesting specific data and retrieving precisely that data. Note that this was not self-evident. It can easily occur, as we shall see below, that actually data is delivered which does not fit to the imagined space. However, in this case, Nick treated the data he got as compatible. This implies a significant performative move. By treating the data in this way, he positioned the data as ready for and to be treated by commensuration.

As a second step of the calculation, the entities within the space can be positioned in new relations to each other, be transformed. Lohmann (2009b, 503) points to the laborious process partially necessary at this step to 'rework the objects' in order to make them '"passive" and tractable to the agencies of calculation'. Nick needed to invest such work. It consisted of making a metric and a spatio-temporal assumption: that the consumption of drinking water, electricity and natural gas were priced, and equally so. With that, I point to the qualities of two kinds of generalisations. Consumption was commensured through the metric of costs, counted in Euro. As Espeland and Stevens (1998, 316, 317) suggest, in this moment all uncertainties have been absorbed; data is rendered as certainly commensurable through a common metric. Thus, following the classificatory step, drawn into a single space, the entities can be compared through the same kind of measurement. In this case, Nick transformed the prices into an *ordered* set of six types of data: for the consumption a quantifier (the amount consumed), a unit (through which the amount was measured) and a category (the category of service consumed); and again, for the referenced costs a quantifier (the price), a unit (the currency EUR) and a category (costs); all of this information was explicitly inscribed in ESDR task-forms☞. Thus, the commensuration moment in this step of calculating consisted of organising data in specific relations, allowing for mathematical operations on them. Furthermore, his approach also implied stability in both dimensions: consumption

[15] In that respect, Nick was performing a similar function of knowledge compared to the one used by the traders described by Beunza and Stark (2008, 253). Their arbitrage traders needed to know what counts as a condition for performing any quantitative calculative operations.

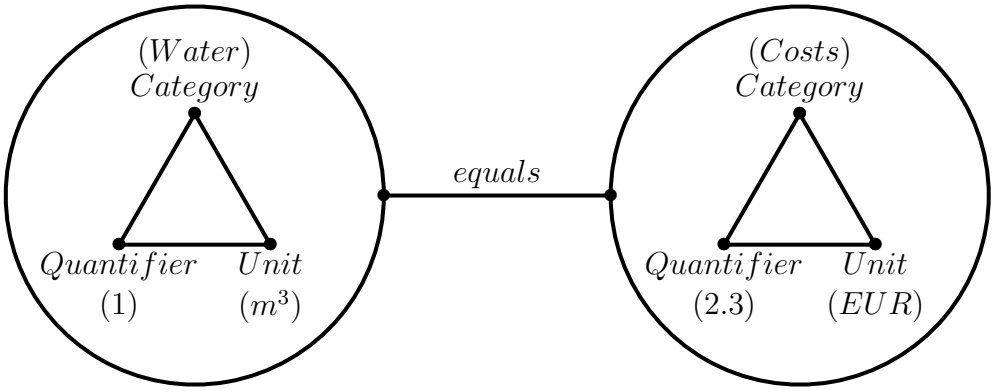
prices for these entities were judged as the same at the different *sites* of consumption and at different *times* of consumption. By this, Nick effectively extended the network which he was shaping. Rather than describing the information in words and telling his superior that he could not get fitting data, Nick translated the data into entities which allowed further calculations (Latour 1987, 251).

The calculation concluded:

> third, a result is extracted. A new entity is produced. A ranking, a sum, a decision. A judgment. A calculation. And this new entity corresponds precisely to – is nothing other than – the relations and manipulations that have been performed along the way (Callon and Law 2005, 719).

What does judgment mean in this respect? Haven't we just described a quite 'normal' calculation? No, Nick had to take judgements which he wove into the calculation's thread. He first separated what data he wanted to commensurate, i. e. make equal, and, later, he added spatio-temporal assumptions about prices. Beunza and Stark (2008, 256) generalise: 'calculation involves judgement'. Callon and Muniesa (2005, 1231) (re)draw the boundary of calculations such that they include the distinctions needed to be made for calculativeness to be established. All the numbers assigned to categories are performing judgements (Robson 1992). Thus, a statement like '1 m^3 of water costs 2.3 EUR' establishes seven relations and two sets; the set consisting of the triangular relations between the quantifier one, the unit and the category water as well as the set of, again, triangular relations between 2.3, the currency and the category costs. And these two triangles are, again, related to each other, illustrated in Figure 2.4. Note, such a statement is everything but universal. It does not translate into arbitrary languages (Guyer et al. 2010).

Figure 2.4: Relations in a Simple Quantitative Statement



Nevertheless, Nick had to get on with his work: he employed this structure of data to relate it to quantified representations of his work environment, the count of workers of his GCE and the costs of consumption at his office site. (I reconstructed their respective

assumptions and judgements towards the beginning of this section.) With some further mathematical operations, multiplications and divisions, Nick achieved to calculate for several environmental indicators the total consumption amounts of the GCE.

The newly made entities – each a complicated network of relations and imagined entities – are, thus, the result of processes which included both, quantitative transformations as well as qualifications. Callon and Law (2005) propose to call this kind of process *qualculation*. Such qualculations 'are all about arraying and manipulating entities in a space in order to achieve an outcome, a conclusion' (ibid., 719). I introduce this concept in order to distance ourselves from the received view on carbon accounting as some simple number juggling. The notion qualculation, thus, should be understood as a sociological designation for what actually happens in the practice called by members 'calculation'. The outcome of a qualculation is turned into a thing because its constituents 'hold together' (Callon and Muniesa 2005, 1233). This new statement is stable and mobile. An open question, however, is this: what is lost by drawing these diverse entities into a single 'spatio-temporal space'? I explore this question by turning to a specific formula which Nick used.

Qualculation in Practice It has become recognisable now that, analytically at the least, it is apt to not discriminate between (qualitative) judgement and (quantitative) calculation. When Nick was attending to the travel account, he drew together a number of entities. The EMS prescribed members to account for the distance travelled by various means; travel was a Key Performance Indicator (KPI). One of its sub-accounts was called 'short-haul flights'. This account was represented to the ESDR user Nick through a task-form. As the starting point of this calculation Nick used, again, a sum of costs. The sum he used was the total of the GCE's financial cost account for domestic flights. For our purposes, it suffices to introduce the calculation as a formula. The total costs of domestic flights is indicated as $total\ flight\ costs_{dom.\ flights}$. Yet, the concern is not about anything measurable as 'EUR' but only in a distance, like 'kilometre (km)'.

Field Note Extract 2.2.b (Calculating travel)

He calculated the following:

$$\frac{total\ \ flight\ costs_{dom.\ flights} * average\ \ flight\ dist._{dom.\ flights}}{average\ \ flight\ costs_{dom.\ \ flight}} = total\ dist._{dom.\ \ flights}$$

$$\frac{168{,}078\,EUR * 500\,km}{230\,EUR} = 365{,}387\,km$$

I suggested writing the comment in the record of the database how he calculated the estimations. He was a bit hesitating but then did so.

As a way of scrutinising this calculation, I tease out what has been included in it. Above all, Nick had identified a particular partial statement which he took into account: it was the triangularised statement, consisting of a known category and unit, both prescribed by the task-form, as well an unknown quantifier – in short: the total distance (*total dist.*) of short-haul flights. In order to make this quantifier known, he engaged in a series of routine translations. With Verran (1999, 150) we can assume his quantification

routines as resulting in certainty. The result of his calculation was to be certain – this was the very aim of the activity. Otherwise, he could have simply made up a number. She proposes that by studying how certainty of numbers is achieved we can make the quality of their certainty experienceable. To commence the qualculatory path towards a (re)solution for the unknown quantifier, first, somehow, he had excavated a statement on the total costs of domestic flights paid by his GCE (168,078 EUR): whilst Nick himself was tied to the building in which he worked, he was able to mobilise via phone and emails actants at other places, motivating them to submit data to him. For this calculation, he relied on one such datum which he retrieved from others. Second, he mobilised his estimating imagination. By this, he was able to draw two further statements into the calculative space which he was forming. These were statements about the average distance of domestic flights (500 km, denoted as *average flight dist.*$_{dom.\,flights}$) as well as their average costs (230 EUR). By saying 'average' we are referring to a spatio-temporal set of assumptions including, as discussed above, the imaginary of commensurability. Verran's (2010, 106) comparative qualculation studies emphasise that any such generalisation logic is particular, premised upon a particular ontics. These statements were, thus, not purely quantitative but interwoven with judgements. Stabilised by a variety of assumptions, his calculative space consisted in total of four statements, one of which was not completely known. These statements needed to be rendered commensurable, i. e., calculable.

Table 2.1: Organised Qualculative Statements

Knowledge Status	Framed triples of data		
	Quantifier	**Unit**	**Category of Flights**
Partial Statement	?	km	short-haul (s. h.)
Complete Statements	500	km	average s. h. flight distance
	168,078	EUR	total s. h. flight costs
	230	EUR	average s. h. flight costs

In Table 2.1 we find these statements organised into a common frame, into triples. This can be understood as a first transformation of the elements within the calculative space. Cochoy (2008) suggests, further, that calculative spaces can be structured. Then, this reconstruction of the statements as a threefold-structured space can also be understood as a manipulation of the space itself. By translating the statements into such triples of *differentially treatable but directly related elements*, Nick rendered all these flights and costs as commensurable – in two metrics for costs and distances. The assumptions could not exist anymore explicitly in this space. To illustrate, by conceptualising the average flight costs as quantitatively measurable and representable in this triangular set – rather than, say, as 'too expensive' or uncertain, '230 EUR**?**' – it became commensurable (Porter 1995, 86) with the dissimilar thing total flight costs.

Through commensuration, the difference of both things is translated into a question of magnitude, Espeland and Stevens (1998, 316) argue. Nick then searched for a way to relate these triangular sets in a way which would allow him to *produce* a result which he could enter into the form's field for the desired quantifier '?'.

While commensurability in itself is often questioned, the choice for *the* (usually as singular conceptualised) mathematical apparatus as an appropriate calculus is normally not questioned. It has been normalised. Even more, working with numbers has become a social norm. Porter (1995), correspondingly, studied 'trust in numbers'. He sees quantification as a social technology (ibid., 49). 'Strict quantification through measurement, counting, and calculation, is among the most credible strategies for rendering nature or society objective.' (ibid., 74) Historically, he traced back, objectivity became to be seen as subordinating human, personal interests, substituting the latter by public standards. Nick, maybe influenced by being a well-trained engineer, reproduced this normative choice to operate a standard division using this apparatus, to employ its operation rules. The latter imply not only a set of axioms[16] – what mathematicians call 'foundation' – (which in itself is changing, and is contested, Shulman 1996), but also very particular relations, among humans and other materials (Restivo 1993; Barany and MacKenzie 2011). The solution he found to identify the unknown consisted of rearranging the triples into triangles which would form what mathematicians call an equation. This formula brought together many relations – illustrated, symbolically, in Figure 2.5 on the facing page.[17] On the left hand, the outer circle depicts the formula as a total. The right hand circle represents the class (short-haul flights). Nick linked both circles. Inside the left hand circle, three punctualised data sets are found (each small circle). Nick constructed the relations for each data point between quantifier, unit and category (the triangles). In order to imitate the shape of the formula, the figure presents the relation between the data points with a denomination line and a multiplication point.

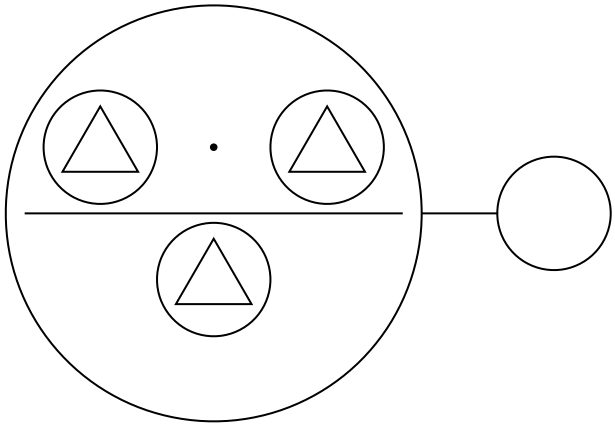
The result of this calculation, which Nick extracted after a series of transformation of the calculative space and the statements he assembled, could be referred to as the total distance of domestic flights. His arrangement, thus, produced a punctualised entity (365,387 km). By this I mean that not only was this entity black-boxing the various assumptions and data constructing methods (including: aligning actors, communication devices, statements, a formula), but also that this entity appeared as a single point to which Nick could later on refer to and calculatively work with.[18] However, while the equality sign '=', only introduced in the sixteenth century (Cajori 1909, 175), suggests

[16] The standard axiomatic system for set theory, at the moment, is staged as a 20^{th} century enterprise – referenced by Wikipedia authors e. g. to Fraenkel, Bar-Hillel, and Levy (1973), Zermelo (1908), see Kunen (1980).

[17] It follows the logics of Figure 2.4. For an explanation see also the introduction corresponding to Figure 2.4 (on page 93).

[18] Kalthoff (2005, 71, 74) emphasises the distinction between 'calculating something' and 'calculating with something'. The former refers to the production of numbers and the latter refers to the expectation that one can use the numbers to interpret a reality and built on this interpretation.

Figure 2.5: Relations in a Simple Qualculation



that both sides of the formula are substitutable, I propose, that this formula did not at all result in an absolute equation. The very point of the labour put into this qualculatory work, was to produce an entity of higher value. If both sides had been equal, there would have not been any progress with his work: the information after the translation must differ (Latour 1987, 51, 238-239). His investment in the calculation was worth it because the task-form demanded from Nick to insert a numeric value into the form's field entitled 'Value'. Technically, the form did not allow the user to inscribe it with the pile of triangular sets in the field. And, how could he have easily represented the left hand of the so-called equation? Equality between both sides of the relation emerges, thus, as restricted to a narrow mathematical sense. For all practical purposes, both sides did not have the same value for the user. The appropriate choice of a reduction apparatus was key for Nick in order to make present an entity which ESDR and he, himself, could easily calculate with. We find, thus, that the mathematical apparatus performed by Nick should not be understood as operating primarily on numbers. Two-thirds of the elements which it transformed into invisible were qualifiers – units and categories. This very achievement made possible that the traces of the qualitative relations underlying a quantifier could be hidden from users along the numbers' production cycle.

Nick rendered this specific entity temporarily visible. Hence, Nick presented an entity, brought it into *presence*. However, as the literature of the performativity of economics – which I read as an element of the sociology of calculation – reminds us: any presence also implies an *absence*. Nick rendered this new entity into the visible, whilst at the same time blinding himself and all other actants who would deal with his constructs from recognising all the other assumptions drawn into his calculation. Beunza and Stark (2008, 279) remark: seeing implies blinding; moving things away, out of the focus, out of the frame – framing being the conceptualisation offered by Callon. Drawing on Goffman (1975), he proposes the notion of *frame* to mark the boundary of that which is self-evident (Callon 1998a, 249). Things which are not or cannot be accommodated in the frame are out of the frame, are *overflow*☞. In their

later work, Callon and Law (2005) generalise that all qualculations co-exist with 'absent presences of non-calculations'. Some things which are not part of the qualculation are, nevertheless, present; they continue to be part of the imagined total world (i. e. of the critical realist real). However, these things do not enter the calculative space, nor are they in other ways penetrated by judgements. Rather, they are judged to be left out of further instances of qualculations. This includes all those monstrous flights which did not fit Nick's spatio-temporal assumptions.

The formula used by Nick was key in the formation of this specific new entity, i. e. the result of 365,387 km. If the formula had been different, the outcome would diverge from this quantitative reality. And such calculations could in principle take place so they are part of bills; but that does not make them less contingent and precarious. Nick expressed for the calculations discussed earlier, that he would have liked to automatise such calculations. He voiced how helpful it would be if GFQ provided him with a software to apply such formulas, without him needing to actively decide for the arrangement of numbers and pressing buttons on a calculator. In this situation, my immediate response had been: I started considering whether I could convince my superiors to implement such a device within ESDR. The material form of a calculative device black boxes assumptions and methods (Knorr Cetina and Bruegger 2002; Kalthoff 2005; Beunza and Stark 2008, 254; MacKenzie 2009b, 59). An actor with a device differs from an actor without one. They enact both, framing and overflowing, while making overflows less visible. Nick constituted a new entity with his particular material arrangement of other entities. The travel 'consumption' which he brought into presence represented this arrangement, the relations inscribed in it, and not something outside. Knorr Cetina and Bruegger (2002) refer to this as not representing a reality out there, but as constituting an own reality, without any counterpart 'outside'. They call this form of making present *appresentation*. Kalthoff (2005, 71), thus, suggests that 'through technical devices of calculation [...] companies are constituted anew'.

We return to how Nick proceeded with the calculation. He navigated to the ESDR application in his web browser, and opened a task-form that was linked to the account short-haul flights. He entered the calculation's result, as well as other necessary data, declared the data quality of this task-form as 'calculated' and 'completed' by checking a box; mark 'D'. These actions were achieved in few moments – and they achieved very much: Nick declared *domestic* flights as *short-haul* flights. This was consequential in three ways. (1) He mapped domestic flights of a variety of distances onto the distance 500 km. The indicator 'short-haul flights' was specified within ESDR as having a carbon emission conversion factor of 180 gram (g)/km. Nick, thus, enacted a classification of all the domestic flights as short-haul flights, which, by that, would become visible as having caused in total about 66 tonne (t) of CO_2 emissions. All the domestic flights' emissions longer than 500 km (identified as monstrous flights above) would accrue in the absent realm of overflows. Thus, a first effect was that the calculated emissions were *lower* than if he had assumed flights to span longer distances. (2) In addition,

this overflow of monstrous flights would, if Nick had 'implemented' HQ's prescriptions, actually have resulted in lower total emissions. This specific overflow needs spelling out. HQ wanted GCEs to classify flights, spanning more than 500 km as long-haul flights. The indicator for long-haul flights was associated with a conversion factor of 110 g/km. Thus, long-haul flights were considered to cause less relative emissions than short-haul flights. If Nick had classified flights which had spanned distances of slightly over 500 km as long-haul flights, total emissions would have been lower. Thus, the second effect was that Nick *increased* his GCE's emissions. (3) Finally, however, by assuming that all international flights were long-haul flights from HQ's perspective, all those international flights which spanned less than 500 km were about to be related to a 'too low' emission factor, resulting in *lower* emissions. While we find that the actual performative effects of Nick's qualculation are not easy to sum up, it becomes clear that it is precisely through his qualculative engagement with these entities that the accounting model was extended, i. e. that the calculuses of standard mathematics as well as of carbon markets were applied on his data. However, as Miller's (2002) intervention in the performativity of economics debate argues, actually, calculuses do not represent well the relations on the ground. The calculuses are staged as data-being-governed. But, as we have seen, data is translated to fit the models, leaving monsters☞ aside. Nick, and similar agents, were situated to provide the data demanded by the corporation. This does not mean the results of qualculations actually reflect what they appear to represent. Appresenting facts, thus, necessarily implies absences; and those entities which are present are present because of normative and political moves. The structure of the qualculation employed statements; these were translated, transformed, into data points, rendered into particular relations to provide a *result* for the EMS's forms. Yet, none of these calculations directly link to real emissions.

Finally, however, Nick had not been too happy with his calculation, even though he had produced a clear-cut number which nicely fit into the form provided by ESDR. Shortly after carrying out the calculation, he asked his accounting department for further information. How their reaction changed the situation is the subsequent topic.

Exclusive Materialities The final part of this section serves to rethink the ambiguous role of materials which enable and are formed by qualculative practices. This involves attending to how these materials have been configured, i. e., their materiality. As a point of departure, I shift forward a couple of hours. We were both waiting for Nick's boss, Simon, to call us. Nick and me were about to report to Simon about our data construction outcomes of the day. While we were waiting, Nick allowed me to shadow him as he was checking emails. At some point, I was losing track of time – it was after 5 pm, he received an email detailing what had been actually paid by the accountants through the domestic flight account. The email contained an spreadsheet.

Field Note Extract 2.2.c (Problem with calculation)

He was scrolling through a Microsoft (MS) Excel spreadsheet and found: domestic flight included items such as:

- *boat [to cross river in the city at which his GCE site was operating],*
- *taxi*
- *restaurant visit: 12 EUR*
- *McDonald's [other city]*
- *visa costs: 265 EUR*
- *1166.5 EUR for former business partner, Jones.*

Nick called out: the list includes Lunch!

Checking emails can be considered a routine activity. In this case, the digital material which Nick immediately hove into the qualculative space constituted a problématique. Looking at the spreadsheet's contents, he found statements which destabilised the arrangement which he had constructed before. Learning about these items shacked the relations holding together *total flight costs*$_{dom.\ flights}$. This triple data point set (quantifier, currency and account, i. e. 168,078 EUR paid for domestic flights) was built upon the foundation of a pure account class. However, with this email, Nick learned that some items had been classified into the category – practically speaking: put into the account – which he considered out of place. From his point of view, all the items named above should have not been linked as co-constituents to be represented in the account. Rather, the relations should have been ones signifying exclusion. This moment points, thus, to two issues of materiality: of what kind of material consisted a flight; and, what was specific about the material Nick now came across.

The materiality of flights: the items, Nick just learned about, deserve our attention. Reading through them, we may ask: how are they constituting domestic flights or not? Where does a flight start, where does it end? Does it start when you book the flight? Does it start when you imagine yourself driving to an airport, rather than going by train? How are these boundaries drawn? Deciding upon these questions configures how flights are material, which materials flights consist of and, hence, *does* (Butler 1993) (the ontics of) flights. Thus, relating to the *materiality* of some thing, addresses how that thing is configured, how it is material. Nick might have shared the understanding with other actors within GFQ that a flight starts when a GCE agent entered a plane physically and the plane moved into the air. Then, the materiality of flights would have been related to the agent using a plane. Nonetheless, as we have seen above, he only related to flights covered by the costs account of his GCE. However, if I were to travel somewhere by plane, I can easily see how this entails all these items (except of the last, 1,165 EUR): I would organise to receive a visa – well, maybe for international flights, normally not for domestic ones; I would take a taxi and maybe also a ferry to get to the airport; eat at a McDonald's while waiting for the flight; and, after I arrived go for a proper meal. In that way, all these items are well accountable for.

Thus, while we can easily see how actors might associate certain costs with a flight's account, an environmental management agent would be characterised by classifying only the paid for service of being flown in itself as an orderly instance of the category short-haul flights. The implicit claim is that a flight account has clear cut boundaries

of what should be included in it and what not. For Nick, the materiality of flights was, therefore, an accounting issue.

However, while certainly GFQ agents had clear cut understandings of how their financial accounts were to be used as containers for a GCE's expenditures, the case of environmental accounting is more complex. Here is a brief excursus: a colleague of mine at the HQ explained once that they recently altered the carbon conversion factor reference for flights. The former reference[19] provided a factor including the carbon emission caused by operating some of the infrastructure necessary for flights to be possibilised, e. g. airports. HQ's EMS agents adjusted the flight carbon emission factors to draw the boundary around the flights, excluding the infrastructure operation's emissions. The result was a decrease of the carbon conversion factor for short-haul flights by a factor of 1.8 and of the long-haul flights' factor by 1.06 times – when comparing the employed conversion factors[20] with the factors GFQ was employing for other categories; the differences are depicted in Table 2.2. Clearly, both standards measure different objects. Conveniently, the qualculations followed on after Nick's data input, would translate his data into CO_2e, measured as metric weight. That different instruments measure different objects (Mol 2002, 75), and that Nick's data input would be measured through competing instruments which all produced results (and were rendered commensurable via their metric weight specifications), would be made invisible.

Table 2.2: Carbon Conversion Factors for Flights

Source	Indicator	Conversion Factor
	Travel: Flights	**kg/km**
VfU	short-haul	0.326
	long-haul	0.116
WBCSD	short-haul	0.18
	long-haul	0.11

Above, we have already introduced the pair of concepts frame/overflow coined by Callon (1998a). This pair is useful to immerse ourselves in the significance in the boundaries drawn – those enacted by Nick and by GFQ through its database ESDR into which the lower two conversion factors of the table have been inscribed. Nick framed what he wanted to include into his calculation. He considered the items listed above out-of-scope for what he had to report. Hear the exclamation mark: *Lunch!* – reminding us of the everyday achievement of practical office work (Suchman 1983).

It became clear to me, that he felt that the list was not pure. What were Nick's options? He could be annoyed about his GCE's accounting department not maintaining pure records. If he was to purify the record, it would be a local purification; it would

[19]Normally, GFQ used the VfU as a reference for conversion factors.

[20]Referenced to the WBCSD's GHG Protocol.

not spread. However, purification was in order (Latour 1993b). Even though I did not observe any purification, let us understand what was supposed to happen after that point. One by one, Nick had looked at all the items listed in the flights account spreadsheet. Most of them had been flights. Cleaning up the record would consist of evaluating each item in terms of whether it would fit to the category domestic flights. Let me comment on some of the items named above. How could GFQ's EMS account for them? Table 2.3 provides a humble approach to provide you an idea of how GFQ would deal with these items. Without going into details, it suffices to note that some consumption types have not been provided for in the classification scheme; no classification scheme can attend to all characteristics of the objects it seeks to frame (Waterton 2002, 195).

Table 2.3: Accounting for Wrong Items?

	Accountable?	
Item	**Within EMS**	**Outside EMS**
Boat	A travel indicator existed.	However, it did neither have categories for travel by boat or a category 'other'.
Taxi	A travel indicator with a sub indicator for car travel existed.	However, only the carbon emissions caused by GFQ owned, officially hired or private cars were considered to be accounted for. A taxi trip was not part of this framing.
Restaurant visit; McDonald's		I learned explicitly: food is not considered a topic for the EMS
Visa costs; Transfer of funds		Probably out of scope of the EMS.

For GFQ's operations – 'serving' global financial markets – all these consumption items, goods and services, and myriads of others were required to be in place. The hegemonic form of markets would not work without the infrastructures connecting people with their mobility devices (Bowker and Star 2000; Jackson, Edwards, Bowker, and Knobel 2007). However, Nick was about to exclude these infrastructure network instances from the calculative space which he had drawn up in order to provide data designated to represent his GCE's carbon emissions. The items shown on the list are what Callon (1998a) called an overflow. Mainstream economic theory refers to this overflow as 'externality' (Callon 1998b, 16-17).[21] Callon suggests that not everything can be framed. If social or environmental problems occur because some material entities have not been part of the frame which has been optimised, this is referred to

[21] See also for competing engagements with externalities in economics Pigou (1920), Coase (1960).

as 'market failure' (1998a, 247).[22] Caring for the environment is not easily compatible with qualculation (Callon and Law 2005, 725). The materiality of the flights accounted for excluded many elements required for actual flights to be possible.

The material devices carrying the qualculation: in the instance encountered above, Nick's situation had been utterly changed at the moment the materiality of his qualculative space was, literally, re-con-figured. The arrival of the spreadsheet transformed the network, it introduced figures to be recognised together with other data points anew. It made the presence of a number of items visible which Nick did not want in the space. Thus, as a consequence of a new material entering the calculative space, the actual materiality of flights was questioned: flights consisted of costs taken into account and through the spreadsheet Nick found that the total costs were have not been purely consisting of 'proper' flight costs. Callon and Law (2005, 731) suggested this as a general property of qualculations:[23]

> 'Quantitative methods, qualitative procedures, professional judgments, or the tinkering of daily practice, all of these are qualculative. And how they are done is a function of the material arrangements, including the bodies, in which they are produced.'

A qualculation is dependent on the materialities which provide the entities to be drawn into the judgement-calculative space. At the same time, drawing some entities into that space may exclude other entities from being recognised in that space. This can have material effects. Thus, the material called 'result' may have inclusive and exclusive effects. In the case discussed above, some carbon emissions were not accounted for: a couple of days after my meeting with Nick, a number was in the database for this type of flights. The number was slightly less than 60% of the number which we had calculated together. The comments were gone. We learned to see that the seemingly known part of the total sum of flight costs was 'non-accurate'. It included expenses which should have never been part of the number associated with $\textit{total flight costs}_{\textit{dom. flights}}$. Thus, the quantifier for $\textit{total dist.}_{\textit{dom. flights}}$ was too high a result. From that point of view, a reduction of the quantifier reported for the account short-haul flights seems to have been a reasonable choice for Nick. As a reaction to the recognised shift in materiality, Nick had purified the statements entering the qualculation and transformed them in a way, probably along the lines described above, to conclude with an equivalent valuable result – one he could enter into the task-form. Thus, effectively, the spreadsheet made Nick re-materialise the short-haul flights flown accounted for by his GCE. And, I argue, the spreadsheet itself was reconfiguring as well the situation: Nick knew that this spreadsheet must have been a copy which also was existing at other places within the subsidiary. While, more easily, he could have ignored a phone call, specifying the

[22] Note, in other respects it might also be good that some entities are not drawn into the space of qualculability (Callon and Law 2005); maybe we do not want all areas of life to be governed by judgements and calculations.

[23] Kalthoff (2005, 75) makes an equivalent point.

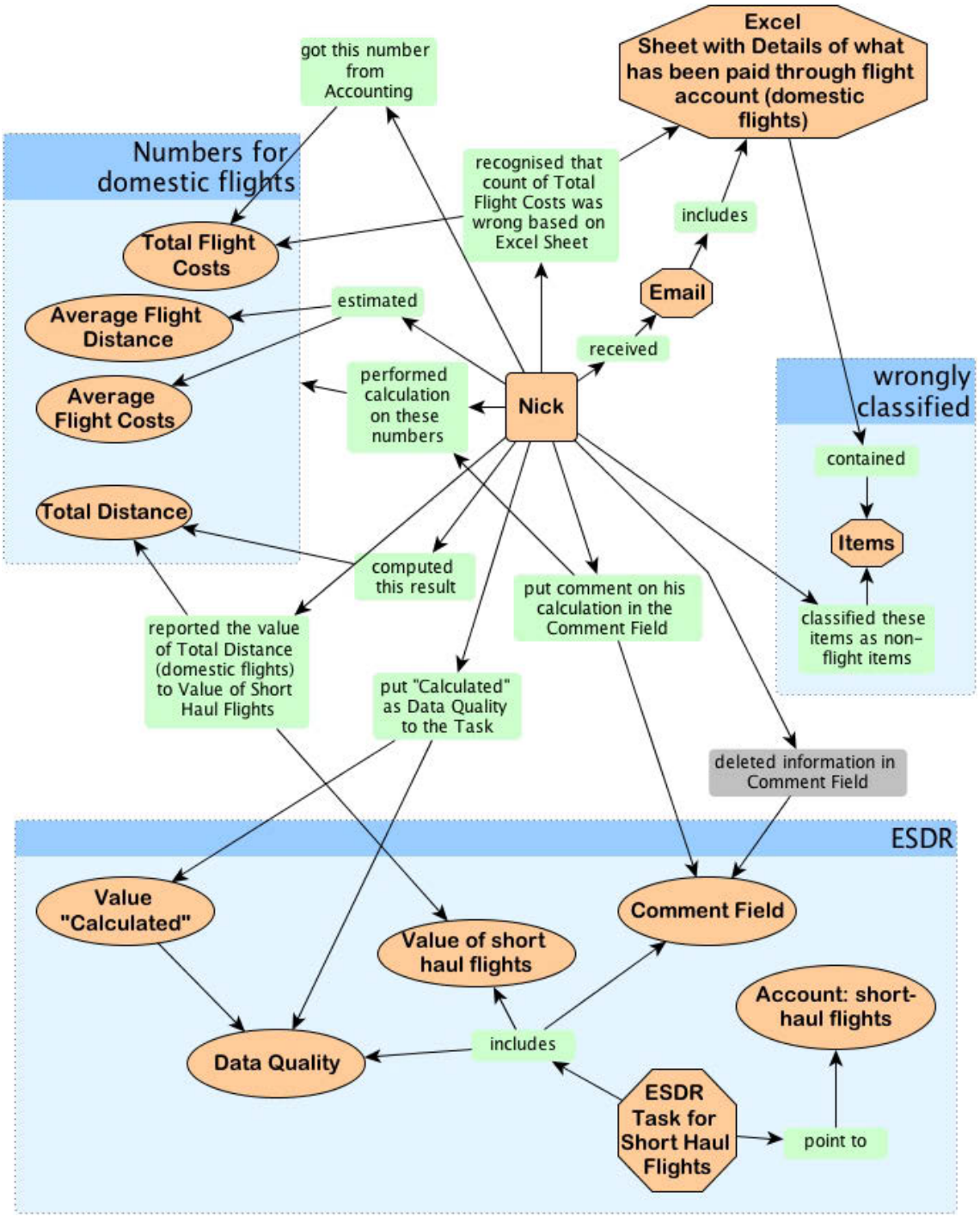
impurity of the numbers in the cost account, the spreadsheet's multiple existence, in his inbox as well at uncontrollable other locations, urged him to lift (it into) the calculation, and through that take it into account. However, we need also to consider this: what is about flights paid through other accounts – just like visa were paid through the flights account? This constitutes an unsolvable ambiguity, overflows out of Nick's hands.

◊ *End of Section* ◊

This section set out to ask how calculative operations matter in the construction of carbon emissions. We found that when we turn to the specific numbers, they emerge not at all as absolutely stable. Much rather, entering and working with false numbers can be very adequate. To be a competent practitioner of carbon accounting, at GFQ, in specific situations, one better makes not a fuss about small differences in numbers. However, at the bottom of GFQ, members had to use exactly this kind of entity, numbers, to construct facts which would fit the HQ's forms. The corporation used a database which did not allow for complex texts. Correspondingly, I found that the complex realities encountered at the subsidiary were stripped off some of their complexities by reducing them into a specific frame which allowed to calculate with them. This form was characterised through a threefold differentiation between quantifiers, units and categories to describe consumption of goods and services. I, thus, identified a triangular structure which consumption in*form*ation (Robson 1992, 691) took. At the same time, assumptions were rendered invisible. These triangles could be arranged such that the standard mathematical apparatus could digest them. This apparatus was, as one could expect, transforming the quantifiers, producing new numbers. However, we need to emphasise that these rules of calculation were also acting on the remaining qualifiers which were part of the triangles. The result was that the new consumption fact was neat, stripped off, once again, of its qualifying history. While a formula describing the calculation would normally be called 'equation', this designation tricks the reader. I was able to establish the – for all practical purposes – in-equality between both sides of data arrangement. The very point of this calculative work was to transform data, to make it different – much rather than keeping it the same. This process of manipulating data required constant judgements. Calculation carbon emissions is full of such judgements. It would be wrong to say that this did not have consequences. The effect of taking these judgements, of translating data into different data, was that members were able to format data such that it would fit ESDR. Only by taking these normatively and politically consequential moves, a person supposed to enter data into the database could get her job done. Therefore it is apt to conceptualise carbon not as simply calculated, but as qualculated – as implicated in both qualitative and quantitative manipulations of data and their relations.

Figure 2.6 on the next page sketches the key relations and practices which the example of Nick, qualculating the distance of short-haul flights by his GCE, entailed. All these relations had to be in place for Nick's GCE to 'posses' its 'total distance of travel by short-haul flights by all its employees for corporate purposes'. This included

Figure 2.6: Calculating the Total Distance of Short-Haul Flights Travelled



the relations between Nick and the items which he understood to have been wrongly classified into the flight account. One aspect deserves more attention: the deletion of the comment in the ESDR form. I attend to this in the next section. The result of this qualculative network which Nick conducted was a pure number without easily recognisable traces of the qualculative work which it was based upon; no comment would suggest to its readers how the distance reported had been assembled.

Following the observation by Kalthoff (2002, 33), we notice that this GCE did not possess some singular objective or independently existing fact like a 'total distance of travel by short-haul flights by all its employees for corporate purposes'. A story suggesting that this fact can be simply figured out on the basis of 'hard accounting facts' to be read off the records is glossing over too many ambiguities. Rather, during the process of data collection at this GCE, many 'total distance*s* of travel by short-haul flights by all its employees for corporate purposes' existed. '[T]hese calculations always remain incomplete' (ibid.). While appresenting any such fact, overflows resulted. Realities were silenced when trying to purify data. However, even the merely mathematical application of rules attached further relations to people, texts, assumptions, world-views to consumption data and, thus, carbon. Any informational entity produced while qualculating towards carbon emissions has to be conceptualised as hybrid, intrinsically related to those entities considered meaningless along the way, monsters.

For calculating is taking place in the real world, and not in some abstract logical pure space, the materials employed for calculation affect the calculative work. Material devices like calculators or spreadsheets enable their users to organise their data manipulation practices – and they can get in the way. Any quantity entered into an environmental accounting database has undergone qualculative moments. Therefore, it makes as much sense to assign a number which Nick en-calculated himself the data quality sign 'measured' as the status 'calculated'. The scale of data quality used by GFQ did not correspond to the qualculative data processing reality on the ground.

Environmental economics proposes to 'internalise' those realities which are significant for the social or environmental outcome into calculations (Clark and York 2005, 409). Global climate change is seen, correspondingly, as a market failure (Stern 2008). The implication of this understanding is that the economic and qualculative space which are part of allocating 'goods' and 'bads' (Beck 1996) need to be more inclusive. This would require the metrological networks to extend and incorporate more entities (Latour 1987). This is exactly the move which can be observed in global environmental politics. The introduction of more and more accounting systems – to account for nature – can be observed (Asdal 2008).

However, the discussion in this section clearly suggests: numbers do not mirror reality 'out there'. Numbers represent the relations and materials which have been arranged to fit together and perform a result. However, all these relations can be called into question; the materials – and this can be observed well at their boundaries – do not produce stable self-evident entities. When we see numbers which make sense then it is

because they are relating to some forms of qualifiers. However, whenever we encounter such constructs we should keep in mind that these are translated, alter-materialised, versions relating to invisibilised realities. They are signifiers of loss of accounts of realities and, thus, of lost chances to exercise transparency, democratic decision-making.

2.3 Commanding Carbon

Recall, it was Simon who ordered Nick to gather consumption data from all over the GCE. Consequently, we have investigated what gathering data meant as a practical activity: we found two fundamental types of practices underlying the translation of consumption of goods and services into carbon emission data – the classification and calculation of consumption. This section underlines a moment of these practices' situatedness, the moment their arte-facts returned to so-called superiors. For that I am shifting the focus from the construction of data sets to the performance of *relations* between bosses and the facts produced. By way of engaging with the presence of Simon (the boss) in Nick's (the subordinated engineer's) work to enter the data in ESDR, a re-conceptualisation of what it means to command carbon becomes possible. Agents who were engaged in the commanding of carbon were utterly dependent on heterogeneous elements in the network. To illustrate this argument we follow the finalisation of 'decisions' over carbon, from Nick's office in the basement to the GCE's top level.

Towards the end of my visit to Nick, he went through all the ESDR task-forms☞, checking whether we had to discuss any more issues.

Field Note Extract 2.3.a (Excluding paper consumed)

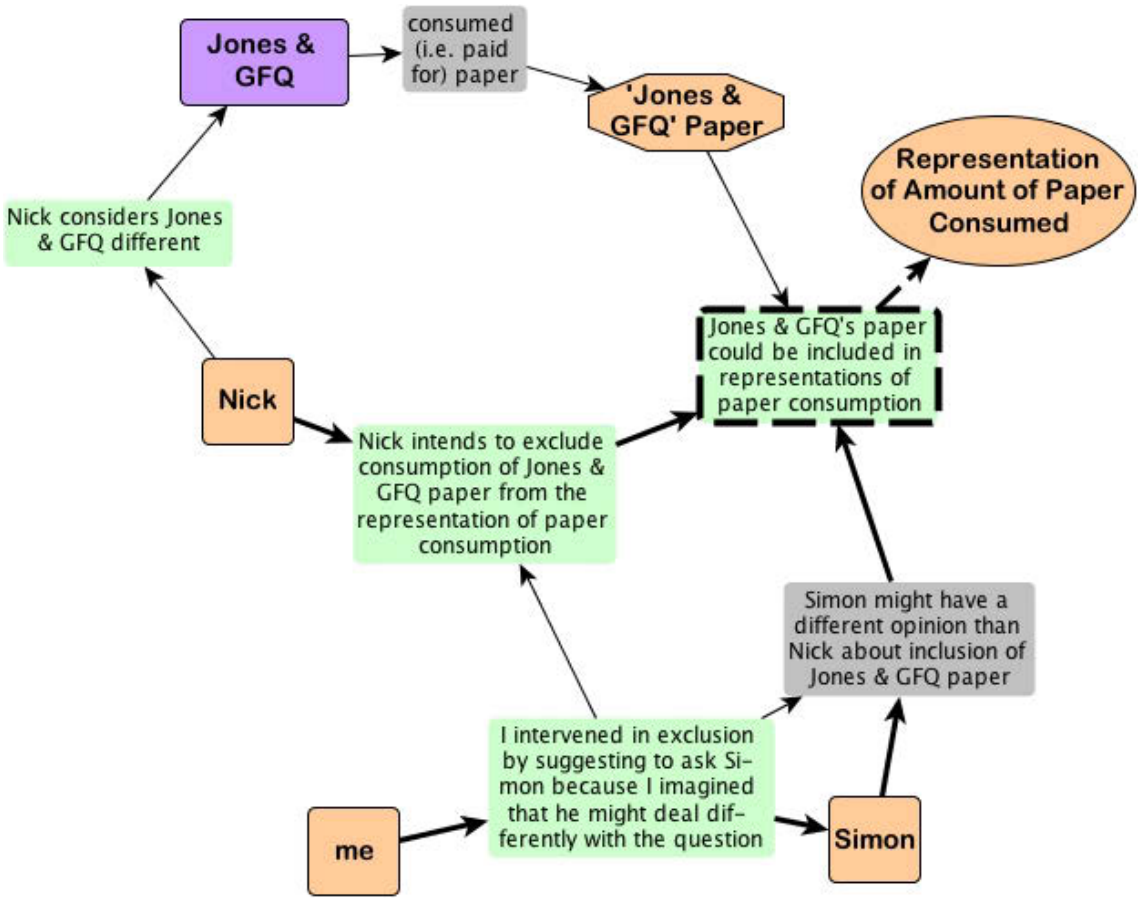
Regarding counting the amount of paper consumed, Nick declared: Jones & GFQ was different. We should not include their paper.

I suggested to ask Simon about this.

This moment connects some very differently existing actants. Nick and me were present and related to a recently departed organisation 'Jones & GFQ' and paper labelled with the name of this organisation. I challenged the way Nick was about to materialise the relation between GFQ's carbon emission machinery and Jones & GFQ's paper. As a background for the analysis, the designation of the entity Jones & GFQ deserves a note: this entity was the condition for and consequence of GFQ's move into the West Asian country this chapter is about. In order to have access to the financial market in that country, GFQ had to establish a partnership with a powerful local player, Jones. However, a year before my field visit to Nick, GFQ was able to leave the cooperative relationship and run this GCE on its own. Thus, Nick's current employer was not anymore staging itself as related to Jones. Nevertheless, in a storage room, which Nick had shown me, large amounts of Jones & GFQ-labelled paper was waiting in boxes to turn into waste.

Nick was aiming to complete data collection. This meant, after collecting or calculating the amount of paper consumed and classifying it, for finalising his task it was still necessary for him to complete filling the task-forms. In this case he did not start to

Figure 2.7: Challenging the Exclusion of Paper Consumption from Counting



question what category of paper he should link the amount of paper to. Rather, he considered that Jones & GFQ was a different organisation than GFQ and, therefore, should not enter the accounts of GFQ at all. I was not agreeing with his perspective and, therefore, intervened. However, as I did not simply want to prescribe what the 'correct' relation between the paper with the Jones & GFQ label and GFQ's emissions was, I suggested to include Simon in the decision. The upper circle of relations visualised in Figure 2.7 indicates the classification trajectory and relations around Nick. I, however, initiated the lower circle of relations, trying to enrol Simon, in order to challenge Nick's intention. Thus, this classification case was contested. The theme of classification raises two points: first, Nick aligned his reasoning to temporal coordinates. According to him, because GFQ's relation to Jones had *ended*, GFQ's carbon balance was not to be polluted by past consumption of Jones & GFQ's paper (materialised, as we have argued above, precisely through their costs). Second, my disagreement was premised upon my understanding that, if GFQ did not account for this paper, no organisational entity would do so. Then, the emissions related to that – now unusable? – paper would have been lost from being expressed in corporate emission statements. Therefore, I wanted to do something about the relation between Nick, GFQ's environmental database and

the paper. Retrospectively considered, I propose that I undertook this reconfiguration of their relation because of two reasons. First, it was my part of my job to teach Nick about the correct engagement with this issue. I must admit that I did not perform this job well: in my interpretation of my task, it would have been more appropriate to stage myself in this situation more authoritatively, i. e. command Nick how to materialise carbon. However, and this is a second reason for intervention, I wanted to not close this issue, but, rather, engage Nick's boss with this decision. As a researcher, I wondered how Simon would relate to the question. Agency to shape carbon, thus, can be redistributed among humans.

Late afternoon on that day we went upstairs in the building to meet Simon. This was my final meeting with Simon and I wanted to let him know some of the uncertainties I recognised during my trip to their GCE in order to give feedback both as a representative of the HQ, i. e. as a friendly internal auditor who would not immediately provide a report to the HQ about their practices, and as a researcher. The following extract is taken from the midst of my field notes on this conversation. Nick was mostly silent and, so, Simon and I exchanged some 'technical' thoughts about the local situation, i. e. the measurement of Key Performance Indicators (KPI), as well as wider considerations about GFQ's move into sustainable finance products.

Field Note Extract 2.3.b (Approval by Simon)

> *Regarding Jones & GFQ, Simon asserted: this is just a brand change, therefore we need to integrate Jones & GFQ data.*
>
> *Concerning waste they informed me: it does not create costs. I learned, however, getting rid of batteries seems to generate costs.*
>
> *Nick pointed towards some estimations. Simon replied: 'We will put in what we know', no insecure estimations!*
>
> *Simon pointed out – in general 'we need to work on' the data, we need time. He made clear that he communicated this to Victoria.*

This series of statements includes four different accentuations of how Simon shaped the relation between consumption and carbon emissions: consumption may be included in counts, it may be excluded and it may be reconfigured or modalised. This is not to say that these accentuations should be read as analytically exclusive from each other. In practice, they may and partially do overlap. Seeking to study how Simon was able to control the doing of carbon, I attend to each of these ways one after the other.

Inclusion Simon decided to include the paper produced for Jones & GFQ, reasoning that the label, rather than the corporation had changed. Before he provided this statement, I had asked him about this issue. Nick had not commented. Simon was able to provide an authoritative decision because both, Nick and me, accepted it as such. The kind of hierarchy enacted here is a symbolic one. Even though data passed, in that very moment, *to* and *through* Simon, this established in no way an Obligatory Passage

Point (OPP). Being a boss depends on being recognised as an authority, being a point of passage depends on being enacted as such. If an actant is enacted as a passage point, that point may then perform as an OPP. As it turns out, the latter, again, may be contingent: in this case, Nick was the person who ultimately entered the data into ESDR; and I was anyway technically able to alter data within the database. Despite these contingencies, we performed Simon as authoritative; and that made Jones & GFQ-labelled paper count. This suggests, control over carbon through formal authority may be quite precarious.

Exclusion The HQ wanted this GCE to state how much and what kinds of waste they had 'produced' in the prior year. Accordingly, ESDR was providing several categories for waste. However, at this GCE's location, producing waste and getting rid of it did not incur costs (at least not ones which the GCE had to compensate for). Elements which were part of the business process but were freely available (as public goods or as public 'dumps', Lohmann 2005) have not entered explicitly the symbolic representations of this GCE's accountants. This finding points to an enormous implication about GFQ's Environmental Management System (EMS). We underline here that carbon accounting can only translate those acts of consumption and pollution into carbon emissions which have resulted in some kinds of costs. An enterprise is not supposed to engage with or optimise any processes which are not cost relevant – otherwise it would not act in the interest of its owners (Corporate Watch 2004). This GCE did not posses an inscription device to record waste data. Nobody would provide them with waste invoices. I assume, the informal economy did not issue appropriate material statements which Nick could have accessed and filed. Power (1996) discusses various options of how things may be made auditable. One option, he finds, is that the environment within which external auditors find facts, including the facts themselves, need to be put in place actively. Otherwise, the auditors would arrive and do not find any of the things they are expecting. Power's point likens the waste situation in this case. Simon and Nick, otherwise friendly and supportive, simply did not seem to feel they had a substantial clue about the amount of waste their GCE produced. Power (1996, 305) calls this 'beyond expertise'. Locally, they did not recognise suitable knowledge. How GFQ dealt with this issue I explore in the next chapter. Above, we have also seen that even if consumption was to be included, the quality of that inclusion was quite uncertain. The decision to exclude waste from being accounted for, overall, was out of their hands. While Simon could have commanded Nick to exclude specific consumed items, without outright lying – or very creative guessing, neither of them could access the waste reality they were supposed to provide an account of.

Reconfiguration When Nick voiced the uncertainties of the information to be reported in the flight account (discussed in the prior section), Simon asked him to only enter facts – only properly known data. That was it. They did not consider details in this conversation. Within the rationality of expert-based environmental management it would

be necessary that all the problems are clarified. This resembles Porter's (1995) account of quantification: to count in political decision-making, numbers have to be construed as hard. Callon (1998a, 265) interprets Coase (1960) in this way: an internalisation of costs requires that all the agents who are part of an economic situation are clearly identified, they are able to negotiate and they know and agree about the externalities, overflows☞ in question. As long as all actors happily agree about overflows and other technicalities, they can negotiate prices, etc. However, if they are not at peace with each other, they are likely to struggle about the nitty-gritty (Callon 1998a, 266). Here is another option: Nick and Simon have been quite at peace. In their situation, neither was there a need to discuss the technicalities nor did they agree and share their knowledges about the situation. I read their relation this way: Simon wanted Nick to perform all consumption data as factual. Simon, through his reaction, took no responsibility for problems with the data produced by Nick. Thus, the boss was not committed to the facts produced for him. In effect, he partially redistributed the responsibility to account for the data from the inscription device to his engineer. In the relationship, constructed here, non-factual data did not have any right to be visible in the task-form. Such data was othered, excluded from counting. This provides an explanation for the comment in the flight task-form, depicted in Figure 2.6 (on page 105), eventually being deleted. Through Nick's comment, overflows could be recognised by those who were to read the data inscribed by him. However, what is achieved, through the enactment of facts is a less vulnerable position of the actor. Fact-making, then, can be understood as a move in *impression management* (Goffman 1959). This would suggest that Simon told Nick how to perform well. And, this case lends itself to be read in that way: Nick would be judged by his boss as performing well if Nick a) completed filling task-forms while only submitting 'facts' and b) omitted declaring what was instrumental for the realisation of the said 'facts', i. e. if he enacted whatever kind of data, he inscribed into ESDR, as factual. While Simon was even further distanced from the imagined sources of carbon emissions, he was able to tell his engineer how to perform data. By that, he could intervene in the shaping of qualculations. He was able to command what *ought* to come *with* the figures, how to *con-figure*. Nevertheless, the re-configuration itself was performed by Nick.

Modalisation Finally, Simon let me know that he had been in touch with my boss, the head of the EMS, Victoria. By telling me, as well as Victoria, that the data was not yet in a state which he considered appropriate, he distanced himself from the current status of data inscribed by Nick into ESDR. Furthermore, he signalled he would be improving the quality of the data after a little while. Interestingly, this approach indicated a further understanding of data: this time, he recognised that data was not static and that it could be improved. Thus, data, in this perspective, are not in-themselves-stable facts where all non-facts could simply be deleted. Rather, facts were informational entities which were not-yet-ready to be read by Victoria. By providing these explications, Simon modalised the data. He added information about their modality: Again following Goffman (1959), Simon was informing me about how

he had performed the data vis-à-vis Victoria, and by that enacted that performance towards me as well. Thus, the way Nick's inscriptions of consumption was made to count vis-à-vis the HQ was altered. The boss did not simply sign off or not sign off the numbers (cf. Harper 1998, 224-225) but, rather, indicated a distancing from the data. He did not make the numbers, which had been worked out by Nick, his own and was not willing to defend them. Thus, again, Simon was not committing himself to the data which had been produced for him. He had, however, decisive agency in shaping his relation to data. Through a simple statement he was able to alter the modality of data. And he could easily extend this modality by letting others know about it.

◇ *End of Section* ◇

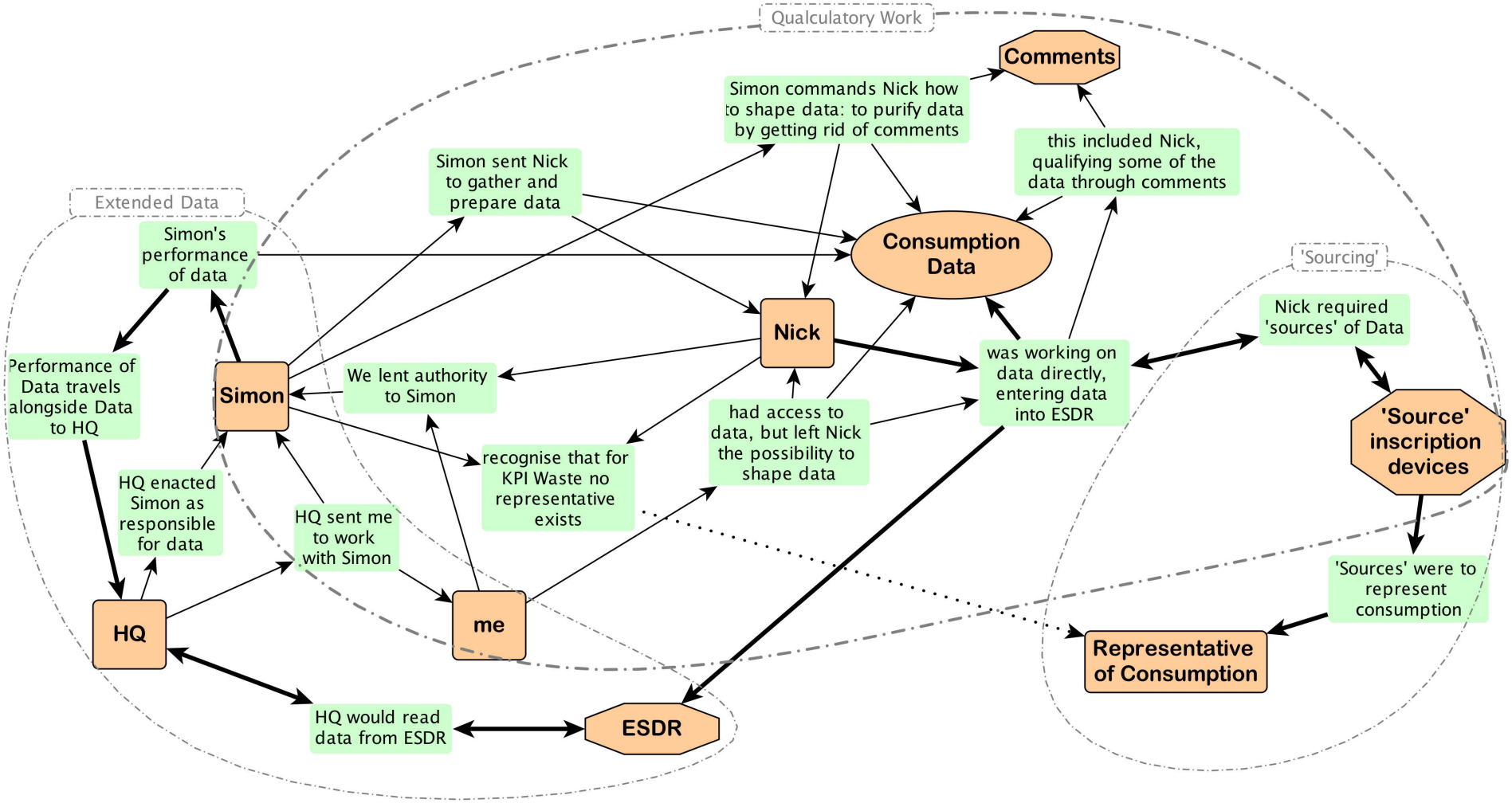
This section examined the distribution of agency to control consumption data and, therefore, carbon emissions. To conclude, I analytically differentiate the ways through which that data has been (not) controlled by Nick and his boss Simon in three segments, sketched in Figure 2.8 on the next page: the imagined sources of data, the qualculatory work and the extension of data to be read by the HQ.

On the figure's right hand, we find the actants which members considered sources of data, representing what they conceptualised as an independent external reality. Any 'sourcing' of data from that reality was implicating dependency of the data gatherer on the availability of sources. Therefore, the network which, partially, crystallised into accepted sources, like invoices, was very much in command: its relations were shaping what could be delivered to Nick, made available to him. A setback, for example, was that the informal waste disposal economy in that country did not provide the GCE with acceptable invoices.

Nevertheless, this GCE's agents did have access to other data fitting the KPIs. And that data was, eventually, read by the HQ as being authored under Simon's responsibility. Thus, in terms of responsibility, the data passed Simon on its way from Nick to the readers at GFQ's centre. However, Simon was not actually positioned between the data and the HQ. Rather, the latter accessed the data via Nick's inscriptions in ESDR. I argue, therefore, that while Simon constituted a point of passage, he was not an *obligatory* passage point for the quantities inscribed in the database. In spite of that, we find that somehow Simon was present in the data, in the qualculatory work (see midst of Figure 2.8). To appreciate the quality of his presence, Figure 2.9 on page 115 serves as an orientation for us to conceptualise non-obligatory forms of passage points enacted around Nick's qualculations.

OPP To recall, an OPP is defined as a point through which data has to pass in order to move on. Actor 1 needs to pass *on* the data to Actor 2 for the data to travel further. Actor 2, at that moment, can translate and transform the data. Then, Actor 2 is established as an OPP. In the case discussed above, Nick (as Actor 1) did not need Simon (as Actor 2) to deliver data to the HQ. Nick only needed ESDR for that. For Nick, the database constituted an OPP while his superior did not.

Figure 2.8: Relations of Control over Data at a GCE



Contingent Passage Point I consider a point *through* which data may (but does not necessarily) pass, a contingent point of passage. In the meeting, Simon's encounter with paper, waste and travel data was contingent upon other actors (Actor 1, Nick or me) deciding (if I may employ the cognitivist take, *pace* Latour) to pass data to him.

- Thus at a *contingency decision point (A)*, Actor 1 can also keep the data in her hands without handing them over to Actor 2. Then, only Actor 1 can transform the data. However, *if* Actor 1 passes data to Actor 2, the latter can transform that data.
- The moment at which Actor 2 receives, potentially transforms and passes on that data can be understood as the *contingent passage point*. At that point, data may or may not be changed.[24] Despite data having been passed to Simon, he did not pass on the data to others on his own, but passed it back to Nick – with some remarks, orders.
- Now, Nick had the chance to decide what to do with the data. This constitutes a further *contingency decision point (B)*. He could keep the data as he received it from Simon – or he could ignore the changes/orders by the boss and keep the data as it was at the time of contingency decision point (A). This binary choice, of course, does not adequately capture the point. Actor 1, necessarily, had to *interpret* Actor 2's performance. Nick had to make sense of Simon's instructions.

We found: not Simon himself shaped the data, but Nick did. Therefore, Simon sough to shape Nick. Thus, Simon's ability to shape data was *contingent* on Nick's acceptance of Simon's authority: only if the formal hierarchy was implemented 'correctly', could the boss order Nick. At GFQ, working for the company presupposed at least a superficial acceptance of these hierarchies.

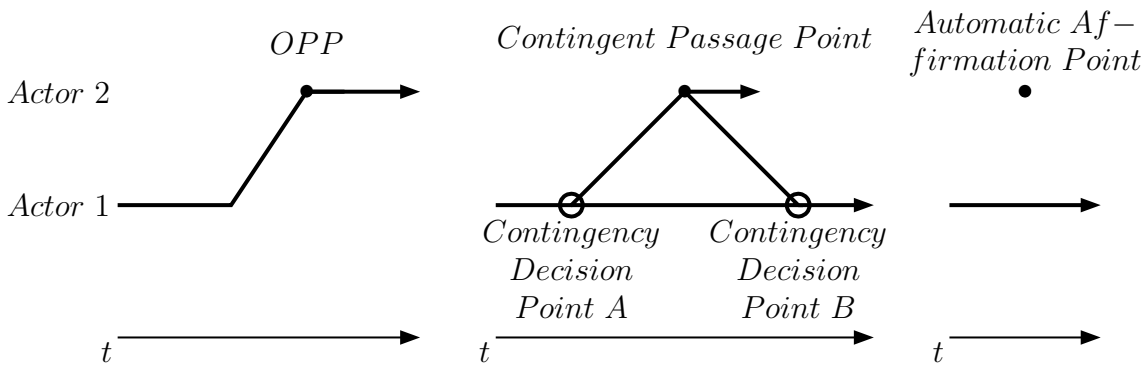
Automatic Affirmation Point Finally, Actor 1 may directly pass on data in the intended direction, passing *by* Actor 2. In that meeting, this was the case for most of the data produced by Nick. Although Simon was responsible for that data, he let the data pass by, i. e. Nick could leave the office without being asked to account for further data. In that way, automatically, Simon signed off all the data absent from explication.

Having understood the principle of these points, we need to make one step further, and underline their situatedness. None of these points existed in isolation. The differentiation provided in Figure 2.9 on the next page serves analytically distinctions, rather than claiming that any situation can be reduced to any of these points.

The situation in which Simon was in was shaped by him being formally responsible for the data produced by Nick. We can, therefore, consider it straightforward for Simon

[24]Note, in theory at this point data could be passed on to another actor, rather than (or not only) back to Actor 1.

Figure 2.9: Obligatory, Contingent and Automatic Affirmation Points of Passage



that he wanted to exclude from that data such qualifying elements which disqualified the quantifiers. This interpretation is strengthened by this observation: he asked the engineer to make available only facts to the HQ, rather than comments inscribed into ESDR which would subvert facticity. This had a significant consequence: Nick was to carry the responsibility for these (dis)qualifications *in* person, rather than placing them *into* GFQ's carbon machinery. As we have seen above, the comment in the task-form, specifying some of the qualculationary practice were eventually deleted. And the effect of reducing the amount of qualifying disqualifiers was the performance of the GCE's consumption reality more in line with the form which (so was the HQ interpreted) GFQ was desiring.

However, while the task-forms were purified – converging with Latour's (1987, 227) proposal that to serve a centre of calculation best, ones needs to produce immutable, combinable mobiles – data was also extended. Simon wanting Nick to ensure that only facts would be inscribed in ESDR, implied that the problematic qualifiers would be stored in the human – Nick. This extension of data storage from digital material to humans was repeated by Simon when letting the HQ (my boss Victoria and me) know that he considered the task-forms, themselves, not complete. Thus, the more complete information about the GCE's environmental data was then distributed over several humans and non-humans (see left hand of Figure 2.8; cf. Lippert 2011a). In a way, then, Simon's activity at the contingent passage point can be conceptualised as having passed on data fragments to several actors: to Nick the data-to-be-inscribed-into-ESDR, and to Victoria and me meta-data. In parallel, hence, data on this GCE's consumption existed from then on. This constitutes an interesting friction in the way data was shaped: on the one hand, Simon asked for purification of the facts and enacted their hybridisation on the other.

To sum up, there was no such thing as a single entity or location commanding the production of carbon emissions. Nick's qualculatory work was informed and constrained by the availability of inscription devices which he could perform as legitimate sources. Precisely because these actants were not fitting to the EMS's forms, Nick had to

constantly make practical compromises. And the finalisation of his task to gather data was, in that respect, contradicted and shaped at the same time by his boss's instructions to ensure the facticity of data. Thus, the relations between Simon and data were added to the data. Checking data with the superior, hence, rendered the data more social, rather than less. While traces of uncertainty were deleted within ESDR, they proliferated amongst the human data storage system. When only reading data off ESDR the imaginary of control would appear. If Latour is right, then control over carbon was made even more unrealistic through Simon's demands for getting rid of the traces of Nick's practical compromises; for 'every trace' (ibid., 245) has to be summarised, rather than simply deleted, to come closer to the modern myth of control over 'nature'. This book can, in this respect, be read as a modest contribution to support the non-ESDR storage of GFQ's emissions.

♢ *End of Chapter* ♢

This chapter established reference points at two levels: theoretically and empirically. Using an interwoven narrative, I, first, introduced the theoretical apparatus of actor-network theory (ANT) (broadly conceived) and illustrated how this books employs some of this theory-method toolbox's analytical devices while, second, scrutinising carbon accounting practices on the ground. How to sum up? In terms of counting carbon emissions? How much emissions did this GCE emit – after all the work they put in discovering the fact? The fact is, quite simply, there is no singular fact. Well, what Nick, Simon (and me) achieved over the couple of days I visited them was to establish – about – one point five kilo tons. Of carbon emissions? Well the number could be linked to it. But it was quite uncertain. Just a couple of days after I had left them, their emissions count *in*creased! By — one point five — grams. Literally. And another twenty days later the count *de*creased by 230 t. Thus, summing up *through* numbers clearly is not promising to understand anything about this GCE's emissions. It seems much more apt, I argued, to zoom into such facts and study how they are done. I have no objections against summing up *with* numbers. But a quantifier in isolation does not do. We need also look at the qualifiers: what is the quantifier linked with?

To answer such questions, I visited a subsidiary of GFQ in a Western Asian country. Studying this GCE's agents who were supposed to 'gather data' for the database ESDR (which produced the numbers inscribed into the prior paragraph) illustrated key notions and ideas exercised by members. With Simon and his engineer Nick, this chapter undermines a conceptualisation of GFQ's carbon emissions as existing out there, independently from humans. To reiterate: before I had arrived to visit Simon and Nick, the boss had asked his engineer to collect the consumption data which the HQ had requested. Then, I followed Nick, the agent who was to know the subsidiary's consumption acts, count the quantities of goods and services utilised, and report them back to Simon and inscribe them into GFQ's centralised environmental database. The chapter engaged in depth with the core of his practices, classifying consumption artefacts

into the accounting frame prescribed by the corporation's EMS and when data was not available qualculating substitute data which would fit ESDR's forms. Engaging with these practices allowed us to comprehend the emissions' hinterland, i. e. the base needed to construct the emission facts.

Typically, an ANT study would present a list of the elements which constituted that very base. However, as others have remarked before me (e. g. Strathern 1996; Suchman 2000; Mol 2002), when zooming in, one does not encounter an end to such a list. As a researcher, and as an author, one has to cut listing. For GCE's members, amongst the most important items they needed for the job of providing an account of consumed goods and services were (what they considered) *sources*, like invoices as well as metering devices, inscription devices like pieces of paper or spreadsheets and ESDR and common to all of them many numbers, qualifiers and their contexts to make sense of the former. One problem with such a list is its fractal character. If one tries to briefly describe any of these elements, imagining it as a stabile entity, one likely fails – or does not give a detailed account.

Take the task-form through which the database was collecting consumption data. For that form to exist and make sense it was dependent on very different kinds of entities: as a task to a human to complete filling the form, it was utterly relying on a human to enter data. And the task needed to be authored. Not just by a formal administrator who assigned the task-form to some worker. The form was connected with GFQ's Information Technology (IT) administrators, software engineers, with web-browsers to render the form viewable, it required concepts and language. Furthermore, the task-form had very specific requirements on how it was to be completed. It was, thus, not separate from software-embedded as well as externally located scripts specifying the user what data to enter. One thing which the task required to be meaningful were numbers. Users were to enter numbers and select among restricted choices of qualifiers like the units in which the consumption category would be measured. Other modalities needed to be stripped off the data for the latter to be enterable into the task-form.

Now, if we ask what numbers are and where they come from, yes, sometimes we are referred to seemingly independent sources. Often, however, sources did not exist or did not provide the required type of numbers. Then these entities had to be constructed. Simply, informally and without making a fuss about them. Reference realities then have been members' imaginations or experiences. Establishing the quantity of consumed goods and services was involving structured qualculations. Numbers, categories and units were separated (rather than fused, as Robson (1992, 698) would have it) to allow for calculability. They were arranged and transformed in minds, in calculators or on paper. Through very particular generalising logics, members quantified past consumption for office blocks, even ones hundreds of kilometres away. To achieve such quantifications they arranged diverse elements, as just noted, say invoices, their local knowledge about prices or consumption patterns. This was part of doing the ontics (Verran 2010) of facts about quantities of consumption.

Elements reflecting consumption facts, thus, do not simply exist out there nor can they be unproblematically reconstructed. Quantities and qualities are neither given nor are they intrinsically separate. Rather, these elements are the effects of practices. And, correspondingly, when attending to these practices, 'we start to discover alternative forms of materialisation' (Law 2008, 11). Studying environmental accounting, then, should not restrict itself to studying the cognitive and formal models of its agents. 'Instead of talking about subjects *knowing* objects we may then, as a next step, come to talk about *enacting* reality in practice', Mol (2002, 50) proposes. Hence we turned to the work practices through which consumption facts have been constructed.

Turning to the practices employed to construct the data, we identified mostly work which normally would stay invisible; it was to be invisible: articulation work. Because the elements presupposed by the data construction guidelines did not necessarily exist, members had to translate non-fitting entities into the EMS's categories and into the task-forms' fields. These translations were always partial. This was the case for both, classification as well as calculation cases: for the very purpose of translation was to manipulate entities to end up with entities which would fit better. Ballast was dropped on the way, histories stripped off.

We could ascertain the normative and political relevancy of this work. The specific turns within the practices were sometimes contested. Such instances revealed precisely those normative and political implications of particular construction possibilities. Enacting one version of a consumption fact, rather than another, therefore implied that specific realities would be rendered invisible during the translation process. Those realities which were not accepted by the translation logics, which was *partially* related to the formal classification scheme, received another status: the status of being a monster☞ – an entity which does not fit the generalisation project. For calculations can be understood as mass translations, they are bound to result in enormous overflows of monsters. I illustrated this point, tracing back the situated practical necessity for translation practices that got rid off complexities to the field of mathematics. For those workers being responsible to 'gather' data, i. e. create through performative writing (Kalthoff 2005, 82), such practices of generating difference, of establishing irrelevancies and non-equalities, were required to get their work done – to achieve what would *appear* as simple, pure facts. The latter are the effects of situated practical compromises. The signs of consumption data are not speaking for themselves. They need to be interpreted (ibid. 2002, 34), and the reader has to imagine or trace back those practicalities and methods which constitute the facts' hinterlands – because they have been bracketed out, deleted from view *in order* to have them forgotten (cf. Mol 2002, 160). Clearly, the Latin *factum* – something done – captures better the ontics of consumption than *dare*, Latin for something given. Consumption data is not data but fact. Data is not given but made.

Although not strictly speaking having taken place in the basement, but in ESDR, consumption facts were entering a relationship with specific carbon conversion factors.

Whilst recognising their politics, this book does not follow the fact-making practices into the thicket of these factors. Much rather, we engage with what happens to the data enacted at these subsidiaries. When data meets conversion factors and, by that, takes the form of reportable emissions it does not relate to the consumption *actually* having taken place at the GCE, but to the qualculated fact prepared by a worker. And these qualculations may and do consist of various materials and references to all kinds of consumption, which are then summarised through a specific factor; even though the latter had been designed for seemingly clearly defined purposes which may or may not much overlap with the entities actually classified into the consumption category and, consequently, black-boxed into the fact.

If we accept this kind of reality of fact-making then we do not wonder anymore about the encounter with a situation in which a qualculation is enacted *anew*. We saw that members sometimes recognised that some entities they utilised in their translations needed, themselves, to be opened, de- and re-constructed – not unfamiliar for engineers (Newman 1998). Enacting consumption facts, qualculating the representatives of the past, is always incomplete, never finished. Hence, the different versions of emission counts I mentioned earlier. At this GCE we encountered also an exercise of hierarchy in data construction which did not fit the neat top-down models with centralised decision making or even clearly identifiable OPPs. The paths which data actually were taking was highly contingent and partially very precarious. It was transported by heterogeneous carriers, which themselves formatted the data – rendered it as in*form*ation. Some of these data transforming actants, like the engineer at the basement, had much more agency in shaping the data (which, ultimately, was read by the HQ) than others (e. g. the engineer's superior). Ordering the ordering of data was not a simple task. Within the network of entities enacting each other, anybody else's authority needed to be accepted by oneself for that governing to work out. The engineer was not forced to accept any data he read into invoices nor to accept his superior's order to ensure the appearance of data as factual (by rendering *all* disqualifying modalities invisible). Even though prescriptions have been formulated, whether they were followed was an in-principle independent question. It is most noteworthy that there was no grand struggle involved. Most data was, anyway, automatically affirmed formally simply through the practice of bringing data into a room and nobody speaking about it.

Nevertheless, the interventions by the superior, suggesting that the engineer better gets rid off the problematic modalities, raise another issue: this chapter conceptualises the order by the superior as having performative effects on two data-carrying actants. First, the data record within the database was cleaned up. And the humans involved (now, including you) knew perfectly that data has been deleted from the record. But this metainformation still exists – distributed among us. In order to carve out the book's line of argument I have to point to this issue as something the humans have to struggle with, at least for the moment, for themselves (well, maybe, let's meet up and see what we could do about it. . .). It definitively raises a question for further research:

what happens to the knowledges about the silenced modalities within the workers who are part of environmental accounting? This is, however, not the route of investigation in this book. We follow the entities inscribed into the database.

To follow that data is relevant because, as I establish below, these facts still perform – in wider political and market relations. And, if, as argued above, the purification practices make the political recognition of their ontics unlikely, then it is significant to trace the normative and political existence of that data until it is leaving the corporation. We also need to understand in more depth how the data produced in the subsidiary discussed above is related to GFQ's carbon emissions overall in order to evaluate how promising carbon management can be. Definitively, this chapter cautions us in taking numbers in combination with a unit and a category – be it a gigaton of carbon emissions or 70,425 km of long-haul flights – at face value. Behind these signs, a load of qualifiers and assumptions have been hidden – precisely because revealing them would render carbon management impossible: calculability would be lost. For the HQ this was a real threat: not only came my colleague Elise across some of the uncertainties in this Western Asian GCE, but also my boss Victoria. While governing GFQ's overall data collection, recognising that even at the level of operations at GCEs data was not completely clear must have been disturbing. Yet, for managing GFQ as a green company, it was vital that they could utilise consumption facts in their calculations. The following chapter, therefore, turns to this question: how the HQ related consumption data to the huge political issues like the environmental crisis, sustainable development and climate change.

CHAPTER 3

Translating Data Into Sustainability

In the prior chapter we have visited an engineer and his boss employed by a Western Asian subsidiary of GFQ. At this subsidiary we observed how they assembled data inscribed with the claim to represent several quantities of goods and services consumed by this GCE in the prior year. This data was, eventually, submitted to GFQ's HQ. In this chapter we follow how such data was translated into so-called sustainability.

For that I turn to the addressees of their data: GFQ's environmental and sustainability managers. This chapter shows why they asked for such data. As will become evident, collecting data from largest GCEs was key for the corporation to enact itself as a *rational* agent of ecological modernisation. The role of this chapter is to trace the links between local practices all over GFQ and the global discourses of sustainable development, ecological modernisation and climate change. I show how the approach taken by this multinational is an instance of the widely spread take of turning environmental issues into accounting matter and translating the latter back into visionary materials, promising the green conduct of corporations – a circular movement. However, I argue that such a promise can only be produced through systematic ignorance of carbon emissions' contingency and the overflows☞ produced in this circular translation exercise. In effect, carbon accounting moves an engagement with the environmental and social problems caused by corporate conduct out of hand, out of control.

On my first day of formally working for GFQ's environmental managers – a winterly monday with lots of snow and ice outside – Victoria introduced me to the Environmental Management System (EMS) and my tasks in it. After sketching the organisational status of the EMS, naming the GCEs which had been the forerunners within GFQ, she explained how her colleagues put the EMS into reality.

Field Note Extract 3.a ('Give me your data!')

> *The actual way it looks like is that they approach the facility managers and tell them: 'give me your data!'*

This stand indicates a hierarchical relationship between the EMS-Team and the facility managers. It was the EMS-Team which seemingly started the data collection process by

telling the GCEs to provide data to them. According to this statement, the EMS-Team was in a position to wait for the data. When I had first contact with Simon (the boss of Nick, encountered in the prior chapter), he announced having the data ready. Thus, he knew, he had to provide data to the EMS-Team. The data collection process was based on this shared understanding: GCEs are responsible for providing data. The construction of carbon emissions depended on data made available to the EMS-Team through the database ESDR.

As part of her introduction to the workplace, Victoria continued pointing to some of the current problems of the EMS – which I discuss throughout this book – and to the cooperation with my new colleagues. She told me that the moment I was entering the field was a phase of change: the EMS was increasing the number of participating GCEs, yielding an even higher complexity; and an external auditor had criticised some of their practices. At the end of this introduction she handed over a couple of documents. One of these was a 86-page internal presentation, titled 'EMS for GFQ' (*EMS4GFQ*). This document emerged as an authoritative document in the field – it was the one Nick had used as a reference document, and EMS-Team members quoted from to point subsidiary agents to definitions which were to be utilised.

In the succeeding section I sketch this document and, through that, show how GFQ performed the link between collecting data from GCEs to the grand discourse of sustainability. Afterwards I turn to actual practices of 'data collection'. This is how they referred to the process reciprocal to the one sketched in the prior chapter: the EMS-Team figured itself as collecting data from the globally distributed subsidiaries of GFQ. These subsidiaries could be little companies with only a few hundred employees as well as own corporate groups – which, again, incorporated many subsidiaries. Studying data collection practices opens several questions. To provide the ground for engaging with these, the subsequent sections serve to introduce three coordinating techniques of the EMS: I make explicit how GFQ imagined the *boundary* of the environment which they accounted for; I show how they rendered their environmental accounts *comparable and commensurable*; and we see how members figured being able to *provide a full account* for GFQ even though they were never able to incorporate all of GFQ's sites into the EMS. I conclude this chapter with a discussion of the technology through which GFQ's impact on 'the environment' was made readable and viewable for both, internal and external audiences: GFQ's Sustainable Development Report's presentation of the employee carbon footprint.

Using existing Foucauldian discourse analyses of sustainable development (Dingler 2003) and scrutinising members day-to-day discourse, language, motive, meanings, ways of acting (Clarke and Star 2008, 116), I argue that GFQ managed to translate the global discourses of sustainable development into the corporate EMS and to enact through that system so-called facts about GFQ's environmental performance which were figured as carbon emissions. GFQ employed these emissions to provide publics with a vision of GFQ as a sustainable agent. Thus, the circle of translating the discourse into data and

back was closed. What was lost on the way? This chapter details the realities which needed being ignored to enable neat facts to emerge which would be compatible with the requirements of presenting GFQ as a knowledgeable and reliable corporate citizen.

3.1 Breaking Down Sustainable Development

This section opens by indicating key claims inscribed into GFQ's official and publicly available *Code of Conduct* which linked the corporation to sustainable development. The focus of the analysis then swiftly shifts to a particular document which Victoria had handed to me: the MS PowerPoint presentation *EMS4GFQ*. To understand this document's position, we need to note that this was an internal document. It was used only by environmental managers; and it was neither designed to be distributed to GFQ's board of directors nor to external audiences.[1] Hence, *EMS4GFQ* was not screened for political correctness. It intended to introduce GCEs' environmental agents to the necessary background and specifics which they needed for accomplishing their tasks. Members of the HQ based EMS-Team enacted this document as the *de-facto* authoritative text to quote from when communicating with subsidiary agents. Within the relations among GFQ's designated agents of ecological modernisation it was the official spokes entity for how the EMS worked. Outside of these agents' relations, this organisational-technical document was not of interest for GFQ. If some arbitrary workers wondered whether GFQ was caring for the environment, then they could, for example, consult GFQ's Sustainable Development Report, the Sustainable Development intranet portal or the corporation's *Code of Conduct*. I use the latter text as a point of departure for this section's analysis. The study of these documents seems promising because official language 'tacitly [lays] down the dividing line between the thinkable and the unthinkable, thereby contributing towards the maintenance of the symbolic order from which it draws its authority' (Bourdieu 1977, 21). Documents, thus, provide fragmental access to members' discourses (Keller 2005). They are part of the '*concrete and material*' character of discourses (2011b, 48) which are performed in the midst of heterogeneous assemblages co-constituted by humans, non-humans and their practices.

I received the *Code of Conduct* alongside the contract as a worker for GFQ. It was also a document publicly available; and it was presented to stake- and shareholders to provide evidence of GFQ's transparency policy. The following quotes (anonymised) indicate how the corporation discursively situated itself.

[1] As an exception to this, auditors were given access to the document. See Section 4.3.

> [GFQ] is brought to life through the trust of our customers, shareholders, employees and public in the benefit and integrity of our group. [...]
>
> Through our initiatives for the UN Global Compact programme and the acknowledgement of the OECD Guidelines for multinational corporations we integrate sustainability and social responsibility into our business. [...]
>
> All statements of [GFQ] have to be complete, fair, definite, prompt and intelligible.

Artefact 3.1.1: Extract from '*Code of Conduct for Business Ethics and Compliance*'

With this document, GFQ was enacted as a living creature which required being trusted as a condition for its existence. The corporation recognised several audiences, such as 'customers, shareholders, employees and public', all of which needed to exercise trust in the corporation's practices. Especially, the authors of the document claimed, these audiences needed to rely on GFQ's promise of providing 'benefit' and enacting 'integrity'. Both latter concepts link to a number of grand claims: profit and advantage through GFQ's existence was semiotically linked to the organisation's honesty and strong moral principles; the *Code of Conduct* presented an internally consistent and uncorrupted corporation acting as a unified whole (Oxford Dictionary 2011a; Oxford Dictionary 2011b). The artefact's last sentence provides prescriptions for GFQ's own practices of text production. The image of integrity is continued in the terms 'complete, fair, definite, prompt and intelligible'. These terms resemble the moral and technical connotations of 'integrity'. Officially, GFQ figured itself as providing texts which were unabridged, legitimate, exact and comprehensible. At the same time, the corporation relates to other global players like the UN and the Organisation for Economic Co-operation and Development (OECD) and global discourses of sustainability and social responsibility. In this book, we are engaging with GFQ's claim of integrating sustainability into its business by way of following the notion of 'the environment'. This is were we jump within the *Code of Conduct* – to the section of nature and environment. Textually situated amongst issues like corruption, money laundering and terrorism, the reader would learn about the corporation's interest in ensuring that its resources are well treated (i. e. not countering GFQ's interests) as well as that natural resources are to be protected by their employees.

EMS4GFQ linked to this paragraph of the *Code of Conduct*. By that we learn that the environmental management unit enacted itself as legitimised by GFQ's general policy on how the corporation imagined its own conduct. Both documents overlapped in suggesting that globally all employees of GFQ were asked to reduce the 'potential negative impact of internal operations on the environment'. *EMS4GFQ* proceeded on its next slide to GFQ's cross sector plan of enhancing the EMS and of assessing GFQ's total 'internal greenhouse gases (GHG) emission footprint'. Victoria, as part of introducing me to the new job, explained how the EMS and her team's activity of incorporating even more GCEs into the EMS were officially mandated by the board of directors. And so she also legitimised the corporation's aim of reducing its carbon emissions by 25 % from 2006 to 2015. The reduction was also established in the presentation a couple of

slides later.[2]

The move of *EMS4GFQ* from quoting the *Code of Conduct* to establishing an EMS and to assessing and reducing GFQ's carbon emissions establishes a generative entry point for a critical analysis. GFQ figured itself as being able to reconcile environmental and sustainability interests with its interests as one of the largest multinationals worldwide. I argue that GFQ was not at all isolated with presenting such a claim. Much rather, this claim is wide spread. Here is how this claim links to the hegemonic discourses of sustainability and greening capitalism:

Sustainable Development Normally 'sustainable development' is traced back to the report *Our Common Future* by Brundtland et al. (1987). However, already before the concept has been used. Dingler (2003, 215) identifies it in the *World Conservation Strategy* published in 1980 by United Nations Environment Programme (UNEP), the International Union for the Conservation of Nature (IUCN) and the World Wildlife Fund for Nature (WWF). Others have provided detailed discourse analysis of sustainable development.[3] Therefore, here, it suffices to explain how GFQ could discursively link to this concept. To recap, following McNeill (2000), after publications like *Silent Spring* by Carson (1962) and *The Limits to Growth* by Meadows, Meadows, Randers, and Behrens III (1972) social and environmental movements as well as governmental authorities increasingly engaged with what was conceptualised as a 'global ecological crisis' (White 2006, 62). Radical analysts postulated fundamental changes of the political economy of the environment and society-nature relationships (e. g. Bookchin 1962; Enzensberger 1996). Global environmental risks were perceived as rather new and/or uncontrollable (Beck 1992; Skirbekk 1996). An analysis of the hundreds of years in which elites experimented with controlling local and global environments was not recognised widely (Glacken 1967; Thomas 1983; Grove 1996; Adams 2003; Clark and York 2005). In parallel to the increasingly recognised environmental crisis after World War II, colonial engagements were reframed as development politics. Modernisation theories suggested that Western techno-economic pathways were to be used as role models for the Global South; and dependency theories argued that the countries of the 'periphery' (Prebisch 1964 cited by Jacob 1997) could develop along alternative trajectories (not those of Western modernisation) (Eblinghaus and Stickler 1996, 22).

In the 1980s, developmental and environmental discourses started to closely interweave. *Our Common Future* was a product of this trajectory; as was the *Earth Summit* in 1992. A product of the latter conference, *Agenda 21*, provides recipes for reconciling modernisation of the Global South, industrial development, spreading capitalist markets and saving earth. The document suggests that governments act:

[2] Artefact 1.1 (on page 24) provides a view on the communication of the emission reduction aim.

[3] See especially Eblinghaus and Stickler (1996), Dingler (2003) and, for a full presentation of how I understand the relations of the discourses of sustainable development, ecological modernisation and environmental management, cf. Lippert (2010a, 2010b). Brief discussions of sustainable development's etymology and struggles over defining a 'concept' provide e. g. Mebratu (1998), Brand (2004).

> To promote and support policies, domestic and international, that make economic growth and environmental protection mutually supportive. (2.9.d)
>
> [And the authors reasoned:]
>
> The improvement of production systems through technologies and processes that utilise resources more efficiently and at the same time produce less wastes – achieving more with less – is an important pathway towards sustainability for business and industry. (United Nations 1992, 30.4)

Growth was to be sustained by moving the limits which had been recognised some decades earlier (Dingler 2003; Næss 2006, 200). Efficiency gains were to be found through science and technology. *Factor 4* by von Weizsäcker, Lovins, and Lovins (1997) argues that doubling the efficiency in production will result in twice the welfare. Business was able to welcome environmental regulation as reliable market conditions (Christoff 1996). Participation loomed everywhere. Sustainable development entailed the integration of NGOs into policy-making. As a result of the new discourse, about everything could be related to sustainability. Swyngedouw (2010b) sketches the diversity of 'sustainabilities'; ranging from sustainable environments over sustainable companies and sustainable markets to sustainable poverty and loss. The complexity of performing projects as targeting all 'three pillars' of sustainable development – the social, the economic and the environment – is normally resolved through techno-managerial rather than social/political solutions (Blühdorn and Welsh 2007, 190). To design sustainable futures, old-fashioned development and capitalism were to be modernised. Næss (2006, 201) reads the discourse as proposing that simply hegemonic institutions have to be willing to learn; in the interaction of new technologies, *better* regulation by the nation-state and the 'invisible hand' of the market with e. g. consumers, pressure groups and companies sustainability is imagined as globally and peacefully emerging. This view is continuously reproduced; accordingly Huber (2008, 360) argues:

> Moving beyond its old-industrial stage, the modernisation of society now also entails ecological modernisation, , readaptation of industrial society within the global geo- and biosphere by *modern means* such as a scientific knowledge base and advanced technology in order to upgrade the earth's carrying capacity and make development more sustainable.

The discourse of rendering economic growth compatible with reducing environmental impacts, e. g. by reducing the amount of waste and increasing efficiency, is, thus, shared with GFQ's *Code of Conduct* and the presentation *EMS4GFQ*. Both GFQ documents voiced that sustainability has to become part of the corporation's *internal* operations. In the rationality of the discourse, economic and political actors only have to ensure their internal sustainability because one's actors externality is another one's internality. If only all render their practices profitable, green and socially just, then – summed up – sustainable development is truly taking place.

Also institutionally, GFQ's CSR unit was interacting with the sustainability discourse's players. Regular meetings took place with UNEP, a global environmental NGO[4] and leading 'sustainability management' academics. GFQ was part of publicly postulating action on climate change, interacting with governments, sending messages to the *Kyoto Protocol* follow-up conference at København (2009). Yet, like *Agenda 21*, the corporation was interested in continued growth as the leading business principle.

Climate Change The discourse of sustainable development is nowadays seen as self-evidently connected to climate change (Ngwakwe 2012). Solutions to climate change need to be sustainable and sustainability politics need to engage with global warming. Swyngedouw's (2010b) analysis suggests that the hegemonic discourse expects legal and technical instruments, like the *Kyoto Protocol* and 'less carbon-intensive' machinery, to bring about climatic sustainability. Climate change is understood as being caused by greenhouse gases, especially CO_2 (IPCC 2007). Above, we have already seen that climate change is rendered as market failure (Stern 2008). It is taken-for-granted that nobody doubts that CO_2 is the culprit.[5] Hegemonic climate politics has transformed climate change into a question of the accumulation of legally recognised GHG; the latter are abbreviated as CO_2e, i. e. carbon equivalents. At GFQ's HQ, EMS-Team members simply referred in shorthand to 'carbon', as do many, if not most, of those who engage with climate change and carbon markets in their everyday. Making different kinds of GHG as well as emission sources commensurable allows for models of market mechanisms to imagine the optimal, i. e. pareto-efficient, allocation of emissions (MacKenzie 2009a; Sullivan 2010, 115). At the same time, under the *Kyoto Protocol* emission trading allows corporations to reduce their carbon footprint by buying CERs, e. g. negative emissions sourced from so-called CDM projects in the Global South.[6] In the EU, owners of installations which emit carbon beyond a legally determined threshold have to acquire CERs. While this policy addresses e. g. the cement industry or fossil-fuel based energy producers at large-scale, GFQ reacted to the climate change discourse as well. Not only has it become discursively straightforward for companies to publicise that they try reducing their emissions – for GFQ climate change also constituted a business risk. GFQ's insurance branch was part of the global discourse of insurers who perceive climate change as leading to weather catastrophes, resulting in damages. If actors are insured against such damages then they receive compensation – expenditures for the insurer; damages of poor households are not immediately problematic for the insurer as these are less likely to be insured (Botzen, van den Bergh, and Bouwer 2010). Finally, GFQ was also acting as a broker and advisor in the carbon market.

[4]Section 4.3 discusses in more depth the relation to this NGO.

[5]So-called climate change sceptics and deniers question merely in how far climate change is induced by human activity. There is evidence that the denial movement is heavily interwoven with conservative anti-environmentalist elites (Jacques, Dunlap, and Freeman 2008).

[6]Böhm and Dabhi (2009), Ninan (2011), Bailey, Gouldson, and Newell (2011) can be of help to navigate the literature on carbon markets, the CDM and their problems. Lohmann (2009b), Blok (2010) link these discussions to Science and Technology Studies (STS).

Accordingly, within the internal universe of GFQ climate change was also a topic. The corporation had set its own carbon reduction target. An intranet portal of the CSR unit provided employees and GCEs with information on how GFQ reacted to climate change and the sustainability discourse. Artefact 3.1.2 allows an anonymised glance at this portal: a glossary providing information on the key concepts of the unit. 'Environmental Management System (EMS)' was one of these. The artefact links business, climate change, internal environmental protection and credibility.



Artefact 3.1.2: Intranet Definition of EMS

On the left hand we find a standard feature of GFQ's intranet web configuration: a graph provided an up-to-date view on its stock quotation. The definition's authors indicate GFQ's claim to be best-in-class with respect to business practice of tackling global warming. The statement implies that such 'leadership' is necessary because the corporation's 'business is highly affected'. This links to a prior point I made: the financial sector performs itself as having a business in ensuring that clients do not experience damages and that GFQ's investments are not threatened by weather catastrophes. Further, the authors suggest, the way the corporation addresses climate change needs to be 'credible'. This resembles GFQ's *Code of Conduct*. Credibility is imagined to be achieved by greening GFQ's 'own operations'. Thus, we learn, GFQ's EMS is defined through the corporation's practice of greening its internal business practices in order to perform well as a credible leader of businesses addressing climate change. The EMS emerges as a reaction to GFQ experiencing itself as being 'highly affected' by climate change.

Imagining an EMS as a Solution I argue, the EMS, as a *reaction* to climate change, was discursively enacted as *contributing to fighting* climate change. This entails briefly reviewing two of the key strategies postulated to bring about sustainability.

The sustainable development discourse is premised upon both, the need for change and the gradual quality of that change. Fundamental concerns about the ideals or instruments of sustainable development and the realisability of sustainability under capitalist or industrialist conditions are excluded (Pepper 2005). Much rather, the discourse emerged precisely through overcoming the postulation of any fundamental opposition. Internally, the 'common sense' (Gramsci (1971, 326) cited by Crehan (2002, 110-115)) of sustainable development is firmly rooted in trust in gradual change, sometimes entitled 'reform' (Prasad and Elmes 2005). Accordingly, step-by-step environmental sustainability is imagined as put into practice by increasing efficiency, innovating technology, managing environments globally, de-coupling economic growth from material resource

use, dematerialising production as well as transforming economy through environmental economics. Within the discourse of sustainable development, attempts towards putting these aims into practice are seen as the only means to the desired form of progress. Radical strategies are not perceived as 'pragmatic' (Prasad and Elmes 2005).

For the development of this book's argument, the strategies of increasing efficiency and (global) environmental management are most relevant. (1) In terms of the efficiency aim two approaches are equally valid: increasing the output relative to a unit of input; or decreasing the input relative to a unit of output. The incentive to optimise a corporation's efficiency can be understood as intrinsic to a competitive economy (Eblinghaus and Stickler 1996, 75-77). Thus, 'eco-efficiency' is seen as promising 'win-win' situations: both, the environment will be protected and the relative economic gain increased (Prasad and Elmes 2005, 848). Efficiency is to be brought about by improving production processes and its substances. Normally this requires expert knowledge (Dingler 2003, 244-246). A business's operations have to be known in detail to be able to locate sites for improvements.

(2) Global environmental management promises the rational administration of resource and energy flows on earth. Jänicke, Kunig, and Stitzel (1999, 143) suggest that, often, lay people are not able to recognise the required actions to bring about sustainability. Consequently, experts have to gather knowledge about the earth's climate and ecosystem. This allows them to calculate e. g. carrying capacities or other thresholds, which can be communicated to globally distributed agents of change, such as nation-states or multinationals. For instance, during my field work GFQ recognised the 2° C aim proposed in the climate change discourse: science calculated that global warming below the threshold of 2° C is unlikely to lead to major catastrophes (Szerszynski 2010). To achieve sustainability, the role of the nation-state under scientific management of environments is reconfigured (Dingler 2003, 246f.). If only complete information, knowledge about all (natural) 'laws' and immanent dynamics were given, then the global system could be ruled by determinism; thus, internal processes and the effects of external influences have to be calculable, the system has to be scientifically analysable and manipulable (Dingler 2003, 247). These presumptions are inscribed into instruments like emission trading or the understanding that internal experts of a corporation may posses the knowledge required to manage the corporation's impacts on the environment.

As a policy, these strategies to render societal and business practices ecologically sustainable are usually addressed as 'ecological modernisation'. This approach emphasises two moves: from end-of-pipe technologies (like a filter) to proactive technologies (like cleaning production processes themselves) and from regulating specific actors to subjecting actors to market mechanisms. Both, the innovation of technologies as well as the proper construction of markets require expert knowledge. Buttel (2000, 63-64) suggests that ecological modernisation is synonymous to sustainable development. The language of ecological modernisation would allow the conceptualisation of environmental success stories: any experience of win-win solutions is readily conceptualised as 'best

practice'. Studies of the latter abound. Making success stories publicly available may set standards by influencing governmental regulation – in terms of both shaping and/or evading regulation (cf. Newton and Harte 1997, 89). At the same time, Hajer (1995, 26-29) observes as a key element of ecological modernisation policies that polluting actors have to carry the burden of proof in cases of environmental damage. And Mol and Sonnenfeld (2000b) suggest that ecological modernisation is actually taking place: their approach, Ecological Modernisation Theory (EMT), identifies that modern industrialism and capitalism manage to come close to sustainable development by means of ecologically modernising their processes (Gibbs 2000). Environmental standards would result in a 'race to the top' among both, corporations as well as nation-states (Drake, Purvis, Hunt, and Millard 2003, 165) if nature is appropriately internalised into the capitalist market. Mol (2010, 23) proposes such an ecological restructuring has indeed been taking place and explains it 'as the growing autonomy, independence, or differentiation of an ecological rationality vis-à-vis other rationalities'. As evidence for this he quotes the 'widespread emergence of environmental management systems in companies' (ibid., 25). EMT argues that such institutional 'changes have some permanency and would be difficult to reverse' (ibid.). If we can identify such changes at GFQ, then we need to investigate what it is that gains permanency. He also proposes that financial services providers, like credit institutions and insurance companies become actors which spread socially the ecological restructuration. If EMT is right, then we can expect the major reconfiguration of societies and economies towards sustainable development to take place. After all, 'everybody' agrees that we need sustainable development; those who are not agreeing are virtually not considered somebody – radical green activists are criminalised and framed as eco-terrorists (Salter 2011, 216). Hegemonic actors have accepted that action and substantive change, not rhetoric, is needed (Blühdorn 2007, 252-253). However, Blühdorn questions whether these statements are not merely adding another layer of lipservice and spin doctoring. The risk is that hegemonic actors provide complex simulations of decisive action, rather than actual change. The point of this book, then, is to engage with a key technology which is supposed to render corporations environmentally sustainable; environmental management systems are best practice (Pojasek 2010). We need to investigate substantially the culture of the EMS's agents: what are they doing, how are they achieving it. The prior chapter already indicated: there is more going on than superficial simulation.

This discussion substantiated my claim that GFQ statements in its *Code of Conduct* and the presentation *EMS4GFQ* fit perfectly the discourses of sustainable development and ecological modernisation. Before continuing the actor-network theory (ANT) analysis commenced in the previous chapter, I now turn back to GFQ and how the corporation imagined its EMS.

GFQ's EMS To implement an EMS, the definition given as Artefact 3.1.2 (on page 128) was not useful. While it helped the reader to recognise that GFQ positioned itself in the sustainable development discourse, it was not providing much information about

what or how such a system ought to *do*. Maybe this was the reason why Victoria asked me to propose a better definition of what an EMS is. She wanted me to provide an alternative to the definition shown as Artefact 3.1.2. A couple of days after she asked me for the definition I sent her an email with this definition:

> An Environmental Management System (EMS) refers to the quality loop of an organisation for continually improving its environmental performance. Within an EMS all activities are to be planned, carried out and documented in a systematic manner. It consists of defining the organisation's environmental policy, setting up an environmental programme, implementing its measures, evaluating the success of measures, reporting the status of the organisation's environmental implications and, finally, reviewing the environmental policy.

Artefact 3.1.3: My Proposal for Defining 'EMS' for GFQ

I had produced this text primarily based on my prior studies of environmental management and ecological modernisation.[7] Thus, the direct source for this statement was my university education. At that stage of my field work, I did not have carried out the analysis which you are reading now. Providing this statement entailed two risks: on the one hand I might have not performed my task well. Maybe my proposal for the definition was too far removed from what Victoria wanted to see as a definition on GFQ's intranet website. On the other hand, by seriously designing the text based upon my understanding of the field I risked succeeding in providing a useful definition. And this was the risk of contributing to the greening of GFQ. The latter, of course, I was and am still ambivalent about.

Thirty one minutes after I had sent her the email, she replied (anonymised):

> Dear Ingmar,
> many thanks for your input. This is absolutely precise. Please forward this to [Jason Mert]!
> Kind regards, [Victoria Miller]

Artefact 3.1.4: Victoria's Reaction to my Definition of an EMS

Jason was working for the CSR unit; and he was handling the contents which were to be published on the unit's intranet website. Victoria accepted the definition I had proposed and asked me to provide the definition to Jason such that he publishes it. I believe I forwarded the email to Jason – I cannot, however, guarantee I did. As a matter of fact, the definition I authored never showed up on the website – and Victoria did not ask about it again.

Nevertheless, Victoria had accepted the definition. This means she accepted it as an apt representative of the system which she was overseeing. So, how does this text reconfigure the meaning of doing sustainability? The definition's first element is the 'quality loop'. An EMS entails an idea of a cyclic process which translates the trope of gradual change into gradual, step-by-step, improvement through following a management cycle. Power (1996, 301) similarly identifies an EMS to be based on year-to-year improvement. 'Improvement' is the central promise of an EMS. 'Environmental

[7] For reflections of these studies see Lippert (2010b, Part I).

performance' refers to efficiency. GFQ wanted to reduce its *average* emissions, rather than its *absolute* ones. This is an instance of the hegemonic discourse of achieving sustainable development through increasing a corporation's efficiency.

The definition, then, continues to name three qualities of this cyclic process. Action which considers itself as part of the EMS is to be planned, implemented and documented *systematically*. These notions resemble the ecological modernisation discourse in that modernisation is based upon *calculative* analysis and management. Arbitrariness in the conceptualisation, implementation and documentation is to be avoided. At the same time, EMS activities are to be planned before they are carried out. Thus, under this paradigm, action is to be fully understood before it is taking place. Accordingly, the way activities are taking place is one of 'implementation', i. e. the direct and full realisation of action in the fully known social and material field according to the plan. Finally, I considered 'documentation' as key to all practices taking place within an EMS. The reason for this is that an EMS is oriented to *show* audiences that the organisation is enabling itself to *learn* about itself. Underlying is the theory that organisations learn through documentary processes and that all action can be materialised in documents. Furthermore, audiences like auditors or other stakeholders can be provided with these documentations in order to provide *evidence* for the claims about environmental performance produced in an EMS. Thus, like in a laboratory, steps of the work process are imagined as being traceable through representations of work practices' facts and artefacts.

The third sentence of the definition, eventually, specifies several steps to be taken within an EMS cycle. (1) This formalist understanding of an EMS assumes that first of all, an organisation has to know what it wants; it has to chose the standards which it wants to comply with; it has to set its aims. Power (1996, 301) makes explicit: in an EMS, the standard is split off the management system. The form of the instrument to green businesses (the EMS) does not prescribe *which* content (i. e. standards, etc) the form should be filled with. The hegemonic discourse of sustainable development through its trust in market mechanisms implies that economic actors know best themselves and can set appropriate preferences themselves. Thus, an EMS requires an organisation to 'have' an environmental 'policy' which prescribes what kinds of environmental performance improvements the activities are to be aimed at (ibid., 302). (2) In that rationality, a policy needs to be detailed in form of a 'programme'. The latter sets specific plans for interventions in the organisation. These planned changes are called 'measures'. A measure is is designed to achieve a specified purpose set by the programme. (3) Subsequently, these measures are to be 'implemented'. (4) The formulation for the next step, 'evaluating the success of measures', captures well the point that measures are assumed to have been implemented – which was recognised as potentially resulting in failure; consequently, even if all measures taken were exactly-to-plan implemented, in sum, their effect could turn out to be less-than-optimal. Therefore, as a step of an EMS it is central to evaluate the environmental status of the organisation. Its changes

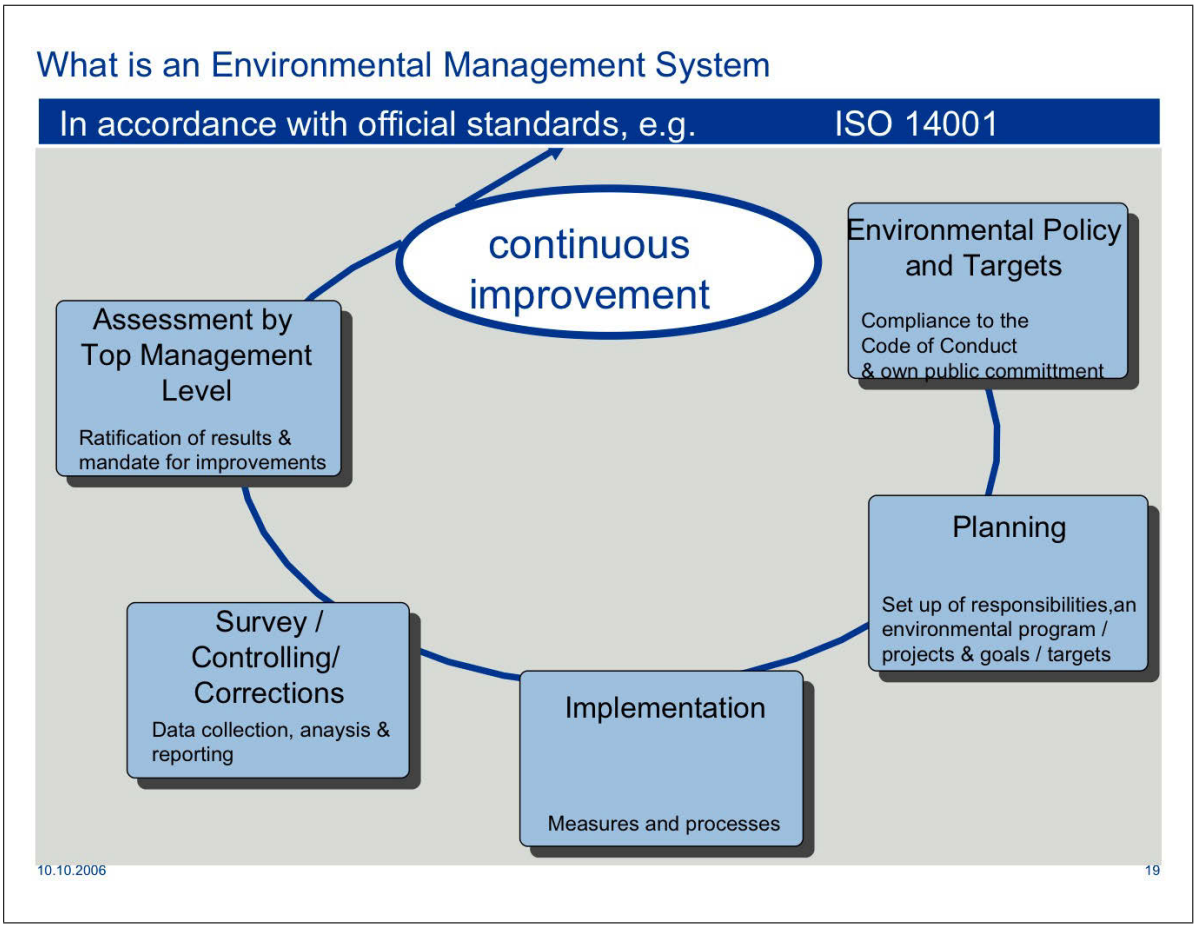
are normally assumed to have been caused by the measures. (Albeit, as we encounter throughout the book, workers recognised sometimes that a financial crisis might have more immediate effects than measures.) (5) All the work within the EMS is geared to result in documents. Consistent with the discourse of sustainable development, an EMS would normally produce a set of statements about the organisation's environmental status which are available for all kinds of stakeholdes. Multinationals like GFQ provide environmental reports on their websites freely available for any interested actor. In parallel, internal documents might be produced as well. (6) The facts produced in an EMS allow the organisation's decision makers to 'review' its environmental policy. In that process the cycle is completed and qualculations necessitating to rewrite the policy are expected. In this last/first step of the cycle, we can find 'the political' within an EMS. The formalist take assumes steps 1/6 as the only moment within the EMS activities in which values are contested and written into the EMS.

To summarise, sustainable development has been translated into a series of formal steps which are imagined as promising, if followed through appropriately, a) gradual improvement of an organisation's eco-efficiency and b) provision of information about the organisation's environmental status to all relevant stakeholders. The specific politics of the environmental conduct of the organisation is to be prescribed in a designated moment for policy review. Finally, an EMS expects measures to be put into practice according to well-defined plans and facts about the organisation's environmental reality to be collected. These results can be used for evidence-based sustainability governance.

While Victoria shared the definition I had proposed, how the EMS actually worked was another matter. To get closer to the EMS machinery, we return to the document *EMS4GFQ*. This presentation provided itself a cyclic presentation, reproduced in Artefact 3.1.5 on the next page (anonymised).

This figure has been shown to all subsidiary environmental managers of GFQ. Instead of a long written text, the figure manages to transport the cyclic rationality inscribed into the EMS. The steps in my definition do not map exactly onto this figure. Of course. The cycle is a mere imaginary. The differentiation of steps is a contingent decision. Artefact 3.1.5 does not make explicit the meanings of all the concept which it employs. The audience of this figure is somebody who has already been partially enculturated into management system cycles. This may well have been the case for most of the full time employees of GFQ. I like to point to one important phrase in this artefact which I did not name explicitly in my definition: 'data collection'. Members used this term to refer the activity of gathering data about the consumption of water, paper, electricity and about the distances travelled as well the amount of wastes outputted by GFQ. Data collection is what this book is using as the empirical thread to structure the story-telling. And, finally, data collection provides the foundation for accounting – which links the EMS to Latour's (1987) 'centres of calculation' (Porter 1995, 51).

Why is data collection of importance? For GFQ to be able setting its own environmental policy, the EMS assumed that it required information. *EMS4GFQ* considers



Artefact 3.1.5: The Improvement Cycle of an EMS

data collection as part of the same step as report production. The understanding inscribed into the presentation was this: environmental data was to be collected, subsequently read and interpreted, as well as reported to designated audiences. Power's (1996) analysis of environmental audit and management systems, however, raises some questions in this respect. Referring to Latour (1987, 104), Power (1996, 309) suggests that in management systems facts are 'built' rather than 'found'. Awaiting audits, he summarises, an organisation authors facts for the purpose of being audited. This interpretation challenges the status of environmental knowledge. Boiral (2007, 137), furthermore, counterposes the improvement of documentation through an EMS with its potential to genuinely induce environmental efficiency improvements. When studying data collection, thus, we should attend to how environmental data is authored and how that data reconfigures engaging with environmentally relevant processes.

And there is a missing element. Neither the figure nor my proposed definition name actors. An EMS in general, and GFQ's EMS in particular, is characterised by being described as actorless. There are no humans. No flesh and blood. It is as if the cycle runs by itself. 'Continuous improvement' is the automatised output of an EMS – as it were. This irritated me years ago. And made me ask: where are the humans, what are they doing. Here are agents implied which put the plans into practice, analyse data, put reports together. Are the facts of nature writing themselves into the policy-making

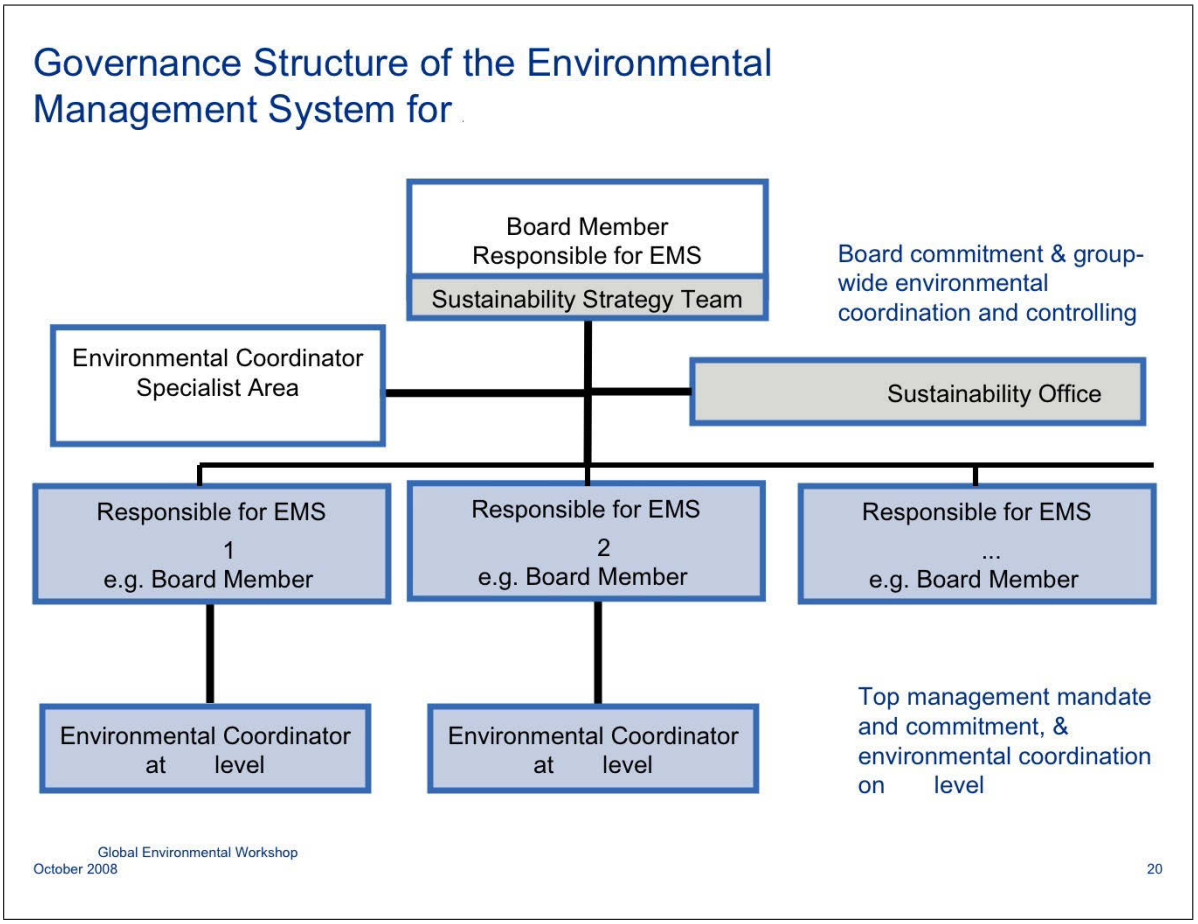
moment? This book is the result of posing such questions.

Organising Humans Power (1996, 312) suggests as well that we should study the practitioners involved in accounting and, especially, their practices. Given that even scholars like Gunningham, Kagan, and Thornton (2003) find that the picture of environmental management needs to account for the understandings of humans to explain how firms are greening themselves and that there is no simple win-win solution, we should expect quite a few intricacies when actually turning to study humans. In order to study how GFQ imagined organising its workers and managers in order to put the EMS into reality, I first turn to their organisational chart. Subsequently, I summarise the remainder of the document *EMS4GFQ*. This discussion prepares for a key actant prominent in GFQ's EMS reality and in this book, their database ESDR. That is, we conceptualise how the EMS tried to make GFQ's environmental effects legible through ESDR and by that constitute itself as the environmental centre of the corporation.

Organisational Chart On my first day on the job Victoria also asked me to study the organisational chart of GFQ. Throughout my study I learned that interacting within EMS-Team members and with other colleagues within the corporation implied that GFQ's employees not only interacted with each other simply as humans but much rather as humans linked to formal roles and positions, partially made transparent on organisational charts and official lists of who was working on particular issues.

The document *EMS4GFQ* contained an organisational chart as well (anonymised Artefact 3.1.6 on the following page). On this chart, the top links to GFQ's leaders, the board of directors. One of the 'board member[s]' was to be responsible for the EMS. His name was Ivo; he was the political sponsor of the EMS. In GFQ's formal theory, a specific set of actors was to discuss and by that support GFQ in devising its environmental and sustainability policies. This 'Sustainability Strategy Team', however, was not working anymore when I joined the efforts of the EMS. Later on during my field work some actors of the EMS-Team missed this element. It had been disregarded by GFQ in the process of streamlining its sustainable development management.

The central work within the EMS was attributed to two agents, the 'Environmental Coordinator' and the Manager of GFQ's 'Sustainability Office'. The first position was occupied for most of my field work time by Frederik. (Later, during my field work phase, this position was taken over by one of the GCE's 'Environmental coordinator['s]', Jack Newman.) The sustainability manager was Victoria. The geometry of this chart indicates a symmetry between GFQ's environmental coordinator and it's sustainability officer. Together they were responsible for maintaining the commitment of the board of directors to the EMS and for 'group-wide environmental coordination and controlling'. The latter involved GFQ's carbon accounting. Victoria, Frederik and Ivo were officially governing GFQ's EMS. Thus, the HQ employed two Full-Time Equivalent (FTE) workers for governing its environmental operations.



Artefact 3.1.6: The 'Governance Structure' of GFQ's EMS

The lower two rows of the chart indicate the roles of the subsidiaries (GCEs). In each GCE one local high-profile actor was to be responsible for the EMS. The HQ did not prescribe who or which role was to take over this formal responsibility. In this respect, the governance structure can be read as not as hierarchically designed as possible. Essentially, GFQ's HQ was not running the GCEs in a very deterministic manner. Rather, the hierarchy was quite flat. GCEs were able to shape business in many respects on their own. This was, thus, also the case for the EMS. GCEs were able to shape how they would govern the local instantiation of the EMS.

The chart shows that for each responsible actor within a GCE a further local environmental coordinator was postulated. The number of GCEs participating in the EMS was not stable. In the early history of the EMS about ten GCEs had run an EMS. Before my field work commenced, this number tripled. EMS-Team members (those working for the HQ) were inscribing into this formal governance structure the idea that the participating GCEs received a mandate to run the EMS locally. This would legitimise spending resources on running the EMS within the GCE. Some of the GCEs voluntarily participated in running GFQ's EMS, others had been forced to do so.

This simple sketch shows that humans were deemed necessary to actually put the EMS into reality. Some readers of the sketch deemed it (and, thus, the governance

structure,) too complicated. Stopping running the strategy team might have been one of the effects. It had involved even more individuals. In principle, for a complete formal governance chart of the EMS each box should be substitutable by a single name of a person. This may explain why, for instance, I was missing on the chart. The governance chart was a formal sketch of a structure. It's purpose was not to show the human reality behind the EMS. That reality had included a number of other actors. Here are three further agents we need to locate within the formal chart. Elise was the assistant of Frederik. She was employed via a temporary work agency. Dieter and me were both practicing skilled but cheap labour for Victoria. Furthermore, in GCEs many further workers were enrolled to contribute to running the EMS. In addition, positions were not necessarily occupied by the same individual for a long time. Thus, if the sketch had been a real-time representation of the humans governing elements within the EMS, it would have been in quite a flux.

EMS4GFQ, however, was to indicate the stable structure of the EMS. And this structure would also be communicated to auditors. Maybe the structure was even devised to be auditable (Power 1999). Officially, thus, the EMS was governed by clearly positioned individuals who were represented as linked to commitment by board members and to the notion of control. This book zooms in at the latter notion. I am concerned with the humans involved in controlling GFQ's environmental reality.

In order to show how this control was imagined, a summary of *EMS4GFQ*'s content is due. The presentation provided first a glance at how the EMS was embedded in the wider discourses of sustainable development and CSR at GFQ. It then drew out how the HQ imagined itself and its organisation of the EMS, followed by the EMS-Team's recommendations for GCEs of how to implement and govern an EMS locally. The technical part of the presentation comprised of an introduction to GFQ's environmental performance indicators, measures targeted at the reduction of emissions and an introduction to the data collection application, ESDR.

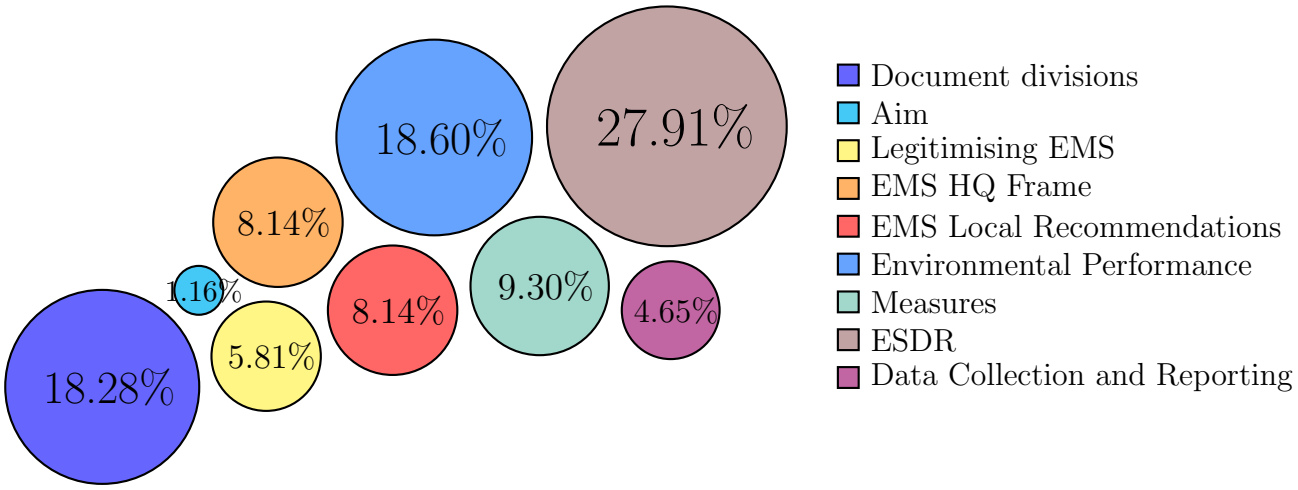
The section entitled 'Environmental Performance' introduced how GFQ made its environmental effects measurable: it drew a boundary of what kind of effects would be excluded and what included.[8] Those activities leading to environmental effects which were inside the boundary were differentiated in five so-called Key Performance Indicators (KPI): water, paper, energy consumption, distances travelled and wastes produced. Environmental performance, thus, was reduced to these KPIs.

EMS4GFQ, subsequently, provided a brief glance at how to reduce emissions. This entailed the dichotomy between 'planning' and 'doing'. Planning was supposed to pay attention to a 'Political situation', 'Economic aspects' and 'External requirements'. Doing reduction was presented as carrying out a variety of measures – intervening technically, organisationally, and through communication.

The largest section of the presentation related to the database ESDR. ESDR was described as employed to help consolidating, collecting and documenting 'various data

[8]For a more detailed discussion of the boundaries set see Section 3.3.

Figure 3.1: *EMS4GFQ*'s Distribution of Contents



and best practice'. It promised helping to expand the EMS by providing a centralised information system. *EMS4GFQ* then goes on to explain all the features of this database. Among these were features for different classes of users and different kinds of data collection and reporting techniques. Moser and Law (2006, 60), studying information systems, suggest that such claims have real consequences. This book explores the effects of GFQ's understandings of what an environmental database should achieve.

If we disregard the introductory elements(aims, framing the EMS, etc) and slide division elements of the presentation, *EMS4GFQ* was using fifty slides (61 percent) to show how – what GFQ considered to be its relevant – environmental effects could be accounted for and eventually reduced. This included four slides with a specific timeline showing the next steps of the EMS-Team and what was to be done at GCE-level.

Within this technical matter, the clear majority of slides relate to the accounting frame (i. e. performance KPIs) and the accounting technology (ESDR) (47 % of the total presentation). Measures to reduce environmental effects were only of secondary priority in terms of spelling them out in detail (9 % of the total presentation). The latter may be understood as grounded in the fact that measures, after all, needed to be locally devised and carried out. The EMS-Team had difficulties providing 'universal' prescriptions of how to reduce environmental effects. In contrast, both environmental performance as well as the database ESDR were presented as universal, rather than local, topics: the performance indicators were introduced through system theory-like figures including depictions of various environmental flows; ESDR was shown with the imagery of a sun and dark blue space (read: studying earth from outer space) underlying the application's title.

Precisely because the definition of the relevant environment for GFQ as well as the way how corresponding environmentally relevant processes within GFQ could be captured were imagined as universal, the audience of the document could be filled in with clear information about KPIs and ESDR.

The humans who were supposed to put the EMS into reality were schooled with this

presentation about how to read their operation's effects on the environment. In this respect this presentation can be considered as a specific *schooling device*, employed by the EMS-Team. A workshop in which this presentation was shown to GCEs' agents was itself such a schooling device as well. When the EMS-Team used these devices to teach local agents of how to imagine, read and treat their GCE's environmental effect they, effectively, treated these local agents as 'empty vessels'. This resembles Suchman's (2002, 140) take on the fallacy by superiors to assume that people are to filled with knowledge and to be taught the proper practices, rather than engaging with these agents as competent members of their worlds who are practically able to interact with these worlds.

As Figure 3.1 on the preceding page makes visible, the presentation's authors imagined it of utter importance to convey to agents who were to implement the EMS how environmental performance could be measured and how that data could be centrally made available to GFQ. This book takes this concern by GFQ's agents of ecological modernisation seriously. This means that this book is zooming into these points with which GFQ's agents were concerned and we provide a story about how environmental performance was made measurable and how that data was turned into centrally available environmental reports.

What is to be done? For developing this story, we need to follow how the EMS-Team addressed GCEs' agents. Artefact 3.1.7 on the following page (anonymised and verbatim reproduced) was provided as one of the final slides of *EMS4GFQ*. With this slide the presentation's authors let the GCEs' agents know how environmental data for 2007 was to be collected. The workshop for which this slide was prepared is the first item of the list: users of ESDR are to be trained and made familiar with the database. The assumption inscribed into this document was that users are able to utilise ESDR afterwards to deliver environmental data to the EMS-Team.

After the workshop, subsidiary agents were given a couple of days to determine key information to allow ESDR to capture the GCE's reality: subsidiary agents needed to inform HQ agents about a) who in their GCE would be actually collecting specific kinds of data and b) at which locations their GCE was active as well as c) whether the GCE was internally separated into several reporting GCEs. Based on this information, the presentation promised, the EMS-Team would adapt ESDR according to the local specifications. Furthermore, the GCEs were asked to identify which environmental consumption data a GCE would be submitting. Once an environmentally relevant consumption (sub)indicator was identified, a GCE's environmental manager was to configure ESDR task-forms☞.[9] Fundamentally, such a task-form was configured in terms of which environmental subindicator it was linked to (e. g. 'drinking water' or 'electricity generated by nuclear power stations'), which GCE it was linked to (e. g. the Malaysian GCE or the London office at a specific street of a British GCE) and who

[9] We came across these digital entities already above. See Artefact 2.1.3 (on page 81).

would be responsible for entering the data for this indicator at that location into this specific task-form.

☞ discussion at Section 3.2

Next Steps [...] Your first steps in [ESDR]

- User Training (30.-31.10.2008)
- Definition of data collectors[.] Mail to [Victoria Miller] with email adress and User level ([GCE] until 10.11.2008)
- Definition of company structure (sub companies or locations)[.] Mail to [Frederik Steine] ([GCE] until 10.11.2008)
- Generation of new user ([Victoria Miller] until 17.11.2008)
- Generation of company structure ([Frederik Steine] until 17.11.2008)
- User administration: User allocation to company ([GCE] until 30.11.2008)
- Generation of necessary Task-forms ([GCE] until 30.11.2008)
- Input of the environmental data 2007 ([GCE] until 20.12.2008)
- Environmental balance 2007 on [GCE]-level – First draft ([Frederik Steine] until 10.01.2009)
- Controlling and clarification of quantitative data 2007 ([GCE] / [Frederik Steine] until 25.01.2009)
- Finalization of environmental balance 2007 on [GCE]-level ([Frederik Steine] until 31.01.2009)

Artefact 3.1.7: 'Next Steps': 'collection of the environmental data 2007'

The 'Next Steps' list designated about twenty days for collecting that data and entering it into the database. Afterwards the EMS-Team would generate reports about this data and produce comprehensive environmental reports for each GCE – draft 'environmental balance sheets☞' were created. As a centralised and summarising inscription device, this entity co-performed data construction heavily. Later in this chapter we investigate these devices in depth. Their construction was part of Frederik's formal responsibility; for this work he received much support by Elise. Next, the GCEs were to check these reports; and soon, a finalised environmental balance sheet was brought into existence.

At least, then, at the surface, we find that GFQ's take on running an EMS was to a significant degree about data collection. However, Power (1996, 302) makes us sensitive to the possibility that doing the data collection might be more about running the processes such that they are auditable rather than about engaging with the substances of environmental improvements.

A recent development in the field of environmental sociology suggests that studying ecological modernisation should investigate, alike ANT, the networks and flow of environmental information (Mol 2010, 31). Following Mol's lead, the subsequent section follows the doing of data collection from my perspective of working as a colleague between Victoria and Frederik, helping them to maintain ESDR. Onto this path of enquire I invite the sensibilities by Swyngedouw (2010b, 191) who suggests:

> Environmentalists (whether activists or scientists) invariably invoke the global physical processes that threaten our existence and insist on the need to re-engineer Nature, so that it can return to a 'sustainable' path. Armed with their charts, formulas, models, numbers and grant applications, to which activists usually add the inevitable pictures of scorched land, factories or cars emitting carbon fumes, dying animals and plants, suffering humans, apocalyptic rhetoric, and calls for

> subsidies and financial support, scientists, activists, and all manner of assorted other human and non-human actants enter the domain of the social, the public and, most importantly, the political. Thus Natures enter the political.

For the investigation commenced in this book, I read GFQ's EMS-Team members as agents alike the environmentalists described by Swyngedouw. The EMS would provide knowledge which could be used to fight within the corporation for greening measures. By collecting data about GCEs' environmental effects environmental managers were imagined as providing a firm base for political action within the capitalist organisation.

◇ *End of Section* ◇

In this section I showed that GFQ's formal guidelines, like its *Code of Conduct*, firmly linked the corporation's discourses to the global discourses of sustainable development, ecological modernisation and climate change. By providing a partial analysis of a key reference document used by the agents of GFQ's EMS, called *EMS4GFQ*, I argued that, effectively, the sustainable development is translated into the corporation's EMS; and the latter focussed upon data collection for assessing the corporation's 'environmental performance'. The notion of translation carries all the elements as laid out in the prior chapter when introducing the sociology of translation. Performing an EMS and collecting environmental data was rendered quasi-synonymous to the universal salvation claims of the sustainable development discourse. While the process of defining data sources, collecting the data and making it centrally available via GFQ's database ESDR were inscribed as equivalent to producing environmental sustainability, the meaning had shifted significantly. The sustainable development discourse has been broken down into technical knowledge production issues with a brief appendix of making suggestions of how to reduce emissions.

The majority of *EMS4GFQ*'s actual contents was devoted to translating environmental performance into KPIs and many subindicators which were presented as measurable by GCEs' local agents. The document contains definitions of what kind of data was desired and how this should be translated into ESDR.

This chapter serves to familiarise ourself with the complex reality of data construction. This first section showed that sustainable development was discursively translated into data collection. In the next section I take you on a journey into GFQ's HQ, following the practices of data collection. I argue, by this approach I take seriously the emphasis provided in *EMS4GFQ*: this authoritative document stressed how data should be *collected*. This refers to a practice. This book, thus, is about studying the ways in which data is handled as part of members' work reality. And I propose such an approach as an alternative to investigating and retelling stories inscribed into formal data processing flow charts.

For this story I mobilise a body of theory which suggests that discourse 'structures buildings, instruments, gestures' (Mol 2002, 61). We need to expect that the ways environmental management and data collection are imagined is not only found in immediate social interaction, but also in workers' materialised infrastructure. Therefore

I pay attention to entities like the central database ESDR and pieces of paper. All such entities are assumed to play a part in making the discourse of sustainable development possible to be translated into GFQ's internal reality. Discourse is not restricted to verbal interaction. It can be found in instruments, tools, machines, documents, emails, on desks, doors and walls (cf. Agamben 2009; Keller 2005). The analysis above suggests that ESDR may play a central role in the specific culture which binds agents of ecological modernisation within GFQ together. Therefore we need to study how environmental data is enacted in and through the database. Literally, as it seems, this database of GFQ was lying in between turning GFQ into a sustainable corporation and the distributed environmental managers. This resembles Latour's (1987, 108) reading of interesse as inter-esse: '"interests" are what lie *in between* actors and their goals'. Thus, Latour suggests to see interest as a relational concept: it refers to the relation between the actor and their goal. In this book I am studying what is between members and their goal of knowing their environmental performance.

3.2 Controlling Data Collection

In the prior chapter we have traced how a GCE's agents were questioning a number of sources (including their colleagues of other company divisions, documents, meters and objects which were to be consumed) in order to classify these objects into the given list of accounts inscribed into ESDR. They assembled data about the amounts consumed and they formatted this data to fit into ESDR task-forms☞. The analysis of these practices suggested that how these translations were to be done was often vague and partially the prescriptions provided by the HQ were not rational for the local situation at the GCE. We saw that local agents were carrying out a variety of calculations and many qualitative judgements in order to allow the desired data to come into existence and inscribe it into the central database. And the preceding section showed that when following the data stream to GFQ's HQ, we find that this database was central to GFQ's internal enactment of itself as a sustainable corporation.

Following the discursive orientation in the prior section, this section introduces a shift to the actual work practices at the centre of the Environmental Management System (EMS). Following Latour (1987, 222) we can expect that many things are accumulated at the centre, that knowledge is created and further things sought for. He suggests that we find a cycle of accumulation in which observed entities are collected at the centre to study and catalogue them (ibid., 220). This book is about a particular kind of entity: data about environmentally relevant consumption, organised into five Key Performance Indicators (KPI). On the following pages I provide a partial account of the practices at the centre, showing how practices make elements hang together. The remainder of the chapter makes you familiar with key qualitative elements of GFQ's environmental accounting approach and shows how the centre's practices translate data collection back into sustainable development.

I found that the EMS-Team frequently observed GCEs not having put in data in the 'correct' manner. Rather than presenting here the detailed prescriptions entailed in *EMS4GFQ* (with all its definitions of environmental performance and its explanation of ESDR) and using them as a standard to evaluate members, this book proceeds by following actors, their practices and the objects they engaged with. Recall, in the prior chapter we encountered Elise who communicated to Nick (via me), specifying how to apply the definition of water accounts correctly. HQ members would conceptualise this instance as 'guidance'. Elise's intervention was not an exception. Although GCEs were supposed to manage entering environmental data into ESDR themselves, often members of the EMS-Team guided subsidiary environmental managers through the complexities of classifying and assembling data. In terms of time, a significant amount of it – often several hours each day – have been invested into comprehending data statūs of, explaining to, guiding and intervening in GCEs. How were these practices taking place and what did they effect? This section explores these issues in three steps: I start by discussing the interaction between GCEs' agents and EMS-Team members circling around the collection of data. We find that GFQ's agents put into practice several possible orderings of data. I proceed by introducing interactions within the EMS-Team which aimed at ensuring proper data delivery by GCEs. This opens larger question about how power was distributed within the team and around environmental data collection. Finally, I show how the EMS-Team was itself connected to external audiences which were considered significant and by that shaped the understanding of what data actually was collected. We find that while HQ based agents were able to make subsidiaries' agents deliver acceptable data, a host of uncertainties were both collectively and in one-to-one interactions sidelined and, hence, silenced.

Ordering Data Collection Winter. Wednesday. We work through a moment which shows a variety of ways workers went through revolving in the vicinity of data input while witnessing the weight of the presence as well as absence of five members in ensuring data delivery: of the EMS-Team present were Dieter, Victoria and me; Elise was absent in this case – yet relevant as the one who would have been positioned best to provide support in the case below. In this instance, we also encounter Manuel Meier. He was the local environmental manager of the Columbian GCE which was about to deliver their data. Another member of the sustainable development unit, Marion Skinner, was a cheap labour worker for the sustainability office. She was a friend of Dieter and shared the office with me.

Field Note Extract 3.2.a (Reactions to a request for guidance)

Today is the deadline for data input into ESDR for the current reporting period☞. Earlier today, Manuel wrote an email to Victoria asking for help to put data into the database. She forwarded this email to Dieter and me. When I asked Dieter about the email, he suggested he would call it a day. And he continued to say: he doesn't like this anymore. For months he has being running after Manuel. And today he is

> *getting in touch with us! Dieter told me he had sent a declining email to Manuel. Dieter then asked me to let Victoria know that Dieter offered Manuel five times trainings. But Manuel never accepted.*
>
> *Later, when I met Victoria I told her how Dieter reacted to Manuel. She then inquired whether Elise was still around and could take care of the issue. Marion lets her know that Elise left already and that the email arrived just five minutes before Dieter and Elise packed up work.*

This field note extract shows that data collection did not work by itself but EMS-Team members were necessary to help the data to be inscribed into ESDR. However, also HQ agents were, after all, only workers. This meant that they at some point also called it a day, stopped working temporarily – until the next working day would have to commence. While in general the EMS was able to run well with this characteristic of workers, on that day there was a tension in the air: a deadline had been scheduled for this very point in the linear timeline. This was the last day on which GCEs' agents officially were allowed to enter data into the database for a specific 'reporting period'. ESDR assigned all data to a single reporting period, a calendar year. The reason for members to conceptualise these temporally bounded entities as reporting period was that in principle the boundaries could change (e. g. a decade, a month, an hour); thus the boundaries were not self-evident to members. Structuring accounting information systems such that they link the data inscribed into accounts to specific reporting periods is a widespread practice (see e. g. Macintosh, Shearer, Thornton, and Welker 2000). Thus, our understanding of consumption facts as developed in the prior chapter is now extended: these three-folded facts were to be specified as well in relation to GFQ's reporting period timeline and to the corporation's organisational structure (two categories), in effect adding another four folds to the fact (each category was specified through another qualifier).

We also find that communication between Manuel and the HQ was taking place by email. The GCE's environmental coordinator Manuel had contacted Victoria in order to mobilise help for putting data into the database. The underlying issue here is that Manuel 'wanted' to enter data into ESDR. I like to distance this book from specific speculations about the motivations of actors. What we can engage with, however, are the actants required for data input.

As it seems, the GCE agent was not feeling competent to provide that data through ESDR in the 'correct' format and manner. My colleague Dieter had already contacted Manuel several times to offer, what Dieter called, 'trainings'. Part of Dieter's job was to show and explain to subsidiary agents how data should be entered into the database. Even though the EMS-Team had wanted these agents to participate in their training workshop a couple of months earlier, not every body was able to take part. One reason was that some GCEs did not allow environmental managers this long-distance trip. As a practical solution to the questions local agents had about ESDR, Dieter frequently had offered phone conferences to these agents, sharing *EMS4GFQ* before and, then,

guiding them through the environmental indicators and the usage of ESDR.

In this case, the process had taken place differently. Manuel had not got back to Dieter until the day the data was supposed to be completely entered. Then he had got in touch with Victoria. She had forwarded Manuel's request to Dieter and me. Her prime addressee was Dieter. Fortunately members of the EMS-Team soon started to copy me in into much of the standard email traffic, which both eased carrying out my studies and ensured that I knew what was going on – considered nearly a necessity to work together.

However, Dieter was not going to help Manuel just then – shortly before he was going to leave the office. When I told Victoria that he had already left, she suggested that Elise should help Manuel. However, another colleague in the office, Marion informed us that Elise also had left shortly before. The direct contact among colleagues allowed to clearly recognise who was available for helping Manuel: only Victoria and me. Victoria was a busy manager. Often staying till late in the evening in the office, she was the top sustainability manager of GFQ which meant that she was not supposed to spend her precious time resources on such a technical issue.

Thus, to allow data to be made available for GFQ's central EMS actors, not only was a database implied but also the availability of workers who would train local agents to achieve data input. Within the EMS workers constituted 'human resources' which could be ordered to do certain work – if only these resources were willing and present.

A couple of moments after Marion informed Victoria that Dieter and Elise already had left, Manuel called Victoria. After they checked timelines, Victoria asked me to help out. I accepted and went to my computer. Before actually getting in touch with Manuel, Victoria called me again, asking me to mobilise data from Manuel for all KPIs:

Field Note Extract 3.2.b (Recognising 'weird' data)

Victoria ends the phone call by saying: 'I am very grateful that you let yourself in for this experiment.'

I am now looking at the ESDR data of Manuel's GCE. I recognise that some data seems weird: the reference figures☞ are totally wrong. Thus, I am writing an email to Manuel, seeking to explain how reference figures are to be constructed.

Victoria framed what I was about to get involved with as an 'experiment'. This underlined the uncertain outcome of the developing engagement with Manuel. Given that Manuel contacted the EMS-Team at this late point in the timeline, it was expectable that supporting him to enter data would not be straightforward.

To prepare myself I first turned to the key reference object lying between any GCE and the EMS-Team: ESDR. The objective of the interaction between GCE and the EMS-Team was that data for all KPIs would be inscribed into an object which was accessible by both parties. This object was the database. Manuel was interested in this object because his job was to enter data in it and I was interested in the object in order to learn the status of representation of his GCE within ESDR. I did not consider any of the 'environmental data', i. e. data pertaining the consumption

relevant to the KPIs, notable. However, non-environmental data, the so-called reference figures, were eye-catching. Subsidiary agents needed to provide reference figures to allow GFQ accounting for efficiency gains rather than only for total environmental performance. My judgement that this kind of data was 'weird' was based on the discrepancy compared to the data I had expected. Manuel's reference figures deviated much from the data reported for reference figures which I had encountered repeatedly before. The way I judged Manuel's data was shaped by me comparing what I had seen before with what I was seeing then. Only through these repeated encounters of data from all over the world, I started to know the numbers I had to expect for reference figures. Latour (1987, 219) similarly suggests that fact-building is shaped by agents at a centre who encounter things again and again and by that are able to study the things comparatively. Based upon such comparisons I judged the reference figures wrong. This was supported by having encountered repeatedly in interactions with EMS-Team members what acceptable data would look like. My finding was that the figures which I considered conspicuous were not 'cognitively consistent' (Wynne 1992) with realistic data. This is usually called a 'cognitive deficit model' (Wynne 1991; Wieser 2002). In this rational model of knowledge, my task was to *repair* the 'gap' between correct data and weird data which I assumed to be caused by a wrong understanding by Manuel. For that I designed an email (Artefact 3.2.1, a verbatim, anonymised copy) which would provide an explanation and usable example for Manuel. Thus, I ventured resuming trying to train Manuel.

Dear [Manuel],
thank you for your Email.
Just to make sure you recognised this (philosophy of [ESDR]):
[ESDR] always needs two kinds of numbers: a) Environmental Indicator (Waste, Water, Energy, ...) b) Number of Employees covered (=reference figure)
Thus: "reference figures" refer to the number of people. Thus: in "reference figures\Energy" you should enter how many people your Energy indicator represents.
If I look at your data, I find the following: you are telling us that [1798332] employees have used [5823424.6] MJ of Hydroelectric power in 2007. I would like to ask you: Are you sure there is no mistake with the number of employees? You are saying that [your GCE] has [1.8] Million employees? Of [c]ourse you know better than me.
In the case of paper you are saying that [153426] employees used [153426]kg of paper. Are you sure? In the case of water you are saying your environmental indicator covers [6733] employees.
Thus, you are saying: you have between [6733] and [1.8] Million employees? [ESDR] is built with this philosophy: (My example:) [GFQ] (X) has 1000 employees. I am the environmental coordinator. [GFQ] X has two buildings. At one building 900 people work, at the other 100. I bought paper for one of the buildings (the one with 900 employees). We bought and used [153426] kg of paper in this building. Then my reference number for paper is 900 and my environmental indicator is [153426] kg of paper. Unfortunately I do not know about the other building. (therefore my environmental ind[i]cator for paper does not represent 1000 employees but only 900.)
Please reconsider your reference numbers.

Cheers, Ingmar

Artefact 3.2.1: Email explaining 'reference figures'

Manuel had been told by Victoria that I would provide help to him. Therefore I considered it both acceptable and appropriate to send him such an authoritative and prescriptive text. My understanding was that the EMS-Team was the centre of the EMS. That meant for me I should guide Manuel's way of seeing reference figures. The

understanding was that this kind of vision would have effects: he was supposed to enter other numbers.

The existence of this email substantiates our understanding of the inscription device ESDR. The latter needed to be amended with further inscription devices, such as *EMS4GFQ* and flexible devices such as this email. Through these prescriptive texts we were attempting to enable ESDR users to engage with the database correctly. With Grint and Woolgar (1997, Chapter 3) we can understand this take as 'configuring the user'. Data production was requiring the user to be probably set in place, in order to make the user employ or simulate that cognitive model of the data which the EMS-Team was making use of. Thus, several figures (as in characters of a script) needed to be aligned with the software in order to yield the desired performance: proper reference figures (as numbers). These latter figures were important characters for the wider script of the construction of data: ESDR needed two types of numbers. First, it required the input of consumption data. Second, GFQ collected information about how many workers' consumption was actually represented by the consumption data. We engage with the count of workers and corresponding calculations in depth below.

Let us return our attention to the unfolding of the interaction in the field. After a while, somebody was calling. It was Manuel's secretary. About twenty seconds later, I talked to Manuel:

Field Note Extract 3.2.c (Multiple orderings of data)

> *He has a question. What's about the market-mix of energy? This does not exist in his case. I offer to delete the 'task-form'. [...] Then, I venture that the reference figures are not correct. It is taking a while to explain it to him. Finally, he gets it: reference figures are coverage☞, i. e. numbers of employees covered.*

This conversation can be understood as containing two parts: Manuel's vs. mine interest. First, he wanted me to change what he saw on his interface to ESDR. He saw a list of task-forms for his GCE (depicted in Figure 3.2 on the following page) and suggested that the specific task-form for market energy mix[11] was not applicable for his GCE. In order to help him with this problem, I deleted the market energy mix task-form from the list. If he had not told me that that task-form was not applicable I would have had never learned about this and my colleague Elise would have asked Manuel to enter data for that task-form. Latour's (1987) notion of interest helps to point out that for Manuel that task-form was lying between himself and a cleaned up interface to the database. Thus, he was interested in that task-form to turn absent. However, from my perspective that task-form was not disturbing me immediately. Hence, I had not been interested in it. Deleting that task-form rendered the interface cleaner and the task-form itself invisible. The potential market mix energy representation was made absent. By

[11]The KPI energy contained the subindicator electrical energy. It was accounted for through a variety of 2^{nd} level subaccounts, including e. g. nuclear energy, hydropower and many others. For each nation state a specific option 'market mix' was available as well. This subindicator was related to an average carbon conversion factor corresponding to the average emissions caused by energy production in a given country.

Figure 3.2: Illustration of Structure of ESDR's List of Task-forms

Corporate Entity	Task Name	Task Owner
GFQ \ Columbia	Environmental \ Energy \ Input \ Electricity \ Average Market Mix	Manuel Meier 20.01.2009
GFQ \ Columbia	Environmental \ Energy \ Input \ Electricity \ Nuclear Power Stations	Manuel Meier 20.01.2009
GFQ \ Columbia	Environmental \ Energy \ Input \ Fossil Fuels	Manuel Meier 18.01.2009
GFQ \ Columbia	Environmental \ Reference Figures \ Energy	Manuel Meier 20.01.2009

initiating the deletion of the task-form Manuel reordered the appearance of the data structure on his interface. This may be interpreted as a form of control. Control over data collection could mean that data structure visualisations were (re)arranged.

My interest in this conversation was partially different. Although I also wanted to order data within ESDR, the ordering I was after was not so much about the arrangement of data containers within the database but about the content of one type of containers: reference figures. By way of telling Manuel that these figures were not correct, I communicated not only what I saw but also how he was supposed to see the data. I attempted to calibrate his vision to the gaze which the EMS-Team wanted him to exercise. To adapt his way of seeing required communicative work and time. Eventually we succeeded in developing a shared understanding – albeit this was not a compromise but rather a hierarchically taught understanding. The gap was filled. The reference numbers, finally, changed. They have been altered to a count of 835 workers inscribed in all respective indicators. Thus, we find that to control data humans had to and could be aligned to specific cognitive understandings. These understandings had to be translated into action within ESDR. Only then the 'correct' data could emerge.

I argue that what we find here can be conceptualised as alternative and, thus, multiple ways of ordering data collection. On the one hand data collection can be ordered by cleaning up data structures; on the other hand ordering data collection can mean changing the representations themselves. Furthermore, within both orderings, several choices existed as well. The data structure could be organised in many different ways; and the numbers which showed up as reference figures could as well change very much. As Mol (2002, 47, 66) points out in her study of multiplicity in a hospital, competing diagnoses may be dealt with by letting one diagnosis win. In this case, the three digit count of employees won over the six digit count. Throughout this book, we repeatedly come across such moments in which multiplicity in representations were existing or possible: slight differences practices resulted in different data.

This incident connected four offices (Manuel's, Victoria's, Marion's and Dieter's) via a database, ESDR, and the phone network. ESDR was the location which was designated as the central database to store and order the data which was provided by GCEs. In

order to allow for this designation to be useful, users had to be trained. Manuel had not undergone such a training. I deferred that because of the missing training he had not known how to enter the correct data. I assumed a cognitive deficit. With this in mind I participated in sending emails and talking with Manuel and Victoria on the phone. These alternative communication means constituted the infrastructure which was required to fill the gap seemingly caused by the missing training. This process entailed the controlling and configuring of agents by shaping their gaze at data. As an agent of the HQ's EMS-Team I strove to move Manuel closer to the imagined standpoint from which the EMS-Team was looking at the data.

The prior discussion emphasised how I configured the subsidiary agent to render him compatible with the EMS-Team's reading of ESDR. To elaborate our understanding of relations of EMS-Team members to environmental data and subsidiary data collectors, I now turn to a similar case, crystallising around a phone conference between Dieter, Elise and the Indonesian GCE's environmental manager, Tom Fis, who was working at a time zone, five hours off ours. This analysis allows us to focus on how EMS-Team members had to be configured such that communication with GCE agents were smoothed. Here the story goes. I had joined Dieter at his office in the early morning. This room was positioned straight above the building's garage. In principle, he shared shared the office with two other workers. However, at this morning we were alone.

Field Note Extract 3.2.d (Starting a phone conference)

> *At the left of his computer screen a phone is placed. It is dialled into a telephone conference. Nobody else is present. He pulls over another phone and tries to call Tom with that one. Dieter tries calling both, Tom's landline as well as Tom's mobile. Tom does not answer either. However, Dieter receives an engaged signal from the mobile. Dieter tells me: 'This shows, he is active', albeit, not necessarily on environmental management. He subtly laughs.*

EMS-Team members were heavily dependent on communication infrastructure to communicate to globally distributed environmental agents. On each desk in the HQ offices a telephone was placed, and each was able to handle several connections at the same time. This extract is about Dieter trying to open a voice connection to Tom. The phone conference had been agreed upon earlier (probably via email). The EMS-Team used phone conferences nearly always when more than three people were to communicate on the phone together. An external operator provided the service; a login code was distributed to participants of the chat and when they had all dialed in local access numbers (hear the computer female-pitched voice: 'you are the ... second, third ... caller in the line') they were able to quite directly communicate. This morning Dieter wanted to talk with Elise to Tom. However, when Dieter dialled in, neither of them was present in the conference yet. To reach Tom, Dieter used an alternative communication path: he called his mobile. Receiving an engaged signal meant for Dieter that Tom was able to communicate. Dieter reckoned Tom was talking to somebody else. Thus, this communication technology allowed to submit an information as sound. The ear was a sense which was able to differentiate three states: no tone would have meant

that the connection between the phones is not working, a ringing tone meant that the connection is working but the called party did not answer and the busy signal meant that the called part was using the connection for something else. The ear as a filter to make sense of the world has been described often, dating back e. g. to Aristotle (Sterne 2006, 834). In this case Dieter had used the phone network to extend his physical listening device to reach thousands of kilometres away. In that respect it resembles the prosthetic devices described by Haraway (1991c, 190). While she was concerned with visualisation technologies to make the world visible and, thus, controllable, the sound technologies can be imagined as well as helpful to sense the world and control the world based on these information (think of the military sonar). In contrast to a fixed image, a sound is always taking place over time and by that allows to follow processes: '[s]ound, silence, intervals between sounds... situates us *in* the world' (Hosking 2007). In this case Dieter was situated with his hearing device in a very rudimentary way in Tom's world learning that in principal Tom seemed to be available for work.

Dieter's subtle laugh about his statement that Tom might be active on something else than the EMS was related to something I had learned early in the field: most GCEs did not employ an FTE environmental manager but, rather, asked an existing employee to *also* attend to the HQ's demand of collecting environmental data. Dieter – as part of the EMS-Team – knew very well: local environmental managers were not necessarily trained environmental professionals. The group of locally responsible agents for the EMS included caretakers, accountants and a variety of other professionals. Data collection procedures and policies had to be translated to all of them.

While waiting for Tom – actually, it took many minutes until the line was established – Dieter introduced me to a problem which he frequently encountered:

Field Note Extract 3.2.e (Framing subsidiary environmental managers)

The problem with people from Asia is: they do not ask when they have not understood something – because it is impolite to ask. He pauses. Dieter explains: several types exist. 'We are dealing with machos', e. g. the [colleague from a Western Asian Country] is saying: I 'worked for WWF', I 'can handle it', i. e. environmental management. Dieter had offered trainings to them. But they declined.

[...] Dieter turns to me and is telling me that Tom loves football. At the last workshop, Tom suggested to him: hey, I have two tickets for a soccer match. Tom left towards Barcelona after the workshop to watch a match of the champions league. Dieter continues by telling me that Tom is only taking a week off each year.

Analysing his account, I like to emphasise how Dieter was imagining GCEs' agents. To introduce his problem of co-operating with 'Asians' he first attributed the characteristic of 'not asking questions when they have not understood something' to this regionally defined class of humans. Above I discussed general problems of classification. In which class to classify an entity is always problematic: it shifts the meaning or identity of an entity because, necessarily, the entity is translated from its world into the world organised around the boundaries introduced by the classification scheme.

In this case Dieter implied that the 'Asians' were different from the norm. The norm was that agents of the EMS should voice if they had not understood something. (Well, here is a book making explicit how understanding an EMS and environmental accounting may look like. Hopefully this is deemed appropriate with respect to the norms of Dieter and his colleagues.) Through drawing this boundary between the 'Asians' and the norm he construed the class 'Asians' as 'Other'. Other refers to an entity which is different from the Self. Dieter's Self was implied as acting according to the norm, the Other was not. This process of Othering was supported by Dieter's generalisation. He introduced all the 'Eastern' cultures as sharing an (imagined) characteristic of not asking questions. Saïd (1979) reconstructs such a take as a projection of Western actors on Eastern cultures. Here we find that colonial history was translated into practices employed within the EMS-Team to make sense of experiences at the HQ of the 'Global North'. Nevertheless, as Law and Singleton (2005) press us to recognise: ontologically, differences exist. Things may be Other to each other. However, the question is whether, when and which differences are put into practice and with what *effect*. In this case, Dieter used the racial stereotype to make sense of the reality of some agents having declined his offers to provide trainings for ESDR usage. Using the stereotype legitimated not engaging more substantially with the communication friction between the HQ and GCEs' agents.

Dieter also drew on his personal knowledge to introduce Tom to me. By telling me about Tom loving football and his work ethos he linked the GCE agent to individual characteristics. We see below how he mobilised that knowledge to relate to Tom. For now we need to recognise that when the telephone conference would start, Dieter was equipped with a general scheme to interpret the 'Asian' GCE's environmental manager as well as knowledge to connect to the specific person Tom.

Finally, Dieter's colleague Elise was entering the phone conference:

Field Note Extract 3.2.f (Checking the status)

> *Dieter: Elise, I am still waiting for Tom. Elise laughs ringingly. Dieter warns her: everything you are saying will be recorded by Ingmar, he is taking notes.*
>
> *[. . .] Elise suggests to Dieter: 'actually, you know everything'. Dieter agrees: in principle. To make sure I got this right: reference numbers are rubbish. Dieter looks at ESDR and then at an MS Excel sheet.*

Dieter's first messages to Elise can be read as showing what was significant for Dieter to understand the status of this phone conference. The meeting had been arranged in order to communicate with Tom. However Tom was not yet present in the conversation. Additionally, Dieter made his colleague aware of my presence. At that moment my presence in the field was not yet taken-for-granted – it was my second week at GFQ. While the phone conference was considered apt to communicate all relevant information about data collection, my non-audible presence in this case also mattered. Elise had had no chance to utilise the extended listening device to recognise me if I had not

made any noise. Dieter made my presence audible. This enabled Elise to adapt her communication to my presence.[12]

Elise's point that Dieter knows everything can be understood as pointing to the bounded reality she considered relevant for this phone conference. She assumed that her colleague was *equipped* with all the information she, again, assumed he would need for the communication with Tom. While I did not know what exactly Elise classified as relevant, Dieter's reaction provides a hint: similar to my move to study the GCE's representation in ESDR he turned to ESDR as well as to a spreadsheet. This move supports my argument that to understand the relation between a GCE's agent and EMS-Team members a GCE's virtual reality (consisting of environmental data and of reference figures) was the mediating object. Thus, the object between GCE and HQ was data – inscribed in ESDR and spreadsheets. These inscription devices acted as archives. Waterton (2010, 648), retracing the meaning of archive with the help of Derrida (1995, Archive Fever), supports our interpretation: an archive may be understood as the residence of 'those who command'. In these inscription devices data resided and that data commanded what environmental reality was visible within GFQ. Why, however, did Dieter look at two inscription devices? One decive should, of course, be sufficient to provide the authoritative data which commanded the reading of environmental reality. This is a puzzle which I ask you to keep in mind – one which I strive to explore in several ways throughout this book. Here we simply have to note that for Dieter, as it seems, it was practically relevant to check the GCE's representation in *parallel* inscription devices.

This phone conference was a result of repeated checking of data. Elise was, in the phase of data collection, regularly checking the status of data delivery by GCEs. She and Dieter were updating each other often several times a day about such statūs. Officially, Elise had the authority to know the data status. Dieter's task was to ensure GCEs participated in the EMS. In terms of division of labour, it would have been Elise's task to communicate about data with Tom. However, by ascribing adequate knowledge to Dieter, she mandated him to participate in talking about data during the phone conference.

Field Note Extract 3.2.g (The phone conference)

After a while, Tom enters the conference and Dieter suggests: Tom, hey are you looking forward to the second half of the soccer season? [...] Thanks for the data of 2006. The problem is: you have too many task-forms. Tom says: if you help me to put data in... He also wants the representation of his GCE to be altered. Dieter then looks at the list of task-forms in ESDR. In the company structure's representation several '[GFQ] Indonesia' exist: '[GFQ] Indonesia', '[GFQ] Indonesia [X]', '[GFQ]

[12]Here, of course, are limits to participant observation. However, over time, Dieter, Elise and me developed relations of trust which allowed me to develop a deep understanding of the processes in the field. During my early phase at GFQ I might have come across only a censored version of reality. However, the analysis of this study builds upon experienced realities over many months and very different moments as well as a large number of artefacts analysed. What this book, thus, provides is an analysis of those elements part of practical action which were considered acceptable to be shared among EMS-Team colleagues.

Indonesia [Y]'. While Dieter asks Tom 'can you repeat what you mean?' – he playfully turns his GFQ identity card between his fingers. Dieter tells Tom: we will delete what you like. Elise: 'I delete everything you want.'

She continues: I didn't see any tasks for waste. Tom: ehh, vast? Elise: 'WASTE'. Dieter asks: do you have no data for waste? Tom replies: not significant.

[. . .] Dieter: We finished for the moment. Elise will delete the structure elements, you will manage to put your data in until tomorrow and we will all be happy.

Dieter used his knowledge about football to open the conversation with Tom. I interpret this as Dieter trying to render the atmosphere of the meeting as a comfortable social setting in which actors are familiar with each other and in which the HQ is interested in its subsidiary agents.

They soon figured out that Tom faced an obstacle to entering data into task-forms. The latter have been organised into a 'company structure'.[13] And this representation of the company structure had been too complex for Tom. ↪[14] Here is a coordination problem: as shown at the end of the prior section, the EMS-Team wanted GCEs to specify their company structure's representation before actually submitting environmental data. It happened several times that representations of the complex and ever shifting organisational structure of GFQ and within GCEs were in the way of users to manage entering the desired data. And I came across EMS-Team members who asked GCEs' agents to simplify the representation of their GCE's structure if only possible. The prescriptions, thus, occasionally needed to be overlooked in order to achieve entering environmental data. Correspondingly, Elise offered to delete those elements of the company structure's representation which were in the way of Tom. For Dieter this reality was not requiring too much attention. The required changes did not surprise him (nor did these surprise Elise). And, it was Elise's job to engage with matter-within-ESDR. This allowed him to play with his identity card in parallel.

When Elise asked Tom about data about waste generated by the Indonesian GCE, Tom did not understand the word waste. Together with Dieter they achieved to develop a common understanding that Elise was interested in the GCE's amount of waste. Here is a dimension of language and understanding, *interfering* with accounting. Interference in this sense refers to two sets of practices which, when they meet, produce unplanned effects (Mol 2002, 142-148). The EMS-Team experienced frequently that they had problems to establish a good spoken understanding with GCEs' agents. In this case Dieter eased the hurdle. Tom's suggestion that waste was not significant to report should be read as based on a form of situated knowledge. To assess environments, actors always need to draw upon some knowledge which is part of the respective situation. Nygren (1999) emphasises that it would be too easy a reading to frame such knowledge like Tom seems to draw on as *local*. Any knowledge, including the knowledges exercised within GFQ's global HQ is locally *situated*. This book is precisely about the local and

[13] Such a company structure is illustrated in the first column of Figure 3.2 (on page 148).

[14] The following discussion is relating to Artefact 3.1.7 (on page 140).

contingent character of the global facts of carbon emissions. Tom's knowledge may have been related to all kinds of facts – these were locally present, including his ideas about what the HQ actors might expect from him. Recall, in the case discussed in the prior chapter waste was also not reported by the GCE: that subsidiary was situated in an economy of informal waste removal and recycling.

Decisive for their interaction was that this telephone conference ended peacefully. Tom had gained that the company structure in which he would sort environmental data into was ordered to his demands and the EMS-Team agents achieved that Tom promised to deliver all the data which he could get his hands on. Not being able to provide data for one of the five KPIs was unpleasant but acceptable. While formally the centralised EMS-Team had expected data for all indicators to be delivered, members learned through their frequent encounter with GCE realities that the patterns of sets of data could be more heterogeneous. This resembles Latour's (1987, 225) observation that scholars at the centre may start seeing new things when they have the possibility to compare various actants. However, in this case, at least, Dieter did not indicate in my presence that he or the EMS-Team would be interested in studying or officially recognising this phenomenon. Thus, the official frame of five KPIs was not threatened by this partial clash between the HQ's formal assumption of what environmental reality was significant and the GCE's reality. The EMS-Team present in this interaction accepted that Tom did not generate task-forms for waste. The result of not generating such task-forms resulted in no carbon emissions being associated with the Indonesian GCE's waste. Zero emissions. I concur, thus, with Bowker and Star (2000) arguing that information in databases may order the world. We find that the interaction between the humans Elise, Dieter and Tom as well as the globally distributed networks of GFQ's intranet-based ESDR and phone lines was ordering memories about the Indonesian GCE's carbon emissions. Ordering data collection, thus, ordered carbon emissions.

To summarise, attending to how data was ordered in the process of collecting it emphasised that the facts about carbon emissions produced are ultimately grounded in people and machines working together. As Latour (1987, 134) would have it: it is a fairy tale that facts produce facts. The analysis of how GFQ's HQ agents guided GCEs' agents in providing data showed that people maintained each other, as well as machines and facts. While Latour (1987, 137) points to the latter two elements, we find that humans ordering attending and ordering the actions and perceptions of other humans are key to understand how facts are produced. However we also agree with him that facts which everybody agrees upon are not less social but, rather, more social: many people support these facts (ibid., 139). The Columbian and the Indonesian GCE each received support in performing the facts by HQ agents. Through that support the facts became more stabilised.

This analysis established that the control gaze of the EMS-Team was supported, again, from multiple prosthetic devices and several inscription devices. Only by employing these devices could communication be ordered. The construction of facts is dependent on

such devices to exist, work and to be used. A phone line which is busy constrains global communication and a task-form on waste which is deleted does not make memorable carbon emissions. Thus, the material, virtual and semiotic ordering of actants at the HQ, a GCE and the elements in between has effects on those carbon emissions finally reported.

Managing Data Delivery While the prior chapter detailed the practices *within* a GCE immediately above I discussed how *both* GCE as well as HQ agents ordered *each other* with the result of shaping carbon emission facts. I now take a step *into* the arena of the HQ aligned EMS-Team. It is here that we find the imaginary of global vision most clearly. While we already saw in the prior chapter that any local vision is necessarily limited, we also need to scrutinise the seemingly global vision at the HQ. Is it anyhow overcoming the limitations of carbon construction at the level of GCEs? For the outset I mobilise Haraway's (1991c) concept of *situated knowledges*. She postulates that we should consider any knowledge as constructed *by* and *through* particular entities – embodied actors or materially configured machines. Any knowledge is contingent on the way *how* it has been conceived – e. g. through eyes or ears. As we have seen above, whether something can be heard or seen can be consequential for the path of an emerging fact of carbon emissions. The following discussion shows that how reality is perceived at the centre is shaping the form of carbon emission reality. Through this we learn that what GFQ sees is a specific, rather than some intrinsically universal reality. Or, in other words, and this is a key line of argument throughout this book, 'universal' environmental facts are partial, local, specific, situated.

While we have encountered above detailled discussions of specifics GCEs (a Western Asian one in the prior chapter, a Columbian GCE as well as a Indonesian GCE), we turn here to how the EMS-Team related to all the GCEs. For that I use observations of EMS-Team members managing the delivery of environmental data. To start, let us join one of the weekly Wednesday EMS-Team meetings.

The meeting sketched below took place at the end of my first winter in the field. At that phase of my research I had been staying in the office often more than twelve hours a day, entering before nine in the morning and leaving between nine and eleven in the evening. This day was packed with two meetings, lasting several hours each. We are now at the second meeting. The meeting started off with Frederik exhibiting an email by a local environmental manager whom he perceived as not cooperating at all. After a little discussion, the head of the meeting, Victoria, channeled the discussion into a structure of checking the status of each GCE. For that Elise had prepared a document.

Field Note Extract 3.2.h (Comprehending data delivery statūs)

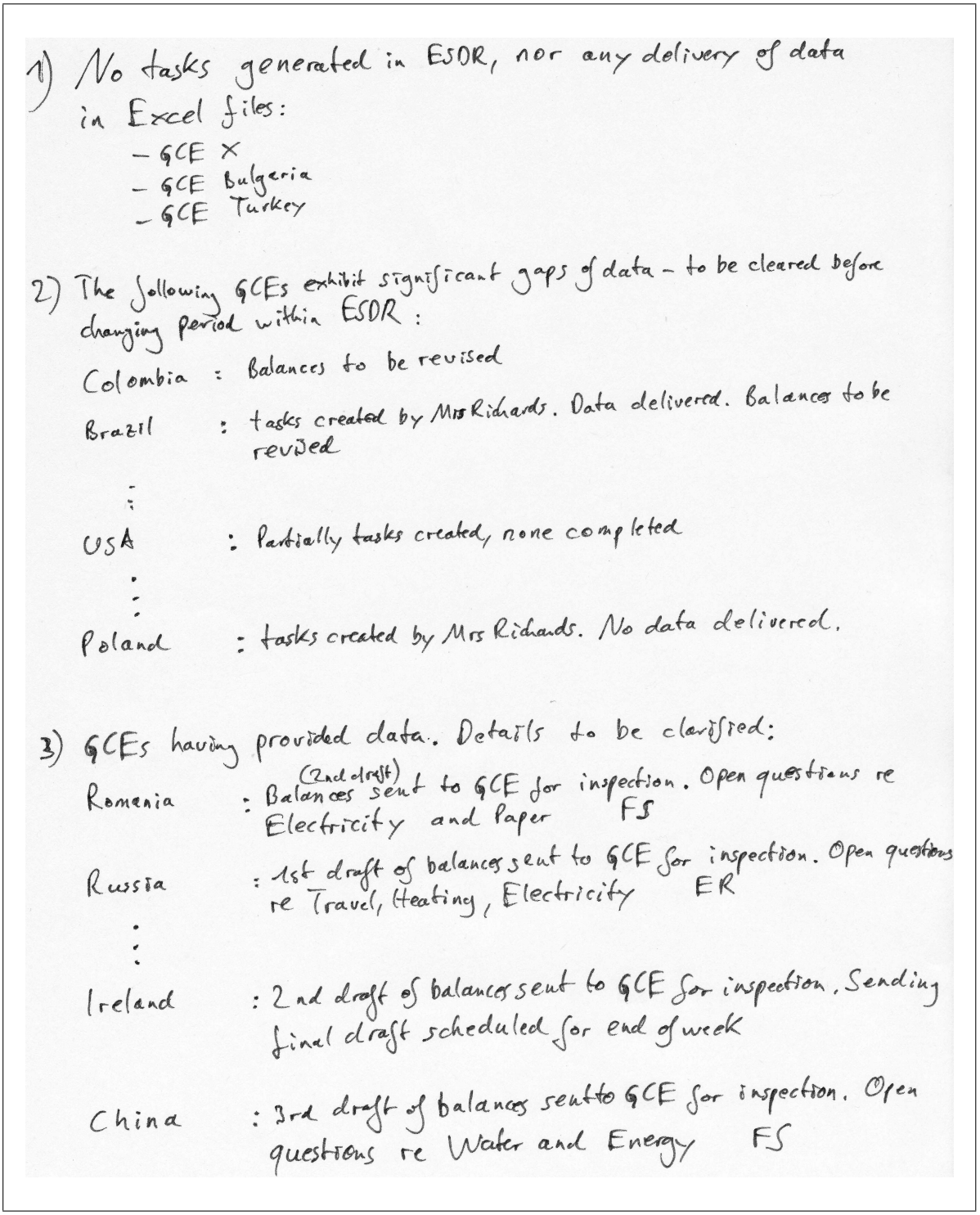
[. . .] Elise points Victoria to the paper she distributed. Victoria looks at it and after a while she is recognising eight GCEs listed at the bottom. She numbers them and points out: 'there are eight. One might say, that looks fine; yes.' Elise and Frederik make Victoria recognise that it does not look fine at these eight GCEs, but

> *rather, that a lot is missing. They point out: these eight seem to be able,* principally, *to deliver data.*
>
> *Then they go through the GCEs listed at the middle ('significant gaps of data'). They discuss back and forth and then Victoria suggests to Frederik: Columbia might work out smoothly, don't you think? Frederik replies: 'no', if you ask so directly.*
>
> *They then continue to discuss numbers which are untrustworthy from Frederik's point of view: these are '... numbers, if we do not get explanations for them; [they are] totally untrustworthy'. [...]*
>
> *Frederik tells us that some GCEs do put data in. However, partially task-forms are not 'completed'. He lets us know: we can only analyse completed task-forms.*

In this meeting EMS-Team members wanted to review the status of data delivery by GCEs and plan next steps. I start my analysis at that moment where Victoria turned to the document provided by Elise (see Artefact[15] 3.2.2 on the next page). Scanning the structure of the document, Victoria identified the section with the title *3) GCEs having provided data. Details to be clarified.* She interpreted this section as listing a group of GCEs which were quite in line with her colleagues' demands on data delivery. When she voiced this reading, Frederik and Elise let her know that her reading was too optimistic. In their perspective, the bottom-listed GCEs seemed merely *able* to deliver – which did not imply 'meaningful' – data, while other GCEs were positioned even worse. The implication of these competing readings is that the document on its own did not provide the knowledge which Frederik and Elise wanted Victoria to use for understanding the status of the various GCEs' delivery of data. Much rather, the document needed to be assisted by authorised interpreters (Frederik/Elise); lay interpreter Victoria did not suffice to translate the document correctly. *Within the EMS-Team, Frederik was assigned the official authority to judge the reality of environmental data, including their delivery. Victoria did not question his authoritative translation.*

Elise's document provided a two-level differentiation. The fundamental unit in which this document was representing GFQ was a GCE. Thus, GFQ's environmental data world consisted here of homogenous subsidiaries which were linked to geographical regions, mostly mapped on nation states. These subsidiaries were construed as punctualisations (Law 1992). And they were grouped under three different headings. While the document provides details for each GCE, the headings also suggest that the differences between the groups are higher than the differences within a group. These groups resemble the regional topology described by Mol and Law (1994): entities are clearly positioned in one group and these groups can be laid out on a two-dimensional plane without overlap. In this document we find this kind of topology at both levels of ordering. Neither do the groups overlap nor do GCEs coincide. A GCE can only be in one category. This became evident when Victoria voiced hope that the the Columbian GCE might be easily moved to deliver the desired data. She contested the classification. Again, Frederik responded

[15] This is an anonymised and selective sketch of the originally computer typed document.



1) No tasks generated in ESDR, nor any delivery of data in Excel files:
- GCE X
- GCE Bulgaria
- GCE Turkey

2) The following GCEs exhibit significant gaps of data – to be cleared before changing period within ESDR:

Colombia : Balances to be revised

Brazil : tasks created by Mrs Richards. Data delivered. Balances to be revised

⋮

USA : Partially tasks created, none completed

⋮

Poland : tasks created by Mrs Richards. No data delivered.

3) GCEs having provided data. Details to be clarified:

Romenia : Balances (2nd draft) sent to GCE for inspection. Open questions re Electricity and Paper FS

Russia : 1st draft of balances sent to GCE for inspection. Open questions re Travel, Heating, Electricity ER

⋮

Ireland : 2nd draft of balances sent to GCE for inspection. Sending final draft scheduled for end of week

China : 3rd draft of balances sent to GCE for inspection. Open questions re Water and Energy FS

Artefact 3.2.2: Status List of Data Delivery Progress (illustrated and anonymised)

negatively to her optimistic reading.[16] The GCE was not allowed to be positioned at two regions at once.

Furthermore, Frederik's comment 'if you ask so directly' can be read as indicative to documents used by the EMS-Team. The document was making *some* things explicit, but not all. Frederik was answering Victoria's enquiries. However, he seemed to have preferred not being asked whether he assumed that the GCE would deliver data without further friction. The document was providing only very limited contextual information about each GCE and about each group. A question, then, arises from this point: how should we understand GFQ's documents presenting data and metadata about its carbon emissions? This is an issue which we trace throughout this book.

Quite a few numbers had been categorised by Frederik as 'not trustworthy'. The team related to GCEs through differentiating how much they trust their numbers and how much they know about them. At the top of the document they listed GCEs which they knew least about (albeit they knew very well that they knew nothing about them) – and at the bottom those GCEs which they knew most about. Thus, they differentiated the groups along an order of known *largely unknowns* to known *uncertainties*. In this way the document certifies that the EMS-Team was clearly aware of some of the uncertainties in the data they were dealing with. Their activities were oriented to alleviate these uncertainties. Accordingly, the document listed the issues which Elise and Frederik had identified. For instance, the GCE operating in Russia did provide data about the two KPIs 'Travel' and 'Energy' as well as for the subindicator 'Heating' neither of which Elise and Frederik did trust. An US GCE did provide some data in task-forms. However, these were not fully digestible by ESDR because the database checked whether a given data set had been marked as completed: each task-form provided for a binary choice of whether the data set was considered completely entered or not. Thus, a user was required to either tick a check mark or not in this form. The label for this check box was: 'This Dataset is finished'.[17] As it appeared to Frederik and Elise, the US GCE had not ticked these boxes. ESDR was programmed to not make use of a task-form's data for its analysis if a task-form was not declared ready to-be-analysed by precisely that tick. Thus, checking that box was consequential: it turned environmental data into objects for the calculation of carbon emissions. As Austin (1962) would have it, carbon emissions can be done with semiotic action. Checking the box was a speech-act. Through it a GCE's agent communicated that their environmental data sets were ready for translation into emissions. Let me spell out the theoretical layer of this understanding. *Through* the task-form, a user would alter the *form* of the data inscribed into that task-form. Data was *per-formed* on the digital stage of ESDR. For the audience of that stage (in

[16] I should note that the differentiation here between negative/pessimistic and positive/optimistic readings were ones which emerged in this situation: if Frederik had agreed with Victoria he would have turned the situation into a more easy-going enterprise. However, that would have implied that he would have had to take the responsibility to align reality to such positive readings. In a way, then, he enacted the prudent conservatism expected of accountants (for the case of carbon accounting, see e. g. Lohmann (2009b)).

[17] See mark 'D' on Artefact 2.1.3 (on page 81).

this case the EMS-Team), the local user performed data sets as either completed or not. We recognise that the user was acting along the lines of a *script* here: the task-forms only provided two options for the user. In a way then, ESDR and the user propped each other in their collective performance of environmental data. Yet, scripts can only partially account for actual action. More precisely, as Suchman (2007) points out, acting according to a script presupposes contingent practices that the script on its own does not, and can never, fully stipulate. The scriptedness of social action can only be seen when simply assuming such contingent further practices as given: in our case, for example, for the script inscribed in ESDR to work, the human needs to be *set* towards the database *as* a user, i. e., oriented towards engaging with ESDR according to the script rather than against it. Thus, Grint and Woolgar (1997, Chapter 3) emphasise that the user has to be configured to fit the technical elements. Otherwise, the machine cannot work.

Goffman (1959) uses the language of performance and stage to theorise how humans act to each other. In his approach, an individual's identity presented frontstage should be considered a mask designed for co-actors or the audience. For a successful performance, the actor does not need to identify internally with the persona they are performing. In line with this, the consequences of performances on social reality can be impressive independently of whether performers belief their acts. Power (1996, 311-312) draws upon this approach suggesting that organisations work hard backstage to produce 'natural' facts for the frontstage of auditing. The natural facts presented by GCEs, hence, could be understood as masks directed to convince the EMS-Team. However, at the same time, we need to recognise that the EMS-Team designed ESDR in a way which frames data sets in a binary state, either completed or not. By this, ESDR was acting on the front stage from the EMS-Team to GCEs' agents. The latter were to be convinced that they could enter data into task-forms and that this represents all the environmental reality necessary for their work. Thus, there is not a simple configuration of stages, front and back ones. Rather, we may assume that actors perform to various other actors using a variety of props which are themselves performed by some actors. Accordingly, Mol's (2002, 34-36) discussion on Goffman's front and backstages problematises the notion of performance because its metaphoric quality suggests that corresponding to a front stage some independent reality would exist. Mol proposes as an alternative that we conceptualise action *only* with respect to stages. Haraway (1991b, Part I) and Butler (1993) support that move, pointing to how even the human body, sex or drives of male domination are performed, *done* – rather than existing as a 'natural' reality. Mol, therefore, mobilises the notion of *enactment*. The ESDR form and the user *enact* environmental data as either usable for translation into carbon emissions or not.

In the interaction between Victoria, Elise, Frederik and the document sketched above environmental data and GCEs were enacted in a remarkable way: the document nearly *appears* authorless and the translations of the document by its authors exercise factual rhetoric rather than an explicitly interpreting engagement. This take resembles Haraway's (1991c, 188) notion of the

> conquering gaze from nowhere. This is the gaze that mythically inscribes all the marked bodies, that makes the unmarked category claim the power to see and not to be seen, to represent while escaping representation.

The EMS-Team can be read as viewing significant parts of its world, i. e. GCEs and environmental data, in a way which orders the world along EMS-Team members' conceptions of the world: the world consists of GCEs, environmental data; that data can be more or less certain and, in parallel, more or less trustworthy. While they exercise such a view their position remains unmarked. These actants simply enact the GFQ's environmental HQ. This is a global, world-encompassing, position; enacting itself as not-situated, as non-partial. According to this view, GCEs enact partial and, thus, often uncertain knowledge abouts its environmental reality. The EMS-Team has to amend the local gazes of GCE's agents as we have seen in the discussion of the first part of this section. While Haraway refers with the unmarked position and category to the masculine, I propose that at GFQ, the HQ was occupying such an unmarked position. The HQ draws together GCEs and their data, enacting new patterns and representations while the centralised EMS-Team itself is not mapped or analysed for patterns. Robson (1992, 693) emphasises the role of writing required for rendering views more stable. Paper can be 'easily dominated' and transported in space and time. Within the universe of GFQ, the HQ can be imagined as exercising what Haraway (1991c) calls the *god trick*: presenting views, enacting knowledge while not accounting for the viewers' embodiment and positionality.[18] The EMS-Team uses devices like ESDR and the document illustrated above to render visible what it aimed to govern. These devices are the prosthetic devices introduced above. They help to enhance the eyes of the HQ and its agents. With these extensions of seeing, the distance between the knower and the known is ever increasing (ibid., 189).

The notion of trust is of interest in that respect. When Frederik notes that some numbers are 'untrustworthy', he makes recognisable two points: first, he judges what he sees as uncertain or even unlikely of being an accurate representation; second, Frederik's relation to environmental data are based upon trusting GCE agents. Below I return to the discussion in that EMS-Team meeting. Before that, however, let us explore in more detail the issue of data controlling in the context of data which members actually did not trust. The following incident occurred during another meeting of the EMS-Team, several months later.

☞ discussion at Section 5.4

Field Note Extract 3.2.i ('Is it real?')

Frederik and Victoria discussed conspicuous GCEs. Victoria referred to Mexico and France. One of them said: 'they tricked', it cannot be correct 'if they have minus 26 %'. Victoria declared Jacques Burk has an explanation which 'might be actually correct'. She established: 'one has to know: is it real?'

Frederik names as an example the GFQ HQ: they report minus 600 % paper consumption. He suggested: 'other collectors, alternative point of view.'

[18] Starting points to the theme of knowing as an embodied and positioned subject could be texts by Haraway (1991b), Butler (1993), M'charek (2010).

In this meeting, EMS-Team members made explicit to each other that data delivered by GCEs may be tricked and that the adequacy of data would not necessarily be ascertainable. While Victoria demanded to know the status of data, Frederik employed a seemingly relativist approach.

With Haraway (1991c) we can grasp Victoria's take as aiming to safe the chance of performing the god-trick: seeing everything and understanding all its meanings. Haraway's (1991c, 190) proposed alternative is feminist objectivity. This stance would recognise that every vision is embodied, partial. Only perspectives which acknowledge this provide objective vision. At a first glance, Frederik's approach might seem compatible with this kind of objectivity. He clearly recognised the partiality of environmental data. However, when following Haraway in her argument, she details: '[f]eminist objectivity is about limited location and situated knowledge, not about transcendence and splitting of subject and object.' While EMS-Team members may have recognised the partiality of knowledge they interact with, they did not seem to question the relation between subject and object. Mol (2002, 11-13) can help us to make the subtle difference between recognising partiality and the enactment of a border between subject and object more explicit. In her discussion of perspectivalism in studies of disease and illness, she proposes that perspectivalism leaves the body (i. e. nature) intact as an unmarked category which cannot be questioned. 'In a world of meaning, nobody is in touch with the reality of diseases, everybody "merely" interprets them.' (ibid., 11) In the account of Frederik, the physical entity to be accounted for is untouched. It is left alone. This renders the object intangibly strong (ibid., 12). While Victoria postulated to end up in a united and singular perspective on environmental data (the 'real'), Frederik accepted that a GCE's environmental data differs depending on the perspective taken to look at it. In both their versions, the viewer is disengaged from the object. In the feminist techno-science approach shaped by Haraway (1991b), Mol (2002), Barad (2003), an analysis is proposed which unravels the empirical relation between agents and their objects. As Mol (2002) would word it, thus, this book is about how the environment, in the form of carbon, is done in practice. For that, throughout the next chapters, we follow not only the eyes viewing data but also the hands shaping data (cf. ibid., 152). In that respect we proceed as well along the lines of classical actor-network theory (ANT) which proposed to study calculations, follow the calculators, their movements in space and time, how they transform the elements, the extensions of networks, and how they tie together information (Latour 1987, 246). Thus, this book is not merely about the perspectives on carbon but about the practical enactment of carbon.

Even though uncertainties existed and were to some degree acknowledged members, eventually, got on with their work. And this was about managing GCEs to deliver environmental data. Following the interaction in the team meeting in which Elise had distributed the document, members reviewed step-by-step all the GCEs and decided how GCEs should be engaged with and who would be looking into the respective issues. When discussing the US GCE, Frederik read out an email by their environmental manager. By reading out the email he articulated that something was wrong. The

status of a properly working GCE would not have entered the discussion at that meeting. Bodily indicating the absurdity of the situation,

☞ discussion at Section 5.3

Field Note Extract 3.2.j (Acting upon data deliverers)

Dieter is grinning and laughing silently, scratching his head. Victoria replies: well, another GCE to act upon. Frederik agrees irritatedly 'yeeeees'. They arrange that Dieter looks to it.

Regarding Poland Dieter suggests: that's a joke. He and Elise are laughing. Victoria, unbelieving that it does not work out with Poland, utters: but he was here, wasn't he? We talked on the phone. The others explain to Victoria that, although she is right about the guy from Poland having been here and although much communication took place, it does not work. Frederik tells me: 'that's a highlight for you [... the situation is] out of control'. For each GCE Victoria recorded who will attend to them, Frederik, Dieter or herself.

Then they – primarily Victoria and Frederik – discuss how Victoria should proceed with her reaction. They agree that Victoria shall send a list to Ivo. She will be communicating this to the GCEs.

In this interaction, EMS-Team members made observable to each other the status of data delivery. Both cases, the US GCE as well as the Polish GCE one, indicate that even though data collection was planned and prescribed in manifold details, in actual practice these prescriptions could not be put into practice. When Frederik read out an email indicating a non-aligned rationality existing within the US GCE, Dieter hinted with his body at the absurdity of the situation. Victoria did not have to open that case for scrutinisation. It merely mattered that the GCE would enact their environmental data. To achieve this she positioned the GCE as an object which was grasped from the distance and now became something to be 'acted upon'.

The case of the Polish GCE exhibits these two characteristics as well: first, the status of data delivery was so absurd that members compensated the situation by laughing and explicating that very strangeness; second, the EMS-Team decided who would take care of these issues. The latter constituted a move which rendered the cases into non-obstacles. The promise was implicitly made that by assigning one of the EMS-Team members to communicate with each GCE, their data would eventually be delivered correctly.

This move is of interest for us in its relation to the team's review of the GCE at work in Poland. In their brief discussion, members provided a snapshot of the schooling devices which the team employed to position GCEs such that they enact their prescribed role within the EMS. In that way, members were clearly aware of the hinterland which was assumed to enable a GCE to perform that role effectively. In this case, members pointed to their expectations on communication means to inscribe the script into GCEs and their agents. Porter (1995, 96) proposes that those accounting practitioners who recognise that measurement does not necessary lead to objective knowledge are likely to recognise that at least they should follow rules. This case supports his take: the corporation employed communication devices to make subsidiary practitioners work according to a script. We find that when devices did not ensure the expected outcome,

the EMS experienced a temporary partial breakdown: the internal powers of EMS-Team members did not suffice to maintain control constantly.

If confusion, however, had loomed at all, it was immediately side-stepped. At GFQ, Haraway's (1991c) god-trick in vision turned into an becoming environmental god, planning action which would subject some entities to its will. The document provided by Elise shows who of the team would take care of these problematic regions of GFQ: a HQ agent's name was associated with a national-state aligned GCE, such as China. The ultimate power which the EMS-Team could mobilise was the name of board of directors member Ivo. Enrolling that (all)mighty name in communication with GCEs should, eventually, secure their submission of environmental data.

Albeit, whether that mighty symbolic resource should and would actually be resorted to was a contested question. The following incident indicates a latent conflict between different styles of ordering data delivery control. While Victoria did not like to go for asking Ivo to help, Frederik wanted to have pressure exercised on GCEs, such that data is delivered on time. He discussed this with me some weeks later:

☞ discussion at Section 4.1, Section 4.2

Field Note Extract 3.2.k (Delivering numbers on time)

> *Frederik constituted as a problem that Victoria did not put any pressure on GCEs such that they deliver data. On Friday he will receive the human resources data together with the annual report. Before that, he won't be able to access it. [...] At the earliest, he will provide information on Monday. In the current situation, he also is not able to deliver data to Marion. Dubious numbers are not meaningful, he said. He emphasised that they won't start analysing unless they have received the human resources data. However, he also mentioned that Elise will start very cautiously checking whether the data – delivered by the GCEs so far – make sense. After a while, he said he is providing regularly status updates to Victoria. He told me, 18 GCEs provided data till now and three of them provided actually data which make sense.*
>
> *[...] I suggested that possibilities to sanction GCEs might be developed for the future. Frederik made clear that such possibilities do exist already: one could inform Ivo regarding the status which GCE delivers data. 'But, they don't do that, do they?'*

Frederik's account deepens our understanding of the politics of controlling data delivery. As GFQ's top environmental manager, Frederik was the one who was to ensure that the calculatory mechanism works correctly. If GCEs did not provide data on time, he was not able to deliver the results of his calculations to other clients when they needed them. One such client was Marion who worked on a report[19] to be published, including some of the numbers which were to be assembled through the EMS. However, even though Frederik understood the data he might be able to provide in that situation as dubious he had to inform his colleagues and superiors about the status represented by the data. This instance shows a transition from not providing data to providing data in three steps. First, he resisted providing any data because data at the current status was not meaningful. Second, he suggested that his assistant, Elise, is able to screen the

[19] We learn more about this report in Section 4.2, entitled *Failing the Market* (page 256).

data in terms of it making any sense. This implied that he assumed, that the data was meaningful – to an insider. Finally, he informed me partially about the status and let me know that he also informed Victoria. Logically, we have to presume that he and Elise were constantly interpreting data as meaningful – in order to decide whether they trust numbers or not, i. e. to control GCEs with respect to the quality of data delivered by them.

Thus, for the role of the top environmental manager to work several things had to be in place: the GCEs had to deliver data and Frederik or Elise had to inspect the incoming data during the phase of data collection. For the delivery of data, however, the EMS-Team was utterly dependent on the willingness of GCEs and their agents. And as Frederik's account suggests, the team was not united with respect to how GCEs should be induced to enact that delivery. Delivery boiled down to seemingly nitty-gritty questions like whether a GCE's agents ticked an task-form's box turning the data set into 'raw' material for the HQ's calculations. Should a board member be involved for such obstacles?

Inspection consisted of two elements: at one level it comprises the gaze of EMS-Team agents. They had constantly to review, analyse and compare the data. At another level they would communicate with GCEs if they considered data to be not adequate, aiming to overwrite the data with more appropriate data. This constant review and communication with GCEs as part of the establishment of carbon emission facts is a key finding of the book.

GFQ's agents of ecological modernisation, hence, can be considered as exercising decisive power over what data would count as dubious, meaningful, correct and the like. Through their inspection work, they became part of the contingent enactment of environmental data. Interpretation is at the core of the environmental calculation centre. The work of these agents altered the content, status and format of the data they were dealing with. As an outcome of their activities, the environmental performance as defined in *EMS4GFQ* could be accounted for. It seems apt, then, to use Tsing's (2005, 68) notion of magical vision. It allows to offer this conceptualisation: the data collection and inspection work, enacted in the course of running the EMS, was generative of a specific kind of scape which did not exist before – a *carbonscape*. Managing data delivery effectively conjured what would be enacted as environmental performance.

Imagining External Control To complete the overview on the ways data collection was interwoven by imaginaries of control, we turn to a last gross contrast in the enactment of emissions. Above we found that GCEs and the EMS-Team shaped each other, that they collectively enacted environmental performance. The storyline which emerges through our discussions seems to suggest that the central figures of Frederik and Elise were very powerful in forming and formatting the semiotic practices of data completion. Here is a further and, again, contrasting, powerful element of the social reality 'around' – or perceived and enacted by – the EMS-Team: as it were, the team experienced pressure from outside the team's boundaries, even from outside GFQ's

boundaries. Porter's (1995, 89-90) discussion of the language of science makes us aware of the widespread understanding 'that quantitative professionals pursue rigour and objectivity except so far as political pressures force them to compromise their ideals. [His analysis, however, concludes that] this is exactly wrong. Objectivity derives its impetus, and also its shape and meaning, from cultural, including political, contexts.' Following this lead, I ask how EMS-Team members *collectively* imagined and performed their knowledge practices as being controlled by their organisational contexts. How do members perform the significance of 'external' agents? We will see that such externals establish an organisational-discursive context that, purportedly, pressures GFQ to ensure objective and compliant data practices. For that we return to the same EMS-Team meeting in which Victoria had demanded to know whether data is real.[20] This conversation took place shortly after the one presented above:

Field Note Extract 3.2.l (Who is involved in control?)

☞ discussion at Section 3.4, Section 4.3

> *Frederik explained: coverages for individual KPIs are different. In Travel we got 76.5 % and in energy 63 %. Often, they are highest for travel. Victoria asked him how he deals with this. Frederik explained that he uses the single highest coverage number reported by a GCE as the coverage number of the total GCE.*
>
> *Victoria enquired: is this clarified in that manner by VfU? Frederik: no. Victoria: then, this is Frederik Steine 'out of control'.*
>
> *Victoria announced: I will talk to Frank,* Auditing for Capitalists *(AfC) and the* Financial Data Strategy Office *(FDSO). After that we will form an opinion. She briefly considered also asking GGCA; and swiftly she concluded: we will skip GGCA.*

While this extract is technically about a calculatory entity denoted coverage,[21] I stress here the point that Victoria considered involving further actors. This became necessary because of a combination of three informational actants. First, Frederik revealed to the EMS-Team how he constructed a GCE's coverage. Second, Victoria enquired whether his qualculation was legitimised by Frederik's key reference standard for environmental accounting. And, third, Victoria considered such legitimisation in need for the seemingly awkward qualculatory practice reported by Frederik.

This reading suggests that we find not only the EMS-Team and GCEs being intermingled in a network of control and communication, but that that network extended to external actors. An alternative reading would construct the centre as exercising discursive control over itself. When Victoria referred to these external actors, she effectively brought them into the room – at least as passively present entities. Thus, when using the notion 'external', I imply that foremost that an entity is *imagined as positioned externally*, rather than making claims about an entity's position in organisational space. In both readings, however, we find that the technology of vision is more complex: the EMS-Team is not only gazing at GCEs and their environmental data, but they also gaze at themselves through the imagined presence of the externals. Frank was linked to the gaze of a public relations and communication expert; FDSO was GFQ's controlling

[20] See Field note extract 3.2.i (on page 160)

[21] Below, in Section 3.4, we discuss coverage numbers in depth.

strategy unit; AfC was one of the Big Four auditing groups; and GGCA was an NGO which enacted a partnership with GFQ.[22]

Victoria had learned something new at that moment. Her reaction to Frederik's qualculation suggests that she considered his practice potentially problematic. This take resembles Latour's (1987, 254) notion that science experiences a problem if it encounters some new alien entity. I propose that Victoria considered inviting selected parts of the external reality into the EMS's sphere, in order to test how that external actors would react to the new informational entity, i. e. Frederik's qualculatory approach. By that the boundaries between the EMS-Team and its externality would turn more permeable. Meyer and Rowan (1991, 47) discuss similarly that the boundaries of an organisation are not strict.[23]

Testing the relations between an account of Frederik's qualculatory practice and each external actor respectively would provide Victoria with a specific kind of information. If things and processes are 'defined by their performances' (Latour 1987, 88, without emphasises) then the thing's – in our case Frederik's qualculatory practice's – competences are revealed by way of testing how the thing re-acts to various conditions. Victoria commenced learning about the social essence of Frederik's practices: how acceptable would they be in relation to various external agents. Through comparing these relations she could construct an emerging common (but not necessarily coherent) ad-hoc prescriptive standard for the construction of coverage numbers. With Jackson, Edwards, Bowker, and Knobel (2007) we may understand the implication of applying such a standard on Frederik's practices. Rendering the latter standardised would construct a social *gateway technology*. It would contribute to the building of a more widespread carbon infrastructure in which the approaches by the different actors are extended in several directions. The EMS-Team, then, is a key connector site for building such a wider carbon infrastructure. It connects its carbon accounting practices on the one hand to discourses of sustainable development and on the other hand to powerful organisations within and outside of GFQ. Furthermore, the idea to confront Frederik's approach with AfC concurs with Power's (1996, 300) analysis of quality audits and environmental management systems: 'the auditability of [EMS practices] is not a subordinate matter, it is almost the essence of [an EMS] itself.'

It follows, thus, that the organisation of the enactment of environmental data was taking place also in the discursive presence of the demands of a variety of organisational and individual actants. This presence was actively enacted by agents of the EMS. The expectation of permeating the boundaries around the EMS was that this would secure the relations of data collection and enactment revolving around Frederik. We also see how linking to these external actants might in itself contribute to the building of carbon accounting and economy infrastructures as well as the reproduction of sustainability discourses. After all, participation and stake-holder dialogue promise so-called socially

[22] The role of these actors is our key concern in Section 4.3.

[23] Alongside that conception, the discourse of New Institutionalism reconsiders the suitability of traditional conceptions of organisations.

and ecologically responsible corporate citizens (see e. g. Frame and Brown 2008).

◇ *End of Section* ◇

To conclude, I like to emphasise the key relations which shaped the enactment of carbon emissions. We identified people, machines and data to be central for this process. In particular, this study revolves around the interaction between environmental agents positioned at both, HQ and GCE level, the database ESDR as a main memory and, finally, consumption information (reduced to and classified into five KPIs) as well as counts of employess. I showed that the ways how the relations between all these actants and their practices were ordered describe contours of how, actually, data is stabilised. Their relations were ordered and reordered in the actual interactions between HQ and GCE's agents, within the EMS-Team and between the EMS-Team and external actors.

By exploring in detail the interactions within the EMS-Team about the consumption data provided (or not provided) by GCEs, we were able to identify practices of circular data review and adjustment. Part of these practices were GCEs' agents inscribing information into ESDR, Elise (and others) reviewing this data, judging it and directly or indirectly acting on GCEs' agents to make them inscribe correct data (if the data was perceived as not yet good enough). The review processes entailed interpretive practices on behalf of GCE agents as well as of HQ based agents: they needed to make sense of the language and the meanings of categories which their communication consisted of. Communication was mediated by inscription as well as audition devices. Spreadsheets, ESDR, emails and phone conferences each limited understanding in specific ways. For their interaction, agents needed to imagine each other, which respectively shaped the processes by which data were stabilised.

Positioning subsidiary agents to provide suitable data entailed adjusting their vision and understanding of environmental reality in order to configure their way of inscribing data into ESDR. The effect of these interactions was the translation of local, situated understandings of consumption into environmental performance. While these translations manufactured certainties and, thus, enacted facts, on the fringes of these translations uncertainties were silenced or ignored. The interactions among EMS-Team members shared this quality of setting aside uncertainties and vaguenesses.

Controlling the EMS was geared to ensure that *de-facto* authorities, like internal or external accounting specialists, would accept the making of data. EMS-Team members discursively enacted these authoritative actors into the presence of the team in order to ensure the acceptability of the configuration of doing data.

These observations suggest that controlling data collection is best understood as a process of contingent enactment. Environmental performance is not something measured but conjured in skill-full interaction of humans, data and particular technologies. Thus, the characteristics of the construction of data established in the prior chapter, analysing the activities at GCE level, are also indicative for the practices at the HQ. Proper environmental accounting, in this reading, consists of selective attention to particular social, consumption and digital realities which was enabled by members accepting the

constructedness of their data and, therefore (as well as additionally), the ignorance of uncertainties.

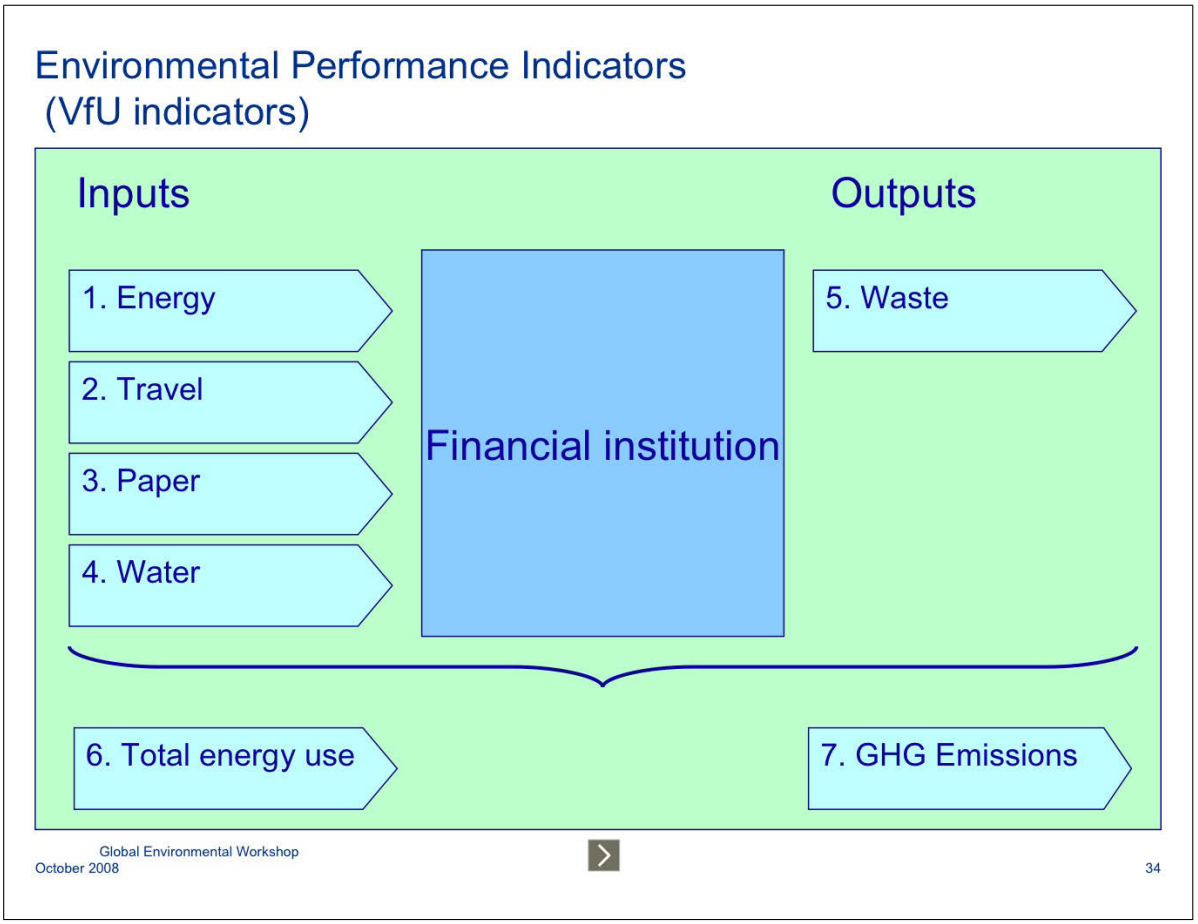
In order to constrain the uncertainties at the imagined core of carbon accounting, i. e. data, the EMS prescribed clear paths and boundaries of how consumption was to be translated into carbon emissions. Therefore, the next section turns to how the boundaries around KPIs were imagined and how the EMS-Team achieved to reformat data measured in terms of these indicators as carbon emissions.

3.3 Boundary Emissions

Above we learned that the team coordinating the Environmental Management System (EMS) used *EMS4GFQ* to lay out the ways how environmental performance was to be conceptualised and determined. However, we also found evidence that the actual practices of creating and managing environmental data were situated, partial and local. Concrete humans and machines, such as ESDR or a computer, take part in putting the data together which would be summarised as environmental performance. In order to explore more closely how environmental performance was conceptualised, this section sets out by studying *EMS4GFQ*'s account of the EMS's Key Performance Indicators (KPI). Approaching to understand these KPIs, their *bounded* character figures prime. Following the role of these boundaries and how they took part in translating environmental performance into sustainable development, eventually, guides us to GFQ's official environmental balance sheet☞. While scrutinising the boundaries through which carbon is carved out, this section engages with a specific conceptualisation of carbon: carbon emissions as a *boundary object* – an object through which diverse communities of practice can interact whilst keeping local meanings (Bowker and Star 2000, 293-294).

System boundaries Bowker and Star (2000, 44) differentiate two processes which they associate with 'the practical politics of classifying and standardising'. For doing any classification or standardising something, the categories and standards need to be given. In addition, the system of classifying and standardising needs to enact delineations. It has to be decided 'what will be visible or invisible within the system'. Anonymised Artefact 3.3.1 on the facing page was used in *EMS4GFQ* to *define* the system of KPIs. Studying the document with Latour's (1987, 87) understanding of definition, it becomes clear that the slide provides the actant environmental performance 'with limits or edges (*finis*), [which give] it a shape'.

The slide presents environmental performance as consisting of a variety of elements and relations. First, a green outer box contains all other elements and relations. Second, the elements in the container are separated horizontally and vertically: the upper elements (five KPIs and the corporation) are differentiated from the lower elements; the lower elements summarise the upper ones. Here is the vertical separation: the four upper KPIs are grouped under the headline 'Inputs'; however, part of the inputs is also



Artefact 3.3.1: Input, Output and Sums

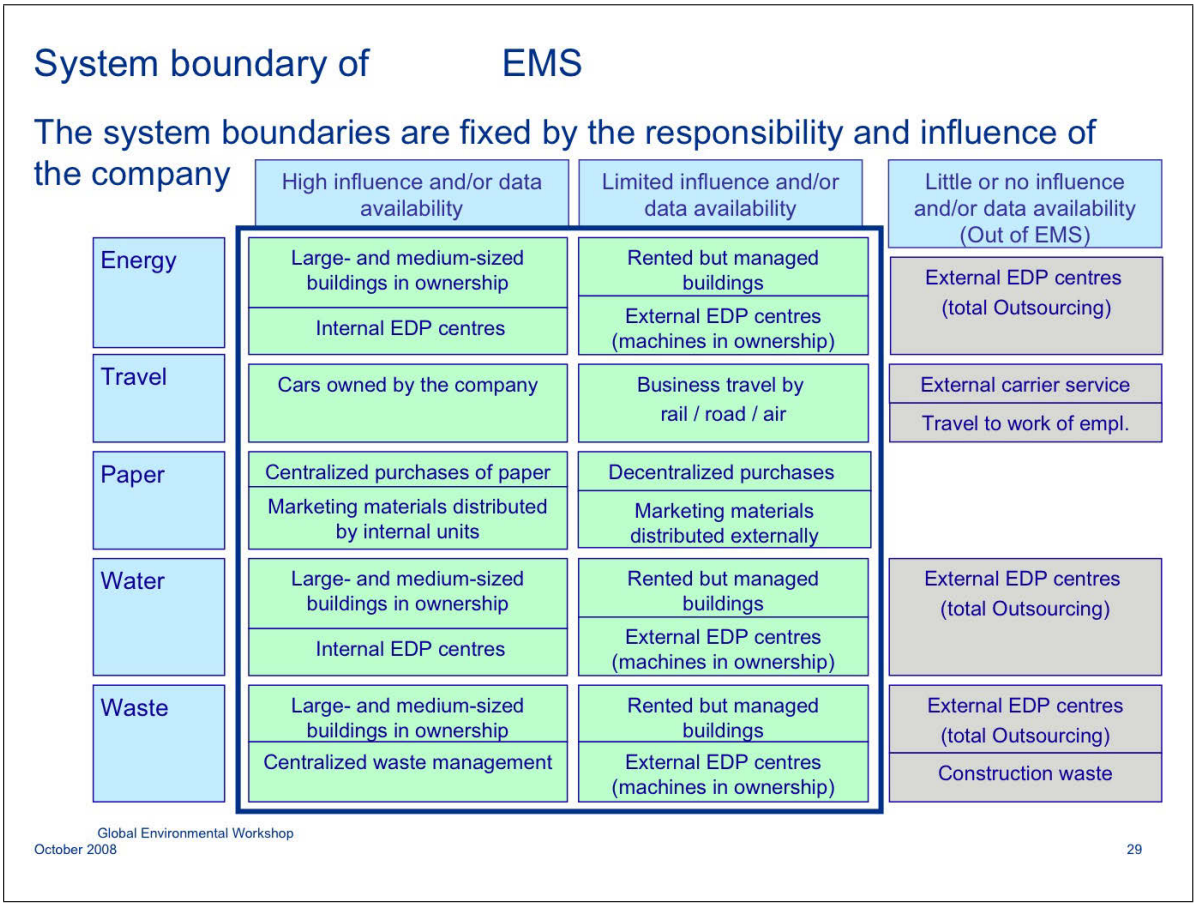
the 'Total energy use' which encompasses as well the energy input attached to waste handling. The upper inputs are depicted as flow-chart like arrows pointing to GFQ. And on GFQ's right side, originating from the corporation and pointing outwards, into the green container we find the fifth KPI, waste. The latter element, again, is grouped under an heading, 'Output'. Waste shares being output, finally, with greenhouse gases (GHG) emissions. The latter, like 'Total energy use' is depicted as the carbon emissions related to all the upper inputs and outputs.

The arrows, boxes and boundaries of the slide resemble the symbolics of ecological models. Even though the slide does not visualise a semi-closed system of material and energy flows, it recognises that for GFQ to work, the corporation uses up resources and generates undesired stuff, i. e. waste. This resemblance can be read as underlining the discursive unity of GFQ's EMS and discourses of sustainable development. Ecological modernisation activities are often targeting inputs and outputs to be better balanced, Huber (2000, 279) writes. I propose to conceptualise this model-like visualisation as connecting these discourses with the inner world of GFQ, as well as connecting the community of (discursive) practice that imagines GFQ as managing the flows depicted in the model with the community of practice that actually practices data 'gathering'.

The heading of the slide linked to VfU, an organisation which enacted an industry

specific environmental accounting standard.[24] The slide uses that standard as a source to legitimise the selection of KPIs. The visualisation could be interpreted as suggesting that GFQ recognised with the help of VfU all the inputs into and outputs of its practices. And it even manages to not merely cover the material services and pollution but also provides an additional conceptualisations of them as energy and carbon emissions. Note this last element: GHG emissions, i. e. carbon, is showing up under the heading of environmental performance and denotes a type of output of the corporation's practices.

If we zoom into the content of this slide and page a couple of slides back, we find more details of what the five KPIs mean. Artefact 3.3.2 (anonymised) shows a table in which the first column includes the KPIs and in which each row provides examples for each indicator. The table differentiates these examples in three columns according to the degree at which GFQ considered itself being able to influence operations. In the language of an EMS this is called *system boundaries*. Corresponding to Bowker and Star's (2000) note on the limits of visibility, these columns and rows define what environmental reality is made visible for GFQ and which environmental realities are rendered invisible – 'Out of EMS' as the slide's last column calls it.



Artefact 3.3.2: System Boundaries

We have already discussed evidence above showing that with respect to these KPIs the classification of local realities into the boxes provided by this scheme is sometimes

[24] For more detailed discussions of the VfU standard see Section 4.3.

not working – and this did not necessarily surprise any of the agents who encountered such friction. For example in Turkey it was normal for larger companies to provide for collective transport vehicles needed by employees to travel from or to work. According to the slide, GCEs did not have control over that reality. However, in some countries GCEs were able to precisely control such realities. Therefore I agree with Butler (1993, xx), proposing to see a boundary as a thing 'that includes and excludes, that decides, as it were, what will and will not be the stuff of the object to which we then refer'. Carbon has been delimited by GFQ's prescriptions and related enactments. And these limitations of what would count as carbon were partially made explicit (as in the artefacts shown above) and simultaneously systematically not even known by the HQ – unknown unknowns (as shown in the prior chapter).

Thus, when viewing such official system boundaries audiences can link to the depicted objects which emerge at the boundary and mark its existence. However, different audiences might link in different ways to these objects. Star and Griesemer (1989, 393) call such entities *boundary objects* when different communities of practice relate to an object in different ways and give it different meanings while maintaining the shape of that object. They use the concept analytically to refer to 'those scientific objects which both inhabit several intersecting social worlds [...] *and* satisfy the informational requirements of each of them'. For the case of the object 'Travel to work of empl[oyee]' we find that the HQ's social world was intersecting through the EMS with the Turkish GCE's one. For the Turkish agents the classification of the object as 'Little or no influence and/or data availability' was neither straightforward nor a problem. In this case the EMS asked them to *not* account for some reality which they were clearly able to account for. And the EMS-Team did not need to worry about those objects excluded, i. e. rendered invisible, external, overflow☞. These boundary objects were ones for which the EMS-Team did not expect any data to be delivered by GCEs. No conflict over this object occurred. Similarly no conflict could be observed over the, nevertheless, contested inscription of water consumption in the case of the Western Asian GCE reported above: Nick engaged with the subindicator 'drinking water' in a way which was explicitly not wanted by the HQ – adding consumed water amounts of a 'wrong' category to the drinking water ESDR task-form☞. Again, diverse practices and meanings can crystallise around a common object, the class. This is necessarily the case because any indicator is an ideal type. Clearly, they fit Bowker and Star's (2000, 297) conceptualisation: these objects have a weak structure across communities; individually, users can structure the object heavily. Any actant classifying some consumption data into indicator category, shapes by that very act the object. The boundaries of the objects are shaped and shared by diverse actants while they commonly uphold the discourse of clearly delimited entities. This makes the boundaries themselves into boundary objects.

It is politically interesting, furthermore, to point to the invisibilities which are not immediately recognisable on the slide. The slide has been produced to show positively how something was to be accounted for. However, to a large degree the slide remained

silent about what it did not recognise. For example, all of GFQ's products and their life-cycle implications were positioned outside of the EMS's system boundaries. Product ecology was not incorporated into GFQ's environmental accounting. Further, at a different level, entities like black carbon had been excluded from recognition as a GHG in the Kyoto Protocol (Feldon 2007), thus not entering the KPIs. The environmental performance of the corporation was systematically not engaging with such carbon realities. My point here is not to suggest that corporations should account for one or more specific further entities, but, rather, that depictions of system boundaries ought to clearly make recognisable to what degree a corporation provides accounts relative to what the organisation ignores.

Reporting emissions as a boundary process Leaving these invisibilities to the side and focussing on that what is assumably located *in* the scope of the EMS should allow us to develop a clearer understanding of what the practice of measuring environmental performance entails. That practice, as we have seen, connects a variety of agents, distributed over space and time; and it is integrated in their situated agendas and workplaces. Thus, the measurement is a process. Wenger (2000, 236) proposes that a process itself can be a boundary object, i. e. something which coordinates different communities of practice while keeping a common shape.

Above we have already learned that ESDR contained definitions for how any subindicator of a KPI should be measured.[25] The EMS was premised upon having defined clearly all its relevant concepts. This promised the reduction of ambiguities. Environmental accounting by quantification was assumed to measure clearly GFQ's environmental reality reduced to thirty five subindicators. Of course, these premises entailed the notion that in fact the understandings and meanings of the subindicators are actually common (Robson 1992, 689); the realities to be represented through these subindicators were imagined as sharing some common essence, the real value which is measured. These real values were defined through the units energy, weight, length and volume. These needed to be measured and entered into task-forms. However, as Robson (1992, 698) emphasises: numbers allow themselves to be combined – independently of how 'real' their referenced realities are. His account also criticised that: 'the suppression of qualitative difference by quantification suggests further limitations to the power of quantification in the construction of knowledge, and indeed indicates that the act of quantifying is open to ambiguity.' While for accountants such ambiguity in the meanings and references around indicators may pose a thread, from a sociological perspective, the fact that boundary objects mediate between different communities of practice is quite accepted now. Star and Griesemer (1989, 393, quoted without footnotes) detail their understanding. Boundary objects

> are plastic enough to adapt to local needs and the constrains of the several parties employing them, yet robust enough to maintain a common identity across sites.

[25] As an illustration see the lower part of Artefact 2.1.3 (on page 81), mark 'A'.

> These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.

Thus, different groups of actors may have different interests in common objects. Analytically, these authors differentiate four kinds of boundary objects: repositories, ideal types, coincident boundaries and standardised forms (ibid., 410-411). A repository allows users to take objects from its 'pile' without that this would affect others when they use other objects. Ideal types are abstract, non-detailed, conceptions of an entity. They can be adapted to various local contexts. Coincident boundaries are objects which share the boundaries but have different contents depending on the user. Finally, standardised forms are methods which allow different users to inscribe different realities in a common potentially highly differentiated container.

A task-form would be precisely such a standardised form; it was meant to allow globally dispersed users to inscribe environmental data into the database. To contribute to identifying GFQ's carbon emissions, members had to inscribe consumption into ESDR. This entailed choosing the 'right' task-form and entering data adequately. This resembles, Bowker and Star's (2000, 298-299) understanding of boundary objects: they suggest that to become member of a community a newcomer is required to become familiar with the community's object. To inscribe data into a task-form, a user had to be at least vaguely familiar with this form. And members saw this form as consequential. It would be part of representing GFQ's environmental performance. An environmental subindicator was primarily defined through its boundaries, which were inscribed into a task-form's definition. And different users could interpret these definitions in different ways. As we have seen earlier, what recycling paper is may turn out to be a very contingent fact. The very idea of facts about consumption of goods or services is an ideal type. Ideally, in the EMS's approach, goods and services are to be consumed, rather than differently acquired or transacted. If GFQ got some goods or services for free, these would not be considered part of the corporation's environmental reality. The task-form served to naturalise the consumption fact. It structured the inscription practice such that 'the contingencies of [the consumption fact's] creation and its situated nature' were stripped away (ibid., 299). The form, however, was not only part of the subsidiary agent's practice of *writing* data into the object (and by that enacting the object 'fact'). ESDR and EMS-Team members would also *read* these inscriptions as part of 'controlling data collection'. The meanings of data in these two kinds of practices were utterly different – I showed above. Ignoring the question of diverging meanings attached to facts and the inscription devices, environmental data would, eventually, be processed into environmental balance sheets. Thus, for the analysis underlying this study, the fact that environmental realities, consumption and non-consumption were attached with very different meanings was not considered a problem, threatening the

fabric of the universe; making the culture of carbon accounting explicit, however, might not benefit the trust in the promises of an EMS and its carbon accounting.

The problem is, of course, that the credibility of the concepts and categories are inextricably linked with trust in the reliability of measurements, as Power (1996, 307-308) points to. He also indicates that only if measurement approaches are *assumed* to be using clearly defined measures and standard methods, the measurement can provide knowledge which can be black-boxed. However, as we have seen above for the case of boundaries of so-called coverage☞, Victoria also wanted that boundary object to be enabling trust of GFQ's controlling strategy unit, their auditor AfC and their NGO partner GGCA. Accordingly, a slide produced by GFQ's sustainable development experts, in the name of GFQ and GGCA, directed at their political sponsor Ivo (anonymised Artefact 3.3.3) makes explicit the need that GFQ runs the EMS in a way that carbon emissions are consistently reported.

[AfC] and [GGCA] have emphasised importance of consistent reporting[.]

Artefact 3.3.3: Extract from 'Direct Footprint -25 % by 2015: Status and Next Steps'

Consistent and, thus, reliable as well as credible, of GFQ's environmental reality, hence, should be understood as a boundary object translating business and sustainable development between GFQ's formal powerful circle of men, and global organisations like the auditing company and the NGO. These organisations shared the understanding that GFQ should translate its environmental reality into carbon emissions based upon measurement of clearly bounded categories of consumption. Thus, the very *process* of reporting was supposed to have certain characteristics. This norm constituted a shared meaning among these different groups while still allowing what was going actually on as part of carbon accounting and reporting to exist through tensions, creativity and multiple practical meanings.

As we have detailed in the prior chapter, however, often environmental agents of subsidiaries cannot have direct access to measurement inscriptions. It was even considered self-evident in *EMS4GFQ* that agents did not carry out measurements themselves but used invoices or other inscriptions to document the consumption numbers they would translate into ESDR. If agents had no access to inscriptions which complied with the definitions of the subindicators then they were expected to carry out calculations or estimations about the consumption. Therefore, the distance between representations and the environmental reality signified was not allowing to easily check how well signifiers and signified corresponded. A possibility to imagine reliability, in that respect, was observing the numbers produced by a GCE *over several years*. The designated role of the repository ESDR was to serve the uniformisation of that environmental data. Any kind of formatting device which was supposed to 'to enhance mechanisms of long distance control is contingent upon their *stability* of form' (Robson 1992, 695).

ESDR effectively translated GCEs' measurements into digital, detailed and documented data. Artefact 3.3.4 on the next page provides an anonymised view on the

format of a report I issued on the Western Asian GCE using ESDR. On the left, the environmental subindicator is named as well as three types of emission categories. The right hand provides the respective sums of carbon emissions. The database provided several page long lists of environmental data in this standardised format. And ESDR was able to produce different versions of such reports, depending on the user's configuration of the report; it could include original values, rather than mathematically normalised ones, total energy input or GHG output information and many other details. This database promised to render the bounded environmental reality readable in a way which would be approved of or verified by AfC and GGCA. However, as users of large bureaucratic software applications are probably well aware of, such complex software packages are likely to experience problems. And so ESDR did. We return to effects of such problems later in the book;[26] for now it suffices to recognise that many users considered the interface of this database not quite intuitive.

	Dimension (Base Unit)	
environmental\energy\input\fossil fuels\gas natural	Energy (MJ)	
1 co2 equivalent value 1	CO2-direct/(kg)	511,203.8394
1 co2 equivalent value 2	CO2-indir./(kg)	0.0000
1 co2 equivalent value 3	CO2-other/(kg)	108,782.2820

Artefact 3.3.4: Extract from an ESDR Report

Nevertheless, control was attempted by using ESDR and producing relative data which would allow to recognise changes of a GCE's environmental reality over time. We address this in the subsequent section. In order to allow the EMS-Team making the environmental reality of GCEs visible, it developed a second order inscription device which was based upon the data delivered through ESDR but *summarised* the data on one page. The result was a so-called *environmental balance sheet*. Through the latter device, the distance from the signified reality was even more increasing. To make sense of the large amounts of data drawn together, an environmental balance sheet introduced even further *normalisations* (Foucault (1979, 184) as discussed by Mol (2002, 57)); data was formatted more – a phenomenon which Latour (1987, 243) called nth order in*form*ation.

Artefact 3.3.5 on the following page shows an anonymised version of such an environmental balance sheet. Throughout the succeeding chapters of this book, I zoom into selected inscriptions which were part of this spreadsheet. Of course, this depiction of the artefact is reducing a complex spreadsheet into an image. Here are two ways of how this image reduces the information.

Structure of the file An environmental balance sheet consisted of eight sheets composed each of a table – and sometimes further elements. The first sheet 'Manuell

[26] See Section 4.4, entitled *Transforming the EMS* (page 320)

Version: 20.04.2009 10:22:42

Environmental Indicators — Period: 2008

Balance sheet — Company: [redacted]

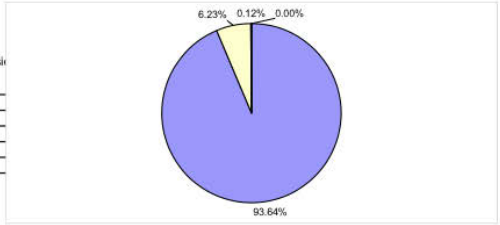
	Indicators	according GRI indicator	Employees		Absolute			Relative	GHG Emission	Absolute total GHG emission per indicator		
			Employees covered	% employees covered in system	Absolute figures collected p.a.	Absolute figures extrapolated to 100% p.a.	Data quality	Relative figures (p.employee or in percent)	Relative figures (p.employee)	Final GHG emission of Indicator (kg)	CO2-neutralisation of Indicator (kg)	GHG emission before neutralisation of Indicator (kg)
	Total of Employees		327	100%								
Internal Energy	1) Total internal energy consumption in MJ (MJ per empl.)	EN 3 / EN 4			4,524,120	5,419,001		16,572	2,675	874,566	0	874,566
	1a) Electricity consumed internally in MJ		273	83%	4,524,120	5,419,001		16,572	2,675	874,566	0	874,566
	electricity from hydroelectric power stations				0	0	0		0	0	0	0
	electricity from wind power stations				0	0	0		0	0	0	0
	electricity from photovoltaic power stations				0	0	0		0	0	0	0
	electricity generated by gas-fired power stations				0	0	0		0	0	0	0
	electricity generated by oil-fired power stations				0	0	0		0	0	0	0
	electricity generated by coal-fired power stations				0	0	0		0	0	0	0
	electricity generated by nuclear power stations				0	0	0		0	0	0	0
	electricity from average market mix				4,524,120	5,419,001	3		2,675	874,566	0	874,566
	1b) Fossil fuels consumed internally in MJ		273	83%	0	0		-	0	0	0	0
	natural gas				0	0	0		0	0	0	0
	heating oil				0	0	0		0	0	0	0
	fuels for emergency power units (petrol, diesel)				0	0	0		0	0	0	0
	coal				0	0	0		0	0	0	0
	1c) Other energy consumed internally in MJ		273	83%	0	0		-	0	0	0	0
	renewable heating energy (solar power, district heating				0	0	0		0	0	0	0
Business Travel	2) Total business travel in km (km per empl.)	EN 29	0	0%	0	0		-	0	0	0	0
	2a) rail travel				0	0	0	0%	0	0	0	0
	2b) road travel				0	0	0	0%	0	0	0	0
	2c) short-haul air travel				0	0	0	0%	0	0	0	0
	2d) long-haul air travel				0	0	0	0%	0	0	0	0
Paper	3) Total Paper consumption in tons (kg per empl.)	EN 1	273	83%	30.49	36.52		112	178	58,213	0	58,213
	3a) post-consumer recycled	EN2			0.00	0.00	0	0%	0	0	0	0
	3b) new fibres ECF + TCF				0.00	0.00	0	0%	0	0	0	0
	3c) new fibres chlorine bleached				30.49	36.52	2	100%	178	58,213	0	58,213
	3d) Consumption of FSC-labelled paper in tons				0.00	0.00	0	0%	0	0	0	0
Water	4) Total water consumption in m3 (liter per empl.)	EN 8	273	83%	3,186	3,816		11,670	3	1,138	0	1,138
	4a) rain water				0	0	0	0%	0	0	0	0
	4b) natural water				3,186	3,186	3	83%	3	902	0	902
	4c) drinking water				0	630	1	17%	1	236	0	236
Waste	5) Total waste in tons (kg per empl.)	EN 22	273	83%	43.00	51.51		158	0	28	0	28
	5a) valuable materials separated and recycled				0.00	0.00	0	0%	0	0	0	0
	5b) waste incinerated				0.00	0.00	0	0%	0	0	0	0
	5c) waste disposed of in landfills				43.00	51.51	2	100%	0	28	0	28
	5d) special waste treatment				0.00	0.00	0	0%	0	0	0	0
Environmental Impacts	6) Direct and indirect Energy in MJ (MJ per empl.)				not summable							
	6a) Direct energy use	EN 3			4,524,120	5,419,001		16,572				
	6b) Indirect energy use	EN 4			15,847,735	18,982,451		58,050				
	6c) Other indirect energy use				712,481	857,874		2,623				
	7) Direct and indirect GHG emissions before CO2 neutralisation in tons (kg per empl.)				779.67	933.95		2,856				
	7a) GHG emissions of direct energy use (6a)	EN 16			0.00	0.00		-				
	7b) GHG emissions of indirect energy use (6b)				730.14	874.57		2,675				
	7c) GHG emissions of other indirect energy use	EN 17			49.52	59.38		182				
	8) Neutralisation of GHG emissions in tons (kg per empl.)				0.00	0.00		-				
	8a) Neutralisation of direct GHG emissions				0.00	0.00		-				
	8b) Neutralisation of indirect GHG emissions				0.00	0.00		-				
	8c) Neutralisation of other indirect GHG emissions				0.00	0.00		-				
	9) Direct and indirect GHG emissions final incl. neutralisation in tons (kg per empl.)				779.67	933.95		2,856				
	9a) Direct GHG emissions final	EN 16			0.00	0.00		-				
	9b) Indirect GHG emissions final				730.14	874.57		2,675				
	9c) Other indirect GHG emissions final	EN 17			49.52	59.38		182				

Data quality
- 3 data based on exact measurement such as bill and meter
- 2 data based on calculation / detailed estimate
- 1 data based on rough esimate
- 0 data not reported

Note: Calculation of relative figures base on the extrapolated data

Total GHG emissions incl. CO2 neutralisation extrapolated to 100 % of employee

	Total GHG emissions (in kg)	Total GHG emissi (in %)
Energy	874,566	93.64%
Travel	0	0.00%
Paper	58,213	6.23%
Water	1,138	0.12%
Waste	28	0.00%
Total	933,945	



Artefact 3.3.5: Environmental Balance Sheet: 'D - Balance sheet'

data input' allowed users to add additional and specific data which ESDR did not submit. The second sheet '[ESDR]-Report Input' was a copy of the output report of ESDR, similar to the one shown above.[27] However, it also included information from the first sheet. Third, 'B - Result collected data' translated the second sheet into a one-paged summary of the data collected through ESDR. Fourth, a sheet entitled 'C - non-covered' introduced additional data to the file. Drawing on a variety of further assumptions, the file was enriched with data to represent all those consumption of workers for which the GCE had not provided measurements. Here we find a process of extrapolation which we detail below. Fifth, sheets B and C are summed up, resulting in 'D - Balance sheet' (depicted in Artefact 3.3.5 on the facing page). Sixth, a sheet summed up all the costs linked to the consumption represented in the balance sheet. Seventh, the file compared the current balance sheet (D) with the equivalent data provided in the prior reporting period☞. Finally, the balance sheet of the prior reporting period was shown.

Structure of the environmental balance sheet Within sheet D, the spreadsheet's cells were full of formula, linking to the other sheets, providing conditional calculations, summing up, dividing numbers. In Kalthoff's (2002, 32) words, these cells cannot be considered neutral because they were forms which carried out calculations: in the instant in which the spreadsheet's cells had access to data to calculate with, the investment by the corporation in the algorithm was completed. The balance sheet organised the indicators primarily around the structure shown in Artefact 3.3.1 (on page 169), linking to the standard VfU. Further the balance sheet shows how many employees' consumption the sheet represents. It then details the absolute amounts of consumption as well as the relative consumption per employee (see subsequent section). For each indicator we learn about the quality of data.[28] An emphasised column provides a translation of these relative amounts consumed into carbon emissions. On the right fringe of the sheet, the absolute emissions per indicator were shown. Towards the bottom of the sheet, several summarising information were provided: energy use, emissions, carbon offsetting, and the distribution of emissions relative to the five KPIs.

The environmental balance sheet, thus, was integrating data from several sheets of a file, which in themselves have summarised a variety of further assumptions, presences and absences. At the same time, the balance sheet was able to transform data, summarise and provide a storage place for a carbon snapshot of an organisational entity. In that sense environmental balance sheets constituted a *distributed repository* of GFQ's emissions, whereas within ESDR they had been centralised. Theoretically, at least, we can expect a multiplication of diverse engagements of agents with this distributed boundary object. For the EMS-Team, the corporation's environmental balance sheet

[27] See Artefact 3.3.4 on page 175 for an extract of an original ESDR output.

[28] See Section 4.1, entitled *Performing Qualities of Data* (page 238)

was meaningful, finally, as a representative of GFQ's emissions. It was a document, which could be shared with third parties, such as ranking agencies.

When viewing the environmental balance sheet together with the task-form and the EMS-Team's interest in organising carbon reporting such that their auditor and an NGO would be satisfied, reporting carbon emissions emerges as a overlapping – and, therefore, partially shared – process of several communities of practice. While, formally, this process is nominated as one of generating knowledge, this boundary process is meaningful in very different ways in parallel: subsidiary agents use it to write off data, get their tasks done; during a phase of data 'collection', HQ members attend to the process as one of controlling data quality and delivery (constantly reading and reviewing data); and, for GFQ's strategical ecological modernisationists, the process serves to perform vis-à-vis stakeholders the firm's ability for consistent reporting.

♢ *End of Section* ♢

This analysis shed light on how GFQ envisioned the boundaries of environmental data and how they emerged as carbon emissions: through environmental balance sheets representing GCEs' consumption data and calculating them into emissions. And the balance sheet of GFQ as a multinational was even more complex, summing up all the emissions reported by GCEs. All these files served for, in Robson's (1992, 699) words,

> creating a new tier of inscriptions that can *stand for* and *replace* the previous inscriptions. The power of quantification exists in the ability to calculate means and distributions that can serve as the standards and norms for benchmark comparisons and as a regulatory principle for subsequent performance.

We found that the environmental balance sheet of GFQ was designed to allow for such comparisons. Structurally, the file would allow to be used for regulation; and the sustainable development as well as the ecological modernisation discourse would postulate that GFQ should govern its environmental practices based precisely upon such inscription devices. Greening benchmarks exist and they require corporations to submit information to render their environmental performance comparable. NGOs may demand the reduction of average consumption, i. e. increase of efficiency. The following section establishes how the balance sheet was used for this aim. Thus, the balance sheet emerged as a promising n^{th}-order qualculation and boundary object. It was part of a process which was able to coordinate within the corporation the different needs of subsidiary agents as well as of HQ agents; and this process was shared by those agents within and around GFQ who were doing sustainability: together they worked on carbon. Even though, what that means is (and must be) utterly implicit. This analysis underlines the problematisation of Obligatory Passage Points (OPP) we started in the prior chapter. In this boundary process who is enrolling whom and how exactly data and information are translated and distributed cannot be fully determined. In that respect, the conceptualisation of actants as boundary objects offers 'a more ecological approach' for analysing the role of actants (Trompette and Vinck 2009, 6), not claiming to reconstruct a centralised and linear chain of translations.

However, while describing the boundaries and sheets as boundary objects, we temporally turned away from the actual practices around them. How are sheets and boundaries actually enacted? Robson (1992, 689) premised that an argument about quantification of, in this case, carbon should consider the inscriptions enacted by humans *writing* in the interaction with specific *material* bases. Following Callon (2002), we should ask how these writing devices were collectively contested and enacted. If Power (1996, 300) is right and around environmental management systems actual processes are not inspected but rather formal system processes are checked for whether they are generative of compliance with a policy, then we need to engage precisely with the practices enacting these system processes. This should allow us to understand what the carbon emissions reported through a verified EMS tell us. This enables us to comprehend these emissions, i. e. the boundary object which links regulatory bodies, corporations, NGOs, scholars, consumers, citizens and activists.

3.4 Extension of Carbon Coverage

GFQ's EMS-Team wanted to know the carbon emissions of all its subsidiaries. Because these had been too numerous, the EMS-Team focussed on larger GCEs, on those with more than a couple of hundred employees. Thus, the *decisive scale was the count of employees*. This kind of scale was meaningful considering the boundaries of the Environmental Management System (EMS): the environmental reality to be accounted for was not related to the products and, hence, profits of a GCE, but concentrated on the environmental implications of running offices and employing workers, and employees' journeys between GCEs and customers or within GFQ.

The EMS was mandated with a formal target of aiming to cover 85 % of GFQ's employees' environmental reality. The higher the coverage☞ achieved the more the EMS could claim to *know* GFQ's actual environmental effects. The extension of the EMS's coverage of employees was, thus, affecting the extent it knew about its carbon emissions. This, correspondingly, would imply that GFQ could manage this bounded environment, i. e. ascertain risks and act to control that environment which it knew about. Here is a link to a promise of running an EMS for a corporation: the more an EMS knows its environment, the smaller would be the likelihood of meeting environmental surprises. Thus, a high coverage was linked to a viewable, calculable and, thus, manageable environment. Having its environment covered meant that GFQ could manage carbon in this environment; and it could manage carbon sustainably, i. e. manage towards the boundary object 'sustainable development'.[29] Extending the EMS promised to control GFQ's global environments; GFQ would not have to leave its safe and controlled terrain but invite the environment into its apparatus. This likens a scientist who extends a metrology all over the world. Latour (1987, 251) suggests that scientists create a 'gigantic enterprise to make of the outside a world inside which facts and machines can

[29] For discourses as boundary objects, see e. g. Wenger (2000, 236).

survive'. Outside of the scientist's network her facts and machines are at high risk. Similar the case for GFQ. The more environment it can grasp through its network, the more it would co-manage that environment in its own corporate terms.

Furthermore, as alluded to above, to format its environment in a commensurable way, the EMS was prescribing that consumption data and carbon emissions were computed into a relation to the amount of employees which were immediately linked to these acts of consumption. Knowing these *relative carbon emissions* promised the possibility for benchmarking and other comparisons. This is the context in which GFQ had set itself a relative carbon emission reduction target; 25 % of the emissions *per employee* should be reduced between 2006 and 2015. Imagine GFQ had used absolute emission data: if the corporation bought or sold a firm with much emissions, the corporation would record shifting emissions all the time. Thus, both, for internal assessment as well as for external comparability, it was considered meaningful to target relative reductions.

Relative emissions of an employee, in addition, could be mobilised to extrapolate towards learning about the emissions related to all those employees' acts of consumption, which had not been covered. In other words, some part of GFQ's emissions was covered by its EMS, and another part was not. This reality was mirrored in the file which contained GFQ's environmental balance sheet☞ form. For both, covered and non-covered, consumption-related emissions spreadsheets existed (sheets B and C). The balance sheet was the sum of these two types of emissions (sheet D).

This section traces the informational entity, underlying these logics, i. e. the amount of employees of a GCE. And we are dealing with two numbers, inscribed in a formula:

$$Coverage = \frac{reference\ figure}{total\ head\ count}$$

The reference figure☞ was the count of the employees covered by an EMS; and the total head count was including the covered as well as the non-covered employees. As a first step we consider the practical problems with knowing these counts of employees. Subsequently I turn to strategic and political questions linked to these facts. And, finally, I detail the practices and assumptions made in extrapolating emissions.

Problems with Employee Count Facts

To start with, I explicate the tensions around two types of employee counts and an aggregate figure: reference figures, total head count and coverage.

Reference figures have cropped up several times in the analysis above. To recap, this number should represent the count of all the employees who worked in an office for which a GCE agent was able to retrieve consumption facts. If a GCE ran two offices, one with five hundred employees and one with ten employees, it was totally acceptable for GFQ if the GCE's environmental manager would simply gather the consumption facts for the Key Performance Indicators (KPI) related to the larger office.[30] The

[30]For a more detailled definition of reference figures see Artefact 3.2.1 (on page 146).

consumption of the employees at the smaller office would simply not be 'measured' but extrapolated. The GCE's coverage, in this case, would be calculated as follows:

$$Coverage = \frac{500}{500+10} = 0.98\,\%$$

We have already seen that the EMS-Team experienced repeatedly problems with GCEs' reference figures. GCEs reported unrealistically high reference figures or none at all. These problems were translated into the centre in different ways. As part of her job, Elise noticed curiosities partially when skimming through the data delivered by GCEs. Another way of constituting numbers as problems was bringing them up during meetings of the EMS-Team. On such an occasion, the following interaction occurred.

Field Note Extract 3.4.a (Astonishment about coverage)

> *Victoria recognised a GCE's coverage being 100 %. She indicated being astonished. I asked Frederik: how trustworthy is the 100 %? He replied: you are asking questions... and he continued: 'what is this, what we have here?' and a moment later he explained: numbers can change; numbers are 'constructs'.*

By way of pointing to that GCE's coverage, Victoria made recognisable to her colleagues that she considered that number exceptional. By voicing this bewilderment, Victoria signalled to the one responsible for numbers, Frederik, that she questioned whether she could defend this GCE's reference figure statement. I propose that Victoria considered it not realistic that a GCE actually was able to deliver environmental data for *all* its employees. Normally, GCEs had managed only capturing the data for a smaller range of employees, about 65 %, give or take ten per cent.

In this case, a GCE, however, had reported that the environmental facts they produced extended to represent one hundred percent of its employees. Thus, they had reported a reference figure which equalled their total head count.[31] I intervened at this moment and directed Frederik to not ignore this situation but position himself with respect to the extension of this coverage claim. His reaction was to silence me by alluding to the inappropriateness of my question. His reasoning provided an insight into his situated ontology of numbers: in this moment of interaction, for him numbers *have been* constructs. This implies an implicit constructivist approach: if numbers are constructs then they must have been constructed. And he recognised as well: numbers can be constructed otherwise as well; then numbers change. Hence, a number did not necessarily need to suffice the demand of representing *the* single reality, normally assumed by positivist approaches to exist.

His statement successfully silenced me: I did not problematise the positivist pretence of that data any more. This interaction had two distinct effects, which we need to note to deepen our understanding of how data was translated into what kind of environmental sustainability. First, the coverage claim by the GCE had passed the filtering view of the EMS-Team. This allowed this claim about the extension of the representativeness

[31] The EMS only considered integer numbers to represent coverages. Thus, 99.7 % would have been rounded to 100 %.

of the GCE's consumption data to be spread. Here are two notions of extension: on the one hand extension may be referring to the *range occupied* in whatever dimension. On the other hand, extension refers to the *adding* of elements to an object, the enlargement of a range. This section deals with extensions of carbon facts in these two senses. In this case the EMS-Team allowed the coverage claim to travel further, i. e. a statement on extension was authorised to extend more deeply into GFQ's carbon fact space.

And, second, the extract helps to recognise the extension of knowledge claims attributed to numbers produced within GFQ's EMS. Frederik's point implied that numbers are constructed and cannot be judged independent of that characteristic. Logically, the knowledge claim of the numbers produced extends then primarily to the constructors. He deemed it difficult to trace the knowledge claim back to some independent reality. We find that the numbers used to orientate GFQ movements towards sustainable development were considered as subject to change. The reference figure reported extended to its constructors and for Frederik there was no interest in trying to extend the meaning of that number to some external thing signified.

Thus, the EMS-Team was decisive in passing on or stopping the extension of employee facts. A question arises, however: why did Victoria select this GCE's fact for discussion while Frederik evaded it? How comes Frederik did not show interest in opening up this figure and why did Victoria not demand more clarification? The next chapters turn to such questions.

While at that moment we have not learned about where a 100 % coverage might stem from, my field work at the Western Asian GCE allowed me to observe how a GCE could construct such a coverage fact. Nick, the GCE's data gatherer, documented how he calculated the drinking water consumption in the corresponding ESDR task-form☞.[32] I read his comment in the task-form as a way of how a local environmental manager may well extrapolate the environmental data for the total count of workers and report 100 % coverage for the indicator. In that case Nick had commented the water task-form with this information: 800 workers consumed 154 m^3 water. (Note the count of employees '800' ought have been his reference figures, if he had acted according to *EMS4GFQ*.) Thus, each employee consumed on average about 193 liters in the reporting year 2008. He multiplied this with a total head count, 1299, and added a fixed amount of water used, 171 m^3 for the water consumed by the cafetaria and the dining hall, resulting in about 421 m^3 in total. And he added some 5 m^3 which I was not able to trace.

First he calculated the relative consumption of tap water per employee for which his data extended.

$$relative\ consumption_{drinking\ water} = \frac{known\ consumption_{tap\ water}}{workers'\ count\ represented_{by\ known\ tap\ water\ consumption}}$$

$$relative\ consumption_{drinking\ water} = \frac{154\,m^3}{800\ employees} = 0.1925\,m^3\ \frac{tap\ water\ consumption}{employee}$$

Second, he extrapolated the tap water consumption of the covered employees to derive the consumption of the non-covered employees, i. e. the remaining 499 workers.

[32] See mark 'C'in Artefact 2.1.3 (on page 81)

$$consumption\ by\ non-covered\ employees_{drinking\ water} = relative\ consumption_{drinking\ water} * count_{non-covered\ employees}$$

$$consumption\ by\ non-covered\ employees_{drinking\ water} = 0.1925 m^3\ \frac{tap\ water\ consumption}{employee} * 499\ employees = 96.1\,m^3$$

Using this calculation, Nick derived the amount of tap water consumption of the 499 employees for which he had not found data himself. To 'consumption by non-covered $employees_{drinking\ water}$' he added the fixed amounts of the dining hall and the cafetaria and the remaining $5\,m^3$ of an unknown source.

$$total\ consumption_{drinking\ water} = consumption\ by\ non-covered\ employees_{drinking\ water} + known\ consumption_{tap\ water} + fixed\ amount + unknown\ source$$

$$total\ consumption_{drinking\ water} = 154\,m^3 + 96\,m^3 + 171\,m^3 + 5\,m^3 = 426\,m^3$$

As a result, this GCE's drinking water consumption was constructed as amounting to 426 cubic metres in the year before. I propose that Nick's calculation promised him to provide the full data of his GCE's drinking water consumption in this way.[33] This calculation allowed him to report to the HQ the total amount consumed, rather than some mere fraction. The coverage number of 100 % was simply instrumental to providing the data which the HQ wanted. Contributing to GFQ's move towards sustainable development may have meant to seriously provide best possible data about the GCE's consumption.

While we do not know how frequently GCEs extrapolated data themselves, a process which might have implied resulting in full coverages, we can see that this was not a too complicated calculation. However, this practice did not comply with the EMS's formal prescriptions. The process which Nick had carried out to report data representing the totality of his GCE was called extrapolation. And this calculation was to be carried out centrally, in spreadsheet scripts, rather than by assumably idiosyncratic 'local' agents.

Before turning to the formal prescriptions and revolving politics, I like us to appreciate in more detail the uncertainties of who should and could define coverages and the counts of employees. Albeit prescriptions existed on how coverages were to be constructed, actors in the HQ were not necessarily enacting these prescriptions. Early on in my field work, I followed a conversation between Victoria and George on the fringe of a meeting of the CSR unit. George was acting as an internal consultant for Victoria on sustainability issues. They were discussing coverage numbers:

Field Note Extract 3.4.b (Coverage of 100 %)

George suggested that it must be possible to have 100 % coverage for those GCEs which participate in the EMS: either a GCE is part of it or not. If they participate, they merely need to extrapolate. Victoria declared, she did not know what Frederik's

[33] Above, in Section 2.1, entitled *Classifying Consumption* (page 70), I discussed in depth the relation of tap water to drinking water.

coverage numbers exactly state. She looked at me with questioning eyes but I was not able to support her. She also told him about the unclarity regarding the employee figures provided by GFQ's own statistics vis-à-vis other sources. And, then, she suggested that numbers external to the EMS are shifting, and, hence, it would be difficult to know what 'our' numbers exactly mean.

George pushed for GCEs to report full coverage. His approach was to enact a binary choice: GCEs participating in the EMS should provide such a full coverage or, as an alternative, they should not participate. The operationalisation for creating such a full coverage was to be extrapolation. He wanted GCEs to extrapolate their data, resulting in a full coverage. For him, this was the grand objective, the *telos*. Victoria, however, did not engage substantially with George's suggestions. Rather, she pointed to three sources of uncertainty. She set out by making recognisable that she did not know the relation between the signifier 'coverage' and the signified. Thus, while the signifier was supposed to represent some thing, knowledge about the assumably represented object's identity was was not necessarily shared within the EMS-Team. Furthermore, she pointed out, different sources of employee counts provided competing statements. There was no singular employee count for a GCE. Thus, some numbers positioned outside of the EMS were not stable. Victoria argued that, therefore, they could not be certain, what the EMS-Team's numbers actually meant.

The assumption which Victoria implied in the last point she addressed, was that stable external numbers would allow the EMS-Team to be certain what their numbers signified. However, this assumption is epistemologically questionable. Of course, stability of numbers might result in a situation in which changes in the depending variable (a GCE's reference number) could be clearly spotted. However, even if changes of a reference number could be recognised it did not logically imply that members knew what reference numbers substantially signified. Victoria had laid out this problem when she introduced me to the work on my first day of employment. She let me know about a recent change in how measuring employees was reconfigured.

☞ discussion at Section 5.4

Field Note Extract 3.4.c (Assessment base)

Victoria: the system of metrics has changed. This means that the assessment base what an employee is changed. Before the change employees were those who worked directly for GFQ. Now, also those workers, who are elsewhere placed, count.

As part of introducing the EMS and the specificities at GFQ, Victoria let us know through these statements several key conceptions in the field. First, members recognised that the counting employees was not a natural process but something dependent on a particular metrical system. For them, what an employee was depended on its definition. Prior to me joining GFQ, the corporation had changed this very definition. Those workers who were organisationally located outside of GFQ but operationally inside were included into the employees' count through the shift.

We find that Victoria's explication makes quite clear what out analysis yields as well. This likens Riles's (2000) observation: she found that activists network organisers

were analysing themselves and their groups and networks precisely as such networks. Similarly, I find that members were quite aware of the constructed nature and definitional contingencies of their work with numbers.

The contribution which this book is making in this respect is, thus, to make explicit the contingent enactments and to shed light on the silencing of realities. This book is about giving a voice to the everyday knowledges and practices of these practitioners. Members were widely aware of the uncertainties they dealt with. The point is not to ridicule these practices and knowledges, but rather to take them seriously and trace how members engaged with them. In this reality what seems in need is to investigate how members engaged with or employed these uncertainties. On the following pages, therefore, I turn to the politics revolving around coverage facts.

Politics of Coverage

In order to unravel the politics of constructing coverage facts, I proceed in three steps. First, we turn to the definition of employees and discuss its practical and theoretical problems. Second, we review the consequences of redefinitions of employees for carbon emissions. Third, we explore several ways of conceptualising coverages which exist even within the boundaries of well-defined employees.

Employees defined The definition of employees had recently changed. Members' reaction to this change is of interest. When Dieter and me prepared for another phone conference with the Columbian GCE we saw that they claimed a 100 % coverage. Dieter reacted by drawing in the Human Resources (HR) unit:

Field Note Extract 3.4.d (Are we workers?)

> *'This is one of our favorite problems;' and this happens regularly: the numbers provided by local agents simply do not fit HR numbers .*
>
> *He tells me that calculating the count of employees is not exactly clear. I reply that Victoria told me the same as well and ask him, whether we are employees. He thinks it through: 'According to our definition we are not employees [pause] no [pause] we are employees [pause] no, we aren't'. He continues to think about it, laughs subtly and shakes the yellow-black pen in his hand and grumbles, hmmm hmmm. Next, he opens a folder on his computer screen and looks at a presentation. At page 30 of a powerpoint presentation he finds what he was looking for: 'no: we are employees [. . .] agents who get paid through provisions' do not belong to us.*

First of all, he affirmed the emerging finding that counting employees was not a straightforward exercise. Dieter made explicit the surface of the problems: the numbers sourced from GFQ's HR agents and those from GCEs' environmental agents often did not match. When I asked him whether we fit the definition of employees, he willingly set out to explain the situation. However, the situation did not feel that self-evident for him after all. He seemed nervous about this. Dieter was turning it over in his

mind, back and forth. No conclusion. After a while, to solve the issue, he turned to *EMS4GFQ*, and by that enacting the presentation's authoritative status.

Page 30 of *EMS4GFQ*[34] names several categories of workers which were to be included in the counting of employees. The definition included workers employed through a variety of labour contracts, while excluding others.GFQ utilised diverse legal contractual forms to differentially manage its workforce. In effect, some workers were considered and accounted for as employees, *inter alia* freelancers – legally – not. And it made explicit that workers who were on leave for a variety of reasons, such as being ill, conscripted or having given birth to a child, were also to be included in the count.

- Definition
  - Number of employees contracted by the reporting company by a working contract.
  - Total Headcount = active + passive headcount
- In scope
  - Active headcount:
  - fulltime and parttime employees
  - temporary employees
  - parental leavers with payments (including maternity protection)
  - elderly parttimers
  - interns, apprentices, trainees, released workers from works councils, board members (when contracted by reporting company)
  - shortterm illness leavers
  - employees on vacation
- Passive headcount:
  - Employees without payments but still contracted with the reporting company such as sabbatical leavers, long-term illness, military and civil services, parental leavers without payments

Artefact 3.4.1: *EMS4GFQ*'s definition of who counts as employee

All these categories can be read as existing for a reason: to administer workers. HR agents classify employees in order to engage them differently (e. g. Schuler and Jackson 1987). This list seemingly tried to ensure that all kinds of workers are included. However, some workers were excluded as well. For example the masses of agents working outside the corporation's main offices and trying to chain people into banking or insurance contracts with GFQ were excluded. Think of all those private individuals in India and other countries who broker microfinance products for GFQ, hoping to bind customers' children and cultures into GFQ's financial management modes. Similar all those agents ringing at houses on rich Western streets. They did not count as employees of GFQ.

Such a list of definitions meets similar problems like those we discussed above for consumption categories. There is no way to ensure that all readers interpret the list in the same way. Even though the list provides many subcategories of employees, the list will never mirror the extension of categories at work within GFQ. Our theoretical explications made above allow us to predict: such a list will not guarantee providing a

[34] provided verbatim and anonymised as Artefact 3.4.1

straightforward translation of counting workers into a reference figure and, ultimately, a coverage fact.

Consequences of redefining employees How did these reference figures matter for carbon? In a phone conference I stumbled upon an exciting way of how counting employees interfered with counting carbon. Here is a conversation within a phone conference of several GCEs, Victoria, Dieter and me. Henry Stark worked for an American GCE and was seen by the EMS-Team as an experienced local environmental manager. He questions the implications of moving employees from being internal full-time workers to act as external staff:

Field Note Extract 3.4.e (Economy of employee counts)

> *Henry asked what counts as a worker. Victoria: 'we discussed it backwards and forward'. We do not look at external workers. Henry replied, that FTEs were substituted by part-time workers. His problem is: 'in fact we are' reducing emissions overall and 'we are trying to reduce our consumption'. However, if the corporation shows up in the balance as having less workers each worker is calculated to consume more. They agreed on: 'Let's discuss it with Frederik'.*

In this phone conference several GCEs participated. This implies that connected over their listening devices members enacted a global meeting.[35] Thus, I interpret the meeting as quite public. Even though general customers or external regulators have not been allowed to take part in this conversation, this was a formal meeting with actors distributed all over the world who could run wild. It was in this context that EMS-Team members ensured not to make any informal promises or deals.

Henry[36] enquired in this public forum how the EMS counts employees. Albeit Victoria showed that she recognised the debatable and negotiable character of the question, she provided a clear definition: external workers would not count as employees. The point of this analysis is *not* to evaluate such a statement vis-à-vis the EMS's formal definitions. Much rather, we need to study what the definition Victoria enacted did to the enactment of carbon emissions. Henry reported that his GCE had substituted internal employees by external part-time workers. And he pointed to a conflict between two interests within GFQ. On the one hand it was considered good for the stock's value of GFQ to formally get rid off employees because this would indicate an increase in efficiency and flexibility. On the other, for the EMS a smaller count of employees risked higher carbon emissions: whether or not workers formally counted as employees, as long as they worked and, thus, consumed resources, they would increase the amounts reported as environmental data. EMS-Team members recognised this conflict and forwarded it to 'the' authority on the EMS's numbers, Frederik.

We can identify here two conflicting rationalities: for some agents of GFQ it appeared to be rational to decrease the amount of workers, while for EMS agents it appeared to

[35] In Section 4.5, entitled *Meeting Data* (page 344) I discuss what enacting meetings did in depth.

[36] In fact I am not certain that the Henrys I referred to in the field note extract were one and the same person. However, for the argument presented here, this can be ignored.

be rational to increase the amount of workers. Thus, to reach its emission reduction target, GFQ could take as a measure paying workers through their own pay roll, rather than outsourcing them.

This kind of contradictory rationalities is well-known in analysis of techno-science. Latour (1987, 229) tells a story of a man who tries to transport some data to a centre of calculation. He might be eaten, however, by cannibals on his way. Thus, he generalises, elements may be subjects to various fights which overlap materially but not in terms of some taken-for-granted logics. Feminist literature points to a similar issue. The concept of *interference* is used to point the phenomenon that methods of seeing some things cannot simply read off facts of nature, but the patterns seen are the result of many mutually affecting enactments. Haraway's (1991b, Part I) study of primatologists shows how simians were studied while configuring them physically along cultural stereotypes of Western nucleus families: a male, a female, two children. The natural science using the experiments read off seemingly 'natural reality' – facts like the natural tendency of males to dominate or struggle for sex. The method of observing the behaviour of the simians was interfered with by the enactment of Western configurations of family life. The facts produced by these scientists, then, were not so much patterns of some independently existing nature but the patterns produced by the overlapping techniques of enacting the entities. Different enactments some decades later on were shaped by other cultures and, hence, resulted in different facts.

In our case, the enactment of employees interfered with the enactment of carbon emissions. Relative counts of carbon emissions are the result of a variety of techniques of enacting things which are required in the course of establishing the 'fact'. The discussion of employee facts serves as an illustration to show the contingency of any carbon emission fact on all the other enactments interfering with each other. In the next step, I discuss how different methods of enactments which the EMS-Team could control were employed.

Employing vagueness Finally, independent of whether employees were clearly defined and appropriately enacted, coverage was an inherently uncertain concept. ↪[37] Recall the EMS-Team meeting in which Frederik made explicit how he constructed coverage facts. His practices were alarming for Victoria; she immediately announced checking whether his mode was acceptable with external authoritative voices, such as the internal accounting strategists or their auditing company. The questioned practice was a result of the design of the environmental balance sheet file. That file calculated seven coverage facts for each sheet. For four of the five KPIs, and for one KPI for each of the three subindicators, a corresponding coverage fact was presented.[38] In principle

[37] The following discussion is relating to Field note extract 3.2.l (on page 165).

[38] Readers might wonder about these numbers. The design of the reference figure's structure was even more wondrous: ESDR was programmed to collect reference numbers for the five KPI. Two alternatives could be immediately considered. First, collecting reference figures for each subindicator or only for the GCE. Anyway, ESDR was designed to collect and report five reference figures. The environmental balance sheet file copied the reference fact for the KPI energy and duplicated it for all

these seven coverage facts could differ, and often they did. At the accumulated level of data for GFQ's environmental balance sheet, they did clearly differ. At the same time, however, the EMS was equipped with a singular coverage target. GFQ's aim was to be reaching a coverage of 85 %. This quantitative aim was usually compared with a single number, i. e. the current coverage. This mode of comparing a singular aim with a singular coverage was positioned in friction with the seven coverage facts inscribed into a balance sheet. Frederik solved this friction by enacting one of these seven facts to win over the others: the highest coverage fact of a GCE was the one he used to represent the total coverage fact of a GCE.

For Victoria his choice was not acceptable on its own. She wanted it to be accepted by those actors who had the power to audit the EMS, internally or externally. The key finding here is that, again, coverage facts could not simply be read off GCEs or GFQ. Much rather, they needed to be interpreted and could be contested. Once more, making a fact harder requires needing it to become more, rather than less, social.

The underlying quality which allowed Frederik so easily to compare and decide upon the coverage fact was its constructedness as a quantity. Robson (1992, 688) emphasised: '[q]uantities express an *identity* between the *concept* counted and the *number* (of instances).' All the qualities of the identity of employees were translated into quantities. Linking all the seven coverage facts to numbers rendered them commensurable and, thus, available for n^{th}-order calculations and decisions. Frederik's decision was a qualculation which did not enact a complicated quantitative manipulation. He created a clear result, deleting the vagueness from the surface: the highest coverage fact would win. This process likens the observation by Mol (2002, 66) that different diagnostic outcomes on the same disease of the same patient may result in multiple diagnosis which do not line up. She found that one way of coordinating these results was to let one diagnosis win over the others. This allows us to recognise: the problem which Frederik encountered was multiply effected. One way of looking at the competing coverage claims was that they were the result of forcing GCEs through ESDR to report multiple reference figures. To get rid off this multiplicity, Frederik had to *somehow* select a value to represent a GCE's coverage. Such a choice would have to be taken if the multiplicity of the coverage value was to be rendered into a singular value.

In the same EMS-Team meeting Frederik pointed to another vagueness of GFQ's coverage fact. In the following interaction he clearly links to the strategical dimension of construing coverages.

Field Note Extract 3.4.f (Recognising the contingency of coverages)

> *Frederik named two options to calculate relative figures: 84 % coverage employees when extrapolated, 77 % are reported. He, then, added information about the numbers. The 84 % figure is related to 11,430 employees, i. e. the total headcount of the GCEs, which are part of the EMS. The 77 % figure refers to the reference figures, adding up to 9,800 employees. He explained: the target you communicated was 85 %*

three main subindicators. Through this process, the single reference figure reported for the KPI energy was resulting in three coverage figures. For the balance sheet spreadsheet see Artefact 3.3.5.

> *in fall 2008. Victoria: 'we really cannot suggest' that we have an increase of 10 %. Frederik replied: 'we are always talking about different things... One has to know where to draw the line.'*

I need to spell out this interaction. Frederik pointed to two ways of calculating GFQ's coverage. These were revolving around the dichotomy 'extrapolated vs. non-extrapolated'. I discuss extrapolation below. For now, we merely need to note that GFQ consisted of many GCEs. Not all of these GCEs participated in the EMS. Within a single participating GCE, its environmental data could be extrapolated to let the GCE know how much emissions they produced overall. Thus, a GCE might have had a highest coverage of 82 %. Its environmental balance sheet would have extrapolated the data to show the environmental balance of an extrapolated one hundred per cent of the GCE.

Now, for the 'container' organisation GFQ, two approaches to enact coverage were possible. The first take was to look at the coverage of GFQ after GCEs' environmental data had been extrapolated. That would have meant that all the participating GCEscoverages were 100 %. GFQ's total coverage, however, was, of course, smaller because not all GCEs participated in the EMS. The employees who were working in non-covered GCEs decreased GFQ's overall coverage. Frederik reported that this enactment of GFQ's overall coverage would result in 84 % coverage.

The alternative take to enact this coverage fact was drawing on the reported reference figures by GCEs, rather than the extrapolated data. That meant that some GCEs which participated in the EMS were counted as having less than 100 % coverage and all the non-participating GCEs contributed zero per cent coverages. Then, the overall fact for GFQ would have amounted to 77 % coverage.

Having understood these alternatives, Victoria and Frederik negotiated which one to choose. The decision was immediately screened through two interests. First, they had an interest in increasing the total coverage. Second, they had an interest in exhibiting plausible changes to their audiences – an increase of 10 % was not considered credible.

Credibility was related to similarity. 'Similarity is an institution.' (Douglas 1991, 93) And Porter (1995, 96) found that arriving at the same result is often considered an indicator of accuracy and reliability. According to him, the assumption is that when results are close to each other, objectivity is considered having been adequately grasped. Victoria's emphasis on the differential between coverages in different years seems, thus, to affirm the literature. The difference between two moments was not to be too visible. Audiences would perceive a distortion, or error, if changes were too high. The judgement of whether a differential would be perceived as unrealistically large was a matter of the experience by members. The figures reported were supposed to be commensurable, thus, depicting the same kind of material. Yet, Frederik's point of 'talking about different things' suggests that he accepted that all materials were qualitatively different and, thus, not intrinsically commensurable. Rather, it was him who related these materials of unique kinds – he constructed them as commensurable.

By suggesting that he 'know[s] where to draw the line' the strategic dimension of his construction surfaces. It is a tacit knowledge, he possessed, about how and where to draw boundaries between different kinds of materials. I use the notion *tacit knowledge* to refer to knowledge which cannot be completely explicated, developed in particular contexts and spaces and which could be embodied. This kind of knowledge is often seen as relevant for scientific and technological processes precisely because it cannot be easily codified and transmitted like an algorithm (Callon 1995, 42-43). Collins (1974) and MacKenzie and Spinardi (1995) provide examples of how techno-scientific knowledge was attached to long-term practitioners who constructed the TEA laser (Collins) or nuclear weapons (MacKenzie and Spinardi). Their knowledge was only partially transferrable into written texts. To a significant degree junior practitioners needed to spend time in the laboratories with the experienced practitioners who would pass on through practices or implicit understandings and models of thinking how to successfully assemble the specific technologies. Frederik both had the authority to make suggestions of how to configure the numbers within the EMS and he had the experience about how other actors might react to his suggested change. For his suggestion to redefine the calculation of GFQ's coverage he employed his knowledge about the vagueness of the construction of GFQ's coverage in the environmental balance (spread)sheet. As it seemed, Victoria was not principally opposed to the suggested reconfiguration of the calculation. However, she considered it unwise to do so. Frederik interpreted the situation differently. Nevertheless, they both accepted each others' perspectives. Both experts' approaches were apt to contribute to the maintenance and development of GFQ's coverage. With Evans and Collins (2008, 620-621) we may underline that the expertise about the social-political-organisational reality as well as the technical adequacy required here were based upon specialist tacit knowledge. Even though other EMS-Team members were present, only Victoria and Frederik were able to contribute to that judgement. However, they were not concluding in the same way. As a solution to the non-conclusive contestation, eventually, they decided to shift the decision to second meeting including further participants.

At the second meeting Victoria and Frederik joined with GFQ's accounting specialists from FDSO – including a senior project leader, Bill Brown. This meeting was designed to draw on the support of the accountants to improve the structure of the EMS. Their prime plan was to move environmental data collection in some future into GFQ's financial data collection. Thus, they planned for a transformation of the EMS.[39] During that meeting, Victoria asked the accountants what they think about the issue of how the coverage is to be calculated.[40]

Field Note Extract 3.4.g (Strategically employing the contingency of coverages)

☞ discussion at Section 4.4

Victoria *What does Accounting think about this: currently, Frederik has a maximum coverage of 77 %.*

[39] I discuss this process in detail in Section 4.4 (entitled *Transforming the EMS*).

[40] Thus, the following conversation followed up from both, the Field note extract 3.2.l (on page 165) and the Field note extract 3.4.f (on page 189).

Bill *What does maximum performance indicator mean?*

Frederik *[explained it – like in the meeting before.]*

Bill *This means, we have calculated too euphemistically because we did not use the average [performance indicator].*

Victoria *AfC did not complain. She added: We can come up with 84 % or 77 %. [. . .]*

Victoria and Frederik now suggest to stay with the 77 %.

Bill *replied briefly afterwards: this is a psychological effect as well. We could say that we reach the 84 % with the new project.*

In this interaction, members managed to develop a consensual plan for reconfiguring GFQ's coverage calculation over time. Victoria opened the topic by pointing to the coverage reported at that moment. Following the earlier interaction in the EMS-Team meeting, she described that coverage as the *maximum coverage*. She wanted to ascertain the professional financial accountants' opinion on the issue. Bill was puzzled by her formulation. I interpret his reaction as related to the fact that he expected any indicator to show up as singular and, thus, without variation within the indicator. Note that for him, coverage was simply an additional performance indicator. For him there was no need to conceptualise coverage differently from the five environmental KPIs. As an answer, Frederik explained that he had declared the highest coverage number of five coverage facts to represent a GCE's coverage. Bill declared that this approach was not acceptable. From his point of view, an average would have been adequate. Victoria, however, contested his perspective by referring to their auditor AfC. The latter organisation, she reported, deemed Frederik's practice acceptable. This, again, suggests that the EMS was oriented towards being approved of by auditors.

Subsequently, she introduced the meeting to the second vagueness of GFQ's coverage. She pointed out that, depending on the calculation, the coverage could be either higher or lower. At that moment Victoria and Frederik enacted both a conservative take, leaving the exploitation of the weakness to other participants of the meeting. Bill took on that role and provided a promising proposal: the EMS-Team should continue its standard calculation of GFQ's coverage for the time being. At the moment at which the EMS would be transformed, they could introduce the changed calculation of the coverage fact. This solution promised to satisfy three demands. First, eventually, GFQ would be meeting its target for the indicator coverage; second, the coverage fact as a boundary object would undergo an explainable shift – members' imagined audiences were expected to accept this shift when rationalised through the transformation; third, the EMS transformation project would be able to claim reaching their quantitative target, and, thus enacting the project's own success. Thus, we find, vagueness around these numbers could be used strategically by actors in order to enact their work performance differently. Coverage numbers were part of enacting members' success.

This discussion of the extension of the amount of workers exhibited three significant characteristics. First, we learned how carbon emission counts *depended* on

non-environmental data. Relative carbon emissions and their reduction was algorithmically linked to counts of employees. The trajectories of the latter counts, however, were partially interfering with the aims of the EMS. Precisely because environmental data was inscribed into balance sheets in relation to employee counts, relative carbon emission were, technically, only half under influence by the environmental managers. To another half, relative emissions per employee were depending on HR decisions. Second, we recognised how these counts were used *strategically*. The EMS was supposed to extend its coverage. And many ways were possible to improve that indicator. Coverage qualculations exhibited vagueness independently how seemingly hard the employee count facts have been. Extending the coverage of carbon facts could be related to the success of the EMS; this enactment, at last, was under control by the EMS-Team. Finally, members emerged as actors who were drawing on and were *partially aware* of the constructivist essence of their calculative practices. Whilst I have shown throughout the prior sections and chapters members' constructive practices, the observations introduced here clearly indicate: members were recognising that the numbers they dealt with were not representing reality out there but were merely constructs. How members' constructivism influenced practices concerns me throughout this book.

Extrapolating Emissions

Finally, I turn to the processes by which environmental data was supposedly extended to represent a total GCE or all of GFQ. This process was called extrapolation. It was needed because the EMS was not able to determine all the consumption within GFQ. While we saw above that some GCEs simply extrapolated data themselves, others did not; and many GCEs did not participate at all in the EMS. Extrapolating is a common technique to construct data about something which cannot be actually measured. MacKenzie (1990, 348), for example, studied the test-bombings carried out by the US military because they could not bomb the Soviet Union. The results of the test-bombings were used to induce knowledge about whether the Soviet Union could be bombed with a certain technology. Extrapolation, then, can be understood as a way to 'spread out in time and space' (Latour 1987, 108). Data from one site and context is translated to other sites and contexts. Robson's (1992, 691) account suggests that we can expect extrapolation to require even more formatting of environmental data in order to bridge the distance between the EMS-Team and the non-existing data. On the following pages I reconstruct the rationale of the EMS-Team to extrapolate data and illustrate the specificity of its extrapolation algorithm by way of contrasting two options for this calculation.

Victoria introduced me to the fact that the EMS-Team extrapolated data during my meeting with her on the day I started to work for her. She let me know:

Field Note Extract 3.4.h (Plenty of uncertainties)

much data is extrapolated because often data coverage is below 100 %. Plenty of

☞ discussion at Section 5.4

uncertainties exist within the data.

In these statements, Victoria linked several phenomena. She pointed to environmental data and reasoned that an operation on that data would be required because GCEs were only able to partially collect information about their employees' consumption. Thus, whenever coverage was lower than one hundred percent, environmental data needed to be extrapolated. Nevertheless, she added, data overall would be often uncertain. Extrapolation, as it seems, did not render data more certain. What was the reason, then, for extrapolating data? An interaction with Dieter allowed me to understand the rationality in more depth. I interpreted him as suggesting that extrapolation allows for orienting the EMS-Team:

Field Note Extract 3.4.i (Retrospective extrapolation needed for orientation)

It seemed self-evident for Dieter that data has to be extrapolated retrospectively in order to be able to orient: if 2006 is the base line, one also has to know it.

Extrapolation, in this understanding, is serving to provide data which can be used as a coordinate for agents to organise their courses of action. The model here seems to be: knowledge about a status allows for proper planning or acting. Dieter suggested, in our interaction, a causal logic. The aim of GFQ is to reduce its emissions relative to the baseline year. Knowing current emissions in itself did not suffice to ascertain the relative change of emissions over time. For that, the emissions at the baseline year were required. If knowledge about the emissions at 2006, however, were unknown, corresponding data needed to be constructed. The means to construct such data was extrapolation. Thus, this mode of calculation did not only allow to construct data about the emissions of employees which had not been covered by the EMS in the current reporting period☞, but also allowed to extrapolate retrospectively, i. e. determining the emissions caused at past times.

To zoom into this mode of calculation, first, we need to sketch extrapolation within the context in which it was employed and, second, we need to scrutinise how, according to the book, such a standard extrapolation was supposed to be enacted. To engage with these questions, I turned to Frederik. Here is a moment in which he situated the need for extrapolation. When Frederik and me talked through the official response of GFQ to a questionnaire[41] he pointed to the section on the methodology of carbon counting. He asked 'how are we actually getting the data' and suggested to add to the written response:

Field Note Extract 3.4.j (Extrapolation necessary)

we collect data by means of measuring, estimating and calculating. Nevertheless, gaps in data do exist. Therefore extrapolation is necessary.

Frederik, here, referred to three ways by which GCEs' agents were officially assumed and supposed to construct the data. Ideally, they simply read off data from measuring devices; alternatively they could calculate consumption data based upon some other 'raw'

[41] The questionnaire has been carried out by *Corporate World Carbon Ranking* (CWC Ranking). This reporting instance is discussed closely in Section 4.2, entitled *Failing the Market* (page 256).

data; in the worst case they would estimate data. He suggested to let the rating agency know that albeit GFQ used these ways of determining environmental data, some 'gaps' in the data body existed. The notion of gap calls for repair. He wanted the response to provide information about how GFQ's EMS repaired that gap: by extrapolation. Thus, we find, extrapolation is used to fill the gaps. Following his statement into the response document, two weeks later his description had been translated into this formulation (transcribed verbatim and anonymised, Artefact 3.4.2):

Process of Data Collection:

The collection of global data is implemented once a year. An extrapolation of the data is conducted for those parts of [GFQ] which are not covered in our reporting system. In the end, emissions are calculated on the basis of standardized conversion factors. Data are collected from group companies, which have more than [250] employees, i.e., from their headquarter locations and their subsidiaries. The collection of data is achieved by using a variety of techniques of ascertaining the data, including exact measurement (such as supplier invoice and meter), calculation and detailed estimation as well as rough estimates.

Artefact 3.4.2: Extract from the Response to CWC Ranking

This formulation firmly embeds the operation called extrapolation within data collection. It argues that the EMS could not cover all parts of the corporation. These non-covered parts, however, were assumed to also consume resources. GFQ acquired knowledge about that consumption by extrapolation. The text continues by explicating the boundaries of which GCEs were covered by the EMS. Only GCEs of a minimum size (250 employees) had to participate in the EMS at all. The emissions by all employees working within companies smaller than this minimum size were planned to be extrapolated. The reply has been formulated such that the emphasis is on the point that data *was* being collected. As the existence of the coverage target indicates, the less extrapolated data were part of of representing GFQ's emissions, the better the total emissions data were assumed to be.[42]

The way GFQ enacted itself here is perfectly compatible with hegemonic discourses of, e. g., climate change. Climate models, for instance, are also based upon some historical and metrological data (Shackley, Young, Parkinson, and Wynne 1998, 167) and extrapolate, in their case future, data for non-covered emissions. The grounding of such discourses is their empirical basis of data collected. Using that data, *somehow* broader knowledge of the non-covered arena is derived. In the following I turn to what that 'somehow' precisely referred to in GFQ's case. Still engaged with the same questionnaire, we were co- and reconstructing the presentation of how extrapolation works. In a discussion of Frederik and me on the response

Field Note Extract 3.4.k (Explaining options to extrapolate)

☞ discussion at Section 4.2

> *he asked me to alter the description of the extrapolation process. Instead of 'We extrapolate our emissions by multiplying average [. . .] emission data with the total head count' he preferred the wording 'We extrapolate our emissions by multiplying average consumption with the total head count and then calculate the emission data.'*

[42] In Section 4.1 (entitled *Performing Qualities of Data*) I detail the EMS-Team's engagement with the 'quality of data'. This provides an even more fine-grained perspective on the issue.

Here the significance lies in the detail: are emissions or consumption used for extrapolation? He wanted to ensure that GFQ would not commit to using average emission data to calculate total emission data. Rather, he wanted to allow for GFQ to make specific assumptions for certain environmental indicators. The following paragraphs illustrate the difference. Afterwards I discuss and visualise the links and differences between both algorithms.

The opposed algorithm The formulation he opposed would have meant the following: say, a GCE has 500 non-covered employees. We know how much on average a covered employee emitted. The non-covered employees would emit as much emissions as the average covered employee. For this example, assume these placeholders: an average covered employee consumes 17,200 mega joule (MJ) of electricity each year; this corresponds to 3,000 kilogram (kg) of greenhouse gases (GHG) emissions each year. The corresponding calculation would look like this:

$$emissions_{non-covered\ employees} = count_{non-covered\ employees} * average\ emissions_{covered\ employees}$$

$$\text{emissions}_{non-covered\ employees} = 500\ non-covered\ employees * 3,000\,kg = 1,500,000\,kg_{GHG\ emissions}$$

Thus, according to this algorithm, the 500 non-covered employees' consumption of energy would result in 1.5 kilotonnes of emissions. The dotted relations depicted in Figure 3.3 (on page 202) trace the combination of these mathematical elements.

The confirmed algorithm Using Frederik's definition, a different algorithm would follow. Rather than using the average emissions per employee, this algorithm uses the average consumption per employee.

$$consumption_{non-covered\ employees} = count_{non-covered\ employees} * average\ consumption_{covered\ employees}$$

$$\text{consumption}_{non-covered\ employees} = 500\ non-covered\ employees * 17,200\,MJ = 8,600,000\,MJ_{electricity\ consumption}$$

In order to prepare for the next calculative step, Frederik would draw on a set of assumptions. In the final response to the questionnaire, we find the assumptions spelt out (in Artefact 3.4.3 on the next page, verbatim and anonymised). Relevant for us are Frederik's assumptions inscribed into the response about electricity consumption.[43]

[43] I recognise that I could zoom into the practices of enacting assumptions and scrutinise how these reported assumptions were actually implemented 'correctly'. However, that analysis would not further the argument which I am pursuing in this book to a large degree.

The central element of this assumption is an informational placeholder called 'average market mix'. Through this formulation, GFQ enacted itself as using a conservative, i. e. the normatively correct accounting approach, and specific nation-state related, i. e. a detailed and impartial, carbon conversion factor. ESDR was configured with a list of carbon conversion factors. For average market mix task-forms, users could select one of thirty six country-specific factors.[44]

Description of assumptions made for extrapolating specific indicators:

Electricity consumption: We assume that an average market mix (using the conservative value; grid average emissions factor specified for the country) is consumed. In cases in which our data includes IT (data) centres we extrapolate electricity consumption based on average consumption per employee covered (without including consumption of IT (data) centres). If the data collected does not include IT (data) centres, we extrapolate data for the non-covered employees based on an average electricity consumption of an employee including the consumption of IT (data centres) to get a conservative estimate.

Heating: We assume that a standard (common) form of heating is used by the 'non-covered' employees. The standard for the source of heating in a given country is established after consultation with the respective [GFQ] branch in the country.

Water: We assume that 'non-covered' employees consume tap/drinking water (VfU defines any processed water as 'drinking water').

All other consumption indicators are calculated on the basis of the collected average consumption per employee.

Artefact 3.4.3: Response to the CWC Ranking questionnaire: Details of any assumptions made

As it were, for the process of the confirmed algorithm for extrapolation, non-covered employees were assumed to consume average market mix electricity. This kind of electricity was related to nation-state specific carbon conversion factors. The confirmed extrapolation's algorithm, thus, would continue by using the consumption value derived in the first calculative step and multiply it with the average market mix's GHG factor, say 0.17 kg CO_2e emissions per MJ.

$$Emissions_{non-covered\ employees} = extrapolated\ consumption_{non-covered\ employees} * conversion\ factor$$

$$8,600,000\,MJ * 0.17\,kg/MJ = 1,462,000\,kg\ GHG\ emissions$$

Finally, the confirmed algoritm would result with 1.46 kilo tonne (t) of emissions caused by the 500 non-covered employees' consumption of electricity. The bold relations depicted in Figure 3.3 (on page 202) trace the combination of the mathematical elements resulting at this number.

Discussion of both algorithms Both algorithms set out by multiplying the amount of non-covered employees with an average value. Figure 3.3 (on page 202) uses a bold circle to emphasise the count of non-covered employees (left hand of the figure).

[44] See Artefact 2.1.3 (on page 81) mark 'B'.

Following that element, we find that it was multiplied with two competing average values. These average values were in both cases established by collecting and processing data related to covered employees. These bases can be considered samples. The sample of covered employees was in both cases used to induce a value for the employees which the EMS had not collected data for. In that respect, this process fits perfectly the classical case of induction reported by Hacking (1990, 210): a quantitative characteristic of a sample is ascertained and the assumption is applied that the unknown part of the population is similar to its sampled part. Then an extrapolation from the sample to the unknown part is carried out, resulting in a value for the total population. Thus, through a specific mode of induction the emission fact has enlarged its extension.

The algorithms, however, differed with respect to what exactly they extrapolated. The opposed algorithm (dotted relations) used as a sample the covered employees' relative emissions, while the confirmed algorithm (bold relations) used their relative consumption. The confirmed algorithm, eventually, also is to derive the non-covered employees' emissions. To do that, it involves a conversion factor* which *may or may not be* equal to the conversion factor used for calculating the covered employees' emissions.

In our illustration, as a result of this difference, if the average market mix has a 'greener', i. e. lower, carbon factor than the covered employees' type of consumed electricity, applying the confirmed algorithm leads to a lower result in total carbon emissions extrapolated: in Figure 3.3 'total emissions*' would be less than 'total emissions'. Thus, if a GCE's environmental agent is only able to gather data from offices which run on purely coal-fired power stations while in the nation-state on average some wind generated electricity is part of the energy consumption, then with the confirmed algorithm, the non-covered employees will be related to less carbon emissions than with the opposed algorithm. In the example, the difference would amount to 38 t of emissions. A result of this discussion is that the extent of carbon emissions is necessarily shaped by the configuration of algorithms.

The rationale for GFQ to have chosen the confirmed algorithm may lie, for example, in the emission factors specified by VfU: for thirty two (out of thirty six) average market mixes the conversion factor was smaller than the conversion factor for gas-fired power stations generating electricity. Thus, for example, in the case of the specific environmental balance sheet introduced above[45] the factor associated with the average market mix is lower than the factor for electricity generated by gas-fired power plants.

This discussion exhibits that for extrapolation to take place, most qualitative traces which were originally attached to environmental data needed to be lost. Latour (1987, 233) would say: you need to '*get rid of them*'. While GFQ was enacting itself as able to collect data for some 77% to 84%, as discussed above, through generalising the findings using particular extrapolation techniques, it can claim to know its emissions for the total corporation. We also find that the confirmed algorithm was requiring several more relations to be enacted by agents than the opposed algorithm. Paraphrasing Latour

[45] See Artefact 3.3.5 (on page 176)

(1987), the confirmed algorithm was more social, rather than less.

Mol and Law (1994, 653) understand this engagement with measuring a limited amount of data and inducing the data to speak for a total as an 'art'. I concur with their wording. The careful crafting of assumptions to provide reasonable carbon emission facts and drawing together data to draw up GFQ's total emissions should not be considered merely a technocratic enterprise but a wondrous feel for the compromises between fashions, audiences, technical possibilities and business aims.

If we study the surface structure of the assumptions for extrapolation[46] we find that three of the five KPIs were to be extrapolated based on average consumption by the covered employees. Thus for them, 'conversion factor*' depicted in Figure 3.3 equalled the 'conversion factor' used for the calculation of the covered employees.

However, for two KPIs GFQ constructed the non-covered employees as consuming differently compared to the average GCE worker. I discuss the KPI 'water' in more detail later.[47] To complete the analysis I turn to the assumptions prescribed for extrapolating the consumption of heating by non-covered employees. In that case, again, Frederik's sketch of extrapolation draws upon the confirmed algorithm of Figure 3.3. According to the assumptions spelt out, the 'conversion factor*' would be 'established after consultation with the respective [GFQ] branch in the country'. The choice of the factor would be decided through a negotiated definition of Frederik and GCE environmental managers about what the 'standard (common) form of heating' would be in the GCE's country. The assumption would be that the non-covered employees works in offices in which the average heating system in that country is employed. Implicit to this assumption is the understanding that 'what is normal is also all right' (Hacking 1990, 160). There was no need to engage substantially with what the average heating implied. Much rather, this assumption provided a significant degree of power for local agents to influence their carbon balance: a GCE's agent was positioned to shape the decision of what would count as the normal source of heating in their country.

Figure 3.3 also allows us to make explicit one assumption which was not made transparent in GFQ's response to the CWC Ranking. I alluded to this fact above: if a GCE did not measure any consumption for a KPI, then no 'division's product' could be calculated. These calculatory actants were underlying the total extrapolation exercise. If these actants were absent, both covered as well as non-covered were assumed to not consume any goods or services classified into a KPI. Thus, zero consumption resulted in zero emissions.

To summarise, extrapolation, as it were, was supposed to provide an objectified take on dealing with gaps in GFQ's carbon emission data body. The social reality depicted above, primarily, underlines the nature of this strategy: a set set of specific assumptions allowed members to enact their everyday engagement with these data gaps as an orderly and objective matter. A number of characteristics of this strategy to

[46] See Artefact 3.4.3 (on page 197)

[47] See also the discussion on the culturality of water in Section 5.2 (entitled *Blurring Definitions*).

extend carbon emission facts seems noteworthy. Members did not consider extrapolated emissions as certain. Nevertheless, the extrapolated emissions were supposed to provide orientation for GFQ's environmental action. Given that the EMS had a low coverage (from members' point of view), it was relevant that the EMS runs an acceptable way of extrapolating data to be able to speak for all of GFQ's emissions. The configuration of the extrapolation algorithm allowed the combination of Frederik, conversion factors and GCEs' agents to lower or higher the emissions of GCEs. Thus, extending carbon facts over the total universe of GFQ could be achieved at low or high extension of the amount of emissions.

We also found that a tension existed over the control of objectification: while the EMS-Team ran their organisational structure based on requiring GCEs to leave extrapolation to the HQ, both local environmental managers as well as the sustainable development officer's consultant, George, implied that GCEs should or do carry out and, thus, black-box the objectification mechanism. This allowed GCEs in principle to make even more adapted or favourable assumptions. Transparent reporting the assumptions to stakeholders turns into a life-time job.

◇ *End of Section* ◇

This section discussed two versions of the extension of carbon facts: at one level, I have been concerned with the measurement of the extent carbon emission facts were based upon data constructed by GCEs (coverage); at another level I have been concerned with how GFQ managed to construct a knowledge claim about the emissions construed as caused by all the office operations of the corporation (extrapolation).

Both levels correspond to activities undertaken under the banner of the EMS. Members were concerned with establishing knowledge about how many employees were covered by the consumption data collected by GCEs. And the EMS was officially supposed to increase that coverage to 85 %. The second level related to the activities of adjusting the coverage fact and of extrapolating environmental data. All these activities overlapped in one point: the count of employees covered by the EMS (reference figure) visualised on the left hand of Figure 3.4 (on page 203). This count was employed for assessing the status quo in the two dimensions defined by the overall target indicators: a) the coverage of the EMS and b) the average emissions of an employee of GFQ (relative emissions per employee). These indicators are highlighted in Figure 3.4.

Coverage Establishing the coverage fact met several obstacles. First, the definition of an employee was not always clear. Different sources counted employees and provided conflicting results. Furthermore, it was known that the definition of employees was unstable, subject to change. Additionally, while only the HQ based EMS-Team was officially authorised to extrapolate data, in fact also GCEs extrapolated data and in that course reported total head counts as reference figures. Thus, inputs in employee placeholders depicted above were uncertain. Second, independently of the uncertainties in counting employees, the EMS always produced multiple reference figures (counts of covered employees). For each KPI, GCEs provided a reference figure, resulting in

five counts of employees. These latter often differed. Frederik had eliminated the problem of multiplicity by choosing the highest reference figure of a GCE to fill the placeholder for the 'count of covered employees' used for further calculations. Third, again independently of the former contingencies, GFQ's total coverage fact could be calculated in two alternatives ways: either the highest reference figures of all participating GCEs were summed up and used to fill the placeholder 'count of covered employees' or the total head counts of all participating GCEs would be summed up and used instead.

In sum, then, the coverage fact of GFQ was calculable as distanced from the official coverage target by one to thirty five percent. Thus, whether GFQ reached its coverage target was highly contingent on its choice of qualculations.

EMS-Team members and GFQ's accountants recognised these contingencies and planned to use them to enact themselves and their configuration of the EMS as successfully attaining their coverage target.

Emissions This section showed that the construction of GFQ's total as well as relative emissions facts were highly dependent on its employee counts. Thus, environmental facts were co-constructed through non-environmental facts. Two processes by which emission data was influenced by employee counts can be summarised. First, independently of the measurement of consumption data, a GCE could alter the definition or alter the contractual status of employees. Such dynamics could interfere with the aim to reduce relative emissions per employee. If a GCE managed to reduce its total head count on the paper while keeping in practice their work force locally, the consequence was that consumption continued to take place at the site of the GCE while the consumption was assigned to the remaining counted employees. Effectively, the GCE's total emissions might prevail while the reference figure would decrease. Consequently, the relative emissions per employee would increase.

Second, the process of extrapolation allowed GFQ to factor in the emissions of the non-covered employees employing a carbon conversion factor diverging from the one used for calculating the emissions of the covered employees. In extrapolations, thus, several employee counts as well as several conversion factors were linked with consumption data to establish the non-covered employees' emissions.

GFQ's relative carbon emissions, hence, need to be conceptualised as contingent on the controlled assumptions and adjustments as part of the formal processes within the EMS as well as on external dynamics which were not necessarily controllable by the EMS, like the changing statūs of employees.

Shifting the viewpoint temporally away from the uncertainties of consumption data, KPIs and their boundaries, this section showed that the key indicator 'coverage' was highly vague and manipulable by GFQ's agents. This indicator promised to represent the extension of the EMS within the corporation. Knowing how much of GFQ's consumption the EMS would represent was key for EMS-Team members as well as stakeholders: using the coverage fact, they would judge how seriously to take the environmental data reported by the EMS.

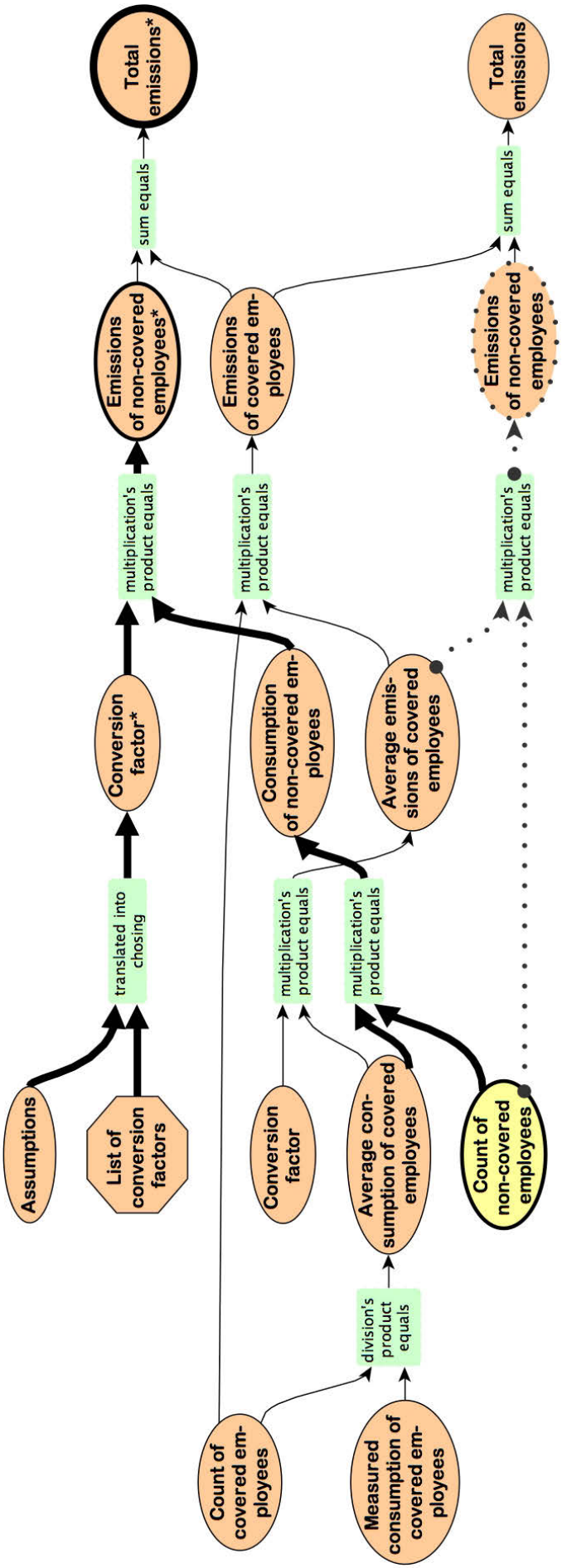


Figure 3.3: Comparing the elements used for extrapolation towards a GCE's total emissions

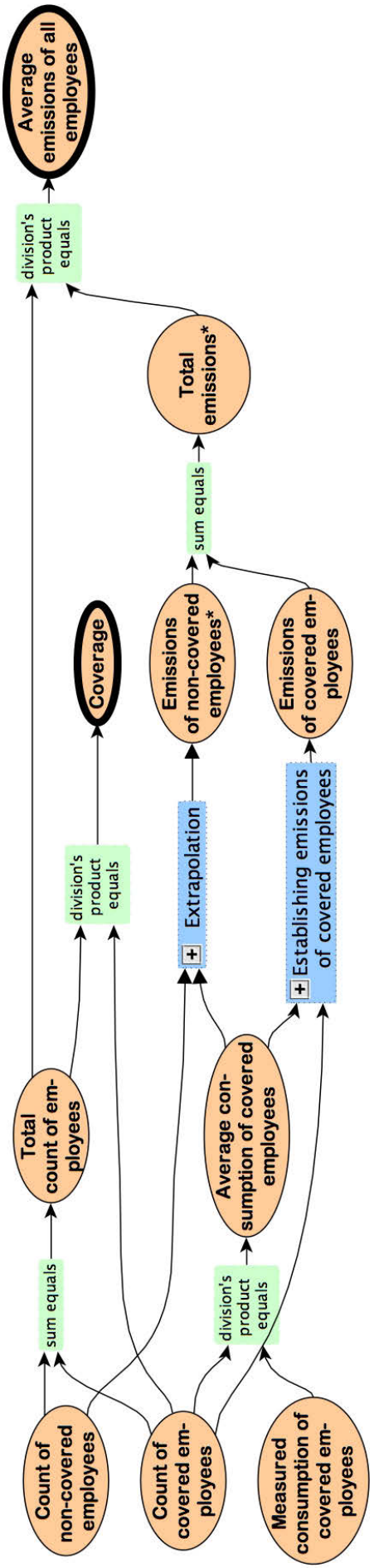


Figure 3.4: Elements used for calculating emission target indicators

This discussion established that independently of whether agents worked according to the book, coverage numbers were enacted and shaped in particular situations. And never could any agent be certain to completely know what these numbers represented.

Members of the EMS-Team recognised that the environmental data they dealt with were uncertain. Even more, members recognised that extrapolated data was constructed with elements assembled by various agents throughout the corporation. Respecting this, it was important to configure the EMS in a way likely to be credible from the perspective of powerful stakeholders, like their auditor. Using their tacit tactical knowledges members could balance the social-organisational demands with technical doabilities. Hence, we may agree with Power's (1999, 94) observation that accounting information systems do not simply mirror external reality, but they 'constitute a realm of facts, to make a world visible and hence controllable' quantitatively.

In sum, I find that while the EMS-Team employed coverage numbers discursively as matters of fact for example when strategising how to present the EMS's performance these facts were highly dynamic. And their dynamic was even to some degree configurable by agents of the team. Thus, the extension of the carbon facts of GFQ should be read as a question, rather than an answer. A number does not tell its story. The EMS-Team had access to qualculative tools which allowed them to extend the range over which they could claim knowledge about carbon emissions. Coverage could be extended; extrapolation allowed to represent the remainder of GFQ's emissions. This more or less little remainder (fifteen to fifty percent) signified the distance from knowledge based on so-called measurements. Total emissions and a large coverage promised that the corporation possessed knowledge about its environmental effects. Thus, GFQ was enacted as meeting two preconditions for ecological modernising itself: GFQ could imagine itself as both knowing itself and recognising its limits of knowledge.

3.5 Visionary Emissions for Sustainability

For emissions to result in the public sphere, further translations are required and devices brought into play. This section takes you to a device which emits carbon into the centre of sustainable development discourses – GFQ's Sustainable Development Report. Using this device, GFQ rendered a selection of some of the finest corporate 'facts' public. By engaging with this report, the objective of this section is to establish a significant landmark within the book's process of following distributed carbon translations. In that respect this device should be understood as one of the outer elements positioned at the margins of the network involved in the doing of emissions. However, for the emissions to be immediately recognisable, they need to be shown – precisely by means of such devices. Hence, the report is both at the margin and at the centre of emitting carbon. I argue that while emission facts are exhibited to publics in this report, they are fundamentally transformed: the report translates seemingly technical facts into *visionary entities* by means of transforming their visibility. The resulting message is

simple enough: emission facts promise sustainable development.

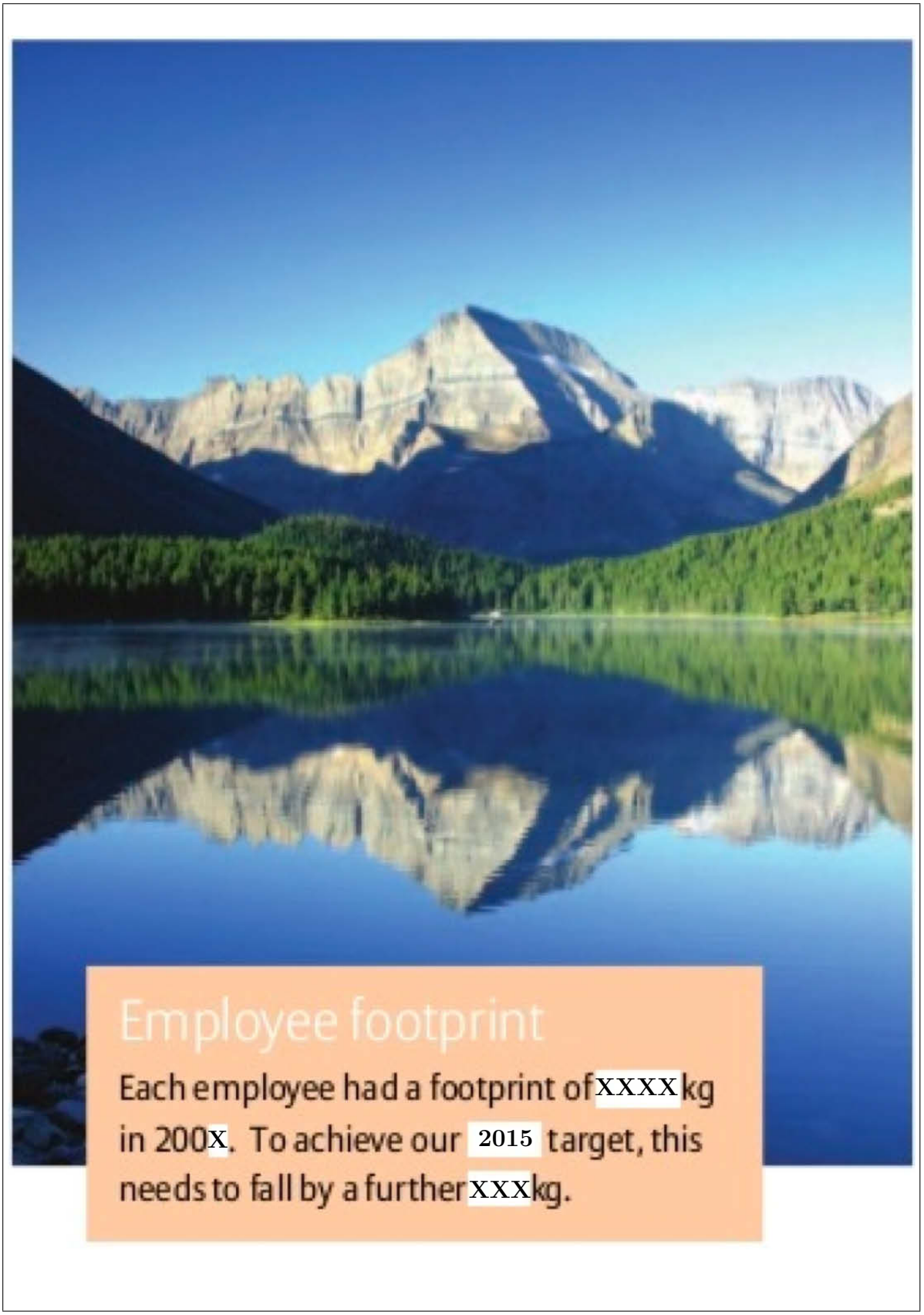
To publicly defend GFQ's claims of being a socially and environmentally responsible 'corporate citizen', corporate actors would point to this report; it was provided both in print and on the web. The document was designed as a first point of contact for publics to engage with GFQ's environmental reality. Victoria, for example, distributed them to her office's visitors. Thus, I employ the report as representative of GFQ's performance of facts. Taking their approach seriously suggests to flip through this document till we find its section on the environment – an expected element of corporate CSR disclosure (Stanton and Stanton 2002, 479).[48] One element caught my interest: a visualisation of emissions. Emissions as solutions. Substantially, GFQ managed to make its emissions visible while engendering a perception of the corporation as positioned on a trajectory towards sustainable development. Thus, by analysing this visualisation we close the study of the discursive circle commenced at the outset of the chapter, i. e. we trace consumption data back to sustainability claims.

This is the image. It depicts a lake and the sky, both deep blue, divided by a mountain range, its crest rising into the sky, and a verdant green wooded shore, mirrored on the water surface. The image's lower fourth is overlaid with a text box. Heading: 'Employee footprint'. And it further reads: 'Each employee had a footprint of [X,XXX] kg in 200[X]. To achieve our [2015] target, this needs to fall by a further [xxx] kg.' Thus, the collage provides us with GFQ's average employee carbon footprint backgrounded by a pristine environment. With this image, GFQ attempted to invoke alliances between nature and emissions.

To analyse this specific visualisation (anonymised and reproduced as Artefact 3.5.1 on the following page) I contrast it with the environmental balance sheet☞. Two visualisations, both claiming to *show* GFQ's emissions. However, while Science and Technology Studies (STS) sensibilities are well suited to critically engage with tables and graphs, studying the facts in relation to the serene landscape calls for inviting a further body of literature. I mobilise elements of the emerging literature of *visual* analysis of CSR reports (e. g. Rämö 2011) to analyse the environmental reality projected onto and through this image. Recognising 'we live in a visual culture' (Burri and Dumit 2008, 297), I read this literature as contributing sensibilities to an engagement with a hybrid entity whose authors would not even claim conveying 'pure' facts. It seems obvious that a Sustainable Development Report is more than technoscience.

Preston, Wright, and Young's (1996, 113) study on corporate annual reports established images as integral in the genre of corporate CSR reports. Employing images is normal. What, then, is the role of this visualisation? And, what does it visualise? Attending to these questions requires us to conceptualise the image not as a simple visualisation of the carbon accountants' knowledge claims. Surely, this visualisation enacts something 'beyond its own surface', Coopmans (2011, 168) would suggest. Her

[48] We skip all the other exciting messages by board members, its sections about micro finances – doing good for the world's poor, about GFQ's investments in sustainable projects, its stakeholders or its work force and so forth.



Artefact 3.5.1: Lakeside Mountains: GFQ as reconciling its global presence with Nature?

study indicates that corporate engineers' knowledge products may be visualised towards publics in a distinctly commercial way. The visual depiction of knowledge, then, is not merely 'an epistemological object of reference' (ibid.), but an entity enacted in the struggle over a variety of stakes, including social and economical. Furthermore, Davison and Warren (2009, 846) stress that accounting is not only about numbers. They propose that 'matters relevant to accounting (when not passed over altogether in silence) are communicated in three "languages": numbers, words and visual images.' And it is the latter that is assumed to elicit the first response by viewing subjects (Rämö 2011, 381). Therefore, Breitbarth, Harris, and Insch (2010, 251) argue, visualisations 'are not only "illustrations"'. Rather, they should be understood as intentional effects of telling corporate stories and supporting the companies' aims.

An analysis of the image needs to address its context as well, and engage with what it represents directly and indirectly, it needs to inquire into its 'hidden meanings' (Van Leeuwen 2001). Both, STS and Accounting Studies require the analysis of how a visualisation is arranged together with other elements (Burri and Dumit 2008; Davison and Warren 2009; Rämö 2011), such as texts, graphs and discursive practices.[49] The relational approach taken in this books harmonises with the call to look between image and (con)text (Preston and Young 2000, 441). And I propose that it is apt to interpret the image as both polysemic (Preston, Wright, and Young 1996, 116) as well as deliberately positioning the viewer to accept the corporation's construals (Preston and Young 2000, 436).

This particular image fits the image body analysed by Rämö's (2011) study of imagery in CSR reports (nearly one a half thousand images). That body was constrained by the choice of corporations (he did study GFQ's Sustainable Development Report) and the size of the image (above 25 cm^2). While such reports make frequent use of images, briefly scanning the environmental report sections in those reports published by the financial services sector suggests that GFQ might have been a *Vorreiter* in visualising environmental data. Mostly, environmental facts were (re)present(ed) solely as texts and tables. However, within GFQ's report, generally sections were equipped with an image. And so was the environmental section. To understand the role of this particular image, I briefly position the image in time and space.

Early on in the development of the report, including the section on the environment, the intended messages of each section had been officially specified. The section on the environment was supposed to signal the reader: GFQ's aim of reducing its emissions is feasible because GFQ employed an Environmental Management System (EMS). Studying the draft versions of the report in general and this section in particular revealed that Ellen Clark, who coordinated the report, differentiated content from design. The image was part of the design. *Was.* The PR agency had equipped GFQ with the page layout and provided visualisations, specific for each section. However, at one point in the section's development, a GFQ worker remarked (using a comment

[49] These requirements on analysis can be understood – with Mitchell (2002, 173) – as (yet another) 'pictorial turn'.

function of the word processor) on a content's sentence: 'If possible, we would like to have that visualised'. This request correlated with a change of the image. From a forested mountain hill with a street to the lakeside mountains. The sentence which had been commented was now depicted overlaying the image, as shown in Artefact 3.5.1; albeit the numbers have been different. Thus, content and design were changed in relation to each other. This suggests that the particular image was not chosen arbitrarily but is an effect of GFQ's, and the PR agency's, action.

The image was placed on a page, laid out for printing. The environmental section comprised two pages. The left-hand page consisted of several elements. The heading clearly indicated the page's concern with GFQ's environmental reality. GFQ, in a few large-sized words at the top, was positioned as being part of causing climate change, recognising climate change as a risk and, therefore, reducing its carbon footprint. The image was the largest demarcated element on the page; it occupied about one fourth of the space occupied by the topic. A further notable element was a pie-like chart, providing information about the relative contribution of each Key Performance Indicator (KPI) to GFQ's total carbon emissions. Three further types of textual elements were presented: a brief personal message by Victoria and a presentation of GFQ's EMS linked to the environmental management standard ISO 14.001[50] as well as information about how GFQ planned to reduce its emissions. The right-hand page contained further textual elements, a table and a graph. These elements provided examples of how GFQ managed to improve its environmental performance, framed by further numbers (read facts) and a 'well organised' overview, of GFQ's past and present environmental targets and corresponding progress.

In brief: of this two-page arrangement, the heading and image caught my eyes first. English language, read left-to-right, top-to-bottom. The environment (top) is this: a picturesque depiction of nature and the message that GFQ's is looking into reducing its carbon footprint (upper left half). At the bottom and on the image's right hand you find text supported by graphs. Rämö (2011, 380) explains that pictures

> are likely to provide immediate perceptual insight and understanding, and thereby increas[e] the coherence of the message. Pictures impart and contain symbolic meaning and capture immaterial values such as responsibility.

My reading of the page concurs with his suggestion. The quality of nature shown makes the viewer imagine that GFQ is recognising carbon emissions as related to the beauty of nature. We all agree, after all, the image proposes, that it is this nature which we strive for to protect. Nature, 'fallen from heaven without any intermediary' (Latour 2002, 7). Beauty. It is difficult to not agree with the image. And such beauties, serene landscapes, are typical for CSR reporting depictions of environments (Rämö 2011, 377). GFQ reduces its emissions, the text/image lets us know, in order to bring about a reality of such a nature; and GFQ can manage to achieve this nature. Of course, the

[50] See Section 4.3 for further discussions about the role of standards.

image can be easily decoded as having been chosen by a human hand; therefore, readers can be assumed to know: the image does not offer truth (Latour 2002, 18). However, the fact, the text, claims truth. Rämö, furthermore, suggests that while images are used to 'capture immaterial values', written structure is favoured for 'content based on standardised information' (2011, 380). This suggestion makes us wonder: have we not seen above that GFQ ran a seemingly standardised accounting system to produce the facts presented hovering above this image? Why, then, did the report not use plain text to provide environmental facts?

Recalling the environmental balance sheet helps us to explore the quality of the image in more depth. Davison and Warren's (2009, 846) overview on images and accounting remind us that accounts 'in themselves [are] visual artefacts'. The tabular structure of the sheet was made possible through the enactment of GFQ's environment as measured through five KPIs. Burri and Dumit (2008, 301) point to the fact that for a visualisation of a scientific object to take place, it first needs to be rendered as measurable. The analysis presented in the preceding sections outlined how this very enactment took place at GFQ. An outcome of that enactment, the balance sheet, was quite different, however, from the presentation of the environmental reality in the Sustainable Development Report. On the left page, visually similar was only the pie chart. GFQ's employee footprint, however, was – in the balance sheet – only one number of many. Most of environmental balance sheets' numbers were silenced in the environmental reporting section.[51] With Porter (1995, 112) I interpret GFQ's professional EMS agents as acting in relation to the audience and reckoning that understanding the original environmental balance sheet would require judgements by 'general lay' readers. However, the EMS-Team would not have trusted general publics to interpret the balance sheets in the right way. Therefore, a punctualisation of the information was needed. In consequence, relative to this pathway of the translation network, the average employee footprint became an Obligatory Passage Point (OPP) to see GFQ's emissions. It was the key spokes entity for the information available in the balance sheet. And we have seen that the environmental balance sheet, in itself, was claiming to represent all the information in ESDR, and so forth. Latour (1987, 50-51) postulates that in-themselves-unique layers of information are stacked such that they add something to each other. What, then, is so unique in the image/text shown above? In Preston and Young's (2000, 443) account, it is the overlay of text on the image that is so important to produce the desired effect. In their words, '[i]n image/texts, the relationship between the word and the image is inescapable'.

[51] The right-hand page of the section included a table of the employee's average consumption for each KPI of the recent two reporting periods☞. The table also provided a column showing respective five values for the change of the consumption relative to the prior reporting period. This assemblage likened the seventh sheet of the file containing the environmental balance sheet. At the Sustainable Development Report's concluding section, environmental data were 'summarised': the same numbers as in the table were shown *again*; in addition this summary exhibited the EMS's coverage☞, total employee footprints and one additional subindicator's values. Moreover, selected numbers were presented in the texts. Compared to the image/text's numbers, all other numbers were presented in small(er) print. Taking all these exhibitions of further numbers into account, the image/text's numbers (reproduced as Artefact 3.5.1) appear as the focus fact. It's factness is strengthened through its relation to the tables. GFQ signalled through the tables that it in fact knows more than the fact in the visualisation.

Technology of the Visualisation To reconstruct how the visualisation works discursively and materially, I question the relations between the left page's elements. The image/text interacts internally as well as with its neighbouring elements: only in relations elements make sense (Latour 2002, 34). Relevant in this respect are not only the meanings depicted or present, but also the meanings constructed through absences (Preston et al. 1996, 122).

I read the image's normative positive projection in conjunction with the page's claims about greening and emission reduction measures. The factual claim in the text overlaying the image, however, related rather to the graphs and the table. The graphs were the main other source of seemingly quantitative environmental information (with truth claims to mirror factual environmental reality). The brief statement by the human, Victoria, provides a subject's identity who lends her personality to the page's claims. In that way, I read Victoria's presence on the page as the mediating element who guarantees that actually humans work towards reducing emissions and bringing about sustainable development. Consequently, I understand the image as a visual declaration of GFQ being a 'responsible corporate citizen' (Rämö 2011, 379), symbolised in the specific image as bringing about that desired state of nature, which – in short – appears as *the promise* (cf. e. g. Brown and Kraft 2006). Rämö (2011, 379) identifies such landscapes as indexing 'responsibility for nature' – corporations '[a]cting wisely with the environment'. That image-promise attaches itself to the Sustainable Development Report's section in the environment – it easily travels from its location on the page to the section, to GFQ, to Nature. This establishes a wonderful, but diffuse, message, not only 'mobilisable' (Mol 2002, 168) but mobilising itself. Thus, to the image there is more than a picture (Breitbarth et al. 2010, 256). It is the promising quality of the image which 'coordinates' (Rämö 2011, 380) the informational elements in this part of the report: the promise connects the text describing the status of the EMS, GFQ's emissions, its claims of how it wants to reduce its emissions, a brief paragraph on a case where they claimed actually having achieved reducing some emissions; the promise was that GFQ is well positioned to solve the environmental problems which it was part of creating beforehand. The environmental problem is being 'dissolved' in front of the viewer's eyes (Breitbarth et al. 2010, 242).[52] The viewer's reading of GFQ's account of its environmental conduct is being 'organised' (Law and Lynch 1988) through this page. Like learning from instructive texts of how to see elements of nature, such as birds, the Sustainable Development Report 'provides an iterable organisation, a bulky object and a moment in a hermeneutic reading of the world' (ibid., 273). In contrast, however, to Law and Lynch's account of scientific instructions suggesting that Nature is to be read sequentially, the Sustainable Development Report arranges the informational elements for the reader to get the message-promise *at once*. This suggests, the image/text emerges only partially as an 'epistemic thing', i. e. as the carbon knowledge sought by reader or author (Rheinberger 2001, 24). It also

[52] I do not know, unfortunately, how or whether the artefact worked for blind readers.

acts: connecting past emissions with a promissory future and linking GFQ to investors' eyes searching for the appropriate amount of greenwash. This actant can, thus, be understood as a *visionary entity*. Backed up by claims of the EMS's status quo, its plans and achievements, the image/text provides a vision of the green future brought about with GFQ.

Material format of the visualisation: the material format which stabilised the visualisation, a fixed image on paper or on screen, is indicative of how carbon emissions existed in this form. A rectangular page as a container of GFQ's information on its environmental facts is necessarily a limiting factor. A page can only show so much information. GFQ's PR agency and agents of the CSR unit needed to balance how much information to provide while ensuring that the genre, Sustainable Development Report, would be immediately recognised. It seemed self-evident to me, while working with these colleagues, that readers do not want to view books full of tables. The parallel versions of the report did not very much alter this situation: even though the report existed as a short print and pdf version as well as a more detailed online version, none of these alternate presentations provided a view on the environmental balance sheets' qualculations underlying the figures presented in the report's section on the environment.[53] The Sustainable Development Report(s) only provided relative emissions facts, missing out statements about its absolute emissions.[54] An argument defending that situation would be to state that for information to be meaningful, it needed to be formatted somehow. This line of thought hints at the *qualitative similarity* between the balance sheet and the image/text. Both documents were material containers with restricting formats of what kind of information was enterable and presentable. This finding likens Kalthoff's (2005, 76) analysis of tables. The carrier of information only allows for a limited variety of inscriptions. The balance sheet even was able to calculate further values on its own. The Sustainable Development Report used a coherent layout, a limited variety of fonts and spatial partitions on the page. In both documents, environments were formatted. Kalthoff (2002, 32) underlines that such formats are the characteristic which renders documents non-neutral. This is not to say that any other way could be neutral.

[53]However, the online html version of the report provided links to further information, including to a document providing a view onto all the total emissions reported by GCEs.

[54]The section, however, supplied the reader with sentences containing absolute numbers concerning emission *reductions*, including the total amount of emissions *saved* by GFQ compared to the prior reporting period. The PR agency pointed to this, letting GFQ know in a comment during the drafting process: they have

> realised this total emissions sentence is a little problematic. Total emissions have gone up since [2006]. The data in the sentence is [the year the Report was about] compared to [the prior year], so it's true. But I wanted to flag it up – some might think it inappropriate to say you've saved [x],000 tons of CO2 when you've increased total tons since your baseline year.

With this comment, a PR agency's agent made explicit that GFQ's depiction of absolute emission reductions was morally questionable. Analytically, this constitutes the agency's warning against greenwash. This tension, however, was not made transparent in the materialisation of the Sustainable Development Report. The format of the latter would have been disrupted by making such a problematisation explicit.

Beunza and Stark's (2008, 277-278) discussion of spreadsheets argues that accountants necessarily are also toolmakers who produce their own little optical devices to 'see'. And in order to see, other things are moved away, out of focus: seeing implies blinding (ibid., 279). The tools, both the balance sheet as well as the image/text of the Sustainable Development Report allow the user to see a world. Each of these devices provides an active, more or less detailed and partial view of the world and by that organises that world: there is 'no unmediated photograph or passive camera', Haraway (1991c, 190) points out. Thus, the material format of the image/text as well as of the Sustainable Development Report, just like the format of the environmental balance sheet, redo the environmental reality which they seek to represent. The material characteristics of the respective documents limit the ways the epistemic thing carbon can be known about.

The promissory quality of the image: interpreting the image with the help of accounting scholars yields a clear understanding. The way nature was enacted promises our environmental dreams to come true. 'Depictions of [...] serene landscapes offer promises of a better future', Rämö (2011, 382) writes. Breitbarth et al. (2010, 249) conceptualise such imagery as a 'Dream World approach' which would invite readers to envision the corporation as making this dream become true. While Rämö (2011, 377) finds that such 'idealised, beautiful sceneries of nature' are often detached from the business, I argue that the nature depicted relates clearly to the business, though in an antithetical way. Drawing on Law and Singleton (2005, 347) we can imagine the relation between the scenery and the emissions as a generative *juxtaposition*. Precisely because the text and the image are opposed, the promissory future is foregrounded. Rämö (2011, 378) describes such an image as an 'ideologically loaded object that intentionally or unintentionally invokes what is not there'. Following Preston, Wright, and Young's (1996, 116) symbolist approach to interpretation, the landscape depicted in the image is not so much relating to enclosure of land or respective financial speculation but rather connotes a correspondence between a depiction of green nature and the capacity of GFQ to engender this greenness. The image/text is positioned at the boundary between two communities; it constituted a juncture between these communities' concerns. However, whereas the GFQ community was interested in reporting GFQ's emissions strategically to strengthen the company, the visionary entity's publics were interested in reading, seeing a green future of and with GFQ – or even in scrutinising GFQ's environmental performance. The image/text was positioned both, between communities as well as between different interests. Communities and interests differed – the definition of this object was principally contested. This makes the image-promise a boundary object. Both communities can and do connect to this kind of boundary object, i. e. the impossible environmental dream as a visionary device.

Dreaming absences: the dream invoked can be considered impossible to come true because it misses several key elements related to GFQ, its operations and its emissions. The partial perspective which was used to enact the landscape depicted in the image does not allow an assessment of effects of carbon emissions. Drawing on Strauss's (2011)

analysis of planning visualisations, we can see how such an absence of realities may be unfavourable to engender communication about the actual effects of GFQ's emissions (let alone its investments' consequences). The image does not show any humans in the picture. It is pure nature. Is it? Primarily it corresponds to a widely spread idea of Nature (Cronon 1996), a romanticised idea (Pepper 1984, 76). Neither the customers of GFQ – e. g. industry or private individuals, maybe including you(?) – are depicted nor are the entities invested in – industry, agricultural projects or even coal-fired or photovoltaic energy power stations. We also do not encounter any depiction of the offices or the workers who are part of creating the carbon footprint referred to in the text. It is as if the reduction of emissions, enabled through efficiency gains as reported on the page, lead to the green utopia depicted. The absences (of labour, industry, GFQ's operations) enact a visionary entity which shares its vision with the dreams of the discourses of sustainable development and ecological modernisation. Yet, Preston et al. (1996, 122) remind us that these absent actants are very much required to allow GFQ's existence as a global enterprise.

One could 'wonder' whether a more encompassing perspective would change the perspective. A regular depiction of a global perspective is the globe (Preston and Young 2000). GFQ used the image of the globe as well in its Sustainable Development Report, albeit to indicate that the globe is held together by the helping hands of GFQ as well as those of its stakeholders.[55] It seems striking that the report did not use the globe to indicate GFQ's global environmental ambitions. I interprete the absence of the globe in the environmental section of the report as GFQ having chosen to construe its greening activities and engagement with natures as environmentally situated, rather than abstract. The corporation accepted that it emits carbon and it signalled the assumably shared green utopia. Global vision enacts a 'gaze from nowhere' (Haraway 1991c, 188). GFQ, however, wanted to construe its engagement with the environment as a situated engagement: the image is taken from the ground. GFQ appears as firmly rooted on earth. Its environmental ambitions can be put into practice, we learn.

At the same time, GFQ was singularising its emissions. It provided a relative footprint, for each employee. GFQ as a global organisation might have gigantic emissions. However much their total emissions were – they stayed absent.

The visualisation of carbon emissions, thus, can be understood as a green vision. GFQ managed to link its emissions to a green promise. For all the elements which stayed absent, this green promise seems unable to ever come true. This discrepancy between promise and reality is what is usually called greenwashing (Lippert 2011b). However, the degree of the discrepancy did not yell at the viewer immediately. It is in the latter respect that the image/text allowed viewers to link their hopes to GFQ. The image/text in its context illustrates GFQ's capacity to provide a green promise while evading any statements how, exactly, they would bring about that dream. GFQ's emissions have been greened. An ethical investor can safely put some money into GFQ.

[55] Section 4.3, entitled *Aligning Legitimacy with Carbon* (page 279) provides a more detailed discussion of these stakeholders.

On underlying realities: investigating the technology of the image is also leading us to issues of some purported reality. Stanton and Stanton (2002, 478) refer to the idea in Accounting Studies that corporate reports may reveal 'what was there' while constructing particular meanings to be imparted to viewers. This discourse readily accepts that images can both represent and construct realities (Preston and Young 2000, 439), which is equally decisive as the understanding of images as, both, records and constructs themselves (Van Leeuwen 2001, 5). The image/text shown above has been deliberately constructed as part of the page by GFQ's agents. Even if we assume the image to be a record of a landscape 'out there', it is not enacted as such in the assemblage. Much rather, the image has been enrolled to visualise a dream of earthly rooted corporate environmentalism. If there ever has been any reference to a specific location, it is lost in GFQ's visualisation. The history of the image has to be understood as subordinated to its role in the assemblage. Those agents who participated in choosing the image, we may assume, have been provided with alternative images by the PR agency. Thus, the image does not so much depict an underlying record but the dream it is to convey.

The text on the employees' average carbon footprint, however, has a very specific referent. Signified is GFQ's emission reality. Also part of the page, the (con)text's reference to GFQ's EMS explicated claims about systematic and correct fact production. This language is part of the rationalist ecological modernisation discourse introduced in the beginning of the chapter. Appropriately, then, the carbon footprint shows up as a matter of fact. Even though the section made explicit that GFQ wanted to improve its quality of environmental data collection, the textual claim overlaid on the image appears hard. Neither pdf- nor html-version of the report link to any kind of data which the EMS would consider 'original'. Similarly Kalthoff (2005, 76) finds that 'original data leave the scene and are kept in files and archives'. The image/text's suggested factness, stabilised through its relations to its con-texts and con-figures, achieved representing carbon emissions. Thus, claims over representing realities could be made within the EMS-Team's environmental balance sheets as well as in the Sustainable Development Report without needing to enact a system allowing to trace back these claims to some imagined 'sources' (e. g. the data enacted at GCE level). This analysis suggests that GFQ chose carefully what data to reveal to publics and what to conceal. The visionary entity of carbon emissions did neither reveal most known processes which were part of the emission claim's production, nor could this entity witness all the processes which were actually part of shaping the claim. For all practical purposes, thus, carbon emissions are not fully traceable in reverse. Latour's (1999a) postulation of reversibility, thus, is challenged. Even employing the internet, we cannot identify the full reversibility which Latour (2011a) postulates. The following chapters need to scrutinise this interpretation. Furthermore, the image/text may be used for further research, both academic – not limited to this book[56] – as well as market – such as

[56]The accounting research literature referred to in this section are examples of analyses employing

research carried out by SRI rating agencies, like those producing the FTSE4Good Index or the DJSI, using CSR disclosure reports to inform their ratings (Breitbarth et al. 2010, 240). Thus, drawing on Robson's (1992, 701) argument on n^{th}-order inscriptions in accounting allowing to produce all kinds of calculations, I propose to conceptualise the image/text to allow for n^{th}-order qualculations, effectively treating the text/image as 'raw data' (Burri and Dumit 2008, 302-303) both for investor as well as consumer 'choice'. The underlying knowledges often simply cannot be accessed, partially because the knowledge is too tacit to be recognised. Thus, while agreeing with Coopmans (2011), i.e., recognising that corporations may conceal some data, I argue that even if the corporation wanted to reveal all the knowledges considered significant by some stakeholders, the constraining technology of visualisations in CSR disclosure would not allow the dream of transparency to become true.

To summarise, we find that the Sustainable Development Report was not only fighting like a scientific article with references, numbers and units (Latour 1987, 49), the corporation also employed images to invite the reader to see what GFQ wanted them to see. Carbon emerged as a peculiar epistemic thing which was shaped by its role as a visionary entity. The emissions were to promise the viewer that the Western dreams of Nature would come true. This entity was enabled to perform that role by rendering absent many of ballasts which could awaken the viewer. This particular technology of visualisation challenges the understanding of numbers proposed by Robson (1992, 704). While he characterised them as mobile, stable and combinable, I identified the image/text with different qualities: while indeed the carbon footprint appears stable in the text, its underlying image intentionally spalls that stability in order to give way to a dynamic reading of the emissions – they are to change, they already have changed, eventually, the dream will become true. This is the story of the image/text's transformation of the emission fact. In the following chapters I investigate how these facts are (de)stabilised without the immediately underlying image. Insofar as the carbon fact in the image/text was not stable, its ability to move was also obstructed: the image was not that easy to mobilise as the number. The number, however, could be easily used for n^{th}-order qualculations. Image and text were differently combinable. This section is just one way of reworking them reflexively. In sum, the image/text was configured to invoke the vision of emissions turning less and into sustainable development.

Constitutive Carbon Coopmans (2011, 156) proposes that actors may position an object such that it is '"seeable" in certain ways' while they may also try to configure the audience of that object. Similarly, I argue that the technology of visualisation we discuss was not only about sharing knowledge and a vision but also about configuring the viewer in order to influence their actions and perceptions. Therefore, we need to engage with how carbon constitutes us, GFQ, and a conceptual space for societal and economic activities.

---

the artefact as data.

First, the viewer of the image/text is synchronically positioned in relation to the image/text. Whether or not the viewer is persuaded by the visionary entity, they cannot not recognise that GFQ is construing itself as promising.[57] As scholars, consumers, shareholders, activists or in any other role, we are necessarily entangled in the promise and the emission reality which the vision is signifying. In all these roles we can be part of the total picture, i. e. of a universe of carbon references (Lippert 2011a) – insofar as we figure ourselves as causing these emissions and/or in that we fight them, or hope for changes against or with the signified. In that respect GFQ's visualisations can tell us a limited kind of truth about ourselves, like scientific images do (Burri and Dumit 2008, 307). Viewing the image/text may make us complicit in co-constructing us in the face of GFQ, Preston et al. (1996, 132) would add. Like '[t]he images of sociality (belonging, sex appeal, power, distinction, health, togetherness, camaraderie) that underly much advertisement [and transform] the consumer to the point where the particular commodity being sold is almost an afterthought' (Appadurai 1986a, 56), the green images of Nature transform us simultaneously to a point of utter hope and disenchantment: we need solutions to global environmental crises – and we know GFQ cannot deliver.

Second, it has been argued that corporate reports, like the Sustainable Development Report, contribute to constituting the corporation (Preston et al. 1996, 115). Rather than speculating about the artefact's effects on GFQ's distributed workforce, I propose that the image/text has a discursive effect on the environmental agents' work: the visionary entity may reflexively constitute or reproduce the ecological modernisation discourse amongst the actors who are positioned to be part of co-enacting the EMS. Viewing the neat image/text may be literally relaxing in contrast to experiences of the unruly numbers encountered during data collection. The image/text may serve to satisfy a desire for clear facts which would not normally be met inside the work of the EMS. Through this visionary entity, thus, the organisation GFQ and its EMS-Team can be conceptualised as reflexively constituted.

Third, by sending 'messages to investors and the public' (ibid.), the report can help to construct carbon as a 'conceptual space' in which business can be conducted (Preston and Young 2000, 427). By making its emission facts public, GFQ signaled that it accepted not only the discourse of climate change but also one in which quantifying carbon emissions is relevant. The aim of reducing carbon emissions inscribed in the image/text, furthermore, is promising for CER traders. They are dependent on companies to quantify their emissions and to be interested in reducing them. Interestingly, in this conceptual arena it is not necessary to equip carbon emission facts with much context and local details. In the space of carbon economics, acting globally, and thus at a distance, is possible without negotiating the local realities of polluter and offsetting project. Acting with carbon emission facts, just like they are portrayed in the image/text, i. e. employing them through carbon economics, to tackle global climate change would actually turn

[57] I recognise, my interpretation is neglecting unintentional misunderstandings.

more difficult if the facts were to be recontextualised: the local realities of emission construction might destabilise trust in carbon economics (which is an underlying theme of this book) whereas engaging with the local experiences at CDM projects is likely to repel even enthusiasts (e. g. Gilbertson and Reyes 2009). Correspondingly, GFQ required, like Robson (1992, 701) proposed, accounting representations to be in the shared form (CO_2e). My analysis, however, contests that 'for acting in a situation which is the object of intervention, representations should not be decontextualised' (ibid.). The case of SRI shows well: precisely decontextualised information, like GFQ's report's, are used to inform rating agencies. This implies the latter enact as commensurable corporations' reports. Too much context would hinder them from efficiently processing data. Even if rating agencies require contextual information to make sense of carbon facts, the information they need may be assumed to be very restricted. The text/image represents, thus, what the EMS-Team envisioned: the exercise of data collection is related to action within the framework of carbon economics and SRI.

◇ *End of Section* ◇

This section provided a first look at *one of the ends of the networks of the enactment of carbon emissions*. GFQ provided publics with a visionary fact. The corporation staged itself as communicating clear and realistic facts to publics. The emissions which GFQ reported in its Sustainable Development Report were not simply zero – much rather they have been portrayed as a specific and detailed number. While the report's pages on the environment informed the viewer/reader about the work-in-progress status of GFQ on its way to increase the coverage of its EMS and to implement emission reduction measures, the central visualisation was a hybrid image/text which combined a brief sentence about GFQ's carbon footprint with an image of a serene landscape. This combination, I argue, should be conceptualised as a technology of visualisation which enacted carbon as a promise: carbon emissions were performed as dynamically reduced by GFQ and, eventually, turning into sustainable development. The factual claim in the image/text and GFQ's acceptance of itself as not (yet) having achieved complete success can be read as a strategy to enact authenticity. Spooner's (1986, 226) discussion of how the authenticity of oriental carpets is enacted suggests: 'Authenticity is a form of cultural discrimination projected onto objects. But it does not in fact inhere in the object but derives from our concern with it.' GFQ presented its emissions in a way which ensured that GFQ is recognised as an organisation which engages with its status as a polluting entity while, in parallel, aiming to reduce these emissions to some degree. A wise move. My analysis corresponds, thus, with Rämö's (2011) who proposed that images can be enrolled as symbols by corporate reports to enact a corporation as a phronetic, i. e. wisely acting, organisation. Recognising pollution and reducing emissions reproduces the discourse of ecological modernisation; and, at the same time, within that discourse it can be read as an authentic policy of a capitalist organisation. Viewers/readers who are familiar with this discourse (re)cognise GFQ's emission facts as genuine; its emissions appear accurate. The viewing subject's position towards GFQ's

emissions is reordered by the act of viewing them. Imagining that corporations pollute and finding that GFQ voluntarily reported its emissions, we are now positioned in a conceptual space of carbon emissions where even the most pristine lake or mountain range is inextricably linked to carbon. And it is the same space in which global carbon economics operates: clear facts and a beautiful outlook.

GFQ enacted itself through this as travelling on the path of sustainability. Along side the top Fortune 500 corporations which positioned themselves similarly (Ihlen and Roper 2011), GFQ designed the Sustainable Development Report such that it spread the imagery of transparency and participation. Breitbarth et al. (2010, 238) comment that demands for 'corporate transparency and accountability concerning social and environmental issues' drove the growth for such reporting. Reporting numbers can be understood with Porter (1995, 80) who suggests that 'faith in numbers was wedded to a belief in progress through public information'. CSR reporting is related to an enlightenment dream which conceptualises numbers as information, which respectively are to support publics in controlling the for-profit sector. The technology of visualisation inscribed into GFQ's Sustainable Development Report provided a kind of fact which was easily digestible by viewers. And this quality made this form of fact also apt for participation. Strauss (2011) agrees that visualisation may be conducive to allow for participation. However, as she points out, a visualisation which does not allow the viewer to position herself in the environmental situation will not allow for multi-dimensional perception and, thus, situated decision-making. The image/text discussed in this section did not position the viewer *in* the environment. The global factual claim of carbon emissions were complemented with a natural scene devoid of humans, industry or even GFQ. This technology of visualisation did not actually allow its user to delve into the object depicted. Much rather, carbon emissions stayed abstract, just like the dream of sustainable development.

For any meaningful account of assumably rational decision-making, the problem is that neither the carbon emission fact depicted in the image/text were clear, nor were the balance sheets underlying the visualisation. Thus, in response to the question raised by Burri and Dumit (2008, 298) about the specificity of the visual form of knowledge, we may underline the transformation of the quantitative factual claim into a visual promise about emission reduction. Numbers enacted through environmental balance sheets as accurate representations of carbon emissions silenced the uncertainties which were part of them. These partial representations were transformed from epistemic things into visionary entities, promising the desired change away from environmental crises. Thus, epistemically and visionarily the viewer is actually positioned on unstable ground.

This deconstruction of the image/text raises questions: how to communicate better? Drawing on accounting scholars Preston et al. (1996) and their mobilisation of Haraway (1991c), what we should be looking for is opening the way the corporation visualised itself and its emissions to built a critical dialogue. Two paths of inquiries suggest themselves now: on the one hand we might ask how agents of the EMS-Team could

engage in order to produce different products for CSR disclosure. On the other, we might ask how we, as activists, as critical scholars or members of local communities, can engage with corporate facts differently.

The factual claim can be perceived as deceiving as the scenic image. Maybe romantic imagery of the landscape and hard facts about environmental destruction are not offering the help to constructively engage with capitalist environmentalism. This book chooses the first path of enquiry, i. e. asking how practitioners might enact carbon figures differently. In the words of Haraway (1994, 60) I aim to refigure carbon, thus to trope and to knot together an understanding of carbon which allows practitioners to provide an alternative account(ing) of carbon – one which does not need to silence the humans involved in the construction of Nature and the destruction of human environments in order to envision a better world.

♢ *End of Chapter* ♢

This chapter set out to trace how GFQ enacted its collection of environmental data as contributing to sustainable development. We aimed to establish that the practices revolving around that data can be considered comparably *normal*, i. e. adequate, with respect to the hegemonic discourses of ecological modernisation and climate change. The corresponding argument was based on several sections which were to investigate the doing of data while relating the enactment of that data to environmental sustainability.

To capture the gist of the approach taken here, let me revisit Mol's (2002) STS study of the disease atherosclerosis. In brief: physicians do not simply look at disease, they also touch it, e. g. touch a leg (88). And they interact with these objects, manipulate the leg, cut, stain, and so forth.

> So there are various ways of knowing embedded in various activities. And yet they all have at their center a representation of the object, a diagnosis, a fact can be written on a form, in a file, in an article. *Data* that may be added up, translated into other data, and, if necessary, travel. (89, original emphasis)

Thus, data is a representation which can easily travel. This corresponds to a core observation of this book as well. And, Mol continues, practitioners represent legs, bodies, people, populations – growing abstractions and circles of representation. 'But as soon as the practicalities of enacting reality are foregrounded, such scaling efforts collapse. A good way of beginning to show this is to attend to representational devices.' (120) This chapter introduced us to the representational devices employed at GFQ's centre of carbon accounting: ESDR, environmental balance sheets, phone conferences, an Sustainable Development Report. And, indeed, these emerged as a far more practical matter than GFQ's powerpoint slides would have suggested.

To summarise, GFQ's EMS was designed to collect data from the globally distributed subsidies, centrally process them and calculate the corporation's carbon footprint. This structure enrolled a set of heterogeneous actants. In more detail, the set included

environmental agents at the subsidies, who collected invoices, did phone calls, read off meters, calculated and estimated figures. More or less directly these agents translated their local data into a centralised database, ESDR. That actant was a powerful, globally accessible, intranet-based application, which would store the data provided by the agents and, at the flick of a switch, sum up these data and translate them into carbon emissions. At GFQ's HQ, EMS-Team members had the possibility to push buttons and configure ESDR to report so-called environmental balances of a GCE or even of the total corporation. The data inscribed into such environmental balance sheets was standardised and, consequently, utilised for internal as well as external reporting. Throughout these processes, most environmental managers occupied quite narrow geographical spaces. They were, essentially, local actors. The database connecting them, in contrast, constituted a net, carried by GFQ's intranet. The consumption data flowing to and fro through these wires and between GCEs' agents and the EMS-Team was mobile and commensurable enough to be formatted as carbon emissions.

The first section showed that GFQ was officially relating to the global discourses of sustainable development, climate change as well as implicitly to the rationality of the ecological modernisation discourse. These discourses were translated into the establishment and configuration of an EMS. And the latter was primarily detailed in terms of environmental accounting. Along this path of translations, the grand promises of sustainable development were transfigured into carbon. Thus, I found that carbon has become 'promissory matter' (Brown and Kraft 2006); it was substantially reconfigured in hope and expectation to capture the move of GFQ as becoming a sustainable financial service provider. By substantially, I mean that the substance of carbon was not so much treated as a molecular entity any more but enacted as the site through which GFQ would express its status as a responsible and sustainable corporate citizen. Carbon was turned into a technical knowledge generation issue for accountants who would provide a firm foundation of facts for figuring sustainable carbon emissions. In effect, many of the original hopes, linked to sustainable development, were lost. Instead of environmental sustainability and justice, environmental accountants had been equipped with a document, entitled *EMS4GFQ*, which provided a set of prescriptions about data collection through a centralised database, ESDR.

Subsequently, the second section followed the HQ's prescriptions into the practices revolving around GFQ's EMS-Team. Controlling data collection took place at three levels: between the EMS-Team and GCEs' agents, within the EMS-Team and between the EMS-Team and even more authoritative actors. In all these analytically separable levels we found that it were the immediate relations among humans and their mediating devices, such as ESDR, emails or phones, which enacted data and, thus, caused the stability of data or their change. The interactions among these actants cannot be adequately understood in terms of how *EMS4GFQ*'s prescriptions tried to govern them. Much rather, members engaged in intensive and several weeks lasting review processes, in which GCEs' agents negotiated with EMS-Team members their data.

Sometimes the data which GCEs 'delivered' were deemed acceptable. Often, however, EMS-Team members were acting on GCEs' agents in order to adjust their vision and understanding of the EMS and ESDR. The effect, HQ based members hoped, would be that adjusted ways of seeing consumption and employee realities result in apt data entering practices and, ultimately, proper data. I employ, thus, Latour's (1987, 230) understanding of centres, i. e. that the EMS rendered everything, data as well as GCEs' agents, readable by the EMS-Team. These elements have been read and interpreted in specific ways: Elise, Dieter or myself decided about what data members should collect, which representations members would invite into the center and which they would exclude; for this to be possible members practically shaped the boundaries around KPIs and transformed the GCEs' agents' practices into formable entities to serve GFQ's data collection configuration. In these interactions within and beyond the EMS-Team, members frequently hit the limits of the actions and definitions prescribed by *EMS4GFQ*. The consequential uncertainties and vaguenesses, however, were mostly set aside if they had been made recognisable at all. Ignorance was a key practice for members to enact data collection such that it produces proper results.

In the third section we traced how the EMS prescribed, envisioned and turned data collected at GCEs into carbon. A key discursive technique mobilised by *EMS4GFQ* was to define boundaries of the EMS and, thus, spell out formal borders of what kind of consumption realities GFQ was interested in. Literally, some consumption realities were considered outside of the area which the EMS was to cover. Thus, inbuilt into the configuration of the data collection exercise was the prescription to exclude many consumption, that is environmental, realities. The accordingly bounded reality to be turned into accounting data was configured into ESDR: GCEs were to translate the consumption realities they encountered into the format inscribed into the database. Through this the data collected was structured as standardised information. On top of that, the EMS-Team copied that information into spreadsheeting applications – a process which yielded environmental balance sheets. The latter were designed as boundary objects to be read by GCEs, the HQ as well as selected stakeholders, such as auditors. That being so, I consider the formal boundary-setting a decisive element for transforming sustainable development into carbon: in balance sheets emissions were emerging as clearly demarcated, highly ordered and readable things endowed with claims of accuracy if not even depicting reality.

The fourth section set out from this observation: balance sheets would represent, inter alia, a GCE's or even GFQ's emissions enacted as caused by the sum of consumption activities which were covered by data collection. However, for the EMS-Team this fact was of limited utility. The sum of emissions which related to these consumption activities was understood as neither comparable with other companies nor as providing full information about all emissions of a GCE or of GFQ. Recognising that GFQ's official emission reduction target was defined in relative terms – 25 % emission reduction per employee – indicates what kind of fact the EMS-Team needed in order to evaluate

their emissions vis-à-vis their target: they needed to know the counts of employees covered by data collection. A calculation would yield the employee carbon footprint. Knowing employee count(s) also was decisive for the EMS-Team in order to determine their position relative to their second grand target – covering 85 % of GFQ's employees through data collection. Thus, counting employees was a decisive fact to construct and understand GFQ's carbon emissions. I identified, however, that this non-environmental fact was in itself uncertain and unstable. In addition, the EMS-Team had little power over this fact. And the coverage fact was used by members as an indicator of the limits of their knowledge. I thus understand EMS-Team members as recognising the partiality of data. Members' conceptualisations of coverage was, on top of that, complicated by their awareness of the parallel existence of up to five coverage facts in ESDR attached to a given organisational unit, each referring to one of the five KPIs. Precisely because the coverage fact was the measure for the extent of the limits of the EMS's carbon emission knowledge, this fact was an object of strategic interest. Depending on the qualculation, this quintuple coverage was expressed as a singular value between about fifty to nearly 85 %. The EMS-Team was, furthermore, employing a process called extrapolation to construct knowledge about the emissions attached to the non-covered employees. I described this process as a way to extend the carbon facts. Through extrapolation, GFQ was able to manufacture its total emission fact. Extending carbon emissions allowed the EMS-Team to derive GFQ's employee carbon footprint, even though it did not hold consumption measurement data for up to fifty percent of its employees. However, producing total emissions was key to produce relative indicators. And it were such relative indicators which were needed to render the environmental performance of GFQ comparable with the performances of competing corporations. The corporate sustainable development policy was imagined by members to demand usable forms of emission data. Extending carbon emissions was, thus, supposed necessary to fit the data into the formats of envisioned sustainable development reporting.

In order to investigate how carbon emissions facts would be represented in the materialisation of the sustainable development discourse, the fifth section turned to a public report by GFQ. As part of its CSR disclosure, the corporation had provided publics with two pages about the EMS and GFQ's environmental performance. The analysis focussed on the most eye-catching element visualised in the Sustainable Development Report's environmental section. Shown was an image with a text overlay. While the text reported GFQ's employee carbon footprint as a step on their path to reach their emission reduction target, the image presented a serene landscape figuring a lake and forested maintain range. As a composite visualisation, this entity was not so much a simple epistemic thing, but rather a way of enacting a promise. GFQ presented its readers/viewers not with a mere factual claim but rendered the text into a visionary entity by suggesting through the depiction of romanticised Nature that the corporation was well on the way towards environmental sustainability. The imagery of greenness was associated with transparency: publics were provided with a clear-cut figure and

a quantified gap to GFQ's emission reduction target. This understanding promised the reader/viewer the possibility to participate in GFQ's enactment of sustainable development. The Sustainable Development Report was presented as witness to the realism and authenticity of environmental accounting. If readers/viewers perceived the visualisation in this way, the Sustainable Development Report successfully achieved to make the factual claim relevant. Only together with the audience was the report able to make the fact matter. This understanding resembles Latour's (1987, 104) account of fact-making. It is a 'collective process'. In sum, GFQ's Sustainable Development Report managed to offer carbon emission as a real and visionary fact: with GFQ sustainable development is at the reader/viewer's hands. A fantastic fact: if they accepted GFQ's promise, jointly, they could move on into a sustainable world. Lost were all the stories of workers about the enactment of carbon emissions, all the information about the realities classified as irrelevant in the EMS. Public emissions visions were everything but coming close to providing a balanced view. Only a part of what emissions meant was published.

Following through these stories provides a clear finding. GFQ managed to close the circle: the corporation inscribed the hegemonic discourses of and around sustainable development into its formal policies which were translated into the EMS, contracted into consumption data collection, translated through ESDR and balance sheets into carbon emissions. The latter were transfigured into the total emissions of GFQ which were enacted as visionary entities in GFQ's Sustainable Development Report promising a green future for humankind. Sustainable development was translated from global discourses through nitty-gritty corporate accounting practices into seemingly raw data to inform the sustainable development discourse with emission data. The substantive argument in this chapter was that closing this circle took only place at surface level. For proceeding on the way to achieve this superficial production of sustainable emission data ignorance was required: the EMS-Team ensured through its practices, that uncertainties would not hinder the accounting processes. The facts produced through the EMS were unstable, strategically shaped and highly contingent on the actual configurations (rather than merely the prescriptions) of members, their technologies and the data they enacted. In this chapter, GFQ's carbon emissions emerged as a deeply complicated construct. Certain is only carbon's contingency.

In terms of the human actants involved, this analysis yielded an exciting understanding: whereas Kalthoff (2005, 76) counterposes a risk analyst as tied to his desk with the data and programmes as mobile, I position the data practices as intentionally tied to the global discourses of sustainable development. Humans utilised the mobility of their imagination, which allowed them to translate local consumption facts to corporate greening. Agents were not tied to their desks but walked around, used globally extended listening devices and visual devices to hear and see the environmental reality and the perception of these realities by other actants. GFQ's environmental managers were expected to estimate emissions, to draw assumptions about the consumption of

hundreds and thousands of workers distributed in their countries, spread all over the world. Therefore, humans, in this study, need to be conceptualised as closely interwoven with the data they perceived and enacted simultaneously to bring about GFQ's version of sustainable development.

Of course, GFQ's complete account of sustainable development extended not only to carbon but also to issues of stakeholder participation, philanthropy, educating pupils to learn about how finance really works, providing micro financial services to the parents of future customer generations and many other details. Short of engaging with a discourse analysis of sustainable development in general and showing the particularity of GFQ's enactment of sustainable development, I should, exemplarily, point to the partiality of GFQ's understanding of environmental sustainability as a matter of visionary carbon facts. For that I mobilise the 1866 study of coal economy by Jevons (2011). He scrutinised how the production and demand of coal in the UK developed and found:

> It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth. (75)

In Chapter VII of his study he argued that the economic use of coal would not result in the reduction of demand at the scale of the total British economy. Even if the manufacturing of goods was rendered more efficient, total consumption would still increase (Clark and Foster 2001). Ecological economics calls this problem the 'Jevons' Paradox' (Alcott 2005). The economists' analysis even considers that 'efficiency policies are simply counter-productive' (ibid., 19). Realists also recognise this problem (Næss 2006, 207). To balance the problem that growth neutralises efficiency gains political scientists postulate structural change, i. e. hard-core regulation beyond trust in market-based solutions (Jänicke 2008). Thus, the recognition of the limited scope if not even detrimental nature of per unit or per employee resource use and, hence, emissions has reached far into the academic centres of hegemonic sustainability and ecological modernisation discourses. Despite these problematisations of efficiency policies, GFQ celebrated its emission reduction target as ambitious. The actual process of translating the sustainable development discourse into business reality and back into public environmental sustainability discourses lost not only sight of uncertainties and recognition of the constructed and strategic nature of facts, but discursively the EMS-Team also excluded entirely any engagement with the problematisation of their efficiency focus. Summarising with Haraway (1991c, 195) we recognise that '[t]ranslation is always interpretative, critical and partial'. No singular correct translation can be possible. In the course of producing this book, colleagues often asked whether I found manipulation going on at GFQ. In response to this question, I like to paraphrase Brown and Kraft (2006, 319), arguing that '[w]hether or not manipulation is or is not taking place' within the EMS-Team the expectations on carbon carbon to be a factual matter were simultaneously connected to the hope to genuinely contribute to sustainable development.

The problem we find is related to this combination of moments: GFQ had enacted a fact which could not be separated from its character as fiction. The corporation had endowed this fact with a promise of Nature devoid of humans, technology, industry, capital and GFQ itself. At the same time GFQ acted upon the premise to sustain its own existence, which required all the humans, technologies, industries and capitalism itself to prevail. The carbon utopia of Nature was, thus, bound to not happen. The conundrum was that GFQ did not enact carbon as residing in an actual socio-environmental situation; GFQ did not provide an embodied vision and material outlook. They did not envision an utopia in which carbon would be able to hold the promises attributed to sustainable development. Their approach did 'not solve problems, they [were] moved around', we might say with Swyngedouw (2010b, 201). Carbon and other environmental problems caused by industrial activity, capitalism or simply GFQ's office work were not named but sidelined. They did not fit the neat formats of ESDR forms, environmental balance sheets or the Sustainable Development Report. Thus, through the material practices inside the corporation, carbon problems moved into a fairy future.

Can we think of an easy way out of these problematic situations? Some readers will propose to look for firmer regulatory action, to change policies governing corporations' move to sustainable development. The analysis of this chapter and the prior one, unfortunately, suggests that this is not such a simple solution. I detailed the corporate EMS as a setting of established practices, routines and discourses. Any new policy, auditors or even state servants would be situated in this already structured field.

An alternative approach could be to engage with the diverse practical knowledges of practitioners. This approach would study the members of the EMS-Team to address how a move to a more situated engagement with carbon emissions could be theorised, grounded in actual members' everyday working practices. The take to be developed, henceforth, is indebted to Haraway's (1991c) notion of situated knowledge. Inspired by this feminist account we recognise: the EMS-Team did not fail delivering objective carbon facts because members were too much attached to their practical improvisations and engagement with local conditions. Much rather, any knowledge which is produced is always partial, situated in and inextricably related to the settings in which it emerged. GFQ did not manage – and might not want to – actually account for the situatedness and partiality of its carbon knowledge. However, the members of the EMS-Team might be motivated to account in a more defensible way for GFQ's environmental implications. Towards such a stance of practitioners Suchman (1994c) coined the notion of 'located accountability'. This kind of accountability is an alternative to the god trick described by Haraway (Suchman 2002, 142). This book, therefore, is about to investigate carbon practices in order to develop a form of how society, GFQ and agents of ecological modernisation can know and engage with carbon emissions while providing a full situated and always partial account of their particularly constrained and enacted knowledges.

The subsequent chapters, accordingly, investigate agents and their practices. We can

think of these calculators as performing the central point of the EMS. However, Law (2007, 12) argued that actor-networks normally represent one of many realities. Thus, many alternative understandings of the EMS exist – alternative to the one detailed in *EMS4GFQ*. If Latour (1987, 245) is right and 'those who control the geometry and mathematics will be able to intervene almost anywhere', then we need to uncover the power relations which their interactions created. Setting out to envision a way how members could put into practice located accountability requires us to understand in detail how members' relations shaped their everyday work place. Also, understanding carbon requires understanding the agents who enact carbon. Enacting carbon is never a politically neutral or innocent activity. And these emissions emerged in members everyday work practices. Therefore we need to address the power relations enacted in the work place setting. This is what the subsequent chapter is to scrutinise.

Interlude II

Normal Anomalies

Carbon emissions are clear, definite – pretends Law (2004a, 2) for half a sentence. He suggests, they belong to a class 'of provisionally stable realities that social and natural science deal with more or less effectively'; only to continue that *other* phenomena are out there, phenomena that these sciences could not catch. What if his opening is wrong? What if social and natural science rather do not catch the phenomenon of carbon emissions? They cannot. Carbon emissions are enacted under precarious conditions, involving tensions, contradictions. This was not really a surprise. CO_2e emissions are, after all, not more and not less than serious practices. Practices that matter. At least: the count of emissions ought to matter. However, the prior two chapters did introduce some grounded doubt – more than mere ideal-type scientific scepticism. The method of following GFQ's engagement with the sustainable development discourse and tracing how that discourse was translated into particular data practices, eventually re-emerging as a visionary entity implied we had to closely observe how GFQ's EMS-Team members were actually putting carbon emissions together. Towards the end of the last chapter we engaged with a visualisation. The visualisation of emissions – as a visionary entity. A vision of GFQ as a wisely acting organisation, knowing – facts – and promising to reduce its emissions.

Take a step back from this analysis. Briefly follow me into a playful mode. A serious engagement with reality. Through playing we learn. In the field of Science and Technology Studies (STS), Burri and Dumit (2008, 309) call for counterimages. Images which help to understand the doing of reality. I react to their call. I produced visualisations which are to undo a reality: the reality that some readers might imagine that what I discussed so far refers to exceptions.

While sitting at GFQ's desks during my fieldwork, I often asked myself: what kind of visualisations could one possibly produce using 'their' data? During the analysis for the prior chapter it became clear that, at least in the analytical trajectory this book is pursuing, carbon emissions appear as unstable entities. Relative to the hegemonic discourses of sustainable development and manageability, this instability constitutes an *anomaly*. Here is a link to the question I just posed. How 'normal' are these

anomalies actually? The prescription is that carbon emissions are to be clear. And in the environmental balance sheet☞ we encountered such definite facts. They were inscription devices full of factness.

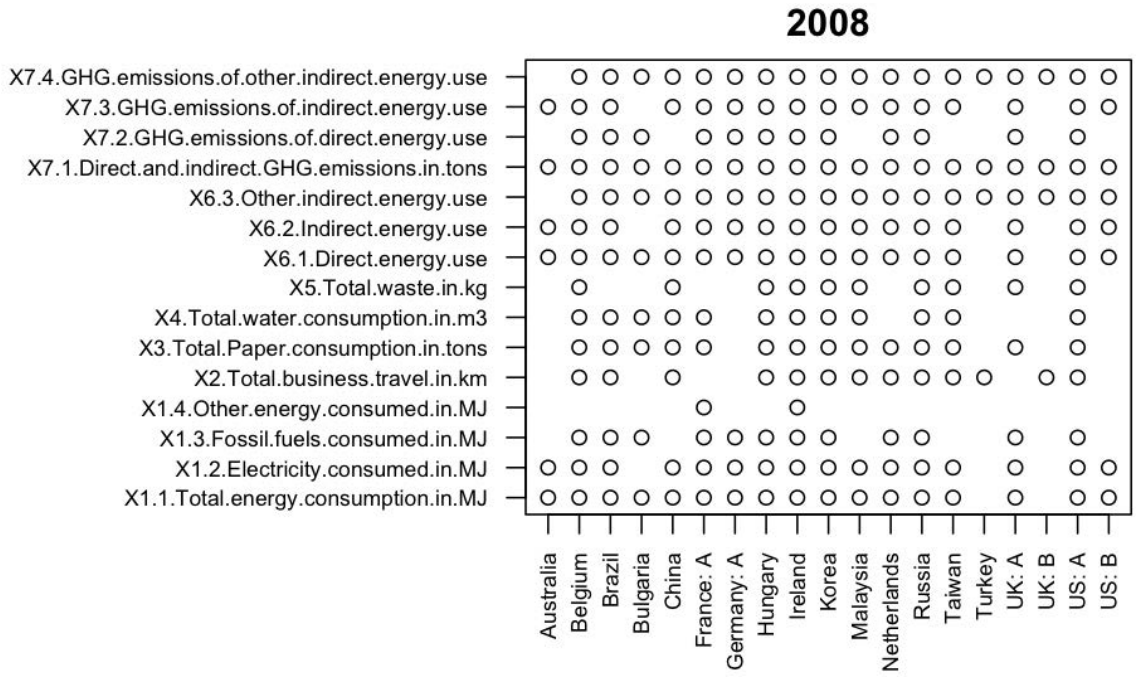
Let's play. Let's follow Haraway's (1994, 60) '[q]ueering what counts as nature'. Let's produce just a tiny difference. I produce this difference by reconfiguring environmental balance sheets. Several times above, we encountered the notion of GCE agents and HQ members interacting resulting in changes within ESDR task-forms☞. Qualculations could undergo changes. Categories could be altered, task-forms deleted, added. Numbers updated. The Western Asian case (Chapter 2) made explicit: the emission count of the Key Performance Indicator (KPI) Travel had changed shortly after my visit. Emissions had decreased.

Imagine an environmental balance sheet as a pattern. Focus on one column. The column which GFQ agents enacted as *the* significant layer of translations: relative emissions per employee. Now, I am taking these numbers at face values. This means: I am not engaging with the formulas by which one could derive the values shown in the environmental balance sheet. I focus on the quantitative values *shown*. These are the numbers which represent a particular GCE's relative carbon emissions. And then, I check whether I find another environmental balance sheet. But not an arbitrary one. I search for an environmental balance sheet which either contains newer or older data than the data inscribed into the environmental balance sheet under consideration – both of the same GCE. And both dated after the deadline at which the GCE had to finalise data input in ESDR. So, I have two environmental balance sheets. With different dates. Versions. The newer one is the result of a GCE's internal or GFQ's data controlling processes.

I compare the pattern. That is, I compare the values in this specific column of the GCE's environmental balance sheet with those values of another environmental balance sheets of the same GCE. I compare them using the help of a little script. A huge script. Well, 38 lines of an R script.[58] R is an open source software used to analyse all kinds of structured data (R Development Core Team 2010). The script calculates both the maximum and the minimum value for an indicator of all available environmental balance sheets assigned to a GCE. It subtracts the minimum value from the maximum value. And if the result is *not* equal zero, i. e. if these values differ, the script produces a circle in a graph at a specific coordinate. The graph's coordinate system has two axes. One depicts environmental indicators, the other one GCEs. The resulting Figure II.1 on the next page, thus, shows whether several coexisting carbon accounts representing the same unit (a GCE's emissions or consumption values for a specific indicator of the reporting period☞ 2008) contain the same information (no circle) or diverging information (a circle). Thus, in this translation, I transform the comparison of numbers 'back' into qualitative information. This is a qualitative graph. The quality refers to this binary distinction: is the difference calculated as zero or not.

[58] Niklas Hartmann was of great help to transform my draft algorithm into a workable R script.

Figure II.1: Diverging Carbon Accounts: the horizontal axis depicts different subsidiaries; the vertical axis depicts emission source indicators. A present circle represents that for this indicator of this subsidiary different files reported competing values for the same reporting period (here: 2008).

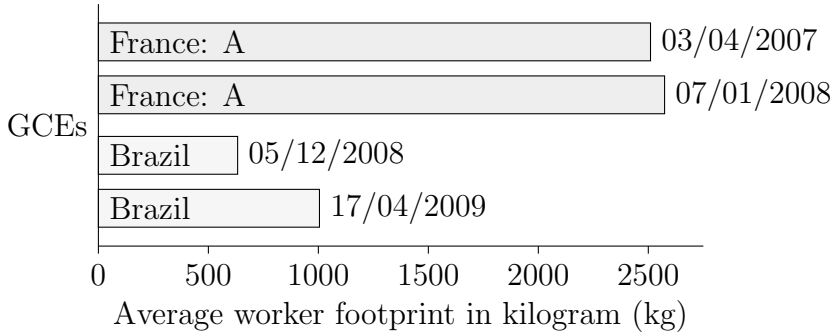


Circles result. They are produced by the script, sensitive to the smallest differences. I read this figure in this way: anomalies are normal. The concept of normality here is a qualitative concept. I am not interested within this book in calculating degrees or ratios. Much rather, I am excited about recognising this: it is not an exceptional outcome of members' practices that several versions of environmental balance sheets are enacted which (re)present diverging accounts of carbon emissions. Thus, the general quality of emissions' counts is that they are unclear.

Emissions can fall and rise. This means that the amount of 'emitted' emissions can differ. Take as an example two reports showing the emissions assigned to the consumption activities of a 2008 employee. GFQ's employee footprint *of 2008* decreased from the 2009 report to the 2010 report by nearly 8 %. Falling emissions may be quite intuitive for a reader sceptical of GFQ's conduct. However, increasing emissions can be very useful as well. Especially if they concern the baseline year, 2006. Figure II.2 on the following page shows an increase in employee footprints in 2006 between environmental balance sheets. The figure shows emissions qualculated in the sheets of two GCEs, the French and the Brazilian. In both cases emissions increased: by nearly 3 % (France) and close to 59 % (Brazil). Such increases in the emission reality could result from socio-material practices over a couple of days. To illustrate: the Brazilian emission count change was requested by a successor of the head of the GCE's Environmental

Without him, these qualculations' position in reality might have been much more unstable.

Figure II.2: 2006 Emissions of Subsidiaries in France and Brazil: names of GCEs in bars; date of balance sheet right of bar



Management System (EMS). The new environmental agent appealed to have the data (which had been 'delivered' before by the prior agent) corrected; and Victoria asked Elise and Frederik in an email 'to take the new numbers' for two reasons: to her, the numbers 'seem[ed] to be more "realistic"' and 'a better reduction potential can be achieved as well'. A couple of days later, a new environmental balance sheet had materialised.

For Victoria providing reasons in the email of why changes seemed adequate to her, readers might suspect forgery. I, however, I do not interpret these changes as such. If we engage with these numbers, we also recognise the difference between the average employee footprints reported by the Brazilian and the French GCE. According to these numbers average emissions in different GCEs could show large discrepancies. To be able to question any of these numbers substantially, one would have to have a quite realist understanding of these numbers. It is this understanding which we challenge: how do these numbers make sense – we may start to ask ourselves. What have they been about? I turn to these questions in the following chapter by investigating what members' practices were about, what the stakes in their workplace have been. Discussing this helps to understand the ontology of these numbers.

CHAPTER 4

Situated Control Over Carbon

In Chapter 2 we learned how members at a subsidiary translated invoice and financial accounting data into environmental data. In the course of that, they have been guided by HQ actors. This had raised the question of how the latter actors conceptualised the Environmental Management System (EMS) and how their rationalities related to societal discourses of the environment, sustainable development, corporate greening and climate change. The preceding chapter investigated members' categories and the discourses they gave rise to and showed how actual practices exhibited quite a bit of friction between discourse and situated actions of environmental management and carbon accounting. This resulted in asking how the EMS-Team's work settings were stabilised.

To address this, in this chapter we explore five configurations of such settings involving humans, non-humans, formal plans and problems caused by mis-aligned actants. All these settings involved conflictual and frictional as well as harmonised phenomena. However, in their ways all five sets of actants contributed to the construction and enactment of carbon emissions. And we find that these settings were structured by actants *striving to control carbon data*: GFQ and the EMS-Team staged themselves as in control over the corporation's emissions ranging from the level of actors' organisational charts to the technical level of database design. In GFQ's presentations, carbon is clearly governed, under control. In contrast to this staged command, the prior chapter indicated: for wider society GFQ's carbon is out of control. Yet, readers will intervene in my argument and, rightfully, point to specific promises suggested in hegemonic discourse.

***Transparent* communication:** is it not the case that ranking organisations do research of firms, i. e. investment objects? Theories suggest that this increases the transparency in communication, allowing market actors to be well informed and, therefore, accumulate resources pareto-optimally?

***Standardised* environmental accounting:** is it not the case that GFQ's practices are governed by auditors and standards? Surely they are forceful actants effecting some kind of control.

***Improving* carbon governance:** and *if*, after all, data enactment does not work perfectly, GFQ would, of course, have some organisational change and repair the problems identified.

To develop responses to such objections, this chapter employs five sections, addressing these hopes. I follow a) how GFQ identified problems and b) how a ranking agency, c) an NGO, an auditor in combination with standards, d) GFQ's own improvement process tried to overcome (if they tried to at all) the problems they encountered while attempting to control carbon data – always e) in specific meetings between humans and data. As an introduction to this theme of control, meet Dieter when summarising the status of the EMS for a visiting sustainability management researcher, Matt Gustavson. Dieter explained:

☞ discussion at Section 4.3

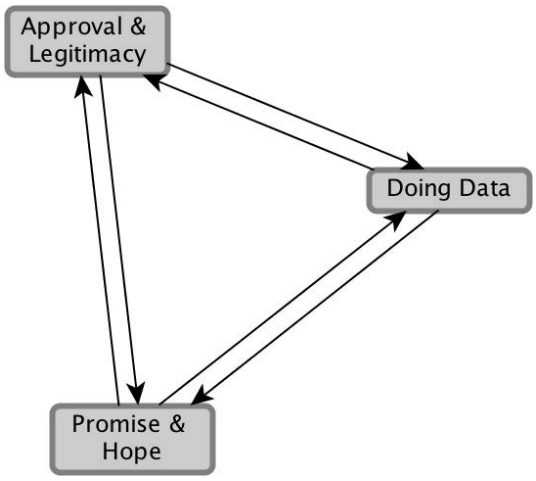
Field Note Extract 4.a (Thread established by NGO)

We are currently positioned in a phase of change – as the total EMS is shifted about. [...] By that we plan to improve 'data quality'☞. We do so to prevent that NGOs would beat us round the head. We are having a partnership with GGCA.

In this statement Dieter linked the trajectory of the EMS with the quality of data collected from subsidiaries. And he associated a hope of improving their data construction with seemingly externally positioned actors. Thus, the EMS, as it has been portrayed above, was to be reconfigured. The version of control implicit in this statement was one in which GFQ's partnership with the NGO was an actual threat. And to defend GFQ against that threat, data quality had to be improved. The organisational approach to ensure such improvement was to transform the EMS. In this statement, thus, Dieter construed the NGO as being in control by way of enacting the threat of sanctioning the corporation. At stake was whether GFQ would be sanctioned. It also paints a gross picture, catching the spirit of the imagined reader's hopes: GFQ recognised that they have a problem with their enactment of carbon data, especially some-thing called quality. And an NGO appeared as an instance of external control, having somehow evaluated GFQ's data in terms of their own *standards*.

The imaginary of control figures prominently – not only in this description of the status of the EMS but among all the activities of doing carbon together. Longing for control and staging carbon as under control was always present, but never fully achieved. For this, the imaginary of a controllable carbon accounting apparatus might be well read as an *incomplete utopian project* (Gregory 2000, Section III.A). That is, a project which is about a dream or hope, a promise, which one cannot operationalise and materialise completely. Another way of making sense of control over carbon is to consider it as a 'staged myth'. With that I refer to the narrative's performed character which requires props to support the performance. It is not a mere rational myth for it is, e. g. through environmental balance sheets☞, also materialised (Bloomfield and Hayes 2009; Boiral 2007). However, if we do want to see it as an utopia, it would be a

Figure 4.1: Stake and capital relations around the enactment of control over carbon



bourgeois utopia, rather than a grounded one (Demirović 2005).[1] For if, as Gregory does, one sees any utopia as never realisable, a significant source of power for societal transformation is lost. Just yet, I am not ready to give up utopias. Rather, I hope to contribute to informing exercises of grounding utopias and putting them into practice.

The subsequent analysis argues that not only in Dieter's statement but constitutive for the EMS-Team and actants positioned formally outside of GFQ three kinds of stakes co-existed; and reaching each of them was required as a decisive resource to reach one of the other stakes. In other words, rather than identifying a clear hierarchy imagined as a proper technique of governance, in the field I encountered a reciprocal web of relations, indicated in Figure 4.1. I propose that there was neither anything like complete control, nor could there be. In orientation to the audiences of the data they produced, the main stake was the approval and legitimacy granted by seemingly independent quality assuring organisations. Internally, at stake was to do data well. And between the imagined inside and outside, members struggled for the stake of enacting the hope and promise that the EMS transformation would work. My analysis suggests, however at the same time, for members to improve their chances to enact approval, they needed to invest their skills and technologies of data enactment. Folded into data enactment was also the approved doing of data enactment. That is to say, to enact data, members had to invest statements signalling that their practices and technologies were approved of or legitimised. Thus, not only did members struggle for approval and doing data as stakes – these stakes were simultaneously employed as resources which members could invest to reach the respective other stake. Resources became capital. The same holds for the remaining relations between the stakes: to enact data members needed to

[1] Critical theorists differentiate these two kinds of utopias: bourgeois ones are not based upon a material analysis of the relations in society (an example would be the Land of Cockaigne); the notion of grounded utopia refers to utopias based upon such analyses, traced back to Bloch (1923) (see e. g. Bourdieu 1998c; an example may be social centres run by e. g. feminists and anarchists all over the world (Lacey 2005; Pickerill and Chatterton 2006; Vanelslander 2007; Cattaneo and Gavaldà 2010)).

invest hope and promise; and to enact hope and promise, members needed to invest doing carbon data. Seeking approval of GFQ's carbon emissions required members to invest enactments of hope and promise and enacting the promises and hopes of the transformation project required members to invest the enactment of approval and legitimacy. Overall, then, we can conceptualise actual control practices over carbon as structured by these reciprocal and circular relationships. Because of this quality, no single capital trumped the others. There could be no complete control of carbon. But there was lots going on.

The conceptual frame for the analysis in this chapter Before delving into the endeavours to control carbon, a preparatory note, well four pages, on the conceptual 'skeleton' which I develop over the course of this chapter seems appropriate. (And a caveat: although I employ different kinds of 'literatures' for this analysis,[2] I do not claim to resolve all tensions between them.) The power to direct actants, i. e. *control*, is not something given but is the effect of a situation in which a collective enacts the more or less centralised distribution of control. A *situation* is structured, *inter alia*, by the presence of materials and speech acts or performances. *Structure* of a situation means that in some way, certain resources to shape the outcome of the situation are more decisive than others and that these decisive resources can be accumulated and distributed in specific configurations. I denote these decisive resources *capital*. If situations' structures are alike and that similarity can be materially traced then we can presume structural continuities between the situations. Seen together, therefore, I construe such situations as mappable onto an n-dimensional space or *field* to imagine the representation of differently positioned actants with different accesses to capitals.

I regard actor-network theory (ANT) notions such as network, region, fluid or fire very useful to point to the extent and the topology of how actants engage in relation to each other (see e. g. Mol and Law 1994; Blok 2010). To conceptually construe boundaries around members who engage with the same tool, the notion of community of practice may be used. Bowker and Star (2000, 294-295) suggest to understand people who engage in relation to each other and, for example, produce a common artefact – such as carbon emissions – as a community. The structure of their community is seen as constituted through their practices, routines, exceptions and their material stuff. To enter a community of practice, one has to learn how to engage with the community's infrastructure or objects (Star 1999). GFQ's distributed carbon data devices constituted such an infrastructure. Hence, I understand the EMS-Team as a community of practice.[3] While the PR agency that helped to produce GFQ's Sustainable Development Report was also handling carbon data, it did so using quite different devices. Nevertheless, agency's staff had to rely on data submitted to them, just like within GFQ members

[2]For a generative discussion of what it may mean to relate to literature, cf. Mol (2002).

[3]People can be members of various overlapping communities of practice. I am here mostly concerned with that community which organised itself around devices like ESDR or GFQ's environmental balance sheets.

trusted each other. We can grasp agency staff as part of a different community of practice. Nevertheless, if we were to describe their position in terms of their enactment of carbon data, we could do so. Thus, we could construe both, EMS-Team members alike the agency's staff, on a continuous map of carbon enactment space. While we can identify in literature several dozens of classes of space, their boundaries may not be fixed (Turnbull 2002, 135). Rather than construing my analysis in terms of some selected classes of space, it seems more promising to conceive the data workplace in terms of a space on its own – the field of the enactment of carbon.

Of course, such a mapping exercise would only partially capture actants' positions. Many other dimensions exist. I contend, however, that when studying data enactment and control over carbon, three types of dimensions figure prominently: the distribution of data *enactment* technologies, the distribution of possibilities to enact carbon as *legitimate and approved* as well as the distribution of the enactment of *promises and hope*. Thus, in the analysis of this chapter, members were not so much struggling in terms of, say, monetary profits, gender or even GFQ's dedicated systems to manage symbolic recognition.[4] Positions in the field of carbon enactment, therefore, can be conceptualised in these three dimensions. Spatial metaphors are widely accepted in Science and Technology Studies (STS). For example, scholars refer to *positions* of agents[5] which raises the question of how positions are conceptualised and measured. If one talks of positions, a kind of map has to be assumed as producible. But it also raises the question of how a position can be altered and on how taking positions may effect others' positioning. Positions evoke the relational character of the notion of field. For Bourdieu and Wacquant (1992, 228)

> [...] the notion of field functions as a conceptual shorthand of a mode of construction of the object which will command, or orient, all the practical choices of research. It functions as a *pense-bête*, a memory-jogger: it tells me that I must, at every stage, make sure that the object I have given myself is not enmashed in a network of relations that assign its most distinctive properties. The notion of field reminds us of the first precept of method, that which requires us to resist by all means available our primary inclination to think the social world in a substantially matter. To speak like Cassirer (1923) in *Substance and Function*:

[4]Two notes are needed. (1) I point to the shadows of such struggles at the backstage of carbon performances in Interlude III. Associated with such struggles have been several other groups of *implicated actants*. This refers to humans or nonhumans who were either not physically present but have power or are not physically present and do not have much power (Clarke and Star 2008, 119) in respect to carbon enactment. Classically, this includes cleaners or other infrastructure maintainers. (2) A secondary, graphically supported, analysis which I have undertaken to identify the dimensions to map can be found in Appendix B.4. The primary analysis is established by this chapter. There is no way to represent all relations and actants on a single map. If we were to map all fields at once, they would at the least appear, say, bent, folded, skewed, knoted (I am inspired by Mol's (2002, 144-146) account of bags). However, in more or less isolation from each other, some patterns within an oligo-dimensional field may be brought into presence, enacted by the author.

[5]See e. g. Haraway (1991b, 8, 10), Haraway (1992, 300) on the cyborg subject position or in the ANT corpus Latour (1987, 173), Latour (1988, 307) suggesting that fitting in positions may be a performance or Latour (2009, 110) on performing positions materially in and on inscription devices.

> One must *think relationally*.

In this quote, they emphasise that the researcher has to investigate whether and in how far an object's characteristics are in fact effects of webs of relations, rather than intrinsic to the object.[6] Where Bourdieu departs from ANT is which relations are emphasised. While ANT stresses the need to follow the actor to understand a larger web of relations, Bourdieu stresses that a field has to be understood in terms of distribution of capitals.[7] Following Mol (2002, 181), an analyst tries to discern patterns. For her, the size of a field does not matter. However, that there is a field in which patterns exist is important. Bourdieu (1985, 188) proposes that patterns are constructed by the scientist 'on paper'. Foremost, then, patterns have the status of theories. Bourdieu and Wacquant (1992, 97-98) suggest to conceptualise fields with respect to the resource which allows actors to gain most. This is where Bourdieu's concept *capital* is meaningful. Resources are capital if they allow members to alter the field's situation in which they act. The *distribution* of capital is seen by him as part of (or representing partially) the objective structure of a field. If members recognise the types and distribution of capitals, this may allow them to emancipate from struggling for it. If they stop using the capitals to work towards realising the game's end, then they will not reach what is at stake. I mobilise this account of capital as something you can change in magnitude (e. g. collect, increase) and transform (e. g. change its currency, its shape) or invest to get something else (e. g. invest data in a report in order to get approval). However, rather than imagining capitals as more or less substantialised entities, I conceptualise what counts as capital as performed. Not only is the distribution of capitals contested but also their meanings. Members may struggle over how a field is defined, which forms of capital trump another (ibid., 99). Thus, an entity may count in one field as capital, in another not. And members can be construed as positioned in many different fields, being equipped with diverse forms of capital. This concept of capital, thus, differs from Latour's (1987, 223). He considers using the notion to refer to that which is accumulated at a centre and instantly reinvested. To me, the notion of capital is useful precisely because whether it is performed as capital or not depends on members' struggles and on an infrastructure

[6] My reading has also been informed by reading Bourdieu and Wacquant (2006, 262).

[7] For this chapter I mobilise specific concepts oriented at how Bourdieu and Wacquant (1992) use them. I recognise that these different ways of seeing are often antagonistic if not antithetical, and this book is not intended to reconcile them. Foremost I acknowledge Latour's (2005) enrolment of Bourdieu as, if I may so, his personal antihero: Latour performs an essentially deterministic, structuralist reading of Bourdieu. Correspondingly, Bourdieu has been criticised intensively in STS (Mialet 2003). However, despite these grand anti-Bourdieu statements, Latour (2005, 95) also recognises that for Bourdieu no (social) scientist can realise the god-trick of seeing everything. Bourdieu is also used by other STS scholars as a general inspiration towards practice theory (such as Waterton 2003, 126), and shares the assumption that e. g. science is socially enacted and shaped (Burri 2008a, 571). Skogen, Mauz, and Krange (2008, 28) draw on Bourdieu to emphasise that 'the acceptance of dominant worldviews is not complete' – there is room for change, after all. Sterne (2003, 2006) proposes a reading of Bourdieu which allows to attend to material artefacts (see also Prior (2008), Lippert (2010a)). Turnbull and Antalffy (2009) even propose, against Latour (2005), that sociology of science should follow Bourdieu to study how the social configures reality, rather than attending to too philosophical questions. I would not go so far because, as this book shows, studying situated action of carbon accounting raises philosophical issues of the ontology of carbon.

which allows to manage capital (e. g. a financial services provider, like GFQ). This implies at the same time, that different kinds of accumulation techniques exist for different kinds of capital (Burri 2008a, 557).

This conception of fields in relation to the enactment and distribution of capitals also allows us to theorise what happens at a position. If an actant occupies a certain position, they are able to access certain volumes and kinds of capitals and employ them for reaching the stake of the field. This does not need to be intentional. Disposed over time to constrained possibilities to generate performances, actants will develop a set of materialised dispositions, inscribed into the actant (Butler 1993). Bourdieu (1988, 782-784) calls this set of generative dispositions *habitus*. From Latour (2005, 169) we hear praise for this concept. It allows to overcame micro/macro debates. While early ANT has been criticised for its executive or managerial vision of actants, precisely targeting grand aims (Moser and Law 2006, 56), habitus tries to capture that agents do not necessarily intentionally struggle for things, but as a result of their dispositions (Burri 2008a, 562). In a situation, members act very much practically, exercising 'practical reason' (Bourdieu 1998b), totally distinct from the rational actor paradigm (Jaeger, Renn, Rosa, and Webler 2001; Bourdieu and Wacquant 1992, 119-121).

Structure of the analysis pursued in this chapter Employing and illustrating this conceptual frame, this chapter attends to five sets of practices which were fundamentally concerned with control over carbon emissions or data.[8] In Section 4.1 (entitled *Performing Qualities of Data*) I engage with varieties of data qualities members explicitly or implicitly attended to. This analysis shows that albeit governing data quality was considered highly important for members, in situated actions of doing or managing data, control could not be guaranteed. Section 4.2 (entitled *Failing the Market*) scrutinises situations along the way by which GFQ informed markets about the corporation's emissions. This analysis extends the analysis of the data enactment field to a ranking organisation. We find that, insofar any market action is drawing on information provided by the ranking organisation, the market cannot control GFQ's emissions. Section 4.3 (entitled *Aligning Legitimacy with Carbon*) investigates the situations within which three organisational (p)layers were to ensure civil society, quality as well as regulatory control over the EMS-Team's practices. As it turns out, rather than strict control *over*, lending legitimacy *to* carbon is effected. In Section 4.4 (entitled *Transforming the EMS*) I focus on the centre of GFQ's activity to improve upon its carbon data enactment. I reconstruct the situations in which the EMS's transformation has been pursued as optimising the prospect of carbon data to be performable as approved and legitimised,

[8] For this analysis I employed Bourdieusian notions (field, stake, resources, capital, nomos). For lack of space, I do not present here the complete Bourdieusian account, but provide its result to argue for a less hierarchical understanding of the field of carbon enactment. This result has been produced based upon a more detailed treatment of Bourdieu's work (see especially Lippert (2010a, Part II) as well as Appendix B.1). Employing this engagement with Bourdieu, I analysed the stakes and resources present in the material inscribed in this chapter. The result revealed several kinds of capitals relevant around the practices of controlling data in the EMS-Team's workplace. I (re)constructed this chapter to engage primarily with the field of carbon data enactment. For the analysis, see Appendix B.4.

rather than as optimising GFQ's understanding of carbon and data enactment. Finally, Section 4.5 (entitled *Meeting Data*) shifts attention to meetings. It was in meetings that members worked out data. I find that enacting meetings meant realising temporally and socially limited orders of control. Thus, after all, control emerges as staged and sought for while the field of carbon enactment does not allow for any actant (or order of them) to actually steer the decisive actants they required to participate in the field.

Throughout, with respect to sociological theory, I argue that *participating* in the field of carbon enactment *had a performative character* and reflexively *constituted this field* as members went along. The field of carbon enactment is brought into presence by particular practices which shape what kind of carbon is emitted into social, political and economic reality. This field is and cannot be under control. Controlling carbon is always situated. And situations are structured by the actants' particular performances and the availability of resources for enacting any kind of configuration.

4.1 Performing Qualities of Data

Rationally managing environmental goods and bads presupposed, within the carbon accounting rationality, knowledge of the state of GFQ's emissions. As I have shown above, for gaining this knowledge, corporations have to create new information. At GFQ this new kind of information was to be based upon consumption data. However, this very data was not always of best *quality*. EMS-Team members employed this notion to refer to a constrained version of a data point's history. And this, as I argue in the following, limited understanding of history had been translated into an indicator which was to be of use for governing carbon. As a result, this indicator was seen as consequential – not only by Dieter but also by our boss, Victoria. I show, however, how the EMS-Team managed to move beyond concern for data quality. GFQ managed to reduce or even abolish its interest in the indicator. Formally this indicator was key, practically, it was to not bother. On the first day of my job she introduced me to the significance of data quality, establishing it by that as an issue which ran throughout my field work. She let me know that data quality was related to their NGO partner and an auditing firm.

☞ discussion at Section 4.3

Field Note Extract 4.1.a (Establishing data quality as an issue)

GGCA said they want a properly verifiable CO_2-reduction strategy. For that GFQ ordered AfC. This auditing firm was asked to verify data as well as the environmental management and accounting system. The result was that both, data basis and data quality were not good enough. The auditors had looked at several subsidiaries. The German ones worked well, others did not. She had anticipated this result.

Victoria drew on the weight of institutional links, i. e. the relations GFQ had with the environmental NGO GGCA and the auditing firm AfC,[9] to make comprehensible the

[9] I explore the role of these organisations below; see Section 4.3 (entitled *Aligning Legitimacy with Carbon*). For now, it suffices to note that both organisations were among the top players in their respective fields, i. e. one of the globally most significant environmental NGOs and one of the most relevant auditing firms.

status of control over data. At stake was the NGO partner's approval of GFQ's emission reduction strategy. To reach this stake, the corporation was to ensure that data basis, i. e. coverage☞,[10] and quality would improve. Data quality emerges in this chapter as a boundary object. The community of the EMS-Team attended to it in specific ways; and the auditor and NGO engaged with it through other practices. For the EMS-Team, data quality had turned into a decisive resource which would make a difference in their relations with the other two organisations. GFQ could invest in data quality in order to reach the stake. And by 'bettering' the quality, GFQ would increase its potential to reach the stake. This indicates we can imagine it as a form of capital.

This opens the questions of what data quality was and how it could be improved. If data quality was a formal indicator employed by GFQ and their partners, we need to make sense of the notion of quality in relation to other qualities of data shaped while enacting data. Answering these questions accompanies us throughout the chapter. In this section I show three sets of accumulation techniques through which qualities of data could be altered: having data, cultivating data and generating hope. Possessing the means to produce high quality data established these three sets of practices as capitals. Thus, I argue, by employing these capitals also the indicator data quality could be shaped, in volume or in kind. For this argument I have to show that different types of capital are convertible (Bourdieu 1990b, 119-132; 2000, 225).

Before we engage with these accumulation techniques, we need to revisit what data quality meant as an *indicator*, i. e., as an authority to represent reality partially (Busch 2011). Recall, in Chapter 2 we encountered data quality as a characteristic attributed to numbers and recorded in ESDR task-forms☞.[11] For the EMS-Team it was straightforward that if they asked for, say, the amount of water consumed in all subsidiaries, not all of them would be able to provide a result of the same quality. Some subsidiary agents would read off a number of the water meter and report this number, others would look at an invoice, still others would not find either of these possibilities but provide an estimation. Data could only be stored in the database if the user selected one of four data qualities associated with task-forms. This policy was inscribed into ESDR's code. Thus, to get the job done, the user had to reproduce the notion data quality. This signifier was structured as an ordinal scale, i. e. a scale in which different characteristics are ordered within one dimension while the distances between these characteristics are not known – like in a rank order. The ESDR based data collection system offered a differentiation of data quality into the classes 'unknown/not available', 'estimated', 'calculated' and 'measured'.[12] Thus, these terms were prescribed (and inscribed into the task-form) for the user to represent her knowledge relation to the consumption fact. The fact's history had to fit one of the four data quality classes. I have shown above that this classification in practice did not serve well to represent the relation of the user to the fact-in-the-making. This crude classification implied enormous overflows☞.

[10] For reasons of limited space, I restrict the discussion here to data quality.

[11] For an illustration, see Artefact 2.1.3 (on page 81), mark 'E'.

[12] See also Artefact 2.1.1 (on page 72)

In the following, I turn to the three sets of practices by which qualities of data could be altered and partially controlled, i. e. having and cultivating data as well as generating hope.

Having Data

There is nothing like raw data. However, from the point of view of EMS-Team members, subsidiary agents were to provide environmental consumption data, raw or 'pure', as it were. HQ based agents were not able to control globally the reading of meters and invoices, etc. The claim of having read or reviewed all these data sources within a given GCE could only, realistically, be made by subsidiary environmental managers.[13] The decisive resources, i. e. capitals, which these subsidiary agents drew on were the ability to read all these data sources, the formal position as subsidiary environmental managers and the corresponding rights (technical and social) to enter data into task-forms, by that very act constituting environmental data from the point of view of the EMS-Team. In task-forms subsidiary agents were to fill various fields – all of which potentially mattered. Ticking the check box labelled 'This Dataset is finished'[14] rendered environmental data into a specific kind of reportable data. ESDR was designed to carry out analyses of task-forms only if this checkmark had been checked. This checkmark was to be checked exclusively by these subsidiary agents. Albeit, technically, some EMS-Team members were able to edit any task-form, the agency had been formally assigned to the subsidiary agent. Frederik as well as GCE agents would, normally, not have accepted if anybody else than the officially assigned subsidiary agent edited a GCE's task.

Thus, the EMS-Team stipulated a norm, effecting a discourse. This norm held that subsidiary contacts 'own' and have at hand data. GCE agents were to provide it to the EMS-Team. This norm was part of this community's constitution. This means, the prescription was enacted as a foundation of their operations. With Bourdieu (2000, 96) I refer to such laws as *nomos*. This concept refers to members' principles of how things were to be seen and delimitated from each other. This principle of vision was not, however, technically inscribed into ESDR. Unfortunately so, in EMS-Team members' view. Thus, humans had to perform the nomos; otherwise it was not existing. Leaving this foundation, i. e. not performing appropriately, was perceived as a threat to members' common ground.[15]

Data ownership implied also responsibility for data. This, of course, was related to the relationship between data-as-representation and the signified emissions. Thus, also responsibility was divided. The EMS-Team was not accountable for GCE's consumption

[13] Theoretically, auditors would be able to do so, too. This, however, constitutes another story.

[14] See Artefact 2.1.3 (on page 81), mark 'D'

[15] To illustrate, I came across a situation in which ESDR was representing a task-form as owned by the German GCE agent Jack. He did not feel responsible for this particular task-form and posited that I had assigned him the task-form (wrongly). It took me about thirty minutes to settle the concern. As it had turned out, the task-form had been assigned to him as an effect of a non-expected performance of the database itself. Human action causing once this task-form's existence had long been forgotten.

facts. However, the team needed the data. An agent who possessed such data had a reason to exist and claim compensation for their work of performing data, i. e. translating heterogeneous sources into consumption facts. Therefore having and owning consumption data constituted a capital.

However, this nomos also caused concern. This is not to say that members were concerned about the nomos. Much rather, they were concerned with reality when it did not fit the assumption of their discourse. The fundamental assumption of their operation was that subsidiaries do have data available (which is an assumption also shared by academic environmental accounting and inventory discourse). Reality, however, did not always behave – suggesting to see the 'world as witty agent' (Haraway 1991c, 199). This wittiness was expected and known within and around the EMS-Team. Here we are in the middle of the period of data gathering, Frederik waited for a meeting to start. Meanwhile he chatted with Marion, a colleague who worked on sustainable development reporting and who was well aware of the actual situation of the quality of data gathered by the EMS-Team.

Field Note Extract 4.1.b (Poor data)

> *Frederik pointed out that they are currently laden with data of the newly participating GCEs. Marion asked: and the data is poor? Frederik responded and explained: well, some are good, some are less good. Unfortunately, currently the latter prevail. This is related to where people are placed: they are people from communications, controlling and even caretakers.*

In this brief exchange, Frederik, a bit hesitating but not resisting, shared what was common sense in his community: some data was poor. He did not say 'bad'. The notion 'less good' captured the euphemist message I noted. The understanding of good vs. poor data was capturing something different than what data quality signified. Some users might inscribe the best data quality ('measured') into a task but still report unrealistically high or low values or 'wrong' task-form categories. Thus, data had many qualities. And Frederik was worried about them. Interestingly, Frederik explained the poor quality in terms of the expertise he connoted with job positions. This suggests, from his point of view, subsidiary environmental managers whose actual prime responsibility (and education) was outside of environmental science, engineering, management were not, quite likely, gathering data well.

His explanation deserves more consideration. I propose this conceptualisation of his rationality: agents were occupying certain formal positions within the GFQ multiverse because they had certain skills. Thus, in general, a designation of a formal position would be an indicator for the set of dispositions of the position's occupant. The organisation could expect that the occupant would generate appropriate performances at this position. That is why they employed agents. However, as it were, some GCEs simply assigned some agents the formal position as the head of a subsidiary's EMS even though the human did not possess the required generative schemes which Frederik wanted them to have. The nomos was assuming that subsidiary agents were able to perform a set of practices, generating the desired data. Thus, for a smooth functioning

of the EMS the network needed agents to have specific habitus. This constitutes a decisive thread which is woven into this chapter.

Frederik's explanation also underlines the performativity of capital. Data was not simply present, but it needed to be enacted. Thus, even though in relation to the community's nomos subsidiary agents were positioned to own and have data, these agents might, in fact, not have had data and not even know how to generate data well. If having data was a capital which could be invested, it nevertheless needed devices and actants which were allowing the capital to exist, agents at GCEs leafing through folders of invoices, ESDR, environmental balance sheets. No capital can exist without maintenance and infrastructure. This analysis argues against Callon's (1998b) reading of Bourdieu. Callon argues that Bourdieu's notion of capital undermines relationalism:

> By disassociating agency and network, it widens the gap between agency and structure. The agent, simply because she mobilises a capital – of which the form and volume do of course depend on the form of the network and on her position therein – escapes, at least in part, from the network. Cast aside, freed from the network to which she is attached only by the resources it provides, the agents regains her autonomy. (11-12)

I suggest that to participate in a network an agent does not necessarily have to own capital. The very point of Bourdieu (1989) is that members may have more or less access to decisive resources. Being better positioned means that an agent has more access. However, having less or no access does not (normally, or, automatically) eliminate the agent from the network. Much rather, the agent may struggle for owning capital. In any way, only by not bothering anymore about the decisive capitals in a field, an agent leaves the field. In contrast, the more capital an agent has access to and *holds*, the more the agent has to invest (other resources) in maintaining or extending the significance, volume and shape of the capital. Elites need not only bank accounts, they require finance managers, specific software to organise their financial capital; capital needs to be reinvested to precent devaluation, it needs to be translated into exhibitions of the elite status. A heterogenous infrastructure is required for elites to perform being proper capitalists. Capital, and this was the case at GFQ for data, needed to be made significant; members had to generate, stabilise and translate data such that it was recognised as good data. Capital does not imply an 'opposition between the action and the resources of that action' as Callon (1998b, 12) would have it. Instead, capital, is enacted – it is both resource and action – a performance.

GFQ employed ESDR as a key device to store data. This device, however, was necessarily constrained. I found one such constraint in the relation between task-forms, organisational and physical reality. In the task-form a field labelled 'company structure' existed.[16] This field was simple to fill – so the design of ESDR assumed. Members were to select the name of their GCE site for which a dataset was to be created. For example, an agent responsible for the Belgian GCE would have to select 'GFQ /

[16] See Artefact 2.1.3 (on page 81), at the task-form's top, mark 'F'.

Belgium / Brussels Office' in that field and then enter below the raw data for this site. However, this in-built assumption of ESDR did not always hold. Sometimes several GCEs occupied the same office site; and there was no automatised path to split the data up within ESDR. This required action. On this, Frederik once told me:

Field Note Extract 4.1.c (Acknowledging misfit of realities)

☞ discussion at Section 4.3, Section 5.2, Section 6.2

> *AfC refers to him as 'out of control' because he translates data of organisations to buildings back and forth such that later the environmental balances also include half buildings. For example, in the house we are currently in, two GCEs are present. One cannot depict this with ESDR. Frederik, thus, has to solve this manually in MS Excel. The problem involved with this is that environmental managers only work in relation to buildings rather than to organisations: 'they only can capture data at the level of the building.' AfC acknowledges this problem – 'otherwise they would not have given us the' verification.*

This note is central to this book because it shows how in the practical work situation Frederik had to balance the presence of the auditing firm, notions of control with ESDR's capabilities, environmental balance sheets and his vision of what good data would mean. In his account, he managed to produce good data, i. e. data which would represent both GCEs. However, enacting this data caused conflict with the auditing firm. The latter deemed him 'out of control'. Thus, the quality of his data was contested. Nevertheless, the quality of his work sufficed the auditor's demands. They, ultimately, accepted his performance.

As shown above, it were subsidiary agents who were to enter data into ESDR and by that establish relations between a consumer (the GCE) and the consumption value, the unit and costs – and sometimes even a country-specific CO_2 factor. However, sometimes subsidiary agents could not get hold of appropriate data. One reason for this was that sometimes an invoice was covering the consumption caused by several GCEs within a single physical building. If this had been foreseen at all, ESDR had not been programmed to provide for this possibility. A breakdown of the machinery? No. Frederik was able to repair the machinery by editing environmental balance sheets manually. If we can conceptualise Frederik as effectively providing a practical solution then this implies that he was also able to generate data – data which should have been generated by subsidiary agents. Frederik, thus, was also enacting *raw* data. And this was not in line with the nomos. Nevertheless, he could employ his resources to enact the desired capital. He capitalised on his access to environmental balance sheets and his skills to edit these in order to construct the appropriate data for each of the building's occupying GCEs. Thus, enacting data depended on both, being able to access and use GFQ's inscription devices and being accepted as a performer of data.

We find that not only the GCEs but also Frederik had agency in having data. However, the agency to hold this kind of capital was materially constrained. The capital's infrastructure put limits to how data could be had. Thus, technology co-structures practice. The reality of the devices sticked around although Frederik would have preferred the GCEs to generate appropriate data on their own. Although the database

code was once intended to be helpful for GFQ's agents of ecological modernisation, in practice ESDR did not serve as required even though the device was encountering a willing and able reader and user, as Bourdieu (2000, 151) would postulate. The problem is that the technology was a sediment of prior action and now constrained (and enabled) users' room for manœvre.[17] Frederik was positioned to find a solution to the problem; and he was disposed to use the inscription devices to enact the GCEs' representations. His position was technologically co-configured.

We find that the capital to edit task-forms was existing in a multiple, in principle independent distributions. The capital of 'having' data has to be conceptualised in relation to at least four forms of capital requiring certain performances:

Sources agents needed access to some kind of source (including the possible source of a good guess);

Humans agents needed to possess certain skills to engage with technologies;

Technologies agents needed the network of ESDR and its surrounding Information Technology (IT) infrastructure to inscribe and maintain data;

Mandates agents could employ being formally mandated to perform data.

The first and the last type of capitals were less decisive than the two central types. Ideally, all these four types of capitals were configured such that good and legitimate data would be performed. However, the simultaneous availability of these capitals was precarious. The presence of the indicator data quality signifies precisely the awareness by members that the shape of the capital data depended on good sources and that these were not necessarily available. We found that some humans were deemed unfit for the job; technologies were not able to accommodate some realities. And agents were able to edit data even though they were not supposed to do. Mandates also mattered in another respect: sometimes the paper, phone and email based communication network among GFQ's distributed environmental managers was out of link with the representations of the mandates within the technologies. While some actors may have defined some worker as an GCE's EMS agent, ESDR's user list was not automatically including this mandate, thus not allowing agents to enter or edit data. In fact the complete status of being a GCE's environmental manager depended on being listed in multiple places (such as on EMS-Team's lists, within ESDR or on subsidiary's lists). Hence we can imagine having data as possible in multiple ways. This likens Mol's (2002) account of the enactment of lower limb atherosclerosis. She shows that a disease may exist in different versions in different sets of practices, each generating its own material reality. And so was data enacted in many different ways, depending on which agents were able to employ specific shapes and amounts of capitals when performing having data.

Finally, how having data was possible was in itself under reconsideration. The fact that GFQ struggled to increase this indicator underlines that data was a capital which needed to be purified. To the detriment of the EMS-Team, some providers of complex

[17]Relevant accounts on relating Bourdieu's thought to how technology may co-constitute the situation in which humans perform have been provided by Sterne (2003, 2006) and Prior (2008).

services (such as providing an office – inclusive of providing water, electricity, heating, air-conditioning) sent GCEs flat rate invoices rather than unique listings of the different aspects of consumption. Subsidiary agents were too often not able to repair this problem. The prescription that a GCE's consumptions had to be inscribed in separate task-forms produced monsters☞. In order to reduce the systemic production of problems in the constitution of data, GFQ had set out to transform their EMS.[18] Here we are at a meeting of the group preparing this change. Bill reflected upon how the transformation would influence the system of data gathering and how ESDR compared to the SAP system which was to be used in an envisaged future.

Field Note Extract 4.1.d (Data quality and lump sum contracts)

☞ discussion at Section 4.4, Section 5.4

> *Bill suggested: 'obviously, data quality will not improve neither.' Then, Victoria noted that some GCEs have lump sum contracts: invoices resulting from these do not split electricity, water and heating, but provide a total. She referred to Malaysia and the US. The FDSO staff opinionated that they, as well, could not sort out this problem. Bill asked: would it be possible that the supplier breaks down the data? Lisbeth Moore: the Anglo Americans won't. Victoria affirmingly shook her head.*

In this meeting members were discussing how to improve data collection. GCE's access to sources was of key relevance to that. And they recognised that invoices simply sometimes did not split up different types of consumption. This is a normal practice in many business cultures. And it contradicts the assumption that agents have data. A significant capital to really hold data was not in immediate control of GFQ's agents – neither locally nor globally. This discussion shows that the capital of having data representing GFQ's consumption was widely distributed, partially even beyond GFQ's control, and consisted of diverse actants which had to enact this capital.

Cultivating Data

A second set of capital practices can be understood as cultivation of data. GFQ processed the data provided by diverse actants (formally owned 'by' subsidiaries) in order to enact publicly reportable emissions. This processing did something to the data. At stake was control over the processes which transform data into carbon emissions. Again, this process was to be a high quality process. A first significant practice which was decisive in the shaping of GFQ's carbon emissions was the reviewing and checking of that data provided by some agent, by e. g. a GCE or HQ colleague.[19] The capital of being able to check was existing as a multiple. On the one hand it was distributed formally, and on the other hand in terms of actual work load. Thus, while Frederik was, *qua* bureaucratic position, assigned basically all of the existing capital of checking numerical environmental data, in another part of reality it was mostly Elise, but also others, like Dieter or I, who reviewed the flows of data 'from' GCEs – i. e. the data flows between actants at all kinds of positions, back and forth – and who compiled

[18] I discuss this issue in depth in Section 4.4 (entitled *Transforming the EMS*).

[19] See Section 3.2

numerous environmental balance sheets. Thus, I need to emphasise: the capital to be mandated was existing in multiple distributions, which did not necessarily coincide. The same holds for further nth order qualculations. Frederik and Victoria were officially responsible for and signed them; and in practice the whole EMS-Team was participating in enacting data. In the following, I illustrate the quality of these 'high quality' data work processes and control over them by analysing five modes of cultivating data.

Interpreting GFQ's CSR Unit required carbon emission data for a variety of reporting exercises. [20] Above, we came across the story of Frederik having his hands on environmental data and regulating access to it. One prospective client was Marion who worked on a response by GFQ to the questionnaire issued by CWC Ranking (cf. discussion in subsequent section). Frederik was hesitating to share the data with her because he was still missing some elementary ingredients for the proper enactment of emissions. He had not associated data with the desired quality at that moment. However, even though Frederik understood the status of data in that situation as mediocre he had to inform his colleagues and superiors about the status represented by the data. He had the agency to report data in various ways to other actors and to assign data a status, such as 'environmental balance sheet', 'mediocre' or 'not making sense', legitimised by his expert status. To generalise, for processing data first of all readers had to interpret it; the quality of data needed to be assessed before officially sharing it. Consequential classifications were attributing modalities to data, thus changing the quality.

Spreadsheeting Spreadsheets' existence was ubiquitous during my field work. Therefore, doing spreadsheets deserves further attention. We learned above that ESDR was the database which stored and digested environmental data. The interfaces onto the environmental data within ESDR, however, were not considered user-friendly. It seemed self-evident for members that a one-pager should suffice to view the environmental effects of a GCE. This was the a prime point of the data collection exercise: to provide easily digestible information about the carbon balance of a subsidiary – in an environmental balance sheet. To create this, Frederik had to transfer the data from the html-view of ESDR's presentation of the summed up environmental data to a spreadsheet. Here is this simple, but fundamental, practical engagement with data:

Field Note Extract 4.1.e (Speadsheeting)

Frederik opened a new MS Excel file, copied the data he got from ESDR and pasted it in the new file.

This is how environmental data was routinely translated from one medium to another: using the functions provided by the operating system (OS), MS Windows, to mark, copy and paste digital data. Note the precariousness: the agent had to mark the correct segments of an intranet html page, right click with the mouse and select copy (or

[20] The following discussion is relating to Field note extract 3.2.k (on page 163).

alternatively press the 'ctrl' key of a keyboard together with the 'c' key) and paste the data at the right position in a spreadsheet. If any step in that process went wrong, no or a wrong result could occur. Hence constant checking and review of data was needed. Precisely because Frederik was mastering spreadsheets he could also invest this capital into producing environmental balance sheets for those GCEs which had not been able to enact their data in interaction with ESDR. Thus, the skill to cultivate data could be invested; one form of capital could be transformed into another – into having data. Corresponding with Frederik's ability to master spreadsheets was his ability to design these forms. Thus, he had the possibility to generate the formatting devices. And he was mandated as the legitimate author of GFQ's environmental balance sheets. All this positioned him as a spreadsheeting actant. I am deliberately turning the noun into a verb because the spreadsheet does not simply exist but has to be made and remade and reconfirmed repeatedly, i. e. its is enacted. Drawing on Law (2004a, 42, 112), who put forward a sociology of and in *verbs*, I like to reiterate that a capital like a spreadsheet and a skill need to be exercised to have effects. It is through 'capitalisation' (Latour 1990, 59) that members bring about effects, difference. Those who control spreadsheeting control forms. Operating data in spreadsheets implied, however, also a contradiction: on the one hand it established *mechanical objectivity* (Porter 1995, 4), on the other hand working with spreadsheets required hands to operate a keyboard, eyes to view the screen, a brain to make sense of all this – a highly manual and precarious activity, full of flesh and body – criticised by AfC.

Plausibilising As part of checking data, members were partially investigating the plausibility of particular facts in much detail. Such routines can be understood as serving members to check the quality of the capital they would invest in their projects – such as reporting emissions. Once I visited Victoria to calculate the intensity of carbon emissions relative to GFQ's turnover. This value was to be used to report in the questionnaire set up by CWC Ranking. I had enacted a draft of GFQ's financial emissions intensity value. And then, this meeting commenced:

Field Note Extract 4.1.f (Calculating with the boss)

☞ discussion at Section 5.2 (shows artefact there)

She enquired how this compares to last year's value. I replied that I did not receive an answer. Subsequently, we set down at her desk. She looked for the old response (last year's response to CWC Ranking by GFQ) and I found that both, question and reply, were worded quite differently. Victoria then wanted to compare the prior year's value with the value which I had calculated. We transformed the value: Victoria by pen and paper, I used a calculator. First, she calculated how much grams 3.44 t constituted, then she converted the currency from USD into Euros. As the exchange rate we used the rate of today from a freely accessible internet exchange rate calculator. The result was 4.78 gram (g)/EUR. Then we recognised that the questionnaire asked last year for turnover. She asked me to contact her contact from CWC Ranking and provided me with their phone number. However, then we checked out Wikipedia, learning that 'turnover' is the British word for revenues.

I propose that our practice was oriented at establishing how plausible the number was which I had produced beforehand. For translating the number into a plausible fact we brought into play three techniques. First, we employed a redundant calculative operation (using two sets of calculative translation practices). Both calculations' results were to be *equal*. Otherwise an error would have been suspected. Second, Victoria checked the meaning of the qualifier using an authoritative source (a Wikipedia entry). The meanings of the qualifiers were to be *commensurable*.[22] Third, she compared the result of the calculation with a fact from the prior year which was to be *similar*. If she had identified non-similarity, the calculation and the fact was to be questioned.

Most important to such practice is the assumption that the conditions under which the information of the previous year had been valid were still capturing reality adequately enough. Thus, the context of the data is assumed to not have changed much. Only under this condition does it make sense for members to use data from the previous year on assumably the same issue as a reference point.

The production of plausible facts can be deemed significant for running a high quality data enactment system. We find, at least superficially this particular fact was very much under our control. The key to making sense of this situation was to identify the norm that a fact ought to be *alike* another fact which was drawn in as a reference fact. This constituted part of the nomos enacted in the field: non-similarity, in other words, *difference*, was not desirable. Of course, this is a question of degrees (how similar is something to some other thing?) – an issue we follow up in the subsequent chapter.[23]

In this particular qualculation, Victoria drew onto the qualculative plane a limited number of items which she used to control the fact-to-be. In that sense, control over the fact was constrained by the available practices which she was able to invest. And that plane can also be understood as producing an image against which she could operate fact-making. This means that in her operation she could trace the image in the new fact. Note, we are far from any standard notion of reality. Much rather we are in the midst of ontic practices. This likens Mol's (2002, 93) account of treating an object in the hospital: treating atherosclerosis treats an object. That may, or may not, be similar to an object diagnosed before, i. e. a version of atherosclerosis diagnosed in a different situation but of the same patient. Physicians make links between body and image of body. For instance, they use angiographic pictures as maps to decide where and how to operate and cut. Victoria used three techniques to judge the quality of our fact-making operation. In this operation, enacting coherent and similar data is capitalised on to produce cultivated data. The nomos does not invite attention to difference. I propose: this risks losing quality.

Anticipating Publics' Perceptions A fourth mode of cultivating data was to draw imagined audiences, that is, their expected perceptions onto the qualculatory plane.

[22] See Section 2.2 on the role of qualifiers in qualculations and the idea of commensurability.

[23] Field note extract 4.1.f (on page 247) is analysed at one further location in this book (Section 5.2). There, I turn to the differences ignored in Victoria's and mine interaction.

By doing this, the quality of a fact could be adjusted to the aim of shaping the fact's perception by audiences. One consequential instance of qualculating with such an imagined perception took place around the determination of GFQ's average data quality. CWC Ranking asked for a comment on the quality of data and GFQ's uncertainties in data collection. In response, I was to calculate the average data quality value of GFQ based on GCEs' reported data qualities. To do so, I carried out the approach of calculating the data quality of an environmental indicator as laid out in the standard VfU.[24] The standard prescribed to calculate GFQ's data quality by constructing an average of the data qualities inscribed in the environmental balance sheets. The resulting figure was 1.74. I got back to Frederik with this number because he was responsible for any numbers on environmental data within the EMS-Team. While talking on the phone he drew upon the complete regiment of sheets which were part of the environmental balance sheet file.[25]

Field Note Extract 4.1.g (Contesting data qualities)

☞ discussion at Section 4.2, Section 4.5

> *It was ok for him that I tried to calculate the data quality. However, he criticised how I calculated it. He pointed out that all extrapolated numbers are assigned a data quality of 1. This is shown in sheet 'C' (of the environmental balance sheet file). Only on sheet 'B' one can find the actually captured data quality. He opinionated that the number I calculated/constructed should indicate the captured data quality rather than the extrapolation. Frederik said: 1.74 – the number does not actually look good. With it we appear worse than we actually are. Compared to others we perform much better. We do not want this touch. And also: the actually captured numbers are positioned near 2. Thus, with a low number we are imaged as being amateurish, which 'we are not at all'. He suggested to calculate it this way: use the average of data quality of sheet 'B'. This is 2.09. However, he added, we do not publish sheet 'B', but sheet 'D'. Then, we should calculate it in 'D'. There the average data quality is 1.73. He, then, suggested: we should round the figure. And he proposed this formulation: 'rough about 2', arguing: then it also does not matter how we arrive at the number. Anyway, obviously we can report this number, but we do not need to.*

In this brief discussion Frederik was effectively performing the quality of the fact-to-be in several respects. First, he accepted, albeit unwillingly, that we were to produce an average data quality. And so we did.[26] Second, he sticked to legitimate material inscription devices, rather than simply making up some numbers. Third, he organised the fact-making in relation to publics. On the one hand he considered whether the

[24] GFQ based their environmental reporting on VfU. I discuss GFQ's relation to standards in detail in Section 4.3 (entitled *Standards and their Agents*).

[25] For a complete overview of the sheets in the file see the contextualisation of Artefact 3.3.5 (on page 176) in Section 3.3 (entitled *Boundary Emissions*).

[26] Interestingly, neither of us questioned the very idea of constructing the mean. If we did, we might have recognised that ordinal scales – by mathematical definition – do not allow for calculating their means with the intention of producing an *absolute* result which can be read with respect to the data quality scale. Rather, one might calculate the median. Or, the result is only to be interpreted *relative* to, say, the average data quality of the prior reporting period☞. In practice, as we see, these considerations from the realm of the ideas of mathematics do not determinate calculative *practice*.

number would be perceived in the way he wanted and tried to adjust the number to be more likely of inducing the desired publics' perceptions. On the other hand, he considered that the fact's elements needed to be available in a document which GFQ would provide publics with.

Thus, the quality of the fact was selected such that it satisfies all of his requirements. This means he performed a compromise between the different norms: we were to provide a statement which would allow to represent the results of a variety of calculations. Producing this compromise allowed us to continue our work without attending to the underlying qualitative question: 'should corporate average data quality represent the quality of data *captured* or the quality of data *published*?' In this situation I did not contest his statements vehemently. One reason for this was that I considered it not acceptable within the nomos of the field to question either – that facts' qualities were to be designed in relation to audiences or his particular representation of audiences' perceptions. In retrospective we can question these issues. Especially the latter assumption, i. e. that he possessed adequate knowledge of publics' future readings of the numbers we produced, appears uncertain. Frederik managed to take action based upon his anticipation of publics' perceptions; but he had only limited control over whether forestalling publics' critical readings of GFQ's environmental data would work out.

Dividing Responsibilities Finally, it mattered who was taking which responsibilities for data. Early on during my field work I had the perception that Victoria was the *de facto* superior of Frederik. I had to learn otherwise. Following up the prior discussion with Frederik on the construction of GFQ's average data quality, on the subsequent day I aimed to reopen the case. When I reported the number to Victoria

Field Note Extract 4.1.h (Affirming average data quality)

I pointed out that Frederik and me tried different paths of calculation. She did not respond to this; however, she suggested: 2 means 'calculated', doesn't it?

Thus, Victoria affirmed the result and did not open this freshly black-boxed product. By that, the number has been successfully established. '2' seemed to be fine with her. The analysis of this material helped me to differentiate my understanding of the relation between Victoria and Frederik. During my field work I tried to keep the issue 'average data quality' open, i. e. prevent a closure. I failed. The reason, I propose, is reflected in a pattern I observed. Rather than Victoria acting as the superior of Frederik I started to recognise that Victoria was partially ensuring to not intervene in Frederik's performance. Whilst Victoria was responsible for GFQ's performance of sustainable development (a largely political and strategic stage), Frederik was performing numbers. When I tried to intervene in the situation presented above, I did not think at that point of differentiating the practical distribution of responsibilities in these terms. The analysis presented above, however, showed this distribution of responsibilities: in principle, Victoria treated numbers presented to her by Frederik as closed – she would not open up such black-boxes. Thus, my understanding of the relationship as purely hierarchical

was changed to one of the division of labour and responsibilities.[27] Controlling the quality of facts, therefore, was constrained by the division of labour among humans. Victoria did not want to control Frederik's numbers; especially not if the number seemed acceptable to her. In this case, the quality of GFQ's average data quality was mostly under the control of Frederik and less so of Victoria. Victoria was enacting an automatic affirmation point. This assigned responsibility over the fact's quality to Frederik. Being responsible was as much a resource as not being responsible. The capital of (not) being mandated with particular responsibilities had to be performed and invested to have effects. Cultivating data implied doing responsibility.

To sum up, many different practices were part of shaping data. These were no unintentional practices. But, rather, they imprinted data with the EMS-Team's nomos. However, in the formatting of data, the history of cultivating data was mostly deleted from explicit visibility. A variety of members was involved in cultivating data. The capital to perform data was distributed and existing in different versions. Therefore, I conclude, the actions taken as part of cultivating data had highly open outcomes. The intended outcome of these practices, carbon emissions, was precarious, depending on many practices to be timed and carried out *precisely*. And, yet, if their enactment were not that precise, carbon data would still emerge – *another quality* of carbon emissions. In any situation, control was differently possible and brought into presence. Thus, in cultivating data, control over quality was not *given*. Instead, doing data meant enacting a situationally constrained version of control that I call *doing situated control*.

Generating Hope

As already indicated, GFQ was preparing a change of the way the EMS was run. Indeed, this was not about a minor change but a complete transformation of the way the EMS collected and processed its data, targeted at improving data quality. Complete? No. Not at all. In the following, I argue that discussing qualities of data was coinciding with generating hope. I show that generating the hope of GFQ, eventually, being equipped with *better* data was instrumental for the transformation project.

Members of the EMS-Team used quite some time and resources to imagine how data collection could be organised without running into problems, such as that often GCE agents did not have direct access to data sources and that data was delivered to the EMS-Team using spreadsheets rather than ESDR. The latter has been interpreted as being the result of the complicated user interface of the database. These problems had to be overcome. In the midst of the period preparing the transformation, I copied these two central bullet points from Victoria's office flip-chart:

[27] Of course, this formal division of labour was not necessarily implemented. Both actors required for their work the expertise of the other and the other's workers. In this division, Frederik and Victoria were not to resource their respectively assigned 'human resources', i. e. workers like Dieter, Elise and me, without consent of the other. Despite this norm, workers willingly supported the other of these actors, even without their respective superior's consent. This constituted cases of non-rule following. Therefore, sometimes, members asked me to not reveal this during my field work.

☞ discussion at Section 4.4

Field Note Extract 4.1.i (Flip-chart: improving data collection)

Plan for the EMS: Data collection should be improved by a) rendering it more certain, b) trimming data collection.

The flip-chart inscriptions indicated that the transformation project was to change two fundamental issues: the quality of data and the data collection process itself. This plan had been developed and was to be carried out by a team consisting of members of the EMS-Team and of FDSO. I interpret the seemingly clear aim as related to one decisive moment in the transformation project's history. This moment was a training exercise. Members of both groups had come together for a couple of days intensive training in organisational change management.[28] The goal had been to learn how to carry out a transition from one management system to another. Within this training, Bill's role as the transformation project's leader had been certified. After all, a proper leader was required. Successfully accomplishing the training required members to carry through an exercise in organisation change. This was the EMS transformation project. Members' success promised symbolic rewards within the global bureaucracy of GFQ. The symbolic capital (Bourdieu 1989) at stake here was realistically transformable into individual financial gain. This set-up constituted as a capital the proper and skilled performance of so-called 'excellency' in preparing a system transition. My analysis suggests that struggling for this symbolic capital was, however, not impacting the performance of data management.[29] Rather, members of the transformation project were committed to performing environmental data 'well'. I argue that their meetings were (re)producing a promise: that data quality was a useful indicator. In this meeting, EMS-Team members were seeking reassurance for their aim to improve data quality.

☞ discussion at Section 4.4

Field Note Extract 4.1.j (Contesting data quality outlook)

Frederik explained that we aim to integrate environmental data collection into financial data collection in order to ensure that data is correct. Bill shied away slightly. 'To some degree' one might ensure this with the financial data collection. He continued to point out that one can only prompt for: 'if data type X, then also ask for data type Y'. Whether users enter rubbish is not evident. Frederik insisted, however, that it will get more reliable by integrating environmental data into FDSO. Bill: well, yes. He hesitated. Then he agreed: when using the financial data collection 'I can also have the four-eyes principle'.

In this interaction, Frederik was pointing to the grand aims which the EMS-Team linked to the transformation project. He voiced the expectation that this project ensures data to be of the finest quality, i. e. that data is correct. Bill pointed out that the financial accounting managers had no control over the quality of data. They had only control over the interface which their database used to capture data to be entered by users (bookkeepers). However, this did not constitute control over the content of data.

[28] As far as I learned, it was not thinkable that I participated in the training because I was employed 'merely' as a cheap assistant. Nevertheless, I had access to the documentation of the training.

[29] If 'excelling' was of relevance for members, they hid this struggle well. Accumulating certified excellence was promised as a resource, useful for cashing in, i. e. swapping the symbolic capital into higher wages when negotiating for the next job position.

Frederik, nevertheless, pressed the point of the grand promise of the transformation project – improving data quality. He shifted the discourse from positivism (is the data correct or not) to pragmatism (is the data reliable). Bill further translated the pragmatic interpretation of data quality into a pragmatic issue of data generation processes. He deemed it possible to design a management system such that data which is entered into a database has to be checked by another person who has access to the same sources.

Through this translation data quality was reaffirmed as a useful indicator to judge data. Even though members would not be able to assess the truth value of a fact, they could initiate systemic incentives for users to inscribe values such that these would be affirmed by another user. Thus, also after the transformation, data quality was expected to ultimately depend on the input of data by subsidiary agents. By mobilising the imaginary of immediate social control (four-eyes principle), the system designers hoped to improve the representations of the environment. More vision promised an improved system of mistake recognition and, therefore, of a system in which data entering agents would have incentives to inscribe reproducible data. Human eyes were expected as the solution. Ultimately, the transformation project would be based upon integrating more humans into carbon enactment. Figure the multitude of additional brains and eyeballs required!

However, I like to suggest the following line of thought: we found that members heard, saw and reasoned that the issuing of lump sum contracts were not under GFQ's control. Yet, they did not react to this knowledge within the transition project team – at least not to my knowledge. Rather, my observations suggest they did not translate this lack of control into a problematic issue of their community. Thus, black-boxing took place: agents were moving a problem out of their way, and by that embedded it within the architecture of their new data collection system. The knowledge of the existence of these lump sum based contracts, leading eventually to lower data quality, can, thus, be considered an archetypical form of capital. Unleashing this knowledge might have threatened the transition project's promises. Pointing to this knowledge or not pointing to it allowed a significant influence on the course of the transition project. I propose, not any knowledge should be considered power, but only that knowledge which allows the knower to intervene in a field.

During the transformation project agents acquired knowledge about the limits of the possibility to meet the project's promises. They knew that data quality in all those cases where environmental consumption could not be known by GCEs' agents was poor. And they knew that this was out of their control. Not bringing this to the surface – it would have threatened their symbolic success of establishing a swift and smooth system change – allowed the project to continue. Bill generated hope that data quality could be improved. However, this contributed to not engaging with the actual practices which enacted data. To safe data quality, and thus GFQ's carbon accounting project, this generation of hope was decisive.

◇ *End of Section* ◇

This section set out to position GFQ's indicator called data quality in relation to an array of decisive practices which shaped qualities of data. The corporation was seeking to measure its own so-called performance in terms of data quality. This promised self-control. However, this section showed that any quality of data is enacted by members; and that specific qualities of data were performed towards particular aims, such as rendering data (and, hence, the corporation) more likely to be approved of by publics. Data quality was an indicator for control. Despite this declaration, it was not capturing the quality of data significantly. GFQ managed to move data quality out of its way; the indicator was to be not significant any longer.

To sum up, in relation to GFQ's partner NGO and their auditor (i. e. control agents), data quality was established as a measuring device for the worth of the EMS's produce. This indicator claimed to point to the quality of the relation between a task-form's owner and the fact-in-the-making. I showed how this position of data quality rendered quality into a decisive resource. At stake was the approval by GFQ's control agents. Members, GFQ, invested their time, skills and materials into performing data qualities as improving. I was able to identify three types of practices by which data quality was being shaped and maintained: having data, cultivating data and generating hope.

First, we came across a forceful nomos, the fundamental law for members' practices, prescribing that subsidiary agents were owning data and had data at hand. Insofar as members imagined, perceived or performed their law in the 'proper' way, having data constituted a decisive resource possessed by GCEs. However, in practice this law neither was nor could be implemented 'properly'. Reasons for this included the problem a) that partially GCE agents were imagined as actually not equipped with the required habitus (caretakers were not considered apt staff choice to perform environmental bookkeeping correctly) or b) that the data collection and storage device ESDR was constrained (ESDR's design did not allow to accommodate all the data needed to represent GFQ's environmental consumption) resulting in repair activities by some members (which, albeit data gaps were successfully repaired, resulted in the effect that the repair itself was criticised for implying manual fiddling with data – a detested activity, seen as worsening the quality). I showed that the capital having data needed to be performed in itself. This book makes clearly visible, that nobody possessed data for data was normally in a flux. For enacting data as 'raw', members needed to ensure that the data holding agent, their holding techniques and devices were considered acceptable. In effect, a variety of members had significant access to the capital 'having data' and were able to accumulate it. This type of capital would not fit into a single container. Much rather, the capital was distributed and, in different versions of representations of the distribution, competing – multiple – distributions existed. Having data could be enacted in multiple ways. Therefore, complete control over having data was impossible.

Second, in the realm of data review, analysis and processing, data was cultivated. Again, a variety of distributions of the mandate to cultivate data existed. For instance,

data was interpreted, classified, altering data modalities and, thus, qualities. Or, data was processed by members, formatted to fit particular spreadsheets; authoring spreadsheets and fitting data in was a significant way of how data was cultivated in the HQ. When doing data, members appreciated to cultivate similarity of data. Difference in data was seen as an indicator of mistakes. Surprises were not welcomed. This nomos intensified the tendency to lose qualities of data. Also, data was cultivated with an imagined audience in mind. The audience was not to be surprised and their perception was to be that GFQ performs well. Accordingly facts have been moulded. To ensure that facts could be utilised for being traced back to significant realities, facts were made such that parallel versions of reality could be signified acceptably well. Also, having access to data and being able to cultivate data could be employed by members to invest into the capital of having data. Finally, the cultivation of data was not only decisive to shape varieties of quality of data, including data qualities, but also to shape and manage responsibilities. Thus, cultivating data implied doing responsibility. While actively shaping data meant being responsible not enacting oneself as fiddling with data performed non-responsibility. However, I maintain, members who enacted themselves as passive, not interfering with data, also did data – they enacted automatic affirmation points. Data ticked (off). Affirming data was widespread: Victoria, Dieter and I, and our superiors – all of us responded to data by performing it as non-problematic.

Third, data quality was performed as an adequate indicator. For this members reproduced a discourse according to which apt proxies exist to measure data quality and they cultivated the imagination that measures could be taken to effectively improve the results of these measurements. Interestingly, while members were occasionally exhibiting knowledges of the limits of improving data quality, their exercises of transforming the EMS hung on their hope of being able to alter data qualities. They recognised that, substantially, they were not able to control data (neither before nor after the EMS's transformation). They managed, however, to shift the target to be controlled from data 'substance' to processes. Members were successfully generating and spreading hope that improved processes would result in better data quality. Consequently, the lack of control was not any more between them and improved data quality; substantial lack of control was thus, objectively, less of interest any more. A caveat: the notion of substance is questioned just below.

I conclude that data quality was a reductionist approach of engaging with qualities of data and the enactment of data. It allowed to bring into view only a very partial understanding of how members related to data. However, keeping this indicator present allowed members to take attention away from other issues and politics of doing data. This politics involves recognition that any quality of data is an effect of members' practices. And particular qualities have been enacted in order to prevent surprises and undesired public perceptions. Qualities are everything but given characteristics.

The imaginary of data to have a clearly definable quality misses the point that data can only be very partially grasped when conceptualising it substantially. Much rather,

data, and its qualities, were performed, effects of sets of practices. Insofar as the transformation project approached data as substances around which the work process merely needed to be augmented, this approach was bound to fail. Adding a couple of eyes and brains here and deleting some hands there – this biological and bodily reconfiguration of data enactment failed to respond to the wittiness of environmental realities which could not that easily be grasped.

A fundamental contradiction built into the EMS, likely in any such system, was that this qualculation approach required humans, be it as bodily characters or as designers of automated devices. And neither humans nor devices worked perfectly. Frederik was criticised for repairing the problems which were caused by the failing database; and he and ESDR were the guarantor of GFQ's quality of data enactment. These contradictory configurations were contained in any of the emissions reported and enacted by the corporation.

While these configurations were still in and on the way of GFQ to get to know its emissions, the particular obstacle of data quality was the be moved out of the way: the imaginary of introducing a number of additional eyes allowed members to sweep aside considerations of enactment practices. By mobilising hope to introduce a working process members did not need anymore to worry about the inferior capital type of actually knowing about qualities of data. The promise was more worth than the skill to enact data – at least temporarily.

Control was only possible within particular situations. The relations enacted in situations between data, devices and other actants configured the emissions emerging. Carbon was emerging. Qualities were as abstract and performed situationally as was everything else around the signifier carbon.

4.2 Failing the Market

For several years, GFQ had been submitting responses to CWC Ranking's questionnaire. Following how the corporation engaged with these questionnaires allows us to better situate two promises entailed by this reporting exercise. First, responding to these questionnaires can be understood as one of the ends of doing data and as a significant means of doing corporate accountability. Second, these responses were and are informing market participants. In terms of those engaged in claiming to construct a low carbon economy, corporate responses (such as GFQ's to CWC Ranking) are key to provide information which allow actors to take the best choices and, thus, bring about pareto efficient allocations of emissions.

I argue: the market cannot govern carbon and, thus, climate change optimally based upon GFQ's response. At the least, GFQ's response distorted the package of information which was and is informing markets. If indeed the results of this study are indicative for more widely distributed qualities of environmental accounting, we can expect all these environmental markets to be misinformed, fundamentally. Of course, the role of

information has been widely discussed in economic theory. Many now recognise, full information will never be available. However, I challenge a decisive level of information, or better, meta information. Hitherto it seems too much taken-for-granted that fuller information can be distributed by way of rankings and that such fuller information is always desirable over less information. While this book empirically grounds why full information on carbon emissions is impossible this section undermines the belief that any information provided to markets is better than none. In a way, thus, this section describes how a corporation manages to aggravate market failure.

So, what was CWC Ranking more precisely? The organisation was part of the globally operating carbon disclosure 'movement' (Kolk, Levy, and Pinkse 2008, 729) or 'initiatives' (Harmes 2011, 99). This particular organisation was providing a ranking of corporations in terms of *how transparently* they report their carbon emissions and their carbon management approach. Accordingly, in an interview with one of the heads of the ranking's organisation it has been made clear to me: CWC Ranking does *not rank in terms of 'carbon performance'*, which might be construed as referring to the average carbon emitted to produce a unit of profit. CWC Ranking portrayed the ranking as being of interest for investors which they partnered with, controlling trillions of USD.

In this section I engage with how GFQ drew together data and punctualised that data as a response to CWC Ranking's questions. To make sense of these practices we need to understand what this reporting exercise meant. Therefore, before delving into data practices, a brief review of the role of carbon disclosure is apt.

How relevant precisely carbon disclosure is for global markets is unknown. As Levy (2011, 17) reports, carbon information is definitively consumed by carbon traders and consultants. That organisations like CWC Ranking exist is explained as an effect alike 'passive revolutions', coined by Gramsci (1971). In this account, CWC Ranking can be understood as seeking societal change of how climate change is mastered by way of reforming accepted modes of governance – that is, by translating climate change and carbon emission issues into markets (Levy 2011, 14), rather than by overthrowing hegemonic mechanisms causing climate change directly.

The alleged aim of disclosing carbon information is to enable *comparison* between firms (Levy 2011, 21). This is seen as prerequisite of SRI. Following Harmes's (2011, 99) reasoning, investors can be informed about the carbon performance of firms. This is supposed to result in a real threat to companies – the threat that investors switch investments to other firms.[30] Economists call this a financial incentive. Further, an available body of carbon information may allow NGOs or governmental actors to demand specific performance levels (Levy 2011, 17).

However, to compare firms, clearly defined and measured carbon emissions have to be known (ibid., 18), economic theory suggests. Without knowledge market failure is likely to occur. Carbon disclosure, according to Harmes (2011, 110), is not an instrument to internalise overflows☞, but, rather to provide the required information in order to

[30]For further information on the rationality of how institutional investors, rankings and SRI hang together see e. g. Clark and Hebb (2005), Richardson (2009).

prevent information asymmetry. The latter can cause market failure, i. e. the inefficient allocation of environmental goods and bads. To allow for internalisation, information of the externalised has to be made available. CWC Ranking served this aim. This information also has to be commensurable. Thus, as Kolk et al. (2008, 737) detail, commensuration of carbon requires commensuration of accounting.

This section contributes to market transparency by way of showing how the carbon emissions reported have found their way from carbon accountants to CWC Ranking. Underlying to this argument is an analysis which explicates how control over carbon was systematically prevented. First, I focus on how the response process had been prepared, i. e. on how actors had been arranged and how the responding practices had been shaped from the outset. Second, I look in more depth at members' practices to get the text together. Finally, we visit the moment of finalising the response-as-a-whole and change the perspective by following the response to its addressee, CWC Ranking-organisation. For simplicity, I use the sign 'Response' to point to the data submitted, eventually, by GFQ to the ranking.

Organising the Response

In early March of my first year in the field, I became increasingly aware of CWC Ranking. The CWC Ranking request for information necessitated, as it were, that members of the EMS-Team co-operate and jointly attend to its questions. The ranking surfaced first when I observed Dieter during his every day work. He had been talking on the phone with Marion. When I asked him what was going on

Field Note Extract 4.2.a (Who is responsible?)

> *he explained that Jack and Frederik skirmish over authority. Correctly, Victoria would need to ask Jack's boss Chris Kent. He recommended Marion to ask Victoria whether she coordinated this with Frederik. Dieter: I don't think she did.*
>
> *Dieter told me that Marion has to fill CWC Ranking's questionnaire. Towards this aim she had asked for a meeting with Frederik, Jack, Victoria and Dieter. He continued: 'I know, however, that Jack has to ask his boss every time'. He elucidated: Jack has no function on group level and irritation with his colleagues lurks.*

In that explanation, Dieter referred to two stakes. Primarily, Marion wanted a meeting to take place. A meeting can be considered a powerful actant because it allows to enact an official level of corporate activity. At a meeting, members may take decisions which are supposed to lead to action and produce certain effects. Marion asked for such a meeting because she was to attend to CWC Ranking's questionnaire. For Marion it was a reasonable move to include those acting voices in setting up the Response which she recognised as most relevant, i. e. Frederik, Jack, Victoria and Dieter. While, in principle, it was possible for her to engage in one-to-one discussions with each of those relevant actants, a meeting promised orientating them towards a collectively agreed-upon engagement with the issue in question – the questionnaire. A meeting,

however, without the indicated relevant actors converging constitutes a chat, rather than an actant which is able to effect a legitimisation of how to respond.[31]

Secondly, this extract suggests that Marion's activity met resistance. This points to another stake – playing the game of hierarchy enactment well. That is, members needed to enact the orders which were commonly imagined as the order of the workplace in order to perform themselves as competent members of the community. Any hierarchy is a provisional outcome of particular ordering practices (Strum and Latour 1987, 789). I interpret Dieter's account as having a feel for the game and based on this he predicted an emergence of conflict. This shifts our attention to the nomos. A reconstruction of the nomoi yields the following elements: formal hierarchies were to be recognised, meetings are places where binding decisions can be taken and as a worker one had to work on one's job assignments.

Thus, the generation of the Response was co-structured by, first, Marion having had the task to attend to the questionnaire and people expecting her to work on that task, and second, corresponding to this task Marion's move to invite for a meeting with the key actors of the Environmental Management System (EMS). While Frederik was the official head of the EMS, Victoria was the officer overseeing the EMS as part of GFQ's take on so-called sustainable development. However, Jack was merely the head of the German GCE's EMS. Yet, Marion had sensed correctly that Jack was turning into a key figure within GFQ's EMS.[32] In this complicated social configuration, she had lost sight of the sensibilities of managers' hierarchies involved. To enrol Jack into the activities of the HQ his boss should have been included. Thus, from the very outset, the construction of the Response took place within the tensions of performing organisational hierarchies and order between actors.

To prepare the Response, Marion translated the questions available at the CWC Ranking's online reporting system into a material that she must have considered adequate to collect the responses internally: she inscribed the questions into another device, an MS Word document. She enriched this document by inscribing as well the 'equivalent' response of the prior year. With this inscription, she provided orienting information for the distributed 'experts', i. e. those agents officially in the know. They were to check the prior Response's answers and correct them if necessary. Thus, responding to the questionnaire had a quality of *updating*. When Marion selected the questions that Frederik was supposed to provide replies for she asked me for my opinion of how to prepare these questions for him.

Field Note Extract 4.2.b (Setting up the response)

☞ discussion at Section 4.5

On the MS Word file, we marked yellow those numbers and units that Frederik is asked to provide the response for. This was my suggestion. Marion suggested that Frederik behaves like at the crèche. She preferred to highlight specific paragraphs over words. However, it was fine with her, marking only words and sentences.

[31] In Section 4.5 (entitled *Meeting Data*) I discuss the notion of meetings as actants in more depth.

[32] I discuss his career below, in Section 4.4 and Section 5.3.

> *My understanding was that Frederik wants to sense that we are telling him exactly what he is supposed to attend to. Thus, we should highlight in such a way that he does not have to search for what actually he should be dealing with.*

Our conversation was structured by the shared understanding that the prime point of our endeavour was to elicit a set of information from Frederik and to make him inscribe that information in a file. The rationale of that activity was that Marion receives information which would be suitable as answers to the questions. The tactical issue at that moment was how to elicit that information. For that we had to imagine how Frederik would deal with the file she were to send to him; and we had to materially translate and produce a file which would fit to his rationality. Ultimately, someone had to classify what parts of a question would need answering and which not – an act of classification. While Marion suggested that Frederik should carry out this act, I proposed that we provide the document such that it already shows classified information (Artefact B.2.1 (on page 588) shows an example). Among many pages of the MS Word file we selected seemingly relevant terms which would catch Frederik's attention and allow him to provide a straightforward reply.

I had had the understanding that Frederik would prefer questions for which he would be able to provide replies imagined as exact. My understanding was the result of a learning process in which I had come repeatedly across Frederik openly avoiding such tasks in which he had to take decisions he classified as 'political'. Thus, he performed himself as unwilling to invest his resources into what he treated as the shaky ground of qualitative classification.[33] This included decisions in which he was not sure whether his interpretations would be agreed by his colleagues. As a result of my understanding I suggested we adapt the file to him.[34] A significant part of what we took-for-granted was the necessity to engage with Frederik at all. We did not consider simply filling the form ourselves. Albeit annoyed about Frederik, Marion accepted the analysis that Frederik would not perform the required classifications and that, therefore, we had to carry out the classification work. Hence we started to process the questions in a manner which allowed Frederik to easily identify the variables requested. Significant is *what we highlighted* in the file:[35] we treated the qualifiers and units as *sufficing* to *poll* the required data from Frederik. In addition, we highlighted the fact that the questionnaire contained fine print which he was responsible for taking into account. By spotting selective light on the text we took partial control over what Frederik was about to see

[33] I discuss the performance of issues as (non-) political in Section 4.5 (entitled *Meeting Data*).

[34] Marion's statement that Frederik behaves like at the crèche implies that Marion related to another game. The nomos she referred to was the nomos of GFQ. An actor positioned officially like Frederik, i. e. the corporation's environmental manager, should be willing to take such classificatory decisions himself. Her statement can also be read as a derogatory classification of Frederik's behaviour.

[35] I provide an analysis of an extract of the document in Appendix B.2 (entitled *Analysis of Marion's MS Word File*). Marion and me inscribed highlighted elements into the file. MS Word provided two functions which we employed, highlighting and comments. With these techniques we guided his vision of how to see and read the document. As Goodwin's (1994) analysis argued, highlighting in texts allows users of texts to be made aware of what is considered significant.

and we made visible to him that it was his task to take the responsibility to engage with the questionnaire's fine printed technicalities.

Did this approach to poll data work out? Two months later I asked Marion about the current status of the CWC Ranking project. She told me that Frederik had exhibited his *traditional* approach:

Field Note Extract 4.2.c (Experts, dependencies and incentives)

☞ discussion at Appendix B.3

Frederik blocked delivering the data in such a way as Marion needs it for CWC Ranking. She explained: this year CWC Ranking provides extra scores for splitting emissions according to country and best as well according to branch. Frederik reacted to her request in this way: he would not have time and actually he would not know whether he is the GFQ environmental manager. To Marion his blocking seems normal. He always would be reacting like this. Eventually, however, it would work out, usually, that Frederik delivers the data. We went for a coffee. She continued, repeating that he would not know whether he still is the environmental manager of the corporate group. Marion suggested that as the group's environmental manager he is supposed to take care of chapters within the response to CWC Ranking. In general she does not want to compose the response herself, but, rather, she wants that the experts look into that. A chapter includes, among other subjects, what are the key challenges, where do we want to go? The authors do have to consider: what is our key message? The environmental manager of the group is supposed to author something like this. However, Marion recognises at the same time, that Frederik is not capable of doing so. Frederik would be panicking when confronted with strategy and politics. Marion framed it as a problem that Frederik controls the numbers.

This conversation with Marion pointed me to five issues. (1) We encounter how *CWC Ranking shaped GFQ's approach* to its external carbon performance. A prerequisite for GFQ to respond was the existence of agents who translated the questionnaire into the corporation. While the ranking provided explicit information on how an organisation could improve its ranking (i. e. by applying a certain technique of how to present data – by providing a differentiated view at emissions), it was Marion who translated the request by CWC Ranking for specific data into GFQ.[36]

(2) Accordingly, Marion wanted data to be provided in specific *formats*. In order to render assembling the reply easier, she needed data in the format which the questionnaire asked for. However, available subsidiary data did not necessarily fit. Frederik needed to be motivated to actually adapt available data to fit.

(3) Further, it was self-evident for her that GFQ should be *staged in the best way*, i. e. by providing 'key messages' and transparently showing GFQ's 'key challenges'. Again, she expected Frederik to translate the questionnaire into appropriate replies.

(4) It is straight forward that to complete her task, assembling the response, *she depended on willing experts*, i. e. those actors she considered as knowing about the questions. As Marion encountered, an obstacle for this was that Frederik was not

[36] In Section 4.3 (entitled *Aligning Legitimacy with Carbon*) I deal more intensively with this and other kinds of external incentives shaping data delivery.

certain about the actual position he was occupying with GFQ: was he the acting environmental manager or not? As a result of him not being sure, he did not stage a willing expert. Therefore, Marion needed to motivate Frederik to provide the requested data anyway. As it were, unfortunate for Marion, Frederik was officially the GFQ environmental manager and, yet, he did not seem capable of fitting into the role's requirements as understood and performed by Marion. He was seemingly controlling and managing the numbers; and, yet, he did not provide those numbers she needed.

The story is even more tricky. As seen above, other members, like Dieter, Elise or I, could also access and manipulate data. If Latour (1990, 56) is correct, access over files may constitute domination. I propose that access is necessary but not sufficient for domination. Frederik had been provided by the organisation access to data *and* the authority to compile and fit the information into the ranking's questionnaire. To play hierarchy well, Marion had to perform Frederik as in control, i. e. as providing something she needs from him and only from him. Thus, performing hierarchy well was contradicting her interest to inscribe the required data in other ways.

(5) Marion reported that Frederik referred to an additional resource he needed to implement her requests: *time*. This refers to paid labour time. GFQ paid employees to rent their work willingness for a contractually agreed amount of time each week. Many readers will know this situation. This configuration contrasts with those in which bosses or corporations *own* actants (if they are humans, they are then referred to as slaves). For actants owned (temporarily) by GFQ, the organisation has to provide full-time care and maintenance. Human workers, however, are supposed to organise themselves such that their ability to work is sustained.[37] Within the configuration of the situation reported by Marion, the ability to allocate workers' paid time to specific projects constituted power to accomplish a task. Thus, time constituted a kind of capital which directly translated into financial capital.

Investigating the preparatory work invested by Marion to start the process of setting up the response was helpful in four ways. First of all, we found that to guide experts through the vast questionnaire, GFQ employed a coordinating agent (Marion) who had set up a inscription device with in-built orientations of what experts should attend to. Second, we found that GFQ's Response was not set up independently of prior Responses. Much rather, Marion constructed the responding process such that already accepted data was available in the inscription device for the expert as a guide to what data they ought consider to inscribe. Third, we found that mobilising data was related to agents who had access to data and who were assigned authority. Thus, Marion was dependent on agents whether or not they performed their role well. Fourth, in consequence, part of the responding process was the contradiction between smooth data inscription and performing formally prescribed hierarchies well. I suggest, therefore, to conceptualise the responding process from the outset as taking place on a contested, contradictory plane designed to provide acceptable data – much rather than to reveal any kinds of

[37]The relation between actants and GFQ constitutes a topic I attend to in Interlude III.

truth. With this in mind, we may turn to the other side of the table: how did these experts assemble the replies?

Constructing the Response

While the specific preparation of the response was providing some orientation to experts, how members actually drew together data for the response constitutes a larger question. Frederik was the expert who was to report actual carbon data. In the following I show that the concern for data to be similar (relative to prior data reported by GFQ) was just one set, next to two other sets, of orientation practices which he considered. He was seeking to ensure coherency between the responses and specific reporting standards; and he was pitching the responses to be perceived well by readers. While engaging with his considerations I also came across that doing 'responding' was heavily dependent on the work stance of specific translating agents. This doubles the precarious status of specific content – another trial of strength: content had to satisfy Frederik's considerations and it had to pass 'correctly' through the human and nonhuman devices employed to translate the content into specific replies.

Modalising data ↪[38] Fundamental to Frederik's approach to respond was that it was him who assigned status modalities to data, such as not completely done or as ready to be distributed. The organisation granted him the symbolic power to assign these statūs. Carbon data reported by GFQ to CWC Ranking was legitimately imagined within the corporation as attached to the modality 'approved of by Frederik'. An investor may read data as having the modality 'approved of by GFQ'. Thus, implicitly these status modalities travelled from inside towards the outside. In addition, some numbers GFQ reported were modalised by adding lengthy qualifiers – whole sentences. Frederik, sometimes, added to numbers non-numeric information in text fields simulated in Marion's Word file.[39] And Victoria made explicit in a conversation with me that she wanted us to ensure that numeric data would be associated with non-numeric data because that would result in a better rank position. Thus, selected modalities were considered apt to travel from within the HQ into the Response.

Ensuring similarity of data Marion, Frederik and Victoria were all involved in enacting the Response as alike the prior year's Response. Also, when GCE agents saved data in ESDR task-forms☞ they were confronted with an analysis of how similar data was compared to prior reported data.[40] In addition to these two levels of seeking similarity, a third level emerged in the questionnaire issued by CWC Ranking. They asked whether 'emissions for the reporting year vary significantly compared to previous years'. Gradual change was acceptable for agents – huge deviations were not.

[38] The following discussion is relating to Field note extract 3.2.k (on page 163).

[39] For an illustration see Artefact B.2.1 (on page 588), left of mark G.

[40] For a detailed discussion of similarity, see Section 5.2.

Frederik let me know that copying answers from the previous Response was an apt approach to fill the current questionnaire because the previous answer had already been legitimised by GFQ. I propose a comparable pattern regarding external accountability. If an answer had been proven to be accepted in a previous Response, members deemed it likely that repeating that statement, or keeping it very similar, would not attract unwelcome attention to the current answers. We find that reporting data was oriented to audiences, including everyday colleagues and superiors, partners at CWC Ranking and non-identified consumers of the Response (users of CWC Ranking). For members to stabilise their position in the community which enacted data, a decisive resource was the ability to imagine these audiences well enough. This capital could be invested and, hence, inform the construction of the Response. Members could, then, assume that the Response would not show up as strange or problematic. The latter would have reflected badly on them. Thus, more or less inert patterns in carbon data were to be achieved by members as much as change. Both data patterns are performed.

Standardising data Frederik was not only seeking orientation in previous Responses and data. He was also attending to reporting standards – i. e. standards which informed standard users about how to report data correctly.[41] However, these standards did not necessarily fit well to his work practices. When I was assisting Frederik with the formulation of replies to the questions he lamented about a difficulty he had encountered. Albeit standards were (and are) supposed to provide clear prescriptions, their clarity could not exist on its own. Much rather, clarity was a relational effect between user and prescription. Frederik's use of standards was of particular interest because his data practices were oriented a several standards simultaneously.

☞ discussion at Section 4.3

Field Note Extract 4.2.d (Standards)

Up to now we have been using GRI as the base for our reporting. We do so because SAM uses GRI. However, GRI is 'not 100 % conform' with CWC Ranking's questionnaire: thus, our replies do not totally fit. And, one point exists at which GRI is not conform with CWC Ranking.

Frederik explained, that the guidance is 'endlessly difficult'. SAM is far more simple and explicit. They simply say what they want: 'electricity consumption'.

Within this extract the most encompassing stake is to accomplish the Response. Towards that goal means have been utilised. Frederik referred to three linked resources, a standard, its guidance/handbook and data itself. Data were, however, not independent of standards themselves. Frederik had invested standards already into constructing data. Under Frederik, GFQ's data collection and reporting system was run such that the output could be immediately utilised for submission to another ranking (DJSI, run by the organisation SAM). This organisation's questionnaire for DJSI (and folded into this was the standard GRI) had been enrolled by Frederik as a standard for GFQ's carbon data. When engaging with CWC Ranking he found that both questionnaires

[41] For the theme of standardisation see Section 4.3.

were not completely commensurable. And, he found that while making sense of DJSI was easy for him, this was not the case for CWC Ranking's questionnaire.

Having these resources under control was decisive for Frederik. He was to invest data and standards into the construction of the Response. Albeit being able to invest some resource underlines the capital characteristic of these resources, Frederik pointed here to a further quality of how he related to standards. They have become more than mere means. He related to compliance with standards as an end-in-itself. The new stakes were conformity with standards (non-conformity would weaken the position of GFQ) and, again, logically a means towards that end, simplicity of the explanation of how the standard is to be applied and interpreted, i. e. the guidance.

This discussion strengthens our case to conceptualise capital not so much as a substantial entity but as a relational effect with an underlying 'fractal' pattern. A resource as a means can be enacted by members as an end-in-itself. This means that members can invest other resources to bring about the effect of having a certain capital. As analysts, we can zoom into a capital and find how something is performed as a capital. This likens Strathern's (1996, 523) point that in actor-network theory (ANT) networks do not have a limit. One can zoom into capital forever and identify all the actants involved in performing a capital effect.[43]

We find that Frederik's engagement with standards points to two aspects of capitals. He had to have access to thingified standards, i. e. actual texts he could reference in the Response. And he had to be able to manœvre within the world of standards. Thus, having capital is neither only a static attribute nor only a competent demonstration of being able to operate standards. Having capital is both, access to a decisive resource as well as being able to competently enact it as a capital under control by the agent.

It seems decisive that carbon emissions which were to be reported can be processed through alternative standards. Agents use standards to formulate their replies, to calculate, create and format numbers. While we may understand the latter, i. e. number construction, as an continuation of the data practices observed till now, the fact that formulations are influenced by standards earns additional attention. How are standards part of the practices of constructing the Response – beyond their impact in shaping the numbers? GFQ drew very much on the standard produced by VfU. On that topic

Field Note Extract 4.2.e (Drawing up coherencies)

☞ discussion at Section 4.3

Frederik explained: he likes bringing to bear VfU concepts within the response, for example 'drinking water'. By doing this, he draws up coherency.

At stake here is the production of coherency, again, to enact a report which cannot be easily questioned by critical audiences. To produce such effects, Frederik linked two types of capital. First, each concept used by VfU acts as an actant which performs a potential of attention, highlighting the represented. This potential can turn actual when the standard's concept is perceived as not consistent with concepts in a report (which

[43] I take this point as different to the well-known characteristic of capital to depend on being accepted and performed by a community as a type of entity or practice which can effect something (money depends on being accepted as a means of exchange).

supposedly applies the standard). The corpus of concepts provided is, thus, constituting a resource which members need to utilise. And knowing this corpus constitutes a capital. Second, to actually shape the response in a coherent manner, an agent needs to have the capacity and authority to shape the relations between the contents of the response and standards. Through the practice of constructing relations between response and standards, members were able to render the response, and by that GFQ, more stable.

Thus, by this practice of wording, the response finally was supposed to consist coherently of both, the quantifiers as calculated and the qualifiers – and both being shaped by the GFQ take drawing on GRI as well as on VfU. This suggests that the carbon emissions expressed through this rationality originated in the decision practices at this step of the construction process as much as they depended on previous steps. The aim was to produce a response which indicates convincingly a non-problematic GFQ reality of carbon emissions. Coherency in words adds to that.

Pitching data At the same time we find that members did not take all the construction materials they used for granted. The formulations, algorithms and formats were not self-evident. [44] For example, Frederik saw several possibilities of calculating extrapolations for carbon emissions. By explicating the arithmetics within the response, the formulas, and their results, turned public. Thus, one way to deal with a situation in which a choice had to be made was to make explicit the calculation – rather than staying with a more superficial (and potentially disadvantageous) overview of the calculation. Frederik's emphasis on formulating the algorithm in the way GFQ used it had at least two effects: first, actors who were to compare different reports of GFQ would not come across an unaccounted-for change in the algorithmic face of GFQ (i. e. the publicly visible calculation paths which GFQ committed itself to); second, in terms of the signified carbon addressed through the algorithm at hand, Frederik ensured that GFQ would transparently show how they calculated those emissions data which they considered as not collected by themselves. To achieve these presentations, Frederik used his ability and authority to prescribe and inscribe (in this case through me) the algorithmic face of GFQ into the Response.

That example and other instances may be read as Frederik being committed to precision. However, this understanding is challenged by the following, which I came across when he mentioned only in passing:

Field Note Extract 4.2.f (Decimal numbers)

> *I like omitting decimal numbers. These are nonsense: 'decimal numbers evoke accuracy. This we do not possess.'*

Frederik suggested to not include decimal numbers in the response to CWC Ranking. This qualifies our picture of him: his intricate knowledge of the processes of data construction suggests that the carbon accounting system does 'not possess' accuracy. At the same time, he explained that his practice of omitting decimal numbers was

[44] The following discussion is relating to Field note extract 3.4.k (on page 195).

intended to prevent audiences imagining that accuracy was present. Thus, the latter approach indicates more precision than if he had included decimal numbers. To whom would decimal numbers indicate precision? To public audiences. Again, implicitly his practice of omitting parts of numbers was orientated towards public perception. The resources he drew on to translate a decimal number into an integer number (i. e. a number without a fraction) were his knowledges of the numbers and the potentials of how they might be read by public readers as well as his ability to alter these numbers (presupposing also access to the Response draft). Would it have been possible for him to perform such a translation without the authority to do so? Yes, albeit, he would have risked his position within the corporation if some superior found out and did not affirm his action. In the latter case, the type of translation might have been destabilised. Thus, I argue, that the authority to perform any translation was in general a factor to stabilise its effect. It is striking that Frederik recognised the mode of publics potentially reading decimal numbers as accurate. This underlines his reflexive and reflecting stance towards accuracy. He was well able to accept that (at least that some of the) numbers they produced were not accurate. This did not cause a visible crises during the time of my field work. While Burri (2008b, 50) observed how medical practitioners experienced a crisis when their 'unquestioned beliefs and routines that had been valid' were put into question during the introduction of alternative technological infrastructure, Frederik did not exhibit any sign of his believes and practices of constructing numbers in terms of their accuracy being threatened.

And yet, the documents co-produced by him did suggest correctness – a rhetoric promise of accuracy? Mostly, only rudimentary chains of qualifiers existed for numbers produced by him and under his supervision.[45]

Frederik's orientation to publics' potential reactions to data was not limited to numbers and algorithms. He was also making sure that explanations of the quality of data would present GFQ in – what he considered – an appropriate light. Recall the prior section. We came across the notion that data transformed into carbon emissions were associated with qualities. When Frederik and me looked through the draft response I pointed to some ambiguities in the Response which questioned the quality of data.

Field Note Extract 4.2.g (Certainties and public perception)

☞ discussion at Section 4.3, Section 5.2

> *Frederik suggested: the question is 'how honest do we want to be here'. He stated that the main sources of uncertainty are data gaps and 'data quality'☞. The remaining problems are isolated cases of people who simply do not know about an issue. Frederik: obviously, within an one-hour phone conference, people will not understand our EMS. The definitions are explicit. Everything can be checked out.*

This extract points to the risk at stake in case publics read the response carefully. By posing the issue of honesty risking exposure as a question, he indicated that he did not want to take the sole responsibility for not being honest. This situation can be interpreted as orientated towards conflicting normative orders: on the one

[45]For example, the Sustainable Development Report simply states some figures, say the average carbon footprint of an employee. For an illustration see Artefact 3.5.1 (on page 206).

hand the claim that GFQ's EMS should produce transparent reports existed; on the other hand GFQ was to be protected from publics which potentially reacted in a non-favoring manner to GFQ. Substantially, the risk was that readers recognise that not everything works. Frederik's statement, that the definitions are explicit, imply that they work.[46] However, he knew that definitions being explicit would not guarantee their 'correct' application. In order to appear as being principally in control over data collection, Frederik suggested to make public two sources of uncertainty which the EMS-Team performed as having control over.[47] Frederik continued by (re)interpreting the actual performance of subsidiary EMS agents as self-evidently caused by the objective circumstances which were beyond his immediate and, therefore, GFQ's influence. His naturalising of the 'weak performance' of some of these agents suggested that this should not be accounted for because he believed GFQ not being in control over them. Thus, some subsidiary agents were positioned at the boundary of the reach of GFQ's environmental and carbon governance. He recognised that telephone conferences used to train some of these agents were not powerful enough to discipline their engagement with the EMS. However, these telephone conferences were a prime schooling device – second to workshops – to get the EMS working.

To summarise, he implied that transparent precision informing publics is not necessary when isolated anomalies exist while the overall structure works fine. His approach also presumed that the definitions used within the reporting machinery are well defined and work. However, he recognised as well that subsidiary environmental managers could not turn into what they were supposed to be only by means of a transient briefing by telephone. Yet, the latter was a normal practice. For Frederik, it was logical to prepare the response in terms of how the EMS was supposed to work, rather than how it actually worked; and he recognised so.

Translating data Finally, significant control over which and how data would become part of the Response was exercised within the translation practices by those agents working on and with the data. Two cases should suffer to stress this point.

↪[48] Members needed to interpret the questionnaire, including Marion's file, to make sense of it and identify their replies. In the course of that they had some leeway. For example, I proposed that GFQ should respond to CWC Ranking's interest in the corporation's data quality by way of calculating a number. Thus, the specific quality of the translation mattered. Subsequently, Frederik and me negotiated how to qualculate precisely and Victoria black-boxed the result. Yet, all of this was partially depending on CWC Ranking's original question. Thus, the agency to control GFQ's performance within the Response was highly distributed and a contingent and contested outcome of situations in which specific data, humans and devices met.

[46] Definitions are an issue which I explore below; see Section 5.2 (entitled *Blurring Definitions*).

[47] An illustration for 'data gaps' was for example, that the GCE introduced in Chapter 2 (entitled *Data Construction in a Basement*) did not report waste data because this had not been collected.

[48] The following discussion is relating to Field note extract 4.1.g (on page 249).

The same holds for an analysis of the cognitive-digital practices which I was asked to perform towards completing the Response.[49] Victoria had asked me to translate the information accumulated within Marion's Word file into the online reporting system provided by CWC Ranking. That system was designed for manual data input. This meant a user had to type in, or in my case copy in, data. I used the Word file as the source. However, the source and the target formats were not always compatible. For example, some of the GFQ Response draft answers have been formulated as words and sentences, rather than numbers. In some cases the CWC Ranking interface constrained which kinds of signs it allowed – only numbers could be inscribed. Thus, employing my interpretive skills, I reduced sentences to numbers. In a nutshell, modalities designed to disclose GFQ's carbon conduct had to be deleted at the end of the translation chain. In other cases my job was to copy specific data from environmental balance sheets☞ into fields in CWC Ranking's forms – a hundred copy-and-paste operations. The latter can be understood as an ordinary technique (Bowker and Star 2000, 300). Nevertheless, it was highly precarious. This was the ground on which the Response was copied into CWC Ranking's database.

To summarise, the final Response was shaped by members' careful cognitive attention as much as by practical digital work with occasional strategic acts evading other members' scrutiny as well as the mobilisation of agents' biological devices (e. g. hands, eyes and memories and interpretational brain capacities). The specific data was dependent on agents' generative schemes of perception and action, on their stance to their work – in short – their habitus. Data was not disclosed but brought onto qualculative planes at which numbers, statements and judgements were arranged to result in data which would ensure best that nobody criticises the worker or GFQ.

Emitting and Digesting Emissions

Towards making sense of the emissions which would eventually be published by CWC Ranking and, through that, made available to economic or political rationality, I turn to the moment at which GFQ performed CWC Ranking as in control over data. Subsequently, we shift our position and meet GFQ's contact at CWC Ranking's HQ.

First, I follow the response-in-the-making during the brief period in which it existed as a whole but was not yet completely punctualised. Two days after I had translated the response-to-be information from the MS Word file to the CWC Ranking's online reporting system, Victoria and I met to send off the response. This involved a three-stage stabilisation process. When I joined her at her desk

Field Note Extract 4.2.h (Triumph)

> *I showed her my email, including the final version. She clicked the link provided by me. Then she opened Marion's email including the access data to the online questionnaire, logged in; called up my email, clicked the link and then read out the text carefully. She asked several times whether this is sendable. I opinionated that*

[49] For a more detailed analysis, see Appendix B.2 (on page 587).

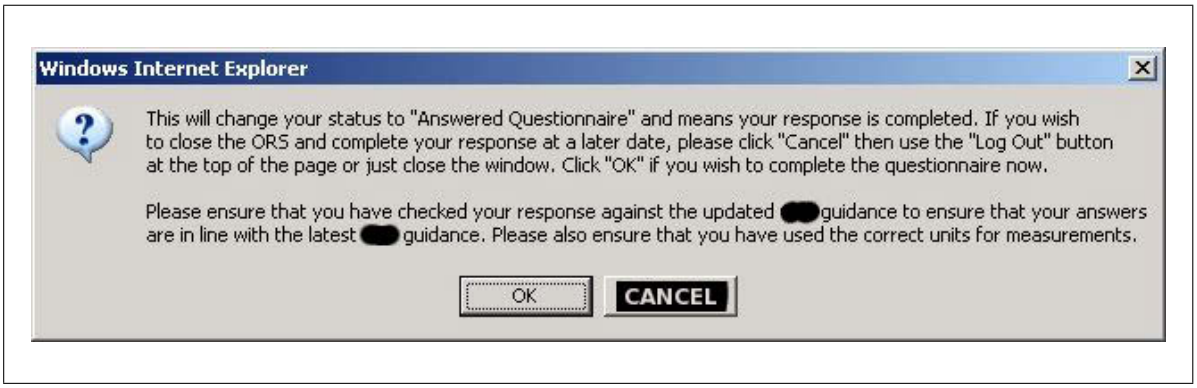
> *we did check it several times. I did not oppose sending. She was very cautious and carefully clicked 'confirm', and confirmed by verbalising 'yes, I agree' and then clicked in slow-motion 'complete questionnaire'. Then a dialogue window appeared (Artefact 4.2.1 on the facing page). She read out everything, 'are we really sure? [...] reaaaaaallllly?'. I jokingly said: we could check everything again. It was self-evident, that this was not an option for her. Teeeeeeensioooon! OK. sent. 'yippeeee' said Victoria and triumphantly raised her arms. And: 'done'.*
>
> *Then she looked up, turned to and thanked me gratefully several times and suggested, that this must have been a chance for me to study another aspect. And she credited that I negotiated with Frederik. She did have the perception that I am on the same wave length as him. I confirmed this.*
>
> *Then we also agreed that I would draft a formulation of an email to express gratitude to all of those who helped completing the response to CWC Ranking. She handed over a folder of Marion including a list of who had delivered to what question.*

What had happened? Carbon emissions have been enacted. Let me reconstruct the configuration of elements in this situation. At the centre of the first part of the extract two humans were present; and in absence the organisational apparatus which Victoria was head of. We were accompanied by her computer, internet infrastructure to connect to CWC Ranking's web interface and a file with the CWC Ranking reporting system's export of the information about GFQ that I had uploaded the days before. Even more infrastructureexisted: e. g. the techno-social machinery of GFQ and of the EMS including all their elements of trust, anger, competition and profit-orientation but also external actors like energy providers powering all the electronic devices needed for this data translation process.

Sending off the response to CWC Ranking marked the closing of a set of facts about GFQ – from then on online available for wide publics including hundreds of investment firms. Or, at least this was how the situation presented itself to Victoria. She took on the responsibility to defend the response in case critique would show up.

An underlying assumption this situation shed light on was instantiated by Victoria *logging into* the web interface. It was not questioned that access to GFQ's account on CWC Ranking's website should be secured. At GFQ, nobody else, except of Victoria, was informed by the ranking organisation about how to put data in. She had to share her account with others, like Marion or me. We had to use the CWC Ranking interface in Victoria's name, and Victoria in the name of GFQ.

Our engagement was structured very much by having to confirm three times. What happened? First, she had to click a tick box, by that preparing the form to recognise that GFQ considered the information provided to CWC Ranking complete and according to the ranking's rules. Second, at the bottom of that page, she had to click a button labelled 'Complete Questionnaire' and by that let the online system know that GFQ would be happy to submit the information. Third, the dialogue window asked Victoria to re-affirm the user's attention (i. e. hers) to perform making publicly available the Response. The artefact enacted Victoria as the collective actor 'GFQ' simply by



Artefact 4.2.1: Final Confirmation 'Windows Internet Explorer'

referring to Victoria/GFQ as 'you' (your status, your response). As Latour (2005, 162) commented when discussing *Leviathan*: it is an entity which can easily dissolve. He credited Bourdieu for summarising the fragility of this seemingly powerful entity perfectly. The corporate body exists of biological bodies. Bourdieu (1985, 215) says that by delegation several people magically constitutes a fictitious person. And, the dialogue window performed the user's agency to complete or cancel the submission of the questionnaire according to the guidance. When 'OK' was clicked, the user also specifically confirmed being sure that numbers were provided in the intended unit. Note how this artefact structured her submission: it constructed a binary choice. Either the user would submit the information or not; either the submitting organisation was sure about its response or not. Thus, beyond the signifier 'this is our response' or 'this is not our response', no further modalisation of the Response was possible. The window shown presented an Obligatory Passage Point (OPP): Victoria was presented with a situation in which she had to use this path of communicating to CWC Ranking or none. The premise expressed through this artefact was that the situation was manageable in a straight-forward manner. And, the window construed agency through the premise that a possibility of choice exists. However, for Victoria to realise the meaning of the EMS was this: at the end of the day she would have had to press 'ok'.

Her practices crystallised around the meanings inscribed into material artefacts she encountered in this confirmation process. Thus, the question emerges: what did this confirmation process structured by CWC Ranking do to the situation? Victoria had asked whether we are sure that this information should be submitted at its current status. This suggests that part of the nomos governing the situation was that only those constructs considered acceptable were to be sent. This nomos is even more meaningful if we consider this confirmation process as marking the boundary of GFQ's control over 'its' data. For all practical purposes, the data submitted was translated from GFQ's information into CWC Ranking's information. Data crossed a boundary and Victoria had to assume she lost control when it left GFQ's territory.

And this finding requires us to immediately reconsider: did data actually cross a boundary? No. As part of the construction process of the Response I had already entered all the data into CWC Ranking's database. Thus, technically, data had already

been submitted beforehand. This suggests that her action was about something more complex. While the notion of submission captures well how the situation presented itself to Victoria, we need to proceed with caution.

Why would Victoria participate at all in that risky process? Her work life would seem to be more safe and predictable if she had not 'submitted' the information. The reason was that the *raison d'être* of the EMS was the production of carbon data to be used for reporting it to both, internal and external, audiences. Thus, as head of the EMS it was also Victoria's task to translate their carbon emissions data into information-to-be-reported (to external audiences). She was positioned to perform the 'submission'. Carbon data stored in environmental balance sheets was supposed to be always ready for translation processes into reports. The stake in the situation presenting itself to Victoria was performing carbon emissions externally and taking the responsibility for this *performance-out-of-control*. Seemingly, for Victoria this situation was about handing over GFQ data to an external organisation which would be able to continuously process, interpret, de- and reconstruct GFQ's reported carbon reality. It would be more precise, however, to understand as the issue at hand whether she would be willing to take the *responsibility* that the CWC Ranking organisation engages in any unforeseeable way with the data in all kinds of futures. 'Submitting data' is better to be understood as a speech act in which nothing but formal control – or ownership over data – is shifted. After pressing 'ok' the data already possessed by CWC Ranking was also owned by the ranking organisation. A decisive resource for Victoria, control over data, was now even more distributed. Victoria's vocal and bodily expression resonated with the load of meanings inscribed into this performance: carbon meanings and responsibility meanings.[50]

Her action was about structuring the socially, politically and economically available carbon emissions. This was an enormous load. This load existed through the triple confirmation process. If the process had not existed, she would have been better positioned to claim back the authority to alter the data even after submitting it. Thus, the load was enacted by both, the meaning of the submission to her as well as the three-fold confirmation. Similarly to the hotel key with a heavy bundle attached which is loaded with a programme of governing the hotel guest's behaviour (they should leave a hotel key at the reception, rather than taking it onto their conference and losing it on their way) (Latour 1991), the confirmation process governed the user's stance towards the information to-be-submitted: it shifted the load of responsibility from the ranking's organisation to the user. By attaching a load to the process of transforming internal data into externally available information, the weight of the responsibility was attached to the transmitter, rather than to the receiver. How was Victoria able to carry that load? She agreed to carry that load as part of her work contract in general and in this particular situation because she had to trust the socio-technical network she was the boss of. She invested her trust in Frederik, ESDR and many other corporate actors as

[50]This instance was one of the rare instances in which a member's body expressed emotions clearly and immediately. Normally, bodies were not to be made visible; but see Interlude III.

well as devices to have produced adequate information to be submitted at that point. Below, I deconstruct the imaginary of transmitter and receiver. Before doing that, let us follow Victoria's actions after having let lose GFQ's data.

The first observable action after having expressed the load of the action, she translated the network of trust she just had drawn on into gratitude in the relations enabling the network. Thanking me, recognising what this situation had meant for me (a chance to study them) and appreciating the relation between Frederik and me was showing her capacity to reflexively and reflectingly relate to the elements she based her action upon. Victoria had often experienced problems within the communication between her and her colleague Frederik. For her, easy and effective communication with colleagues constituted a valuable resource. In this case she recognised that it was me who possessed that resource. She also immediately set up a process directed to materialise her appreciation of the network and the human elements who were part of it by way of asking me to prepare an email to these human elements. For that she provided me with a material list of all those elements. This list was a representation of the network she had drawn on. Without this list this specific response would have not been possible. This is not to say that exactly that list was the decisive element on which the total response depended. Rather, the list was part of the organisational memory on the relation between GFQ and CWC Ranking. That memory was distributed across a paper folder and computer files as well as humans, like Victoria, Marion and myself.

This discussion showed that Victoria relied on a network of human actors whom she trusted to produce the correct information, how she used that information to translate it into publicly available information and was willing to let lose her control over the information because she trusted the information. At the same time, we saw that Victoria managed her social network to ensure further co-operation for future co-constructions of reports.

The key resource which Victoria invested during this process was trust. Trust can be considered a capital. The more removed a superior is from practices on the ground, the more they have to develop and invest trust. To trust colleagues, Victoria drew on the assumption and partial experience that they shared a professional practice which constituted, largely unarticulated, what was acceptable. This section showed the range of these unarticulated grounds. Contained in data were such relations of trust. Carbon data as capital was built upon trust. Where members did not and could not know what data meant, they had to believe that their colleagues had produced data diligently.

Following GFQ's response, finally, brought me to the HQ of CWC Ranking. I met Rick Becks, the organisation's contact to GFQ, holding a degree in sociology, to interview him on a sunny summer day at this HQ's hallway with tables and couches in front of his office. He introduced me to the history of his organisation's philosophy.

Field Note Extract 4.2.i (Interview with Rick Becks)

For CWC Ranking it was good that GFQ participated. If 'massive institutions', like GFQ, support the project, other companies can be drawn into the questionaire.

It was a process of 'trail and error' to find the right person in the companies. Often, senior people were not convinced but some committed individuals filled the questionaire. Then, when the results were good, the seniors were glad. Yet, the seniors alone would not have done it (the participation in the CWC Ranking).

Rick mentioned that CWC Ranking became a 'brand', one which is 'reliable', 'impartial'. Now they commissioned AfC to write the global report. Rick said that taking AfC into the process increased the level of 'authenticity'. Thus, he said, companies feel that the CWC Ranking is more serious. Later he added: we leave 'opinions' and 'judgements' to others, like AfC.

I was asking him, whether he knows how the data is being used. He said: the primary audience of the collected data is the 'investment community'. CWC Ranking also did a simple survey among the contributing companies. The results was: 'yes, they were using the data'.

He mentioned that the aim is to build a low carbon economy.

Sometimes partners recognise that data might be wrong when they compile the reports. Last week one of his partners said: these numbers 'appears to be wrong', referring to 3 billion tons of scope-3-emissions. They were then asking the responding company which submitted the number. They found that they had too many zeros in the answer: it should have been millions, rather than billions. Thus, CWC Ranking improves its database. Later changes are amended and online-reports are corrected (or reports will be amended). They do not carry out any 'verification' whether the data submitted is correct. Rick: we accept data. The primary audience are the shareholders. Therefore, we do not expect companies to lie.

In case of mistakes 'we are pretty quick' to correct the data. I asked again, how often corrections take place. He replied: there is lots of checking before companies press 'submit'. Less than 5 %, about 2-3 %.

I asked what happened with the qualitative data. He said, that 'narratives' are really important: they provide much more insight about the context. Thus, one understands what numbers mean. For Rick, narratives have 'definitive value'. The problem is: you cannot put them in 'numerical scale'.

This is what one can immediately learn from Rick: he portrayed CWC Ranking as contributing to the building of a low carbon economy. Towards this aim, investors are supposed to put their money into low carbon firms. As a first step *en route*, CWC Ranking collected information and ranked companies by how transparently they reported. To make this possible they needed companies providing their carbon data. Just like GFQ's EMS-Team was dependent on subsidiary environmental managers to provide carbon data (in form of not-yet-translated consumption data), CWC Ranking was enabled by companies providing their carbon data to them. This body of contributors needed to be built initially – similar to the EMS network of GFQ having been built over a period of several years.

For corporate actors, the stake is to be perceived as green corporations in order to

attract investment by green or ethical investors. However, the latter are only interested in a ranking if it includes potentially interesting investment opportunities. Thus, for CWC Ranking it was of importance not only to attract investors but also enormous multinationals like GFQ as potential investment objects. Thus, they constituted a resource. Enrolling both types of resources brought life to the ranking.

Also the claim of quasi-scientific authority by CWC Ranking parallels GFQ's carbon reporting. Both suggest that the numbers they produced are reliable and impartial. CWC Ranking's identity with neutral numbers was strengthened by their understanding that they leave normative values (i. e. opinion and judgements) to external actors. Given a community of investors sharing a belief that sufficiently objective knowledge was possible and a nomos of objective knowledge, if CWC Ranking was not perceived as reliable, impartial and authentic the ranking would risk losing or alienating its resources, i. e. the subjects to be ranked and the investors. Note how for Rick these norms are compatible with perceiving and accepting as well as changing and adjusting data depending on whether they perceived numbers as appropriate or not. In all cases CWC Ranking was studying the data, like Elise studied the data provided by GCEs and classified it as to its acceptability. Depending on that screening, data would be changed. This shows that a simple model of transmitter-receiver does not apply well for the relation between ranked and ranking organisation. Thus, the culture of carbon emission construction encountered at GFQ is continued through CWC Ranking's approach to deal with data which 'appears wrong': data can be improved, adjusted and amended. They trust the data delivering parties – as if the latter were disinterested.

♢ *End of Section* ♢

This section aimed to extend the focus of this book by following GFQ's emissions 'out' – into a database of a ranking organisation. This ranking claimed to improve the information base upon which market participants' knowledge is founded. In economic theory, and now a hegemonic political narrative, if market actors know or can grasp the emissions of investment objects, like GFQ, these actors are enabled to take greening choices, such a switching investments to more green or, at the least, more transparent firms. Thus, the decisive premise is that market participants learn about corporations' carbon transparency performance through devices like rankings.

In the following, I draw together the empirical findings, arguing that they do not support the imaginary of establishing green(er) capitalism through *better* information.[51] GFQ had employed a coordinating agent who was to guide the orientation of those busy experts who were officially holding the replies to the ranking's questionnaire. This agent used previous responses' data to orient the experts – for these previous answers had already been proven to work well, internally and externally. While it was relevant for the coordinating agent to access authorised data, for the forms through which data was drawn together the status of data was not mattering so much. In work practice, the coordinating agent was positioned in a tension between smooth data inscription

[51]This analysis is also drawing upon a detailed engagement with the material presented in Appendix B.2, entitled *Overall analysis of how GFQ responded to CWC Ranking* (page 589).

and performing hierarchies appropriately. Data could be mobilised in many different ways, some fast and smoother, others authorised and slow. From the outset, the set-up of GFQ's response to the questionnaire was taking place on a contested, contradictory plane structured to provide *acceptable* data.

When engaging with the practices of inscribing data I found not only that data was existing in several versions, some of which were not to be reported, and that, indeed, members were designing replies to be alike the replies of the previous year's response, I also came across replies being organised to correspond with standards and to attract publics' or investors' approval. Enrolling standards in the response allowed GFQ to signal that their data were accepted or verified. Data was modalised such that coherencies between the response and standards would be perceived by the ranking's users. Present throughout the response construction was a concern for how data would be evaluated by readers. Members tried to ensure that the response would not attract critique of GFQ. Nevertheless, data construction and translation practices have been highly precarious. Though words and numbers have been checked and double-checked, ultimately, data depended on very few eyes, hands, brains and members' habitus.

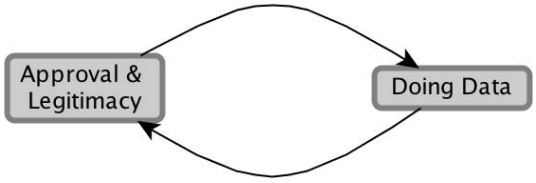
As it appeared, for GFQ to submit data, the corporation required an agent who would press a button in a web interface, and by that transmitting data. However, this was not actually the case. First, the response had already been positioned on the ranking's server before Victoria had agreed that the data would be officially submitted. Second, the notion of submission implies that data is moved from one place to another – stable data. Yet, in fact, data had been copied. And the ranking organisation checked that data. Data could easily be adapted even after submission took place. Thus, the ranking organisation could not rank more than snapshots, always subject to change.

Two stakes have been prime: doing data well and seeking approval of GFQ's carbon conduct by publics. And these two stakes presupposed each other.

Approval and Legitimacy GFQ wanted to be perceived by publics as a transparent player. Allowing CWC Ranking to present GFQ as reporting emissions was instrumental for this. Providing the ranking organisation with data established a risk at the same time: it made GFQ vulnerable. Employing signs of data already being approved (e. g. performing data as standardised) was seen as promising to increase the chances that the response would be approved by other publics. While, officially, GFQ wanted to disclose its emissions transparently, in practical reality, members aimed to shape the carbon presentation as favourable.

Doing data To enact data well, members had to enact data as exact, coherent and stable. This required members to exercise their imagination of how publics would perceive the data and, potentially, defend their imagination. At the same time, data had to be accountable. To mobilise data as accountable members aligned workers and devices in specific ways. And they had to invest their trust in that others delivered appropriate data. (And those members who were not willing or capable to provide the required data were experienced as troubling.)

Figure 4.2: Circular stake and capital relations around the Response to CWC Ranking



As illustrated in Figure 4.2 this analysis suggests that if both stakes presuppose each other, they may be resources to each other. In this case, to reach either stake, the other stake was *required*. And we find that to understand both capitals, it seems more apt to conceptualise them as performed effects rather than homogenous or substantial. As an effect of their practices, members constituted an interlocked structural relationship between both capitals and stakes. The structure was to provide a) *approvable* b) *data*.

Within this structure, agency to mould and mobilise data was distributed. There were no significant OPPs. Even CWC Ranking's web interface turned out as much more an affirmation point attaching merely authority to the response. No single actor had control over any of the decisive resources. Control over carbon within GFQ, thus, was highly situated and contingent. Nobody was able to enact carbon in a way which would encompass all concerns. At each translation step further overflows took place. The resulting displacements of modalities and meanings were silenced by techniques which conjured up coherency, such as authoring wordings in the response as similar to standards or re-inscribing data in the same way as in the previous response. Thus, if GFQ's appearance signalled stability and only gradual changes this was not an effect of passive mechanisms with direct access to some underlying reality. Much rather, an appearance of inertness or steady variation was an active achievement by members.

Not only was GFQ enrolling the approval by standards in their communication strategy (to be linked to even more approval), they also enrolled being ranked by CWC Ranking. And CWC Ranking was proud to co-operate with GFQ. Much rather than CWC Ranking scrutinising the multinational, they enacted a citational circle: they publicly referenced each other and this, I propose, signalled to market participants an imaginary of control. CWC Ranking said clearly that they know GFQ's emissions – and, thus, implied that these emissions are knowable. And by linking itself to the ranking, GFQ lent its weight as a Fortune 50 company to CWC Ranking. Together, they appeared strong. The message to markets was clear: CWC Ranking knows emissions and, therefore, control is possible. Yet, this message was fundamentally flawed. GFQ was not at all transparent about its emissions and its data enactment processes. And the corporation could not because it silenced such knowledge throughout these very processes. Thus, when we find corporations performing themselves as distinctively green or transparent, this especially makes clear that they are interested in construing themselves as in control. This is not to say that such struggle is not very real to those

involved. I contend, nevertheless, that this struggle is about receiving publics' approval rather than about greening corporations' internal processes.

It was striking that members discussed in this section were highly interdependent and positioned within contradictory interests. Marion was dependent on data suppliers – and, yet, she directed them. Victoria had to control us – and, yet, she had to trust her socio-technical network. She was positioned to perform a GFQ of contradictory aims (transparency vs. protection from publics). This predisposed her to carry the loads of contradictions built into carbon work. She took it on. Frederik tried to focus his entanglements with data on numbers (performed as positivist data) – and, yet, he engaged willingly with strategic-political inscriptions into that data, and was even expected to be far more strategically acting. Positioned such that he was to perform positivist data while not being able to resulted in a disposition which was well-known: he tried to avoid the strategic-political. The division of labour suggested that Frederik was responsible for quantities and Victoria for qualitative texts – and, yet, both presupposed and implied each other. Finally, the CWC Ranking organisation wanted to understand carbon emissions and engender a low carbon economy – and, yet, their questionnaire suggested a neatly quantitatively manageable carbon dimension.

Who has been silenced? While this setting was all about relating to publics, the latter have not been welcomed in any active position. Rather, members invested their resources to demobilise external audiences. The latter did not have access to data; neither could they realign the heterogeneous elements constituting emission facts. In this game, the main choice publics had was whether to grant GFQ approval or not.

Conceptually, the problem with the carbon disclosure movement is that it assumes a more or realist ontology of carbon. Non-efficient allocations of carbon emissions is sought to fight against on the false promise that carbon emissions *can* be disclosed. The problem is not that carbon information is absent or wrong. The problem is that it is imagined in these terms and not as being enacted. The ranking could not rank GFQ in respect to the corporation's real emissions. It could only rank it with respect to the data submitted. And this data did not represent 'emissions of GFQ' but 'carbon realities imagined as appropriate in the collective and distributed engagement of agents within and between GFQ and CWC Ranking'.

Thus, neither could GFQ provide complete information nor full. If information *is* provided, it allows for economic qualculations. Inevitably, though, it will multiply overflows. I accept that GFQ *did* provide some information. And it could always provide even 'fuller' information. Yet, at the same time, this constituted massive misinformation. The information which was provided claimed to inform users about GFQ's carbon emissions. Any information GFQ provided would normally be interpreted as more, fuller, information. This misses the point that carbon information of this sort represented less GFQ's emissions than GFQ's imaginary of which representation of emissions the corporation deemed publicly acceptable. The market is failed because it is not informed that carbon *cannot* adequately be grasped by carbon accounting, reporting

and, thus, economics. The market is informed with a straightforward *prevarication*: by saying that GFQ and CWC Ranking know emissions they neither inform publics that their statements do not point to carbon in any direct way nor that they are not interested in engaging closely with the reality of the emissions they report.

Optimistic readers will argue that even if this analysis holds, society orders organisations to purify themselves – voluntarily or with force. Standards and auditors are usually enlisted in these arguments. And I provide one more for these readers: an NGO overseeing GFQ's carbon governance. The subsequent section turns to what happens within carbon data enactment in consequence to their presences.

4.3 Aligning Legitimacy with Carbon

This section weaves together several strands pulsating throughout the activities of the EMS-Team, namely the strands of collective actors which were formally positioned outside of GFQ itself and yet interwoven with the core concerns of GFQ's EMS. Arguably, we can understand their relations as part of a *joined* exercise to conjure a low carbon economy. The question I attend to can be posed in this way: how do members enact the presence of external institutions into the EMS-Team's company and how does such a world of external accountability relate to the team's internal world? Addressing these concerns helps to scrutinise how neoliberal economy is performed and to address the power relations in the production chain of carbon emissions including, beyond GFQ, NGOs and auditors supposedly connected through standards (Busch 2010, 67).

Throughout the prior sections and chapters we already have come across a variety of organisations influencing members' practices. [52] As a way to enter this inter-organisational thicket systematically, recall Frederik making explicit his choice of how to present coverage☞ figures: in a meeting with his colleagues he had let them know that he had used the maximum of the five calculated coverages inscribed in any environmental balance sheet as a spokes entity for a GCE's total coverage. Thus, a GCE which had collected a variety of data types, each from a different office building, consequently would be equipped with multiple reference figures☞ and, hence, coverages (e. g. 37 %, 49 %, 59 %, 72 % and 100 %). With Frederik's approach, such a GCE's coverage would be represented as full, 100 %. In response, Victoria was enquiring whether his decision was in accordance with their key reference standard VfU. She, thus, called into discursive presence the existence of a standard administrated by an organisation seemingly positioned outside the team. When Frederik made explicit that his approach had not been prescribed by the standard, she considered him 'out of control' and announced to involve several organisational entities – among them the auditing company AfC, the NGO GGCA and GFQ's department FDSO. However, immediately after naming these organisations, she dropped the NGO from the list. This is puzzling. Why would she include some organisations and exclude others? Untangling

[52] The following discussion is relating to Field note extract 3.2.l (on page 165).

their relationships is the main point of this section. For that this section pays particular attention to the presences and absences of the auditor, the NGO and the standard VfU.

The grand stake in this interaction revolved around legitimacy. If Frederik had stated that his approach had been prescribed by the standard, Victoria would have read the standard as legitimising his practice. By this reading, she enacted the standard as a decisive actant over legitimate reality. As Frederik made accountable that he alone was responsible for his decision, Victoria was not satisfied. In her view, his approach required stabilisation through external actors. Arbitrarily choosing the maximum indicator to represent the up to four other indicators with lower values might have been considered illegitimate. Victoria, herself, also did not want to bear the responsibility for Frederik's approach. Instead, she announced, she would engage these external entities as resources for enacting legitimacy. As it seemed, these entities possessed something which Frederik had not possessed. I argue that this something was a specific version of symbolic capital – the ability to attach legitimacy to something.[53]

Legitimacy refers to lawfulness, to conformity of something or someone to prescriptions. In Clarke and Star's (2008, 118) account, members of a social world normally seek legitimation for their worlds vis-à-vis members of other social worlds. Thus, members can be seen as representatives. In environmental management this search is often coined as organisations seeking a *license to operate* (Howard-Grenville, Nash, and Coglianese 2008).[54] In other words, firms need a wide range of societal legitimacy to be tolerated when shaping environments. In the context of global environmental crises corporations' legitimacy to pollute has been questioned and their role in society was challenged. Levy (1997) proposes correspondingly that environmental management can be understood as a reaction to what Habermas (1976) calls 'crisis of legitimacy'. In Levy's (1997, 131) analysis, environmental management 'could forestall such a crisis by curbing the more egregious environmental impacts of industry on a practical level and by constructing corporations as responsible and green on the ideological level'. To achieve the latter, companies may start to talk green or engage with environmental NGOs (Ortmann 1997, 50-60). As a result, multinational corporations 'have, *de facto*, become part of the fabric of global governance' (Levy and Kaplan 2008), including networks like the WBCSD and the UN. GFQ was part of this fabric.

From the moment at which I entered this field, I sensed hints of the distribution of power among these organisations. ↪[55] Right on the first day, Victoria had introduced me to the impact of GFQ's partnership with GGCA on the EMS. The partnership, thus, constituted part of the body of knowledge which was required to understand the

[53] Bourdieu (1989, 21) engaged with 'symbolic capital [as] nothing other than economic or cultural capital when it is known and recognised'.

[54] The notion that organisations need a license to operate and that this license has to be supported by publics is quite old. It crops up, for example, in a Caltech study on nuclear power plant siting (Borrelli, Lees, Easterling, Pauker, Klein, and Poppe 1971). In the academic field of environmental management the idea that such a license is required is by now widespread (Bansal and Roth 2000; Gunningham, Kagan, and Thornton 2003).

[55] The following discussion is relating to Field note extract 4.1.a (on page 238).

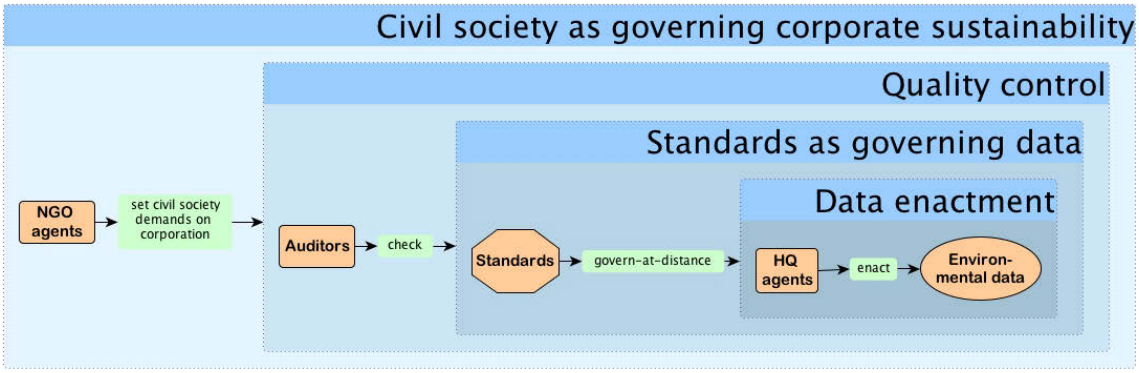
EMS-Team's workplace. In her narrative, the NGO wanted GFQ to reduce its emissions and it demanded GFQ to provide an emission reduction plan which would be verifiable. GFQ, hence, had decided to order AfC to audit their EMS, hoping for a verification of the data body underlying any carbon reduction strategy. However, as Victoria had already feared, the audit had resulted terribly: at a global scale, the data practices of GCEs were understood and, therefore, defined by AfC as not sufficient to standard.

In that rationality the role of standards surfaces. As it seems, then, standards figured as a key resource to enact carbon emission reduction. Standards provide seemingly objective rules. Following these leads to mechanical objectivity. Porter (1995) would say so to underline the imaginary of such rules being opposed to subjectivity which, as it were, needed to be kept in check. In the case of Frederik's choice of the maximum indicator as a spokes entity Victoria had judged his approach as subjective because he had not followed any rules: VfU had not prescribed his course of action. The solution to render the situation objective enough was to substitute the missing mechanical rules through external agents. In Porter's (1995, 228) account, the latter can be used as witnesses who would confirm the appropriate calculative practices. All these witnesses could engage with the practices revolving around carbon – although the practices might mean very different things to them. As an assumption of this section, therefore, I consider these witnesses all as relating to GFQ's data practices as a boundary *infrastructure* (Bowker and Star 2000). Conceptualising this situation might suggest that these different actors simply had different perspectives on carbon data practices. Mol (2002, 11-13), however, cautions against such a take. She proposes that perspectivalism leaves the body (nature) intact as an unmarked category which cannot be questioned. 'In a world of meaning, nobody is in touch with the reality of diseases, everybody "merely" interprets them.' (ibid., 11) Carbon, in the perspectivalist approach, would remain untouched. This renders the object intangibly strong (ibid., 12). We should be aware, in that respect, in how far it is generative to conceptualise these external institutions as having different perspectives on carbon as compared to studying how they *do* carbon. I propose, capital in this inter-organisational field might be the ability to control how and what carbon data would be enacted.

Busch (2010) proposes that standards and auditing firms form a new type of regime. In this account, standards are not only a boundary object but also heavily discipline their users. If this is the case, we could expect to identify hard regulation, rather than soft law. I argue that the GFQ case shows how such a hard regime can be staged without actually controlling its object, carbon. However, that carbon emissions are the decisive object, is seen as quasi-natural. Thus, dissent from this carbon as natural, the communal naturalisation exercise, would be seen as mad – or so, at least Bowker and Star (2000, 312) would argue. They propose that if several communities of practice naturalise the same object, dissent from the object would not appear rational.

By way of studying selected relations of these organisations I aim to provide a more nuanced view on the power relations within and beyond the EMS-Team and

Figure 4.3: An idealised view on the multi-layered governance of the enactment of carbon emissions



the extension of carbon enactment in this shared field. Towards this aim I engage with the idealised and actual presences of three institutions: the NGO GGCA was supposedly guaranteeing that GFQ would perform its environmental practices in a societally acceptable way; the auditors by AfC were assumed independent actors who would scrutinise whether GFQ met its own targets; and the standard VfU was required to govern GFQ's carbon accounting practices. While the idealised version of this account can be rendered into a neat figure (Figure 4.3), studying how these organisations were interwoven with the enactment of carbon results in far more complicated understandings.

Conserving Nature – Conserving Carbon

GFQ engaged in a *strategic partnership* with GGCA, a globally operating nature conservation NGO. To make sense of this partnership I elaborate the partnership's material-discursive framing and then discuss several ways of how GGCA was present in the workplace of GFQ's agents of ecological modernisation.

Following a 'stakeholder dialogue' – a 'participation' technique celebrated as a promise of democracy (Livesey 2002, 343) – GFQ negotiated a partnership with one of the dialogue's participants, GGCA, in a lake-side conference involving GGCA's Chief Operations Officer (COO) and his GFQ counterpart Ivo. This partnership constituted an investment for GFQ. GFQ paid GGCA a couple of millions USD and in response GGCA got a seat at corporate tables, influencing, as it were, corporate agendas. In GGCA's analysis, engaging with corporations was part of the solution to tackle global environmental problems. They were a type of NGO imagining the economy as solution, rather than as a problem (van Huijstee, Pollock, Glasbergen, and Leroy 2011).[56]

[56]This NGO drew resources from a supporting base of several millions individual people. It was active in many countries – similarly many as the number of those countries GFQ was operating in. In internal documents they construed themselves as equally important players in their respective markets. While environmental NGOs have reason to be worried about being used for greenwashing purposes (Burchell and Cook 2008, 36), GGCA was not reluctant to engage with for-profit firms. GGCA's aim was to support these companies in a transition towards a greener business conduct. For a more detailed

GFQ had been interested in developing a partnership by which they would establish institutional access to knowledge and competencies to deal with climate change issues and, especially, the NGO's green clientele (a consumer milieu not well enlisted as customers by GFQ). To turn this partnership profitable, GFQ was specifically interested in GGCA's understanding of green markets. In brief: GGCA would recognise if GFQ's environmental conduct was pushing off consumers. At the same time, members conceptualised the relationship as providing a source of reflexivity for GFQ: through the eyes of GGCA the corporation was to be watched. In that sense, the partnership established an early warning system on reputational risks with respect to the green image of the corporation. This kind of risk was an official category employed by GFQ and, therefore, their engagement could be framed as a potential business case.

Discursively, both organisations linked in their written communication in the language of sustainable development and climate change. GGCA agreed with GFQ that global warming was to be kept below 2° C. They stressed that climate change could 'only be tackled globally', requiring measures for emission reduction to take place globally which corresponded to both organisations' imagined global playing fields.

Victoria had asked me in the beginning of my work for GFQ to make myself familiar with the work and structure of the corporation and the unit. On the fileserver I found a slideshow about the utility of the CSR unit, which also presented GFQ's engagement with the NGO. A slide, reproduced as Artefact 4.3.1 on the next page, had been designed to convince GFQ agents about the value of partnering with GGCA.

The slide is titled 'Strategic Partnership: Thought and action leadership'. It orients the audience to a diffuse understanding that the object addressed is related to indirect gains. The notion of strategy suggests that the partnership is not of intrinsic interest but instrumental to reach the targets set by a plan. At the same time the title conveys that the object addressed is about leadership, i. e. about management and governance, rather than some immediate outcome. This interpretation is underpinned by evoking the concept 'thought'. The promises of this partnership are signalled to be quite immaterial. It seems as if the word 'action' is included in the title merely to indicate that the authors of the partnership are aware that somehow the engagement has to pay off. The promise enacted in the title is that in the long-run GFQ will benefit from the engagement with so-called partners.

Partnership in itself can be understood as a format for enacting a relationship which is more open than a simple consultancy contract. A partnership connotes parties as engaging on a level playing field. Interestingly, the slide then continues by pointing to various benefits for the corporation, and silencing the direct voice of the NGO. Under the heading the slide's designers positioned an image depicting the stereotype of a black-skinned child, happily peering at the audience from behind a green leaved bough, backgrounded by a sunny palm-like silhouette. The smiling face could be read (by the overwhelmingly white HQ audience) as indicating that these partnerships are doing

description of the relationship between GGCA and GFQ, see Appendix B.3 (on page 601).



Artefact 4.3.1: 'Strategic Partnerships: Thought and action leadership' (rendered anonymous; the word 'strategic' is cut off from the artefact's heading in this book)

good – say furthering the outlook of black, i. e. poor, children to live a happy life.[57] At stake in this framing of the slide is achieving to convey that these partnerships are morally beneficial while not promising immediate gains for the corporation. Despite this, the slide goes on and tells the reader that GFQ is 'partnering' – i. e. enacting the specific quality of their relationship – in order to achieve a number of rewards within the investment field of climate change.

The authors point to several interests which GFQ has in this field. They reason the partnership would be beneficial because it would promise the corporation to understand how the economic field is influenced by climate change. More fundamentally, however, they claim GFQ had to better understand climate change as well as what it means for

[57] We need to take note that the enactment of GGCA's presence is interfering with the enactment of whiteness. This book does not focus on the corresponding but relevant discourses of post-colonial and critical whiteness studies. This marks a blind-spot of this study – a boundary to following actants around. For a more systematic overview of this book's exclusionary boundaries, see Interlude III.

the corporation. Details are as follows: the risks are to be reduced and opportunities are to be used to further GFQ's economic interests. Finally, the partnership was set up in order to discursively move industry and emphasise GFQ's role in these moves; yet where the 'momentum' should lead to is not made explicit. This slide cannot be understood as very detailed. What the partnership was to mean in practice is not answered. However, it becomes evident that the slide enacted *expectations*. The name of GGCA was associated with promises of sessions to be learned. Furthermore, the reader has been drawn into anticipating that GFQ would adapt its operations to the existence of climate change. And the corporation was presented as engaging the partnership to understand and move other business actors. The relation between both organisations, thus, can be understood as being carried by expectations. Authors in GFQ's internal communication processes had the possibility to direct these expectations and by that shape a 'community of promise' (Brown and Kraft 2006, 324). An implicit assumption as well as a prescription inscribed in the slide was that climate change can actually be turned into a profitable topic for GFQ. Audiences were equipped with the expectation that GFQ would be acting towards working on this widely discussed topic, climate change, while securing business cases.

In another document authored by a GGCA agent, the NGO's understanding of the term 'action' had been detailed. The NGO wanted GFQ to 'measure and reduce' its carbon emissions on three levels: its direct emissions through its operations, the emissions 'of products' and 'of investment'. This book already made obvious: measurement was not happening. Emissions associated with the first 'level' are better to be conceptualised as enacted rather than as being independent of the measurement. Accordingly we may also infer that measuring, in its the narrow sense, the emissions at the other two levels was impossible. Furthermore, GGCA postulated that the corporation should '[p]romote new technologies that lead to a low carbon society'.

During the phase of my field work GGCA officials recognised that GFQ was having problems to pursue these action targets at all three levels.[58] The organisation told GFQ that 'focussing on direct CO_2 reduction [neither] adequately reflect[ed] the partnership, its targets nor the finance sector's area of maximum impact and lever'. Thus, GGCA was contesting GFQ's move to reduce its carbon accounting to its office operations and demanded that the corporation would work towards actually employing its market force to fight climate change.

In parallel to the private documentary presence of GGCA I also came across the NGO in more public spaces such as the EMS-Team's offices. It was there that I encountered the partnership in material practice every day: the NGO logo was imprinted on

[58] Actually, as their partnership dialogue became aware of, GFQ focussed only on its operative carbon accounting – which coincides with the empirical focus of this book. The NGO detested that GFQ had 'downgraded [the] importance' of the 'initial main objectives of the partnership – taking on a leadership position in the financial sector regarding its climate related impacts and leverage factors ("CO_2 compliant investment strategies" and "Green Product Development")' in favour of prioritising the measurement and reduction of emissions caused by GFQ's employees' work. GGCA attributed this shifted prioritisation to the EMS-Team. The work by that team to measure and reduce GFQ's 'direct CO_2 emissions' was considered by the NGO a 'standard task'.

calendars, decorating walls, and in the corporation's Sustainable Development Report.[59] Notwithstanding this visual politics, GGCA also was enacted as present in the EMS-Team's core practices. Visiting two sets of practices helps making this point.

The role of GGCA in shaping the transformation of the EMS ↪60 As we saw in the opening of the chapter, Dieter figured the NGO as a threat under which GFQ had to act towards installing a more reliable EMS, iconised by the improvement of data quality. In this depiction of the situation, at stake was whether GFQ enacted the EMS in a way which prevented the corporation from being sanctioned by the NGO. The resource to achieve this prevention was improving data quality significantly, which was understood to require and simultaneously establish a transformation of the EMS: a move from collecting consumption data through ESDR to employing an SAP based accounting routine. For now it suffices to recognise this: the NGO was seen as trying to influence this transformation in an indirect way. Yet, the partnership's dialogue would not steer the operative nitty-gritty details of GFQ's greening activities. Rather, GGCA was involved in governing the sustainability conduct of the corporation. That meant, however, that the NGO had not much chances to actually get to see or influence the practices of the EMS-Team. In my understanding, these practices were too low-level to be worried about in detail in the discussions between GGCA and GFQ. There was a chance, however, for another type of actor who was expected to actually engage with the technical details of greening: GGCA wanted the auditing firm *Environmental Auditor for NGOs* (EAN) to be involved. In a meeting revolving around the transformation Victoria let the group know:

☞ discussion at Section 4.4

Field Note Extract 4.3.a (IT to be accepted by external players)

initially, the new software is supposed to be audited centrally. AfC is to audit the process of collecting data. In the course of their discussion Frederik suggested that this software would be automatically audited in the process of auditing GFQ's financial accounting software. They concluded that the key stake is that any IT solution would have to be accepted by players positioned outside of GFQ.

During this discussion, Frederik let me know, whispering, that GGCA wants EAN as auditor. GFQ, however, wants AfC to carry out this audit.

The subsequent section details the stakes in the transformation process. Pivotal for the discussion here is that GGCA was imagined as wanting a specific auditing firm to audit the technical details of carbon accounting. During my field work I learned that the NGO was in a closer relationship with environmentalist EAN rather than with the global top auditing firm AfC. In the partnership, GGCA had successfully been enacted as establishing a dynamics within GFQ to transform the EMS. Whether the specific transformation which GFQ was engaged in, however, would suffice, needed to be confirmed by actors imagined as independent, i. e. externally positioned auditors. Yet, what 'external audit' would mean was a contested question in itself. While in principle

[59] For a more detailed description of the calendars see Appendix B.3 (on page 602).

[60] The following discussion is relating to Field note extract 4.a (on page 232).

an EMS can be audited, the political sponsor of GFQ's EMS, Ivo, did not want such an audit to take place.[61] Nevertheless, members pursued the aim of transforming the EMS to be audible. At stake was, thus, enacting the EMS as accepted.

To summarise: GGCA was enacted by members as an actant which was pressuring GFQ to ensure that the corporate EMS produces high quality carbon emission data. At the same time, the NGO was enacted as not of relevance to GFQ in devising the technical details of carbon accounting. However, Frederik's move of whispering in my direction that GGCA was interested in the choice of the auditing firm, suggests that individual environmental workers were aware of the decisiveness of the nitty-gritty and, thus, of the relevancy of the NGO being excluded from direct access to the 'technical'. The actual capital to govern carbon and to secure public approval were less memorandums of understandings than steering who would see and handle data.

The role of GGCA in carbon offsetting Repeatedly EMS-Team members enacted the inclusion of the NGO into their decisions about employing CER credits for offsetting GFQ's emissions. ↪62 In a discussion between Victoria, her consultant George and Elise about using CERs, Victoria argued against the other two: Victoria claimed that GFQ should not offset its emissions but, rather, focus on actually reducing emissions. George and Elise, in contrast, wanted the corporation to resort to offsetting products to reduce emissions on paper. In the course of their discussion, several stakes were conflicting in parallel. First, GFQ's reduction of its emissions was an issue. Several means were seen as possible to achieve emission reduction. However, these means differed in their costs and their controllability. Buying offsetting credits involved very different costs and (im)possibilities of control compared to e. g. a global green purchasing policy for advertisement materials (figure all the glossy brochures advertising insurances for burglary damages or car crashs). Second, the NGO was not to be irritated. The partnership was at stake from Victoria's point of view. GGCA had stressed that GFQ's carbon governance should prioritise actual consumption reduction over offsetting accounting solutions. The means to enact this partnership, Victoria implied, was to act in accordance with the prioritisation demanded by the NGO. Third, for George the gist of carbon emission offsetting was at stake. He aligned himself to the properly working nature of the offsetting industry by pointing to himself: he claimed to have followed the carbon offsetting payments and, by that, evoked the role of the witness.[63] The resource he employed was his authority as a direct and indirect witness of the proper working of the offsetting mechanism.

Whilst all three of them agreed that carbon emission reduction was a key issue, they related emission reduction to competing institutions: the norms established in

[61] Below I detail GFQ's relation to greening standards. This entails a more nuanced description.

[62] The following discussion is relating to Field note extract I.d (on page 65).

[63] The notion of witness resembles the powerful claim in science of scientists to have witnessed some phenomena (see e. g. Shapin and Schaffer (1989) for a historical study on the role of this notion and see Haraway (2006) for a critique of the idea that witnesses could observe neutrally (like a modest omniscient observer).

the partnership with GGCA versus the gist of emission trading. In the course of their meeting, they managed to achieve a shared understanding of what institution they could all relate to. ↪[64] While Victoria tried even to mobilise the financial value of the partnership, only enrolling board member Ivo, finally, established a currency which George and Elise accepted. Victoria's claim over her alignment with the authority of a member of the board of directors was, thus, a capital. All the other resources which members struggled with for their stakes did not constitute capitals which the opposing side was accepting. Next to the aim of carbon emission reduction, only the approval by the institution Ivo was shared as worth struggling for. The distribution of the resources 'authority to interpret GGCA's voice' or the 'definition of the import of emission trading' was not decisive in their struggle. In this case we find, therefore, that Victoria attempted to enact GGCA's presence as a capital in the field of contesting the means for emission reduction. However, in that very internal strategic discussion, this tactic was not guaranteeing immediate success. Bringing GGCA into presence did not seem decisive in shaping HQ's emission reduction conduct in this situation, but the enactment of the authority of a member of the board of directors was allowing to turn the discussion towards a conclusion.

Still, Victoria's position was relevant. For GCEs turned to *her* definition of GFQ's emission reduction policy, she was positioned to bring into presence GGCA and let the NGO's stance mark offsetting decisions. This was the case in a digitally mediated interaction between Victoria and the Australian GCE:[65] the Australian environmental manager sent Victoria an email declaring that they considered buying ahead carbon credits on the voluntary emission trading market – i. e. VER credits. They imagined to use such a supply if their GCE was experiencing reputational pressure caused by the discrepancy between their environmental conduct and advertising green products.

Contacting Victoria, he had enquired whether GFQ's carbon accounting would actually allow them to integrate such emissions reduction or carbon neutral consumption activities (their issue was exercising a carbon neutral car fleet). Thus, for the GCE the issue was a technical question of whether carbon offsetting would be recognised at all. If HQ did not allow to subtract emissions within an environmental balance sheet anyway, buying offsets would not pay off. For the Australian agent the technical question was linked to managing reputational risks. They imagined that buying ahead VERs promised cheaper prevention of reputational damages than buying carbon credits closer to the target year for which the emission reduction target had been formulated.

In Victoria's relation to the Australian request two issues have been prime. On the one hand, she was confronted with a more widespread phenomena that GCEs wanted to offset emissions. This required environmental balance sheets and ESDR to allow to inscribe and represent GCE offsets or carbon neutralised consumption. On the other hand, she translated the emission reduction policy established with GGCA into

[64] The following discussion is relating to Field note extract I.f (on page 66).

[65] A detailed description, discussion and analysis of this interaction can be found in Appendix B.3.

presence. She announced checking with GGCA and the auditor how to engage with this strategic question of accumulating a supply of carbon credits.

In their email exchange, two issues were of most concern: would the deal pay off and would it be accepted by some legitimator. For the Australian agent, the legitimising actant was Victoria; for her it were GGCA and AfC. Thus, in this interaction, the role of the NGO was to provide legitimacy to carbon accounting techniques. For Victoria, GGCA constituted a legitimising resource. While I did not follow the Australian case, I can report that, after all, the German GCE was eventually offsetting some of their car fleet's emissions.[66] In a critical reading, of course, consumption reduction of car use is possible as long as cars exist. Yet, such a critical perspective was not performed by actants aligned to GFQ's carbon governance. The NGO did not prevent these offsetting practices to take place even though reduction was still possible. Much rather, GFQ's environmental balance sheets and their emission sums, ultimately, were enriched – or disfigured – by the inscription of the possibility for neutralised consumption as a standardised engagement with emissions.[67]

With respect to carbon offsetting we find, thus, that the NGO was dependent on being enacted into presence to inform agents. While for Victoria the interests of GGCA were relevant, for other environmental agents, primarily, approval by superiors was at stake. Seen the other way around, approval generating institutions like a member of the board of directors or the NGO could be enacted as capitals to invest into specific courses of carbon conduct.

This engagement with the enactment of GGCA's presence within GFQ allows us to draw three conclusions. (1) We found that the NGO was criticising GFQ's *de facto* reduction of carbon accounting to the level of measurement and seeming reduction of the *office operation*'s footprints. In contrast to this level of carbon accounting, originally, the partnership between both organisations had set out with the 'grand' aims of carbon accounting and emission reduction as well for GFQ's products and its investments. However, this demanding character of the partnership was not even voiced in the CSR unit's depiction of their engagement with GGCA. Rather, GFQ's agents for sustainable development were portraying the partnership as providing moral legitimacy whilst emphasising that GFQ had not committed itself to any weighty climate action. Through the partnership, climate change was to be translated into a profitable field of engagement for the corporation. Thus, the formulated political expectations on the partnership from GGCA's perspective were not met.

(2) In contrast, however, within the field of activities revolving around GFQ's operative carbon accounting, GGCA was enacted as a decisive actant. The NGO was used within GFQ as a representative of the claim to improve the measurement of carbon emissions. Interestingly, thus, legitimacy was outsourced and subsequently enlisted for internal

[66] See Interlude IV for more details on GFQ's offsetting engagements.

[67] See the fields declared as environmental impacts '8) Neutralisation of greenhouse gases (GHG) emissions in tons (kg per empl.)' of an environmental balance sheet.

struggles. Thus, beyond what already Bachram (2004, 11) alluded to when writing about 'outsourcing legitimacy' to NGOs (i. e. saying that corporations draw on NGOs as legitimising agents in their public relations), I find that NGOs may also be employed for internal contestations. To improve GFQ's measurement of emissions the EMS was to be transformed, pinpointed to the boosting of data quality. Yet, while GGCA was used as a legitimatory resource for a seemingly tough implementation of GFQ's carbon policy, the NGO had little access to the nitty-gritty practices of the enactment of carbon emissions. Thus, empirically we can support Kuhn's (2008, 1246) contention that for business it may be perceived as unwise to actually engage in dialogue with its stakeholders. GFQ even excluded the auditor which was positioned closely to the NGO from overseeing the corporation's carbon accounting. Being enrolled as a legitimising resource did not entail access or control over carbon.

(3) We gathered an ambiguous impression of GGCA's influence on explicit carbon decision-making. While we find that in some fundamental carbon governance decisions GGCA's approval was not considered decisive, Victoria repeatedly pointed to the need to ensure accounting practices to be confirmed by their NGO partner. Successfully, she voiced as GGCA's interest that carbon emissions were to be reduced or substituted by seemingly greener consumption practices rather than offset via emission trading. Crucial to our conceptualisation of EMS-Team members' structure of their workplace is that the NGO's presence was dependent on being enacted by corporate agents. GGCA's influence was contingent on being performed by members; yet even if EMS-Team members gave life to the partnership in this way the appearance of the NGO on the carbon stage was not necessarily having any impact. After all, offsetting took place – GGCA's petition for actual reductions rather than textual offsetting contracts was not turned into material politics.

These three points show that within the EMS-Team's workplace the NGO's position was precarious. Even so, the partnership allowed agents within the corporation to restructure the carbon accounting field to some degree. Bourdieu's (2001, 27) understanding that actors can acquire dispositions is helpful to understand the relations between EMS-Team members and GGCA. By rendering the NGO present in their interactions, members were able to enact the corporation as disposed to act in accordance with greener standards than without GGCA. Members used the NGO as a legitimatory resource to struggle for positioning GFQ as a green *Vorreiter*. The justification of environmental action of higher standard could either take the form of pointing to the threat of GGCA's potential moves against the corporation or staging the partnership as a positive incentive for improving GFQ's position on the market. These two forms were inextricably linked. GFQ's positioning in relation to GGCA effectively transformed the dispositions of the organisations and, therefore, of employees.

Yet, these dispositions did not determine action: while the NGO was present in documents and meetings, their relevance had to be enacted by agents situationally in order to position the corporation towards GGCA's claims. Whether or not to embrace

the 'partner', thus, was always a political move. At stake was whether members wanted a critical onlooker. Sometimes and by same agents, such role-taker was welcomed, often not. If, however, members enacted GFQ as disposed to engage with GGCA's interests and if other members participated in enacting a situation in these terms, then the support by the NGO could be enrolled as a capital, as in control over carbon accounting. Clearly then I have to conclude that a 'seat at a table' (Kuhn 2008, 1246), i. e. an actualised representation in an internal negotiation is not guaranteed by being positioned in documents.

GGCA engaged in a partnership which claimed to serve conserving Nature, especially contributing to serve the 2° C aim, while the partnership was built upon the continuation of emitting greenhouse gases. Neither formal reality of the engagement of GFQ with the NGO nor members' practices did in any way structure situations such that GGCA was in control over GFQ's (environmental) conduct. Much rather, we find that the NGO's symbolic link to legitimacy has been enlisted – for internal as well as for public relations.

Auditing and the Illusion of Control

Auditing was present – every day. Yet, how was the realm of auditing enacted into presence within the workspaces of the EMS-Team? Repeatedly, we have come across AfC, one of the world largest auditing firms. While I never physically met human agents employed by AfC their presence was, however, physically and informationally quite constantly enacted in the workspace. For example in this way: one morning Victoria asked me kindly to ensure that my external appearance would satisfy the eyes of auditors (in a period preceding this event, I had been wearing mostly dark pairs of trousers and jumpers[68]). I, thus, had to imagine what suite they would expect GFQ's workers to wear; a short-cut solution for me was imitating the clothing style by male employees who I encountered all-day. Thus was the company of the auditors impressed on my body. Also, we observed that Victoria and Frederik enacted the presence of AfC as significantly shaping their own work practices. The following pages serve to elaborate how auditing shaped the carbon work realities in the workplace.[69] I draw upon the work by Power (1996, 1999) on the *Audit Society* in order to contextualise AfC's relation to GFQ in the wider discussion of auditing. With this discussion I aim to establish a firmer ground for debating how control over carbon was structured. For that, we have to go beyond Bachram's (2004, 4) account, problematising that *de facto* auditing companies act as accountants, consultants and verifiers at once.

I set out by positioning this discussion in terms of two significant debates, audit society and the performativity of economics' engagement with auditing. I continue by

[68] My field work period started off in suit and tie; I then had adapted to other cheap labor colleagues' external appearance. Victoria's intervention turned me back to suit and tie. See also Interlude III.

[69] Methodologically, this analysis is drawing on the study of the aftershocks of AfC's audit of GFQ's EMS, i. e. the enactment of AfC's presence, rather than an actual audit.

showing how the AfC framed the audit of GFQ's EMS. This finally leads to the main concern of this discussion: qualifying what control has meant in auditing situations – in theory and in practice. I detail this qualifying by showing how AfC simultaneously was enacted as a chance, a partner and a threat.

From *Audit Society* to Performativity of Auditing Theory Above we encountered Power's (1996) work when pointing out that GFQ's EMS did normally not 'find' environmental consumption or carbon emission facts anywhere. Much rather, these facts needed to be 'built'. These factual claims needed to be hardened by members such that they could be performed as 'natural' vis-à-vis diverse audiences. Consequently, we need to question: were EMS processes designed to be audible or were they substantially about environmental change? Power's work is relevant for our engagement with GFQ's carbon practices because his claims directly affect our conceptualisation of the carbon knowledges which EMS-Team members were enacting. He argues that auditing itself is co-constructing that which it seeks to audit; i.e., in his analyses, auditing 'plays a decisive role in constituting the environment of cues itself' (291) – cues to the reality which auditors need to have access to in order to evaluate the auditee's representations. Following Power (1996, 290), auditing is normally understood as beneficial for corporations because it provides an auditee with additional knowledges pertinent to the auditee's practices and artefacts.

For example, Power suggests that while invoices may be not constructed solely to serve being auditable (295), other evidence may not be that readily available. With regard to his work, the analysis undertaken in this book adds an empirical study to the scholarly engagement with the practices which bring auditable evidence into existence. His discussion of environmental management systems emphasises that audits of these systems stress the 'compatibility of commercial and environmental imperatives and [aim at] the "production of comfort" for varied constituencies' (304). This comfort is fundamental to produce a commodity (Pentland 1993, 611). Carbon has to be comfortable. AfC is to render GFQ's carbon into a comfortable emissions commodity. While critics of Power's thesis (e. g. Maltby 2008) point to the fact that audits may also produce unwelcome results, Power (2008, 402) maintains that auditing overall creates 'illusions of control and comfort'. Sometimes societies or communities stop trusting audits. If indeed publics are able to transform their relation to audits and auditors, this book addresses a worthwhile issue. Furthermore, as auditing is considered playing a central role in management and business strategy theory, theories of auditing may well have performative effects (Callon 1998b). However it is in this respect, following Miller (2002, 229), that this book calls into question the thesis that economic (or auditing) theory is performative in the quality some of Callon's work suggests. In the following, I like to develop an argument which empirically grounds an understanding of the power of auditing agents to transform the world according to their theories.

Setting the Scene for Being Audited by AfC In the opening of this section we came across Victoria: she had made clear that GFQ's carbon emission reduction strategy needed to be based in a firmly grounded emission data base. However, as 'reality' did not speak for itself, another voice needed to be invited to evaluate the representational quality of GFQ's emissions. While the corporation's NGO partner preferred the 'environmentalist' auditing firm EAN to carry out this audit, GFQ engaged in an audit agreement with AfC. AfC was one of the so-called Big Four. The latter expression indicates the auditing market structure: four corporations constitute the oligopoly in accounting/auditing companies.[70] For GFQ to work with one of them was promising because it would signal internally as well as externally that GFQ was working according to the hegemonic auditing practices and standards. For our analysis, AfC must be considered as (more or less) competing with the other three auditing companies. In fact, during my field work, I came across the presence of two of the Big Four within GFQ's CSR department. For AfC, thus, at stake was doing business with GFQ. I assume this rationality: the more contracts AfC was engaged in with GFQ, the bigger would be its market power as well as its power to shape GFQ's work realities. In order to ensure that GFQ would be satisfied by the auditing services, AfC – I expect – needed to ensure engaging in an at-least acceptable audit process.

However, the relationship between AfC and GFQ did not seem like a textbook-like business relationship. Rather than simply swapping money against an audit service, I found cues to the strategically designed character of how these organisations engaged with each other. To illustrate, as part of a workshop[71] in which AfC presented its approach to the gathering and publishing of carbon information to several of the world biggest multinationals, presentation slides attributed to AfC evoked as a common conceptual structure the 2° C aim – thus, enacting the discursive continuity between AfC and GFQ. The relationship between the auditor and GFQ was, furthermore, moulded into a triangular organisational inscription. The CSR unit's file server provided a document entitled: *Memorandum of Understanding regarding the Cooperation of [GFQ, GGCA and AfC] within the framework of the Analysis of the direct Footprint of [GFQ] and the Evaluation of the CO_2 Reduction Strategy.* The existence of this document indicates that these actors were interested in identifying vis-à-vis each other the scope of carbon accounting and the role of the respective actors within their cooperation. Practically, the document inscribed a shared understanding of the aims of GFQ's carbon emission reduction policies and AfC's auditing tasks. The authors specified that

[70] The 'Big Four' in the auditing market refers to Deloitte & Touche, Ernst & Young, KPMG and PricewaterhouseCoopers (mostly referred to as PwC).

[71] A brief note on method seems apt. The workshop was scheduled to take place shortly *before* my study at GFQ commenced. I assume that this workshop was actually held and that the presentations which carried AfC attributions to authors were designed by the auditors. For this analysis I use shorthand formulations of AfC authors and the activities attributed to the workshop in order to refer to this status of evidence. The EMS-Team's folder on the file-server contained only a small number of folders (data was thoroughly hierarchically organised); one folder at the top level of the EMS's section was designated to the workshop organised by AfC. I interpret this positioning as a performance of the important status of the knowledges shared and enacted at this event for GFQ's EMS-Team.

within the auditing process, all three organisations' agents were to provide each other 'proactively' with 'all relevant documents'. Thus, the audit of GFQ's carbon accounting was positioned in a field in which on the one hand AfC needed to ensure that the audit would be perceived as acceptable (and encouraging for doing further business) by GFQ while, on the other hand, GFQ's agents assumed that their invited 'critic', GGCA, would be informed about the audit process and outcome.

Qualifying Control At the workshop, AfC agents presented several slides which set the terms under which their audit was to be understood. The specification of the auditors' requirements on the establishment and publication of non-financial data is of particular interest for our analysis. A straightforward move of these slides was to establish the auditors' view on data as focussed on the data construction *process* which would be supported by samples and checking the result of data construction. The AfC agent pointed to all kinds of technical details GFQ was required to consider – such as clearly enforcing the boundaries enacted in all kinds of dimensions, regulating the formatting of forms, files, databases as well as of units or of decimal places. GFQ was to ensure all kinds of control processes, including manual and automated checks, integrated, internal and external examinations, carrying out time series, regulating access to data, ensuring that several people checked data, requiring explanations for deviations over time from GCEs. Having worked through this book so far, we recognise immediately the significance of these technical details for the enactment of carbon data emissions: they all relate deeply to the configuration within which carbon is enacted.

Subsequently to pointing to these details, the AfC agent translated these requirements into a doable job. He introduced this translation with a quote from *My Fair Lady* – a story, musical and film about performativity itself? – in which Professor Henry Higgins voices: 'The French don't care what they do actually, as long as they pronounce it properly.' On the slide, the AfC author performed a specific interpretation of this quote. He suggested that as long as the subject (the French, the carbon accountant) uses the adequate sounds for a statement the subject will be able to venture about anything. The slide specified (translated, verbatim):

> Assumptions, estimations, non-reporting of specific facts, non-consideration of themes, modification of earlier communicated data, deviation from data communicated elsewhere ...
>
> - ... all this is acceptable, as long as you make it sufficiently transparent for the audience!
> - ... and a fundamental extent of data series' continuity and the statements is maintained.

Artefact 4.3.2: 'Higgins' Law of Sustainability Reporting'

We need to recognise that the list of statūs named at the beginning of the artefact was grouped by the slide but not associated with a specific word. The slide simply used the terms 'all this' to refer to the list of statūs. These statūs of data, facts and reports were all part of the expected reporting and data construction work reality of a practitioner. However, they were all *deviations* from the norm – the norm of perfect

data realities, of statements which speak 'truly' to the audience and transparently, as it were. A way to make sense of this list of accepted imperfect realities is to consider this knowledge as tacit; and, yet, as an exception, this practical reality has been made explicit. I conceptualise this list as a *hint* for our interpretive engagement: we can think of the list as signifying *mess*.[72] AfC was making explicit that it recognised the existence of the signified. Power (1996, 298) makes a supporting point: auditors may be perfectly fine with accepting that reality is not represented as accurately as possible as long as accuracy is sufficient to result in meaningful representations and supported that the latter are auditable. Yet, two slides on in the presentation by AfC, after enacting this recognition, the author constructed huge claims: *all* data was to be complete, correct, up-to-date and replicable; the presentation's slides emphasised further AfC requirements on the digital representation of data, i. e. on software. Three points are key for our discussion: First, *integrity* was defined as 'data and systems are completely and correctly available [. . .]'; second, *completeness, correctness and being up-to-date* were characteristics demanded of each data as well as the total data body; third, under the heading *replicability* the slides postulated that the data would have to be organised such that non-GFQ experts would be able to comprehend that processes represented by the data in an appropriately short period of time.

These points entail a tension. The artefacts clearly suggests that all kinds of idiosyncrasies, specificities or contingencies in data are expected and accepted by the auditing firm. Albeit this acceptance was declared to the customer, i. e. GFQ, the auditors afterwards raised enormous demands on the data and their organisation. We may understand these seemingly conflicting groups of statements as perfectly fitting to two inter-dependent issues at stake here. If AfC wanted to keep GFQ a happy customer, the auditors had to make recognisable that they accepted the messy reality of carbon data. Were the auditors not signalling that they knew perfectly well that there was no way that data could ever be non-messy, EMS-Team members of GFQ would be positioned with an incentive to search for a more realistic auditing engagement. Yet, at the same time, AfC also needed to indicate that they would measure GFQ with respect to highest standards – after all, GFQ was to be performed as best-in-class and AfC as the pure priest (Pentland 1993). The norms of completeness, correctness, being up-to-date and replicable are important coordinates for the staging of proper data-handling.

Goffman's (1959) notions of backstage and frontstage may be of help to think through the relations between these two seemingly opposing stakes. Auditing is positioned right in the middle between both stages. While the workshop and the presentation were enacted backstage (in the heart of the corporate circle within which the event took place; this event cannot be found on the public internet), the corporate actors present were all interested in frontstage performances. By means of the presentation, the auditing firm was indicating that they recognised well the reality backstage and were at the same time able to support the customers in their frontstage performances

[72] I discuss my usage of the notion of mess in detail in Section 5.4 (entitled *Accommodating Mess*).

by relating the corporation to the hegemonic norms of perfect data handling.

AfC was able to balance these divergent backstage and frontstage requirements by declaring the acceptance of messiness under certain conditions. In the relation between GFQ and the auditing firm, GFQ's actors would be the ones who would grant (surely firmly embedded in corresponding discourses) AfC the authority to make such declarations. And the EMS-Team's members would have to invest their trust in that AfC would not suddenly start to ignore the formerly recognised tacit knowledges about data handling. The position of AfC in the field likens any ruler's position who is utterly dependent on subjects to trust and support the ruler. Without followers, the ruler loses her power. Wanting to ensure that trusting the auditing firm in which GFQ would invest is least risky seems an additional reason for the corporation to engage with a Big Four auditor. Belonging to the Big Four indicates to potential customers that they are so much followed by other customers that it would be unlikely that suddenly followers would start doubting the auditor as a reference agency.

The structure of relationships here is one of customers who need to invest their trust in the auditor. And for the auditing firm it would seem utterly irrational to behave in a way which would put off customers. It is in that respect that the auditing process cannot be governed solely by determinate rules. Much rather, customers and auditors need to find consensuses about what constitute appropriate compromises between the norms of perfectness and practical data handling realities. In Power's (1996, 298, original emphasis) words:

> Hence, far from being an objective and neutral property of information systems, auditability is largely a product of a consensus about the nature *and detail* of evidence required by those whom the audit is intended to serve. This consensus about the 'appropriate level of detail' reflects a certain *style of verification*, a style which is not necessarily natural or objective but which serves institutionally legitimate 'rituals of inspection'.

To summarise, from the outset in the auditing process, EMS-Team members were positioned in a mutually dependent relationship with AfC's auditors. However, if we conceptualise AfC as one of the Big Four in the auditing business, we recognise that while AfC needed GFQ as a customer – but many other customers were available, EMS-Team members had a much smaller choice *if they wanted a Big Four firm* to audit their data. It is also significant that the performed imaginary of data was one of recognising the contingency and messiness of data handling. Making this explicit, configured the distribution of resources in the field: EMS-Team members were now equipped with the possibility to demand their practices to not be solely audited with respect to perfectionist norms but they were now enabled to require the auditors to engage with the nitty-gritty of practical work.

How was control through AfC inscribed in situations of data enactment? Three cases on the distribution of agency revolving around the enactment of AfC's presence suffice to develop my argument on auditors' role.

AfC as a chance Above, in the discussion of the NGO, we encountered the Australian GCE's wish to purchase carbon credits as part of their reputational risk management.[73] In reaction to this, Victoria enrolled a set of statements about what AfC would want GFQ to do. She enacted the content of the auditors' message in this way: the GCE was supposed to reduce their emissions *as much as possible*; furthermore, before resorting to offsetting techniques, the subsidiary was asked to provide a thorough reduction plan. Of this, note that such a reduction policy prescribed by AfC can only be understood as a perfectionist statement as discussed above. This frontstage status had to be recognised by practitioners. In an audit situation practitioners and auditors would have to negotiate whether they would both be willing to enact the reduction activities as having been *sufficiently* undertaken before employing CERs/VERs.

Whether or not Victoria had actually received this message from AfC, her enactment of the message shaped the paths dependent on this situation. The Australian GCE's agents were now able to demand to not be evaluated with respect to additional specific backstage criteria; much rather, these agents could ask auditors to openly negotiate the sufficiency of the GCE's emission reduction activities.

Victoria's move to enact a AfC message in the discussion with the Australian managers rendered the discussion of utilising offsets for decreasing the sum of carbon emissions legitimate. In that respect, the relation between GFQ and the auditor positioned the customer to have the chance of learning from AfC whether certain practices would be acceptable. The auditors had been included in shaping the decision. If AfC did not make recognisable that certain practices were not acceptable, *ipso facto* the practices' statūs were transformed as appropriate and, thus, safe to resort to. Enrolling AfC can, thus, be understood as a chance to legitimise specific entities or practices.

AfC as a partner We also learned how important it was for Frederik to have his data construction practices accepted by AfC. ↪[74] One data handling issue addressed in the audit process, which Frederik recounted for me, was about the *problem* that sometimes the organisational boundaries did not map onto physical boundaries. In practice, several GCEs were housed in the same office building. Frederik experienced AfC as an understanding organisation. The auditors recognised this backstage issue and did not formally sanction him for the resulting problems. The latter have been that GFQ's top environmental manager had been routinely carrying out a combination of specific spreadsheet operations which did not meet at all AfC's criterion of organising data in a way that it can be comprehended and replicated in an appropriately short period of time. Albeit Frederik had chosen to go for the not-that-easily-comprehendable data construction, he had at the same time opted for (the aim of) representing reality more accurately. In this situation we find that AfC was not able to exercise the control

[73] The detailed discussion of this situation can be found in Appendix B.3.

[74] The following discussion is relating to Field note extract 4.1.c (on page 243).

it was supposed (and paid) to carry out.[75]

Auditors had to believe the practitioner that data practices were actually delivering what they were intended to do. The way auditors and Frederik related to each other here resembles a discussion by Power (1999, 80) on the relationship between auditors and practitioners. If auditors encounter new practices the latter would be unauditable. However, a way to consider a practice audible is to use the practitioner as a proxy. A practice is not judged (un)reliable on its own. Instead, Power proposes, the reliability of a particular instantiation of a practice is constructed in a social consensus among auditors. The practice becomes generally accepted if auditors consider its practitioners credible: if 'their expertise can be relied upon [...] the numbers they produce become auditable' (ibid., 80).

AfC considered Frederik's practices credible and accepted his part in the EMS. In parallel the auditors let GFQ know that the corporation would better reorganise its practices, i. e. its EMS, such that the practices would not only be accurate but also replicable. One resulting conclusion for the auditors has been this: they suggested that GFQ's EMS could not actually be considered a *system* because of its dependency on specific *humans*. For Frederik, the auditors appeared here as a partner in the controlling exercise: they helped checking GFQ's internal system of control. The EMS was a first order control system and enacting the EMS as an auditable object allowed to perform auditing as a second order control (Power 1999, 82). Together, EMS-Team members and auditors were imagining themselves as improving GFQ's carbon control system.

AfC as a threat I turn to a meeting of Victoria with the top coordinator of all of GFQ's Sustainable Development reporting, called Ellen. Her task was to gather data from within GFQ and translate these into responses to all kinds of questionnaires by rating agencies (including e. g. CWC Ranking), investors, indices as well as to prepare GFQ's Sustainable Development Report. In this particular meeting Victoria had updated Ellen on the status of the transformation of the EMS and the corresponding organisational environment. This included sharing auditing criteria and conventions as she learned about them from AfC.

Field Note Extract 4.3.b (Deleting data)

> *Victoria told Ellen that AfC wants them to document 'contents' – not merely the processes. Ellen recounted, that for one report she got differing numbers on the same issue by X and Y. X and Y then agreed midway. Thus, she suggested: 'better that I deleted this.' Victoria did not dispute. Shortly afterwards she pointed out: other corporations are no better.*

In this brief exchange Victoria opens by pointing to a counter-intuitive interest of the auditing firm. As we have seen above the EMS is all about constructing data

[75]The very point was that the materiality of the environmental balance sheets was seen as unpredictable by the auditors. That technologies are situated in generative but intrinsically unpredictable ways in the world, constantly altering how they are and become, has been a main point in feminist techno-science studies (Haraway 1991c; Barad 2003). Clearly, any carbon accounting technology used by Frederik was out of control for the auditors.

handling *processes* and designing an organisational *system* which, when run, would in small degrees – but still constantly – improve GFQ's environmental performance. Key for getting this system audited was detailed documentation of the prescribed practices, information flows and causal mechanisms within the system. The *raison d'être* of auditing an environmental management *system* is that the auditor does not have to bother so much about the minute and contingent details in an organisation. However, Victoria communicated that AfC, nevertheless, asked for documenting the actual practices and contents members worked on. In reaction to this, Ellen pointed to good reasons for not documenting all of what Victoria just had demanded through this story:[76] Ellen told Victoria what it actually may imply to gather data. In her story other actors existed who were to deliver a fact to her. However, while each of them delivered a fact to her, these two facts have not been identical.[77] The practical solution which these actors advanced was to identify a value at the midst of both claims and use this one as the singular response to the question which Ellen sought to answer. Using this singularised manu*fact*ured entity was safeguarding Ellen's position relative to the option of being confronted with staging data as non-coherent. Victoria did not explicitly disagree with this practice but was silent for a moment and, then, pointed the meeting to her understanding that any organisation would be positioned in a similar way: all corporations consist of people and entail non-coherent data. In my understanding, for Victoria it seemed an unfortunate but the only available reality which she felt they had all rights to accept and practically relate to.

And this point has theoretical implications. First, the auditable stage is not jointly and equally configured by auditors and auditees together. Members have to engage in 'a process of constructing a particular kind of auditable front region for an organisation' (Power 1996, 303). The to-be-audited reality may be co-constructed by auditors more or less. We find that members may carefully chose which realities not to offer to debate to auditors. Second, we find evidence which supports Miller's (2002, 230) interpretation of members reaction to auditing. Practitioners may well learn what realities are *normally* provided to auditors for inspection in order to allow the practitioner performing the 'normal'. In addition, I suggest, that members may also use taken-for-granted knowledge on the imagined other to guide their construal of reality. It is in this respect that indeed formal economic and audit theory does only *partially* shape members' work practices. The performativity of theory is limited.

AfC's audit resulted in a mixed report. While they considered some GCEs as not having provided sufficient quality of data, other GCEs and the HQ's data processing were labelled as having provided data accurately enough. However, the auditors considered GFQ's overall carbon data management system as not 'professionalised'. From their point of view, too many humans – read: too little automated data processing algorithms (which Porter (1995, 91) would call 'mechanical objectivity') – were managing GFQ's

[76] In the subsequent chapter we engage in more depth with the theme of 'good reasons for bad records' drawing on Garfinkel (1967, chapter 6).

[77] The issue of non-identical facts is discussed in detail in Section 6.3 (entitled *Multiplicity*).

carbon data. In effect, albeit the auditors recognised that selected entities within GFQ engaged in acceptable ways in their carbon accounting, they did not provide an assurance that GFQ's carbon data management was working correctly overall.

In the received view, stating that GFQ's carbon data could not be labelled positively implies that *if* GFQ had ensured internally all practices to work correctly, AfC would have provided assurance of GFQ's carbon data. Our analysis, however, is providing a competing interpretation: rather than considering at all a binary claim on the assurance of the quality of the data we are able to question what *any* auditing statement means and how the evidence and data handling processes have been manufactured.

To summarise the discussion, I like to emphasise two forms of capitals which underlay the way auditing co-structured the EMS-Team's work reality. First, access to and power to create, manipulate or share *data* is key to most engagement with carbon. Second, interrelated with the enactment of data is another entity: *trust*, and in effect legitimacy, to define the rules of carbon data enactment. In practical situations, the distribution of both types of capitals was differing. While practitioners of data enactment (like Frederik) had access to all kinds of numbers and documents, the auditors had the ability to shape the norms according to which data should be handled. A caveat is necessary: one EMS-Team member was actively shaping the standard VfU.

However, it is here that another distribution of resources becomes relevant: economic capital. GFQ had a wide range of choice among competing auditing firms. The client seemed positioned quite well to chose an alternative auditor (albeit not so big a choice among the Big Four). At the same time, AfC was not dependent on this particular auditing contract with GFQ. Furthermore, we found that the auditor's formal conclusion of the auditing engagement was that GFQ's EMS was mostly not yet enacted well enough. However, this valuation did not seem to cause any immediate fundamental trouble. The fact that AfC had not approved of GFQ's environmental and carbon accounting did not leak to wider publics. As part of GFQ's internal problem-solving and recognition system GGCA emphasised attention to these accounting problems. Actors within GFQ concluded by deciding to improve the set-up of the EMS and its carbon accounting. Thus after the audit the situation revolving around the EMS-Team's situation was structured in this way: auditors had criticised the carbon accounting system, GGCA was asking for reliable carbon data, and GFQ had decided that the EMS would have to be transformed to enact all the desired improvements.[78] In this structure we might wonder how we should understand the position of the auditing firm. I propose this interpretation: AfC and GFQ were limitedly dependent on each other. While actors within GFQ had access to a large the degree to capital in form of data, the auditors had access to trust and legitimacy. Both actors existed in powerful positions with respect to the auditing situation's structure. With their access to the respective forms of capital, they were able to support each other. However, if one of both organisations had

[78]The transformation of the EMS is discussed in the subsequent section.

not played acceptably (from the point of view of their business partner), the business relationship could in principle be altered; both organisations were substitutable through alternative organisations. However, I did not find reason for the organisations' actors to put their cooperation at risk; both organisations benefitted from their business relation. In the auditing situation auditing agents at least partially engaged with a *practical* understanding with the auditee's practices. Both, auditors and auditees were perfectly aware of the messiness of practical work. This allowed both types of agents to grant each other knowledge of how their practices really worked (i. e. how the EMS worked in practice, and what the auditors would check). Sharing these knowledges also enabled GFQ agents to hide specific realities which were not deemed suitable for recognition by AfC. Thus, the nomos of the field of their engagement consisted not only of a commitment to discursive fragments, like the 2° aim or transparency, but also a number of postulations related to the aim of a verifiable data base of carbon emissions for a carbon emission reduction strategy:

Processes, rules and substances I find the following partially conflicting elements:

- the EMS was to be audited in terms of its processes, rather than substantially; and
- the auditees were to expect not only have their work processes inspected but also substances;
- as long as rules and processes were properly implemented, the results of work practices would be accepted;
- therefore, as long as practitioners could rely on others' rules (mechanical objectivity), they would be safe from critique;

Transparency and qualities of data After all, not only processes were to be explicated and assured but also the specific qualities of data:

- as long as practitioners made their work processes and substances transparent and explicit these realities would be accepted;
- nevertheless, data needed to suffice specific quality standards (especially singularity, coherency, accuracy and replicability);
- messiness in practical work reality was acceptable and, thus, transparency and explication could not always be expected.

We may understand this friction in this body of nomoi as generative (cf. Tsing 2005). Auditees and auditors were (whether implicitly of explicitly) negotiating with each other which compromises were acceptable to come to an auditing conclusion. Analytically, I share Power's (1999, 60) appreciation of an approach to differentiate the enactment of an auditable reality from 'substantive performance'. The exciting question is what happens practically in this generative friction between concern for 'abstract' EMS processes (Power 1996, 301) and interest in actual data enactment.

We found that the interest in actual data enactment was guided by a perfectionist discourse about data. Vis-à-vis auditors' message of accepting the practical messiness,

EMS-Team members imagined also the limits of auditors' understanding approval. Framing Frederik's spreadsheeting practices as oriented at accuracy was a performance of these practices as acceptable and being auditable. Practices like his or similar to Victoria's practices of hiding non-coherent data were significant: they ensured that work practices could be rendered into acceptable work performances.

The EMS-Team staged AfC as an effectively controlling entity. Reviewing auditing results and devising actions to improve and transform the EMS seem like staging of auditing as enabling governance-at-a-distance (Higgins and Hallström 2007, 698). At the same time, EMS-Team members were only partially enacting the illusion of 'auditing is able to effect control of substantive data'. They confirm Power's (1996, 311) hint at the problem of independent verification of the auditees' data: who is making the judgement, based upon which body of knowledge? Auditors seem to have relied on the data provided by the auditee.[79] Power (1999, 145), regarding the structure of such a situation, warns: '[b]eing fit for auditing, being auditable and ready for compliance visits, says little about fitness for any other purpose or about the dangers societies face.' My brief discussion here supports the warning; yet we still want to know in how far the performative effects of auditing exceed the layer of a to-be-audited reality. Auditing may, after all, alter substantive performance. In auditing, 'certain ways of thinking and acting [are made possible]. In so doing they inhibit other ways of thinking and acting' (Power 1996, 299): members primarily have to observe the rules and formal norms, they need to ensure that their substantive work realities are performed as proper to auditing eyes. Applying perfectionist data standards on carbon emissions was necessarily silencing carbon realities. Messiness was allowed for by AfC but at the same time detested: the EMS was described as not yet professionalised – clearly a devaluation. Thus, auditing plays a part in shaping carbon realities; but it is not simply the effect claimed by public auditing discourses.

Ideally – from the perspective of the common *Memorandum* by AfC, GGCA and GFQ – messiness would not occur at all. The primary explicitly mandated means by which EMS-Team members tried to ensure that data was accounted for coherently was prescribing themselves to work according to rules, formal norms and standards. These, supposedly, were the body for the auditors to base their evaluation on.

Standards and their Agents

Having detailed the role of NGOs and auditing I, finally, turn to an underlying institution which contributed much to the performance of legitimacy – but was affecting far more than that: standards. This institution, somehow, supposedly held together work

[79]Power (1996, 303) points to the development that organisations would not only invite external auditors to check their auditable layers, but would also pre-audit their auditable realities before submitting them to external agents. Within the EMS-Team, Dieter and Elise repeatedly postulated such internal audits. Albeit such internal audits might encounter differently constructed realities than external auditors (otherwise, what would be their *raison d'être*?), they are still part of enacting the workplace as a space in which data and carbon accounting processes are evaluated with respect to allow lending the auditee a certain label.

practices of EMS-Team members, AfC and GGCA. In the following I show how such nearly 'magic' (Bowker and Star 1996) entities were co-performing carbon.

Ideally, as the received view would have it, standards act as purifying tools, creating order *in* disorder. Timmermans and Berg (1997, 296) propose to think of standards as coordinating tools. Classification systems, protocols and other standards provide prescriptions of how to see and act on the world. Thus, standards are inextricably linked to members' practices. Above, we have already recognised that categorising realities inevitably produces monsters☞ – new orders produce *their* disorders. To detail our conception of standards and standardisation, it is apt to point to, what I take to be, five politically and societally relevant issues. First, standards may be forgotten, become self-evident, invisible or anonymous (Busch 2011). In that way, they can control structuring processes in society while evading being democratically controlled themselves. Therefore, Busch (2010) sees standards, standard-setters and those who are to oversee their implementation as a form of power. For this form of power, second, social groups may compete over who standardises or audits. Thus, standards can serve e. g. professional communities to extend their jurisdiction (Thévenot 2009, 794).[80] Third, to implement standards on specific objects in a setting or situation, the elements configuring and enacting the object have to be adapted. This often requires practical tinkering (Suchman 2007) and may involve large-scale effects on the actants presupposed, reframing individual tool-use by workers into substitutable devices: labour operating a machinery (Busch 2010, 62). Fourth, this work, supposedly, results in standardised objects, governable-at-a-distance (Higgins and Hallström 2007). In the static vision of a completely standardised world, the paths of reality would be dependent on particular standards. Full path dependency (Busch 2011), however, cannot be expected precisely because the paths prescribed are locally and situationally taken; actants interfere; standardised universality is restricted to multiple localities (Berg and Timmermans 2000). Fifth, hegemonic actors take a clear stance on the politics of standards and standardisation: rather than going for direct governmental regulation, corporations are to govern themselves through voluntary standards, supervised by private sector auditing firms and in accountable engagement with so-called civil society (Busch 2010, 61) – those parts of society deemed civilised enough to not threaten the corporations. Recognising these issues, I use standard as an analytical notion. It exceeds textual entities designated 'standards'.

Standards have been present as important devices to orientate oneself and others around GFQ's carbon enactment. Indeed, fundamentally, as it were, standards originally helped to translate environment, sustainable development and carbon into the corporation's rationality.[83] GFQ effectively employed a myriad of standards in

[80] Ngwakwe (2012), for example, exactly makes such claims for the sustainability accounting discourse; and Lovell and MacKenzie (2011) reconstruct the process by which accountants tried to get their hands on carbon accounting standards.

[83] At least, this was the core of a story I came across in an interview of sustainability researcher, Matt, with Victoria. She recounted joining GFQ. The status, she encountered inside the corporation, entailed the existence of DJSI. This index is a specific type of standard: a *rating*. Taking her narrative

their enactment of emission data: carbon conversion factors, SI units, file formats, organisational hierarchies, formalised boundaries between organisations and many more. Also, not only existed a standard prescribing which environmental indicators to cover but also many detailed standards of how each indicator was to be measured.[84]

An EMS was deemed a core instrument to make GFQ's masses of environmental information available and manageable. A variety of standards exist circumscribing what an EMS ought to do.[85] A common element to these prescriptions is that an EMS should bundle and coordinate all the environmentally relevant activities to ensure that they are conducted according to respective standards (note the circular definition implied: what *is* environmentally relevant is prescribed by these standards) Accordingly, an enactment of an EMS would entail engaging with both, law governing environmentally relevant activities as well as corresponding 'voluntary' standards. GFQ claimed, both, internally and publicly that it ran such an EMS.[86]

While this book makes certainly visible how GFQ's EMS was not in any way ensuring that carbon accounting was determined by any combination of standards, here I focus more on how standards were lending legitimacy to GFQ's emissions. With this agenda, I turn to the core of the magic of standards: to a) how the standard VfU was stageable as GFQ's singular carbon accounting standard while b) that standard actually was only one of many. This provides us with a firm ground to discuss c) what enacting standards at the environmental workplace did to carbon.

Singularity: Imagining VfU as *the* standard In the field note which I employed as the key anchor of this section, Victoria enrolled *the standard set by VfU* for deciding over the legitimacy of Frederik's qualculative account: when she sensed that his practices might not be accepted as legitimate her first move was to enquire whether 'their', i. e. GFQ's, carbon accounting standard was the legitimising source for his practices. Thus, we may read this sequence of actions as performing the status of the standard as a decisive actant. The standard could either legitimise practices or not. However, it could not speak for itself. Frederik had to voice what the standard was saying. I turn to the ways standards needed to be enacted in order to have effects on reality below.

at face value, she successfully enrolled the existence of this standard's discursive linkage with finance in order to provide a reasoning compatible to the financial discourse within the corporation.

[84] See Section 3.1 (entitled *Breaking Down Sustainable Development*)

[85] Well known standards for an EMS are EMAS and ISO 14.001ff. In Section 3.1 (entitled *Breaking Down Sustainable Development*) you can also find an introduction to the discursive links between Sustainable Development and environmental management systems.

[86] In terms of the corporation's EMS readers might be interested to note that EMS-Team members voiced both to me as well vis-à-vis Matt that GFQ's EMS was *not* formally governed by a particular standard. However, repeatedly they used the standard ISO 14.001 as a point of reference. At the same time, in GFQ's internal environmental report, the EMS-Team claims that the corporation's EMS was run 'in accordance with the Eco-Management and Audit Scheme European Directive (EMAS) and the international standard ISO 14001'. And in their response to CWC Ranking GFQ performed itself qualitatively as certified according to ISO 14.001; they legitimised this by referencing to *Simply Got-Rid-Off Bank* (SigBa) which was once certified as running their EMS as stipulated by ISO 14.001.

Before doing so, we need to unsettle the firm ground of VfU being *the singular* standard governing GFQ's carbon accounting. To underline the relevancy of this point I turn to GFQ's response to the CWC Ranking questionnaire. Publicly, as the following artefact shows (verbatim and anonymised), the response to the question on GFQ's methodology of establishing its carbon footprint included this statement:

Standard and CO2 Conversion Factors: [GFQ] collects environmental data in accordance with the VfU standard.

Artefact 4.3.3: Response to the CWC Ranking questionnaire: 'Select methodologies'

This formulation does five things simultaneously. (1) At a first glance it *de*scribes what GFQ did in the reporting period☞. The corporation drew on the VfU standard in its carbon calculation methodology. Several paragraphs below, GFQ repeated (a textual copy of the statement) that VfU was *the* standard which needed to be noted to understand GFQ's methodology of carbon emission calculations. However, a moment later we can recognise that formally the statement is far more specific. It enacts two moments of restricting what GFQ claims. (2) On the one hand, even though the question is concerned with the general methodology of how GFQ calculates its emissions, the claim is restricted to how GFQ *collects* environmental data. Thus, the reply to the question is opened by addressing how the information underlying any calculation is sourced. Sourcing is definitively part of the methodology. (3) On the other hand, the qualification of this sourcing is that GFQ acts *in accordance* with the standard.This formulation does *not* claim that GFQ acted in *identity* with the standard's prescriptions: in this quasi-legal genre of text, it seems decisive that GFQ did not commit to executing the standard to the letter. Rather, this wording merely suggests a consistency with the prescriptions. Thus, a technical deviation from the standard is not denied while it is claimed that the practices were in line with the standard. Hence, as a description, in this moment GFQ only addresses data collection rather than the complete methodology. However, to my knowledge GFQ never carried out an empirical study of how its data was actually collected.[87] Maybe, then, the status of the formulation signifies what members took-for-granted. (4) Or, rather – and this may be the fourth relevant performance of this speech act – the sentence acted as a *pre*scription. It could be read as informing the reader about GFQ's intentions of how it wanted to govern its environmental data collection.[88] Then the formulation did not address the question provided by the standard. The standard assumably wanted to know what methodology GFQ had employed rather than which standard it intended to use for its collection of data. (5) The main issue at stake here is that readers might get back to GFQ, inquiring how environmental staff *actually* collected data. Not claiming practices identical to the standard's prescriptions was useful for such a case. The reader and the corporation would have to enter the negotiation field of interpreting what it

[87]Hopefully this study comes handy to aid GFQ in its efforts to know itself.

[88]This reading would be consistent with the analysis on GFQ's informal standard 'EMS for GFQ' (*EMS4GFQ*) presented above.

means to collect data which fits the form of VfU but is not necessarily identical to the standard's specific requirements. The formulation in this respect can be read as a safe-guard against too substantial investigation. Any close investigation measuring GFQ's practices according to GFQ's own claims would have to accept that – after all – the corporation had never claimed to collect its data in identity with the standard. Such an investigation would have to engage in negotiations like the ones I described for the case of AfC above. Thus, overall, this simple statement is enacting the relation between GFQ and the VfU standard in a very specific way.

Working according to a singular standard would seem recommendable. With Thévenot (2009, 794-6) we can explain the benefit of working according to VfU's standard. In GFQ's case we saw that communicating carbon emissions was premised upon *informing* about carbon. Thus, data was put into forms; afterwards information has been repeatedly translated and reformatted. The issue with standards is that a standard prescribes certain forms; and agents are to ensure that practices *conform* with the standard's form. Thévenot argues that organisations or people may invest in standards. The concept of investment seems useful here because actors have to transform economic capital into practices of adapting to the standard, i. e. formatting contents and processes according to the prescriptions. Locally and temporally constrained, thus, we may expect stabilisation of forms.

> ... once invested in and immobilised, a form cannot conserve the traces of its own past if it is to operate effectively as the new principle of equivalence. Should they appear, such traces would insinuate doubt. Any recollection of the processes through which the convention was established would most certainly reopen anxieties about its initial arbitrariness. (ibid., 795)

Following Thévenot's argument, a standard will be more 'successful' (if success is measured in terms of how long a standard will be able to maintain its objects in the desired form) by silencing the alternative histories and bifurcation points passed on the path to format the object according to the standard. If the standard achieves *quietude*, Thévenot suggests, users encounter the 'agreed upon, accepted, established' (ibid.). In case of failure, users might recognise the 'conformist, formulaic and inauthentic arbitrariness' of the standard (ibid., 796). Thus, for an organisation it would seem recommendable to stick to one standard, format its environmental data accordingly and hide traces of data formation. The VfU standard could be understood as a well-suited candidate to be employed in this way by GFQ: the corporation was one among only a few corporations who drew upon the standard. Members of the standard had the possibility to shape the standard together.[89] Other forms of capital possessed and

[89]Founded in 1994 in Germany and since then with repeated symbolic governmental support (e. g. in the context of – then – German environmental minister Jürgen Trittin (2002)), the association was able to win several international banks and insurance providers to use and legitimise the standard. In theory, then, GFQ could have much shaped the development of the standard to fit its own needs. In fact, members of the EMS-Team have been in close touch with the association and the development of the accounting standard.

exercised by GFQ and their competitors had been exchanged into another decisive resource – their own standard. It would seem, therefore, that GFQ was well positioned to put VfU as their singular standard for environmental accounting into practice.

Multiplicity: VfU amongst other standards However, as it turned out, the corporation did not restrict their accounting de/prescriptions to link to VfU. For example, the complete response to the methodology question (of which the artefact shown above was part) contained references to two additional carbon standards: GRI's standard as well as the GHG Protocol. In the response to CWC Ranking, the corporation reasoned that they needed to use the GHG Protocol's carbon conversion factors in order to ensure comparability with other firms. The multiplicity of these factors can be traced back to the environmental balance sheet. While the spreadsheet form was structured in its cell design according to VfU (in itself drawing on GRI), several emission factors were not referenced to VfU but to other sources.

Having firmly in-built multiple carbon conversion factors caused a useful effect: as we have seen above, alternative emission factors partially lowered GFQ's emissions.[90] Busch's (2010, 63) discussion similarly suggests that standards are not only useful to render things equal but also to render them different. The different sources of the conversion factors were themselves standardised as was another file employed by the EMS-Team which provided a standardised view on the identity of the sources for each factor. GFQ's environmental agents were supposed to understand the standards' different implications and enrol them to further GFQ's interest. In sum, GFQ employed about a dozen sources in addition to VfU to legitimise the conversion factors they used.

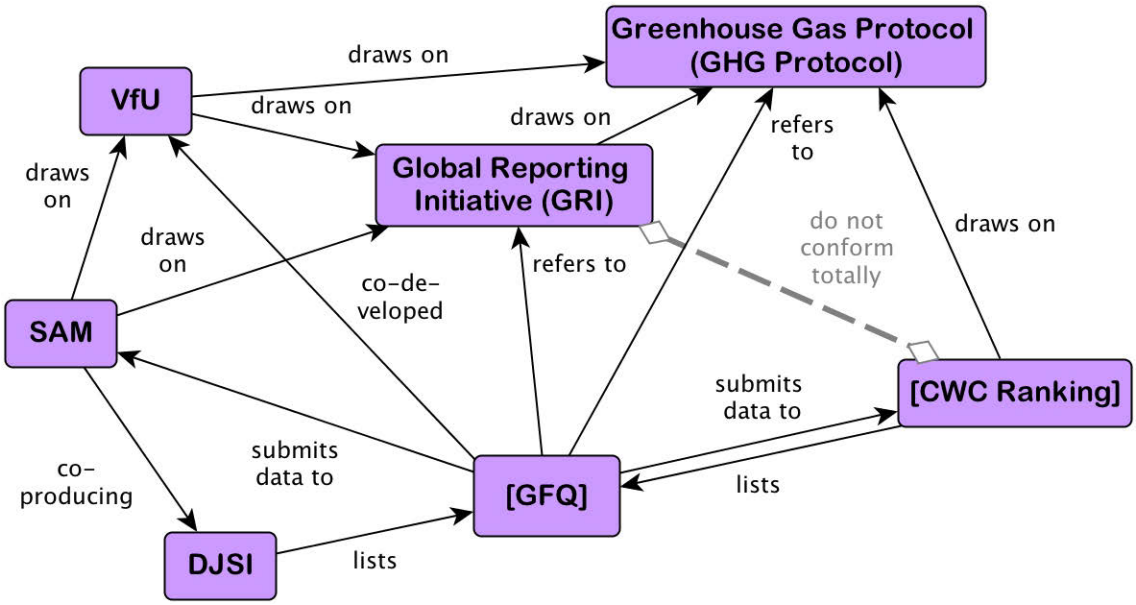
An excursus is required. Folded into the spreadsheet were multiple ways of formatting environmental data: its cells included conditional calculations and references to other cells. The contents of sum cells were compared, divided, summed up, multiplied and so on (mathematical standards). Preceding the spreadsheet were two kinds of data: standardised data manually copied from ESDR as well as 'additionally' entered data to compensate ESDR's data shortcomings. The environmental balance sheet's contents were also formatted according to standards, such as the SI conventions for metric measures (e. g. kilogram (kg) or kilometre (km)). The file was constructed as MS Office Excel. And the file was stored and modified through the standardised infrastructure of International Business Machines (IBM) compatible computers – which were reliant on standardised electricity provision, and so on. All these standards were *made* in some way or another.[91]

[90] See the discussion in Section 2.2 (entitled *Constructing Consumption via Calculation*).

[91] Following Busch (2000, 291), these standards could be differentiated in terms of how they are governed. While the VfU standard is an instance of a legally 'independent' standard setting body, the xls-file format for MS's spreadsheets was developed by an industry leader. Others may also be able to set standards. This includes in the GFQ case nation-states (for example Victoria communicated that the United Kingdom (UK) government would soon require corporations to report their carbon emissions) or customers (in our case GGCA could be considered as such customer).

With respect to environmental or carbon accounting, the environmental balance sheet connected several standards. Figure 4.4 provides a rough sketch of some of the relations between environmental standards, standardisation bodies and ratings revolving around GFQ. This mapping suggests that the corporation linked to entities which were themselves interlinked: GFQ was directly drawing on the three standards provided by VfU, GHG Protocol and GRI; and the corporation submitted data to the rankings, DJSI and CWC Ranking – which required GFQ to format their data such that the information fitted the formatting stipulated by these rating organisations. Thus, rather than conceptualising the relation between GFQ and VfU as a privileged singular link, as it turns out, multiple relations existed between most of these standard-setting and -employing entities.

Figure 4.4: Map of selected relations among environmental standards and standardisation organisation



Yet, any particular carbon fact inscribed into the environmental balance sheet was quiet in several ways – not only about which standards had been part in constructing it but also about which standards have *not* been made part of the fact. Insofar as the carbon conversion factors differed, Thévenot's (2009) 'quietude' relates to the overflow described above. Each conversion factor erodes carbon knowledges into too quiet a factual claim that is perceived as a 'statement based on an objective state' (ibid., 809). While forming the factual claim, Other realities are treated as not substantial part of emissions. Forgetting realities, unfortunately, may easily result in significant overflows of a qualculation. Indeed, standardisation co-possibilised rendering carbon calculable. While some carbon reporting standards, such as CWC Ranking, provide digital space to spell out the engagements required in the construction of the factual claims, GFQ only spelt out partially the paths by which they arrived at carbon emission knowledge.

The existence of differing standards for translating consumption into carbon renders obvious that each and any standard implies some overflows. No standard of conversion factors can capture 'reality' completely.

Even though standards allegedly were to induce a more uniform shaping of reality, we find that corporate carbon reporting practices were linked to a variety of standards resulting in different reports.[92] A problem for members was, of course, that different standards governing reporting were not always completely compatible. This resulted in practical difficulties at the environmental workplace. [93] For example GRI's guidelines were to some part not conform with CWC Ranking (illustrated in Figure 4.4). However, GFQ's CSR unit not only provided responses to the latter ranking but also to DJSI. In Frederik's account, prior to the existence of CWC Ranking, GFQ's had standardised their reporting to serve DJSI. And DJSI was carried out by SAM according to GRI's guidelines. However, CWC Ranking was drawing on the GHG Protocol. Effectively, DJSI relation to GHG Protocol, via two intermediaries, was different to CWC Ranking's relation to GHG Protocol. Thus, in terms of accountancy logic, the reports by GFQ to DJSI (the older order) and CWC Ranking (the newer order) could not totally conform. With Timmermans and Berg (1997, 274) we may generalise: standardisation does not create a new world of its own, but relates to prior existing standards and practices. Whilst such non-conformity is unlikely to surprise an experienced observer of accounting, this friction sheds light on the nomos of accounting: in principle the accountants' artefacts were supposed to be one hundred percent conform with each other. However, competing concepts in standards rendered the translation of standards' requirements into a singular and coherent understanding difficult. In addition, standards underwent repeatedly updates. Thus, over time, standards were not stable. From the practitioner's point of view, these complications called into question the ease of accomplishing carbon reporting.

With respect to the singularity of standards supposed to, or supposedly, governing carbon accounting we find that the practitioners' workplace was structured not only by multiple standards, but also by the shared *prescription* of a singular and coherent standard to shape the format of carbon data. This postulated entity was partially enrolled by members as the norm to evaluate data or data practices. Nevertheless, in written form, the organisation did not commit to this postulated entity but acknowledged the existence of multiple standards. Thus, albeit members recognised the multiply and differentially normed quality of their data practices, they shared the postulation of a singular and coherent standard. As data workers, members had to cope with the incoherencies and, nevertheless, try to construct (ever impossible) coherent carbon representations. While we see in the next section how members tried to change and improve their accounting practices, here I need to emphasise that these workers were to utilise the multiplicities and incoherencies of standards while not giving voice to or

[92] If, say, professions aim to influence carbon accounting strategically we cannot expect their standards to prescribe accounting in conform, let alone in identical, ways (see e. g. Castel 2009).

[93] The following discussion is relating to Field note extract 4.2.d (on page 264).

demanding engagement with the overflows of corresponding problems to their work practice confronted with a never achievable nomos.

Enacting Standards in the Workplace The variety of standards available to or confronting members was not acting on its own but standards needed to be actively introduced or defended in the workplace. Two examples suffice to make this point: I rediscuss Frederik's move to phrase tap water as drinking water; and I introduce a new case in which Dieter defended some GHG Protocol's stipulations. [↪94] When working on the response to CWC Ranking, Frederik deliberately utilised the terms used by VfU documents to present data to publics. He wanted data collection to appear more coherent. The quality 'coherency' was a straightforward aim of carbon accounting. In order to ensure such an appearance, agents needed not only access to the wording of data presentations but also the skill to formulate statements appropriate to the situations in which the data would be used. This ability to present data well can be understood as requiring a fitting habitus. Frederik needed to understand the situation well enough to construe this coherency. In this specific case, he stabilised the appearance of standardised carbon accounting by standardising the categories he used to present data: VfU used the notion 'drinking water' to refer to tap water. And, in order to not deviate from the wording standard, Frederik reproduced this formulation. For carbon accounting to appear standardised, thus, it seems it was relevant that the categories used to (re)present carbon needed also to be appear standardised.

Recognising that Frederik's formulation practices were key to depict carbon accounting as standardised allows us to elaborate the role of the human agent. For carbon accounting to be standardised, also the worker was to be standardised. GFQ's environmental manager was to ensure the standardised production of standardised carbon. Recall, the discussion of AfC; we saw that auditors were lamenting that the humans within GFQ's EMS were playing too significant a role to allow understanding the system. The audit agents wanted the EMS to involve standardised tasks and positions for the agents of ecological modernisation. Frederik's creative engagement with data to ensure that GFQ's emissions would be represented well was not welcomed in this respect. In the auditing perspective, his work was not standardised enough. The EMS was to be independent of idiosyncratic human activities.

I argue: standards don't act on their own; they needed to be enacted by humans or their artefacts to be part of social reality. For this, we now approach the discussion of the transformation of the EMS. Key for the transformation was the imaginary that an improved EMS was to enact carbon in a more standardised, i. e. less human influenced, way. Yet, standards themselves were not relevant if humans did not put them onto the agenda in, for example, meetings of the EMS-Team.

Here we are at a meeting of this team; the head of FDSO, Jacob Scott, participated. Their discussion revolved around the effects of selling off an entire GCE, which was

[94] The following discussion is relating to Field note extract 4.2.e (on page 265).

revealed debt-ridden during the financial crisis. At the meeting, they discussed the impact of the effect, i. e. the GCE's absence, on carbon: the bargain for GFQ had unfortunate effects on their emissions. I call this GCE, which had focussed on banking services, SigBa. This former GCE had ecologically modernised their firm significantly – e. g. carried out and installed a large number of emission reduction measures.

Field Note Extract 4.3.c (Reduction gap of SigBa)

☞ discussion at Section 4.5

> *Jacob suggested: we should include SigBa's past reductions in our calculations; we did save these emissions. Dieter replied: the GHG Protocol postulates we need to carry out a back calculation and exclude SigBa totally – not only from now on. Jacob calls this a 'critical issue' and Victoria names it as 'reduction gap of SigBa'. Jacob: 'Nobody looked into this during the sale.' The three of them agree that CO_2 did not matter during the sale of SigBa.*

At GFQ, it was taken-for-granted that reducing emissions would have to be traceable back to some kind of document. Thus, while agents were recognising that they were to ensure the reduction of the emission count, they did not arbitrarily invent lower numbers. Rather, we can think of them as strategically employing documents which would legitimise reducing emission counts. The fact that the former GCE had managed successfully to reduce their emissions was encouraging for Jacob. The first critical issue in this moment was whether these negative emissions could be counted into GFQ's momentary carbon account or not. If it had been acceptable to store SigBa's emission reductions on a sheet and apply them later for GFQ's carbon balance the corporation would have eased reaching its emission reduction target. However, Dieter interrupted Jacob's move to prepare the ground for utilising SigBa's 'past emissions' by way of evoking the stake of compliance with a standard, the GHG Protocol. Swiftly members agreed that this stake superseded the one of reducing emissions.

To conceptualise how members structured the environmental workplace it is relevant to note that both superiors, Victoria and Jacob, granted Dieter the authority to speak for the GHG Protocol and, thus, the 'proper' enactment of standardised carbon accounting. We may conceptualise this situation by positioning GHG Protocol as an *indicator* (Busch 2011). The meeting can be considered a test: in it, the substance (GFQ's carbon accounting policy) is asked to reveal through an indicator what happens as a consequence of a specific intervention (a change to the policy). However, as the realm of the textual standard could not visibly react unmediated to the meeting's query, EMS-Team members used Dieter as a proxy to the indicator. In this particular situation, his performance of the standards' realm was treated as the reaction of the standards themselves. In my analysis, this testing situation has to be understood as different to the test of materials in a laboratory described by Latour (1987, 87): whereas with Latour we would identify an OPP, in my analysis Dieter took on a position of a contingent passage point. Following Busch (2011), the procedures to determine whether a standard is properly enforced also need to be standardised. Asking auditors would have been an option; another was to ask Dieter who was expected to soon be a certified sustainability manager. Who was to speak for the indicator was contingent. Studying

the enactment of this test, we learn that ensuring the proper enforcement of carbon standards was highly contingent on this specific situation. Studies of the so-called implementation of environmental management systems also indicate that organisation 'have considerable margin for manœuvre in the way they actually integrate the standard requirements' (Boiral 2007, 128).

This underlines that standards have to be locally enacted to make an impact. If Dieter had not pointed to the standard's stipulations, the amount of reported carbon emissions would have been lower. Thus, in this case Dieter made evident to his colleagues what the standard called for. And this did not merely voice but, rather, *set the standard*. Recognising that standards do not act on themselves but need to be enacted points to an additional and crucial qualification: it is not the case that standards are either implemented or not, but that myriad ways of relating to them are possible.

Members translated the phrases and issues inscribed in standards into the workplace as relevant categories. [↪95] This has been exemplified above, when Marion was enacting the questions raised in the CWC Ranking as an incentive for GFQ to provide data in a specific format, corresponding to these questions. However, we also saw that the exertion of agency by members could result in subjecting particularities not to being measured by a standard. One version of this was GFQ using non-VfU conversion factors. [↪96] Another version was Frederik inscribing his interpretation of GFQ's data quality into the response to, seemingly globally standardising, CWC Ranking: he defined away all the practitioners who were part of carbon accounting; he decided that they were no source of uncertainty. Thus, implementing a standard's intentions is not a straightforward exercise. Even the most globally inspired ordering project – thriving to set universal standards – has to be locally interpreted and translated into actual data practices. Timmermans and Berg (1997, 275) call this *local universality*.

The contrast between Frederik's and Marion's moves underlines that a standard does not apply itself on its subject matter, but what its subject matter *is* is the outcome of a contingent situation. One constraint of the possible outcome may be the distribution of agency to configure the translation of a standard into practice. Compare this to researchers who like to investigate a disease and the process by which it is developing: they face the problem of not seeing patients until they already show symptoms (there is a politics of what is made visible as subject matter). Mol (2002, 104), discussing the enactment of atherosclerosis, argues that these medical researchers may not have the agency to challenge that their colleagues treat atherosclerosis as a condition: actors may find, 'they are not in the position to raise a controversy'. In the case of the encounter between Jacob and Dieter we find that Dieter was able to contest the inclusion of SigBa's 'past emissions' because he was attributed with knowledge of carbon standards whereas Jacob was not. This suggests that both the knowledge (of standards) as well as its attribution to agents can be understood as capitals which co-configure the

[95] The following discussion is relating to Field note extract 4.2.c (on page 261).

[96] The following discussion is relating to Field note extract 4.2.g (on page 267).

workplace. Any implementation of standards depends on human translators to perform the standards' effect on reality.

This discussion showed that standards are not adequately conceptualised in terms of whether they have been implemented correctly or not. Much rather, the work practices of GFQ's environmental agents constituted a careful alignment of elements for enacting standards towards particular outcomes. Two effects of this standard-saturated work need to be differentiated – even though these effects were intricately interwoven. First, albeit GFQ employed a multitude of standards in the course of enacting the emissions, we found that these standards did not determine the quality or quantity of carbon. Instead, enacting carbon entailed diverse actants as representatives of standards. As representatives they interpreted and (re)formatted the standards' requirements for situated audiences within the corporation. And they had the possibility to search for or construct further standards if necessary.

The second effect of this co-enactment of carbon emissions and standards was that carbon was appearing as standardised and, therefore, under control. The notion of *appearance*, however, is highly problematic in this respect. What would it mean for our analysis if carbon constitutes nothing else than an appearance for GFQ? If carbon emissions cannot be known independently of instruments, pointing to the appearance of carbon can be understood as a tautology: in relation to human cognition, carbon is nothing more than how it is made to appear through some or another process of enactment.[97] Employing standards to enact a particular form of carbon results in an appearance of control. In spite of that, we learned above that GFQ took pains to not commit to working in identity with standards' postulations. GFQ's practitioners were confronted with the fact that, for different audiences, they performed carbon differently. And they recognised that even if they wanted to, the standards could not completely enforce stability because in order to not get outdated, standards needed to be updated and interpreted continuously, resulting in ever partially changing standards. The appearance of carbon is changing; carbon is a flow.

Where Timmermans and Berg (1997, 296) find that protocols can create comparability of activities over time and place I underline that carbon accounting standards *destroy comparabilities* not only over time and between corporations, but even within the same location, GFQ. Nonetheless, aligning carbon with standards rendered emissions at a level of appearance viewable as comparable via their alleged conformity with prescriptions. Emissions were stripped off their uniqueness and were performed as standardised, i. e. equivalent carbon, CO_2e. Drawing on Appadurai (1986a), Busch (2000, 277) argues that things which are identical, rather than unique, turn into commodities. Thus GFQ managed to stage carbon as a commodity. And there is nothing accessible for humans but staged carbon. Carbon is everything but inert. GFQ carefully aligned carbon

[97]This is not to say that I assume, carbon 'out there' would not exist. I emphasise: any cognitive interaction with carbon can only render carbon into view through a set of practices and techniques.

with standards. The appearance of coherent lawfulness resulted. As if carbon was corresponding to some laws of nature.

To stage carbon as legitimate, members drew on standards as a capital. They could invest their knowledges of standards in particular performances of carbon. For these performances to be stabilised, members needed other members' support. Collectively, members – and organisations – staged each other as experts on standards with the authority to perform carbon emissions. Being attributed with the skills and knowledges allowed agents to take situationally control over particular acts by means of which carbon took form. Managing the appearance of carbon and, serving this, configuring the enactment of environmental standards was what members had to struggle for to secure their positions and the position of their emissions. Aligning carbon with legitimacy was primarily requiring member to enact standards at their workplace, in their inscription practices. Standards are not governing carbon but carbon appearances are enacted in environmental managers' everyday practices. Standards are not positioned outside of the workplace but are brought into presence through members' work.

♢ *End of Section* ♢

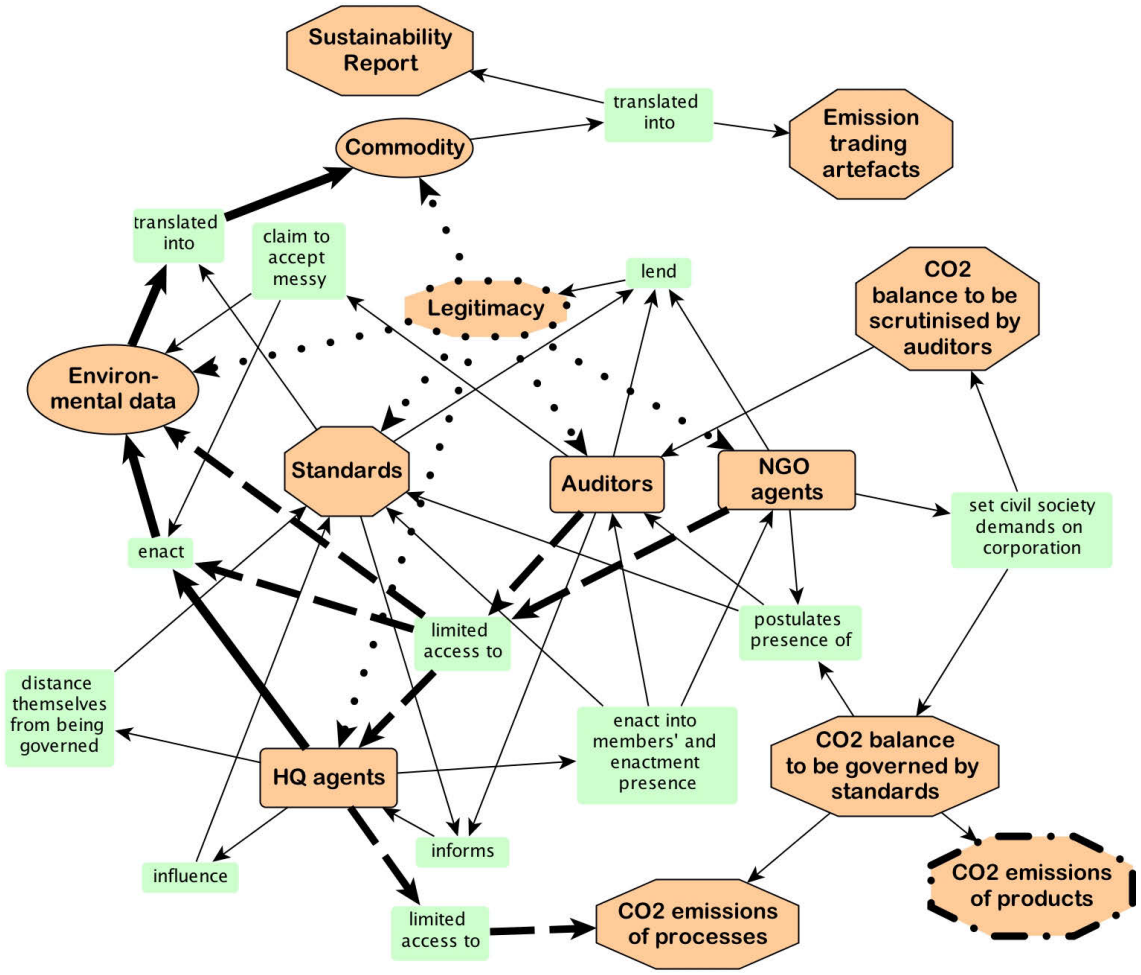
This section argued that EMS-Team members managed to align the shine of legitimacy to GFQ's carbon emissions. For this, I turned to the relations between members and three institutions: the standards supposed to govern carbon accounting, the assumably independent and externally positioned guarantor of the appropriate application of the standards – an auditing company – and an environmental NGO which was to ensure that GFQ's carbon governance would suffice the requirements of critical publics.

The presence of these actants and the relations in the field (as well as in this study) has to be understood in relation to the discourse of sustainable development and its translation into technocratic practices, as discussed in the prior chapter: corporations are being staged as agents of ecological modernisation. This take implies that they perform themselves as being governable by the market – and, hence, as accountable to the consumer as well as to the market regulator. GFQ, accordingly, presented itself as subject to those eyes wanting to compare the corporation with its competitors. Staging GFQ as comparable in terms of their carbon emissions was approached by relating to reference points which lent the shine of being compared to the corporation: the standard VfU, the auditor AfC and the NGO GGCA.

Retracing the findings To guide us in summarising the complicated enactment of their alliance, Figure 4.5 on the next page provides a glance at key performances I identified. The bold relations at the left in this view indicate the enactment of carbon emissions. HQ agents construct and maintain these peculiar entities in continuing efforts; and they translate them into a standardised economic and PR entity 'emissions', hence a commodity.

First, we learned that NGO agents visited from time to time GFQ offices. With respect to the corporation's emissions, GGCA demanded that GFQ should provide standardised accounts of their emissions – not only of operational emissions (i. e. those

Figure 4.5: Legitimising relations between assumed governing agents and the enactment of carbon emissions



'caused' by GFQ's office work) but also of emissions originating from GFQ's business conduct. While the NGO postulated the presence of standards and auditors to guide and oversee carbon accounting, GGCA itself had little access to emissions' enactment. GGCA's postulations could not be enacted by any committed NGO agent her- or himself, but had to be represented, i. e., translated by GFQ staff.

Second, turning to the auditors we found that AfC informed EMS-Team agents about how they would view data construction and enactment processes and they indicated that their view on these processes and practices was perfectly ok with the contingencies and problems (as they were imagined) in the field. Their take was that messiness needed to be made explicit and this would suffice to perceive the data practices as accountable. However, in auditing reality, Frederik experienced that auditors were not entirely satisfied with his ways of making explicit his practices because these explication demanded too many resources. In contrast to GGCA, AfC's agents had much more access to the nitty-gritty of data practices. Nevertheless, relative to the distribution

and extent of carbon qualculations, their access was also very limited. Furthermore, for the most part, AfC was not exercising its influence on data practices on its own but only by being translated into the field by EMS-Team agents.

Third, the standard did not govern any practices itself. Much rather, it informed EMS-Team members. Not only did I find that members made explicit that they and their carbon emissions were not determined by VfU; EMS-Team members were also positioned to influence the development of the standard itself. In members' work practices, they were aligned environmental standards with data such that carbon appeared legitimate. Making carbon appear standardised was of key importance to render environmental data as a commodity which could be represented in PR publications or invested in market transactions (i. e. emission trading).

Generalising For our further discussion we need to underline three general findings about the relations in this alliance. First, the standard, the NGO and the auditor have been present in the field only because they were enacted into presence by GFQ's agents. Thus, not only are the boundaries between the corporation and the 'external' actants blurred as neo-institutionalism emphasise (Meyer and Rowan 1991, 47), but it seems more adequate to not conceptualise these actants as substances themselves and instead much more as effects of performative practices.

Second, in terms of governing-at-distance we find that neither of these actants had significant control over, nor access to, practices at the environmental workplace (see dashed relations in Figure 4.5). While, collectively, the alliance constituted a community of practice – with the common practice of promising each other legitimacy – the community which had carbon data in their hands was the EMS-Team. Similar to Asdal's (2011) case of a factory being able to govern the state organisation, we find that GFQ's agents should better be figured as those governing carbon and its publics rather than the other way around. The primary way by which EMS-Team members' practices can be considered as governed by others would be sustainable development discourses. However, the latter do not so much govern or determine practices but they constitute each other. Power's (1996, 300) analysis suggests that if an abstract object, like quality or the environment, is to be audited this implies that 'audit processes have the potential to become constitutive of' the object. The analysis undertaken above qualifies his take and proposes that while audit discourses may well be co-constitutive of the object, the latter is not necessarily substantially made governable but may merely be *made to appear* governable. Performing carbon emissions as governable, this analysis suggests, suffices in environmental accounting practices to present them as auditable. Then, while Higgins and Hallström (2007, 698) propose that being auditable means 'to be visible and governable at a distance', I claim that being governable-at-distance is not necessary for carbon accounting practice to be auditable. Thus, the combination of auditing and standards (Busch 2010, 70) may only partially govern members practices, that is – symbolically, rather than substantially. The 'rituals of verification' (Power 1999) are removed from the objects-assumably-being-verified (emissions).

Third, Figure 4.5 (using pointed relations) illustrates the central relevance of legitimacy lent by the three entities discussed above to the processes and effects of carbon emission enactment. This section showed that at the discursive centre of the alliance was the auditability and verifiability of the processes enacting emissions. However, while Power (1996, 302) argues that a quality assurance system is not institutionally beneficial without certification (as if certification was a clearly delimitable performance), the carbon enactment case indicates that GFQ agents tried to render the corporation's environmental management less vulnerable vis-à-vis critical publics 'even' without a 'proper' certification like ISO 14.001ff. For that they were able to enrol as present three discursive reference entities, signalling to various publics the technical, auditing and environmental adequacy and legitimate existence of GFQ's emissions. The technical correctness was signalled by referring to the VfU standard. Like a scientist who is exercising scepticism on a factual claim has to face not only the objects enrolled by the author but also other texts which are used by the author as a defence against sceptics (Latour 1987), any audiences of GFQ's carbon emissions would be confronted not only with the name of GFQ but also with the performance of rigour, neutrality and objectivity by the technical documentation of VfU. For this defence to work, the standard has to be present and made visible (Higgins and Hallström 2007). Then, VfU likens a symbol such as, say, the SI unit 'watt': while this symbol is used to refer to energy conversion, the actants allowing the unit to exist and be performed are silenced or turn(ed) invisible over time (Busch 2011). Thus, the standard's presence in carbon emissions (representations) provides legitimacy to this depiction of the emissions while making invisible the entities black-boxed into the emissions. And, especially, it hides from view this characteristic of enactment practices: the are not governed by hard rules. While Busch (2010, 70) emphasises that so-called soft law standards can have effects like hard laws, this section draws attention to the packaging character of standards: whereas an outer surface of the emissions was regulated and may have been affected by VfU's regulations, the core of the emissions enactment was constant balancing and negotiation, rather than any strict accounting rule. AfC's role in that respect was to present these emissions as properly accounted for, and verified, emissions. Especially vis-à-vis the corporate realm AfC, as part of the Big Four, provided a symbol to be attached to the emissions which signalled that GFQ's emissions were enacted along the lines of hegemonic capitalist practices as envisioned by the auditor.

It is in this respect that I partially agree with Busch (2010, 71) when he suggests: 'Standards are laws; the market is the state.' I suggest, AfC symbolised accepted market practices; and this status was lending legitimacy to the practices' effect, i. e. the emissions. Thus, the market was decisive in co-configuring who would be part of the alliance. However, rather than finding standards enacted as laws, this section showed how standards, just like the presence of the other two entities, are better to be conceptualised as resources. Control over aligning emission enactment practices with standards was a capital in the field. The market provided all kinds of resources employed

by HQ members: the choice of the auditor was influenced by its market position, the standard was engineered by an industry consortium and the NGO was financing itself through the market success of its clients (like GFQ).[98] For GFQ, the biggest threat was that its emissions would not be accepted by audiences. Therefore the corporation was interested in seeking legitimising allies. With GGCA they enacted a relationship which was to ensure that publics would not question GFQ's 'license to operate'. Lending their label to GFQ's emissions, the NGO provided a *de-facto* certificate to the corporation. As the figure above indicates, GGCA was discursively enacted as legitimising GFQ's emissions even though the aims of the partnership with respect to carbon accounting were clearly not met: the carbon emissions of GFQ's products had not shifted into the focus of GFQ's greening efforts. Thus, in contrast to Busch (2010, 70) NGO-business partnerships do not emerge in this account as guarantors of substantial environmental adequacy according to hard standards but as devices for greenwashing. What this section shows may also be an example for what Loconto and Busch (2010) call the tripartite standards regime. However, I like to emphasise the character of the alliance as a tripartite *legitimising* network, employed by GFQ to perform its emissions as governed, verifiable and legitimate.

Concluding Firmly positioned inside the hegemonic discourse of sustainable development, expert solutions to climate change, GFQ reproduced also the discourse of verifiability and quality assurance. The analysis points to a consequential distribution of capitals within this alliance. Sticking to the discourses mentioned, GFQ's agents had the possibility to enact the particular way the partners of the alliance would be present in their workplace. Corporate agents were positioned to make in/visible those realities which were (not) to be directly accessed by members of the alliance. And they had the possibility to shape who would represent the discourses vis-à-vis themselves: EMS-Team members were positioned to include in their legitimising network other standards, and in principle also other auditors or even different NGOs (however, the latter was seen as most likely to be discursively sanctioned). Thus, while discourses may have played a role in forming the structure of the alliance, i. e. GFQ engaging with a standard and in contracts with an auditor as well as with an NGO, the particular choices for VfU, AfC and GGCA were precarious. Topologically, the triangle of the three kinds of institutions all legitimising GFQ's emissions, may well be preserved even when the elements would be substituted. The influence by the specific elements to govern GFQ's practices was quite limited and neither the NGO nor the auditor can expect to be confronted by GFQ with the contingencies forming the corporation's carbon facts. In the workplace, nevertheless, achieving any particular enactment of such an alliance was quite challenging. With Thévenot (2009, 800) I argue: creating workable and acceptable arrangements of and with the alliance's members required hard

[98] In their interaction, the nation-state was not relevant, nothing regulated carbon emission enactment like supposedly laws would do. And I did not see any indication that governmental regulation would have made significant other effects on members' carbon practices.

work. EMS-Team members needed to enact the three institutions in ways which would be accepted within the team as well as by their superiors. If they succeeded, they were positioned able to enrol in their carbon artefacts members of this tripartite legitimising network as defenders against dissenters. In that respect, this network likens the masses of allies which scientists hope to rescue their black boxes with (Latour 1987, 132). We find that these institutions were enacted with the consequence of legitimising not only the carbon facts but also each other's presence. I propose that this network stabilised itself: each participant in the alliance lent legitimacy to the others. Emissions, emitters and emission control institutions appeared as conforming to the hegemonic discourses of climate change, sustainable development, verifiability and quality assurance. Yet, substantially what was going on within the workplace was out of control.

Turning to the power relations in the environmental workplace, we found that struggling over correct ways to enact emissions often enrolled and enacted the presence of some or all of the members of the tripartite legitimising alliance. EMS-Team members were differently positioned vis-à-vis the enactment of these institutions' presences. Victoria was accepted as a spokesperson for the partnership with GGCA and the general politics of quality assurance and GFQ's relation to AfC. In parallel, Frederik was positioned as the representative of the standard VfU and particular accounting statements by AfC made during the audit process. Dieter was positioned to represent global standards like the GHG Protocol. These positions were dependent on being recognised by members of this microfield – the environmental workplace. The guiding nomos, in this respect, was one of expert knowledge and of the separation of 'politics' from 'technical accounting' issues. Relative to this nomos, members could enact their competent reproduction of the environmental workplace. As Suchman (2000, 313) argues, being competent is shown by making evident in a social situation that one complies with particular professional and technological norms, which one performs as relevant. EMS-Team members used as capital their ability to perform their data practices as aligned with these hegemonic discourses. It is noteworthy, and this may be a key finding, that this ability was not so much evaluated against an independent overseer, positioned outside of GFQ, but against the enactment of this imagined overseer within the workplace. The immediate and potentially sanctioning audience was, hence, not the overseer imagined as positioned externally, but rather the colleague. Therefore we can conceptualise this ability as a symbolic capital. The audience itself was performing the capital distribution. EMS-Team members granted each other expert and spokesperson positions vis-à-vis the elements of the legitimising network.

We should not, however, mistake the culture of representing data practices as well-aligned with the hegemonic discourses with an actual understanding of the achievement of carbon emissions. The succeeding chapter engages with the question of how members managed to achieve order. For now it suffices to recognise the legitimising network as consisting of 'virtualist institutions [which] all create a culture of audit and assessment that has to pretend that [carbon enactment] consists of [idealised accounting-like

processes], since the rest of the world is rendered an externality' (Miller 2002, 230). While the calculative quality of carbon enactment signals accountability (Porter 1995) and EMS-Team members provided the legitimising alliance with numbers, discursively the qualculative character of carbon emissions had to be utterly denied by agents of ecological modernisation to be considered competent workers. Being competent and ensuring ones position in the environmental workplace consisted of making invisible the inherent overflows and perform the discourse of verifiability.

The data practitioner was, thus, positioned in a field full of tensions: the sustainable development discourse's normative commitment to representing carbon emissions most fully, 'true to nature' as it were, and the professional discourse of detailed and fine-grained accounting conflicted with the norm to provide an account of carbon enactment practices which was comprehensible in a constrained time frame. A too full account of emission enactment resulted in a maybe impressed but, nevertheless, negative evaluation by the auditors, as Frederik experienced. His configuration of emission enactment was considered not good enough. Thus we have identified an antagonism between verifiability and committed carbon enactment. Yet, attention to this problematic systemic relation can be expected to be denied just like the systemic overflows of this topology of so-called quality assurance. With Power (1999, 33) I argue that

> programmatic confidence [by the tripartite legitimising alliance] must be maintained and the general expectations of the efficacy of [carbon quality assurance] must be preserved. Accordingly systemic doubt about the capabilities of audit [and accounting], such as radical questioning of what [they] really produce[...], is not a regulatory option. [...] Particular audits may go wrong, but not audits [and accounting] as such.

And, as he continues, 'there are pressures to *particularise* audit [and accounting] failure even where systemic issues seem to be at stake' (ibid., 35). GFQ, its EMS-Team members as well as the alliance members were positioned to perform trust in each other and in the fundamental possibility to enact emissions correctly. While this community was able to sense particular shortcomings in the processes through which carbon emissions emerged as facts, systemic doubt was out of question. Consequentially, next we investigate how the EMS-Team approached the shortcomings they recognised.

4.4 Transforming the EMS

The vision was straight-forward. Data collection can be optimised. Proper technical and social control will result in proper data quality. This section draws together the discussion of members' expectation that an improved data collection software would transform the EMS into a more effective system: first, ESDR was to be *substituted* by an SAP based data collection IT 'solution' with, second, a correspondingly *streamlined* environmental data 'governance' approach. For these two 'levels' of change, I frame this

discussion as one of transforming the EMS. Thus we may shed light on the changing forms through which carbon would be enacted.[99]

My argument is this: ESDR had figured as the repository through which GFQ's carbon emissions were enacted as knowable. Therefore it was this boundary object that was picked as the primary element to question. Soon the vision of substituting ESDR through an SAP based set-up became an uniting vision – in Briers and Chua's (2001) words – a visionary boundary object. The vision was that with the transformation GFQ's carbon data would gain the legitimacy so much needed. This approval was imagined as depending on being able to show auditors that data quality and data collection could be configured more predictable, under control. Coverage was to be increased. Members' optimistic storyline was accompanied by antithetic observations: they recognised repeatedly in-built limits to control over carbon. My analysis suggests that the transformation was structuring the future EMS to stage carbon as under control by way of moving actual data enactment problems behind the scene. Ribes and Bowker (2009) are right when they suggest that building practically useful ontologies requires the involvement of users. We need to recognise, though, that, as the following case shows, users may work together in order to *not* capture particular ontological problems: users know what they have to ignore to not threaten their project.

To support this argument, this section reviews key characteristics of both kinds of objects, the repository and the vision, and the conditions as well as effects of their existence. I start by describing the situation of ESDR when it was still the main device to enact carbon emissions. Subsequently, I turn to members' practices of analysing the status of data collection and the development of a solution to ESDR's disadvantages. Following this we engage with two ways by which the solution was stabilised: silencing problems and the enactment of a strategic environmental manager.

Envisioning Change From the outset of this study, Victoria had made explicit that I would be participating during a time of *change*. The envisioned change encompassed primarily the integration of environmental data collection into the collection of financial data. The latter referred to the collection of payment information in reaction to invoices. Significant for the actual unfolding of the transformation project, ESDR's IT base was seen as not directly compatible to the IT used by financial data gatherers. Here is Victoria, sharing her feeling of suspense about the change of the IT system:

Field Note Extract 4.4.a (Trust in Frederik)

☞ discussion at Section 5.4

It is exciting how SAP will be dealing with capturing environmental data. [...]

Later, she summarises: ESDR had been established. Victoria trusts the function of ESDR – calculation and objectivity – because she trusts Frederik, because she knows that he is an adept 'number guy'.

[99] As a backdrop to this heterogeneous change process one might want to recall that GGCA wanted GFQ to employ a verifiable carbon accounting system. The NGO partner, thus, had not accepted the carbon enactment set-up, as I had encountered it at the start of my field work.

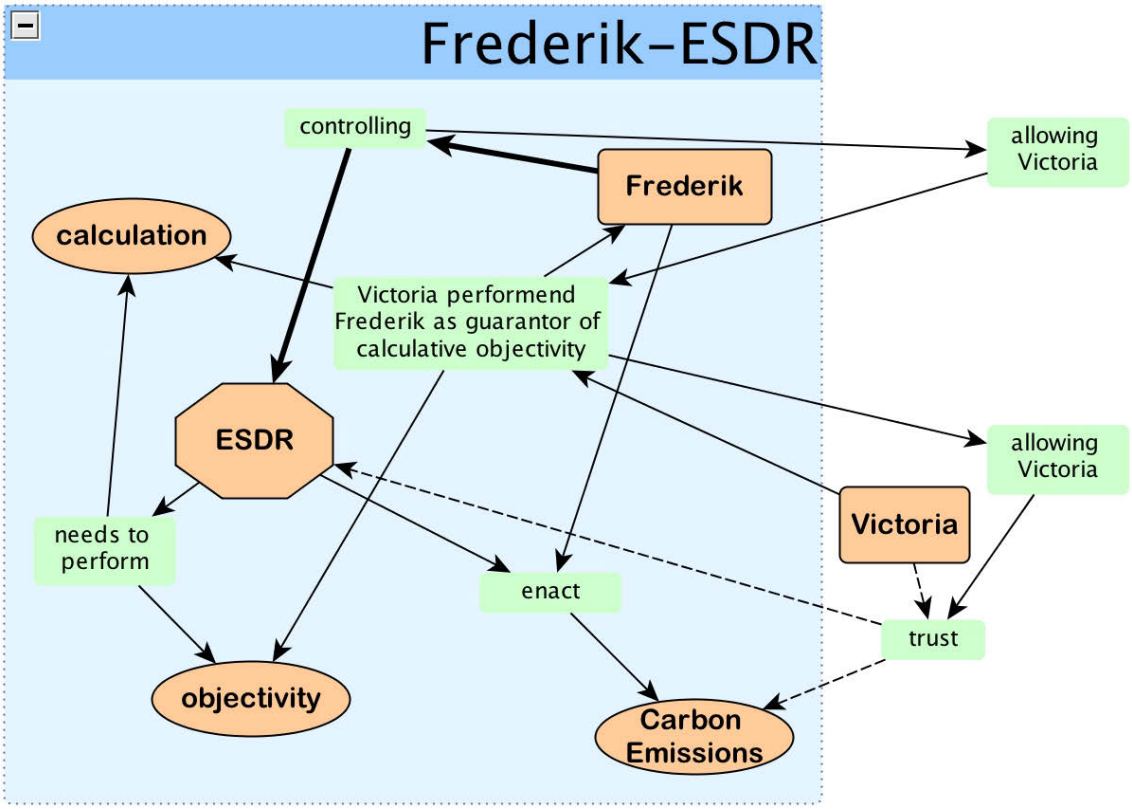
A global market leader, SAP was the provider of the accounting software used by GFQ. Financial data was collected through SAP's software and, this was the aim of the transformation, so should be environmental data. In contrast, ESDR was a database developed specifically by a small IT company for GFQ's distributed environmental managers – and its source code was legally owned by GFQ. Preceding my entry into the field, GFQ's board had decided that environmental reporting was to be moved into the responsibility of GCEs' Chief Financial Officers (CFOs); and the responsibility for reduction measures was to be assigned to the COOs. This decision had been translated into the aim to switch from the environmental managers' usage of their specifically tailored platform ESDR to the widely recognised and known platform SAP. However, actually, this understanding was not yet technically specific. SAP was primarily a signifier of accepted software solutions (and as such I use the company's name here). The specific configuration of environmental data flows and their integration with any software used by GFQ's financial accountants was yet to be discussed.

The usage of this signifier by Victoria indicates that to some degree SAP was, what I would call, a promissory black-box. That is, without needing to zoom into the assumed network within the solution-to-be, the name of SAP attached to the future configuration promised GFQ a reliable route to expand its EMS including, especially, its environmental data reporting. Therefore, while Victoria was excited about how specifically SAP would actually capture data, the promise *that* it would capture data was part of the black box. A key question for this section, correspondingly, is how this promissory configuration and enactment would be stabilised. This should indicate shapes of how carbon would be re-'materialised' (Pollock and Williams 2010, 543) through the transformation process.

From Victoria's perspective, to understand the transformation process one needed to grasp the current status of the EMS, i. e. how the system collected environmental data. ESDR can be seen as a landmark in the field and denotes a set of material practices which the transformation process had to engage with. In her introduction to the field we find that Victoria related her trust in Frederik with trusting the database. At stake in this relationship was that the system functions; and indicators for the latter were the ability of ESDR to enact carbon as objectively calculated. Victoria did not pretend to somehow independently access any indicators for objectivity. Rather, she used her conceptualisation of Frederik as a proxy for indicating that the system met her standard: she figured him as a person who was in control of numbers. By investing trust in Frederik she declared trust in his speech acts: she classified the qualculations by him as objectively calculated. Thus, through her, Frederik's statements of carbon emissions were performed as trustworthy. Figure 4.6 on the facing page indicates these relations.

In this understanding, the actants within the network were stabilised by their relations: Victoria's ability to perform GFQ's emissions as trustworthy depended on ESDR to work. And because the database was not able to indicate on its own that it performed well, it needed Frederik. I classify this net of relations as an *assemblage*. Relevant for

Figure 4.6: The Stabilised Network of [Frederik-ESDR]–Victoria



our analysis is that the assemblage's effect, i. e. Victoria's trust in the database (see dashed relations in the figure), was premised upon Frederik's control of the instrument (see bold relations in the figure). Furthermore, if we zoom into this assemblage we see that Frederik and ESDR were intricately dependent on each other. *Together* they constituted an OPP which Victoria had to accept *if* she wanted either of them.[100] Interestingly, while Porter (1995) notes that where trust in humans is decreasing, trust in numbers is gaining prominence, I read this configuration in a way which shows that humans (Frederik) and numbers (ESDR) cannot that easily be separated. Empirically, we identify trust in and through an assemblage, rather than in any isolated actant. In fact, the entire EMS-Team had to perform trust in this hybrid machinery in order to imagine carbon emissions as trustworthy.

Victoria's introduction to the situation in the field directly positions us to understand a tension which was to shape and structure members' workplaces. While the calculative assemblage 'Frederik–ESDR' – just described and often black-boxed simply as ESDR – had to be performed as working in order to rely on its effect 'carbon emissions' within GFQ a process to challenge the core position of this assemblage, i. e. the transformation of the EMS, was already underway. I learned over time about many problems associated

[100] If she did not want either of them, they did not constitute an OPP, but rather a contingent passage point, where Victoria was positioned as a contingency decision point A.

with ESDR. Collectively, this databased was enacted by members as not fitting the job anymore. Frederik, for example, suggested that the EMS was encompassing too many GCEs for the capacities of the instrument. When the global EMS was initiated, ESDR was run with under a dozen GCEs entering data. In the year before my field work commenced, GFQ had integrated several further GCEs into the environmental data collection process. And this process had not been running smooth at all. As Jackson et al. (2007) propose, the transfer of a technology into a new context (here: more users and data from all over the globe), can meet challenges of scale. One significant reason for why the cooperative work by Frederik and ESDR did not manage to enact carbon emissions 'well', was – as it were – the quality of the relationship between Frederik and ESDR and their particular way of enacting emissions: they required manual operations on environmental balance sheets to translate ESDR's output into emissions which would be digestible by emissions' audiences.

Precisely because of a human's interwoven position in the midst of, imagined as ideally independent, data flows, the auditor AfC had pressed GFQ to rework their environmental data collection process. AfC's statement was given force, among others, by the partner NGO's claim that the EMS was to be verifiable. Therefore, for EMS-Team members it was important that the transformation exercise would ensure the environmental data collection process turns acceptable to auditors. [101] Frederik posited that if the financial data collection process was verified and certified anyway, attaching the collection of environmental data to the financial data streams would result in having the environmental data machinery automatically verified. With Power we can conceptualise this suggestion as a form of normalising environmental data collection: according to Power (1996, 308) 'a normalisation of measurement [...can be...] coextensive with making [...an object...] auditable'. The many auditing processes exercised around GFQ's financial data can be assumed to have shaped the norms. Auditability as an outcome of the transformation exercise would have meant that Frederik's position would be significantly reconfigured: GFQ's environmental manager would then be figured, and this was a vision by EMS-Team members, as outside of the calculative machinery. This person would be merely controlling the machinery without being so intricately interwoven with it. Whether the degree of unweaving would be enough would be evaluated by auditors. And it was clear for Frederik that competing auditors would conclude differently. As I argued above, for GFQ the prime target of this transformation was to perform the carbon machinery as legitimate. Gaining this status by attaching environmental data collection to the definitively legitimate financial data flows was, therefore, rational for members.

To bring about the transformation, meetings between the managers of financial data streams, i. e. members of FDSO, as well as some EMS-Team members started to take place fortnightly. These meetings revolved around issues relevant for the transformation, including its technical details, questions of strategy and financing the future system. We now turn to such a meeting. Jacob, the head of FDSO, was pointing to the organisational

[101] The following discussion is relating to Field note extract 4.3.a (on page 286).

environment which allowed the financial data gatherers to imagine themselves as having control over their data. Thus, members recognised that control over data could not be conceptualised as only a question of 'hard' technology (as in software), but also required human actants and relations among them. Jacob reported

Field Note Extract 4.4.b (This is another system)

☞ discussion at Section 5.3

> *from a key unit of GFQ: if a GCE's CFO or Chief Executive Officer (CEO) does not deliver data they are fired. GFQ's CFO is able to withdraw CFOs of GCEs if they do not deliver requested data; very simple and immediate an escalation. It is, first, a question 'of will', second, 'of phantasy' and, third, 'of governance'. Frederik: 'this is exactly the topic.' Jacob detailed his take on GCEs: 'save now or pay for it! [...] I need a ladle to push.' Frederik commented: we had to accept it when GCEs stated they would not hold data. Victoria: so far it was about 'nice will'. Jacob: now it is about 'must'. Victoria to Frederik: this is another system.*

Victoria's understanding of the organisational abilities outlined by Jacob as another kind of system indicates the significance of power relations in the perceived poor performance of the 'old' system of data gathering: the configuration of data collectors, ESDR and the EMS-Team was structured very much by central actors of the EMS-Team feeling not willing or able to exercise hierarchy over GCEs' environmental managers. However, the delivery of data, i. e. collecting it, was key to enacting carbon emissions. Therefore, any organisational change which would allow hard sanctions, such as firing so-called responsible actors, was welcomed by EMS-Team members.

Relative to the prior organisational ties between the team and GCEs' agents of ecological modernisation, this envisioned change in the organisational power distribution entailed also a change in the nomos associated with GFQ's environmental labour field. While EMS-Team members often had signalled the cooperative atmosphere in GFQ's EMS-Network, the notions of 'will, phantasy and governance' indicated an emphasis of individual action, agency and the following of orders. At the same time these notions made the data collection process appear as better manageable. If no complex group relations are involved but merely simple questions of individuals having followed rules or implemented orders appropriately, actors could be treated in binary ways: either someone properly managed a job or not.

↪[102] Thus, when the transformation project shaped its contents and aims it became obvious that not only the quality of data was to be improved by improving the data collection software but the collection process was to be purified as well: mistakes, irregularities and unwanted parts in the collection process were to be eliminated. This change process was performed as high profile in several ways. Actors with much symbolic power involved themselves in the process, like the head of FDSO, Jacob, or the head of the CSR unit, Herbert. More subtle ways of making clear the stakes in this process have surfaced in interactions between Dieter and Victoria. On two occasions Dieter had publicly shown that he would prefer to use internal auditors and, thus, their expertise,

[102] The following discussion is relating to Field note extract 4.1.i (on page 252).

to help GFQ's EMS onto its feet. He figured that within the EMS-Network sufficient expertise was present in order to support each other in improving data collection. Victoria however allocated several millions of USD for external consultants to provide appropriate knowledges. Vis-à-vis his boss, Dieter was not positioned to sustain any controversy.

I read the way the transformation was framed as ensuring that the problems were staged as 'technical', rather than 'cultural', ones. Engaging with the complicated relationships mediating the enactment of carbon emissions within GFQ would have been possible through careful involvement of those distributed environmental workers who had lived the actual EMS. However, this was not desired. Top staff made clear that the transformation was being translated into a discourse in which externally positioned agents were to be in control over the interpretation of data and data handling agents. This finding resembles Munro's (1999, 634) point that the discourse of management assumes and performs control as external to culture. In the management take, technologies merely are subject to 'implementation', rather than enactment. As Munro suggests, 'a "show" of control is pivotal to [the] cultural performance' of enacting oneself as manager. Managers could not accept Dieter's proposal: if the EMS was performed in this moment as being able to solve its problems with internal means (knowledges and actants) then it would have implied that before, managers had not been in control. GFQ's top staff involvement in the transformation process, hence, can be read as EMS managers enacting themselves as being in control precisely through figuring the problems as to be solved through external control instruments rather than through internal human change processes.

'Identifying' '*the* Solution' The EMS-Team was officially committed to use the transformation process for rendering carbon data more certain. However, as it were, when Victoria's boss, Herbert, proposed to translate the data collection process by trimming the amount of indicators, EMS-Team members have been shocked. With Latour (1987, 117) we can conceptualise Herbert's approach as one of moving the data collection process towards less access to 'the environment'. As we see towards the end of this section, his approach also restructured the scales in the data collection field. For example, he wanted the EMS-Team to stop gathering data for the indicators waste and water. Frederik, however, voiced several times opposition to Herbert's calls. For Frederik it was straight-forward that GFQ should continue collecting data for these indicators. In future, he suggested, issues like 'water' might gain political importance.[103] Accordingly, the corporation would need to be equipped with data to provide and have at hand data series.

[103]This minute observation carries an enormous implication for this study. Members are not taking the carbon discourse as self-evident. Climate change as a social and political issue, they recognise, might suddenly be substituted by other concerns, say global water quality and shortage. GFQ's data configuration should help to prepare for such a discursive change.

This agrees with Bowker and Star's (2000, 44) observation: the design of the classification system is a practically political issue. In this case, Frederik and other members of the EMS-Team wanted to enact 'generative redundancy' (Beunza and Stark 2003, 153). This meant, that the data collection was to consist of so much redundancy that it would be able to adapt to new conditions and needs of the collection process and of data itself. Beunza and Stark's (2003) concept can be read as an alternative to 'replicative redundancy', which in our case would mean the organisation of environmental data to directly serve carbon accounting and nothing else. Herbert preferred the latter, more efficient, version of redundancy. This related, of course, to costs: maintaining generative redundancy implies generative friction and requires compensation (ibid.).

Between these poles, the EMS-Team and the accounting strategists had to rationalise a path towards a solution. Hence, members met to analyse the situation and discuss possible strategies to design and implement a transformed EMS. These meetings were paralleled by many phone calls up and down the hierarchies, discussions over lunch and with board of directors' personal secretaries, and both, the CFO and COO. Also, in a condensed workshop early in the process participants were trained in change management. Discussed at this workshop, the creation and existence of two documentary artefacts guided much of the transformation team's later activities. I received one for a meeting: several pages of paper, puzzled into the correct order, resulted in a cryptic graph. This graph was entitled 'CO^2 [sic!] Data Collection As-Is' and was the result of members mapping the process by which data collection was achieved.[104]

Artefact 4.4.1 (on page 330) provides a glance at this graph. I arranged the artefact's reproduction by cutting and singling out three exemplary parts. This graph is an effect of an activity often called business process modelling.[105] The claim inscribed in this document is that most significant actors, activities, options, decisions and their sequence and causal order are represented which stretch from an origin of the data collection process to its end, the activity entitled 'Create final report'. This approach can be grasped as following the spirit of Taylor's (1911) *principles of scientific management*. Taylor suggests that work practices can be studied, systematised and, by that, optimised: a 'best' work process design is possible in this kind of thought. In Clegg, Courpasson, and Phillips's (2006, 46-49) interpretation of Taylor, such a best way would then set the standard by which to evaluate actual work practices. At the same time, the process explication would also allow workers participating in it to be accountable, and, therefore, claim wage. Analyses of business processes 'as is' are imagined as helping to optimise processes (Bloomfield and Hayes 2009, 471).

[104]Here I need to make an epistemological point: the graph's claim to make visible the process by which environmental data was collected and translated into environmental information is positioned in competition to my study. Both works, this book as well as the graph, claim to make visible by which processes and means environmental data was transformed into final information. However, where these two works differ is the method by which they reconstruct these processes. Having read till now, I am optimistic, dear reader, you found deep and problematising insights into the processes having taking place within GFQ, which the graph could not, cannot and did not want to provide.

[105]See, for instance, Georgakopoulos, Hornick, and Sheth (1995), Giaglis (2001).

FDSO staff was well trained to model data collection and flow processes. This may explain why it was them who set out to provide a draft of the model which was to define the generalised *status quo* of the EMS-Team's data collection. The experts on financial data modelling, of course, were not that schooled yet in reproducing the discourse of sustainable development and climate change. The graph's heading resulting began with 'CO^2' rather than 'CO_2'. Through and in the graph the transformation team reconstructed the process's structure: they differentiated six realms of activities.

(1) the CSR unit was positioned as the top activity in the hierarchy of the data process. This unit was only overtopped by (0) the 'outside' social, economic and political environment of GFQ. The initiation of data collection, however, was undertaken by the CSR unit which translated 'outside trigger[s]' into need for action within the corporation. Between this preparation for the data collection process and its end, the 'creat[ion of the] final report', we find 1.463 m of directed (arrows) and non-directed relations, rectangles, diamonds, ovals, yesses and noes (distributed over six pages arranged next to each other). In total, the software, which allowed me to view the file, reported that the file consists of 157 such objects. As the artefact illustrates, to the largest degree the arrows indicated a flow of data activity from the left to the right, from origin to the end. However, the end was not always reached. As the oval 'Outside process' (level (0), mark A) indicates, the data collection process could also lead to 'Other' business practices which were not part of this particular model and, thus, were not conceptualised as directly being linked back to collection of data.

From top to bottom, the graph shows a differentiated distribution of activities. While (1) the CSR unit (i. e. Victoria) was represented as being involved only a couple of times to set up the overall frame of the collection process and (2) the 'Group EMS Manager' (i. e. Frederik) was primarily recognised as channeling through information and requirements from top to the lower positions – and towards the end of the process to draw together all data and produce the 'final report', (3) the '[GCE] EMS Manager' as well as (4) the 'Data Collector' were inscribed in the graph as responsible for most of the assembling of data elements: these two levels of activities were laden with tasks like ensuring that data would be deliverable, translating requirements on data to those who possessed the data, collecting as well as putting it into ESDR and reviewing the data. The bottom layer of activity, assigned to (5) the 'Data Owner', consisted only of four activities and one decision: they were to receive 'Information about data requirements', carry out the 'Preparation of data gethering [sic] & update', 'Receive information about [the start of] data collection', decide how to answer the question '[is] Data available?', and if 'Yes' 'Send data' to the 'Data Collector'. If the latter, or even higher actors in this hierarchy, decided that the 'data quality [was not] sufficient' or that 'Data [was not] complete', the 'Owner' would simply repeat the subprocess, starting with the preparation step again.

In contrast, my analysis of work practices in a GCE (in the artefact modelled as the bottom three levels) and around Victoria, Frederik, standards, the NGO and auditors

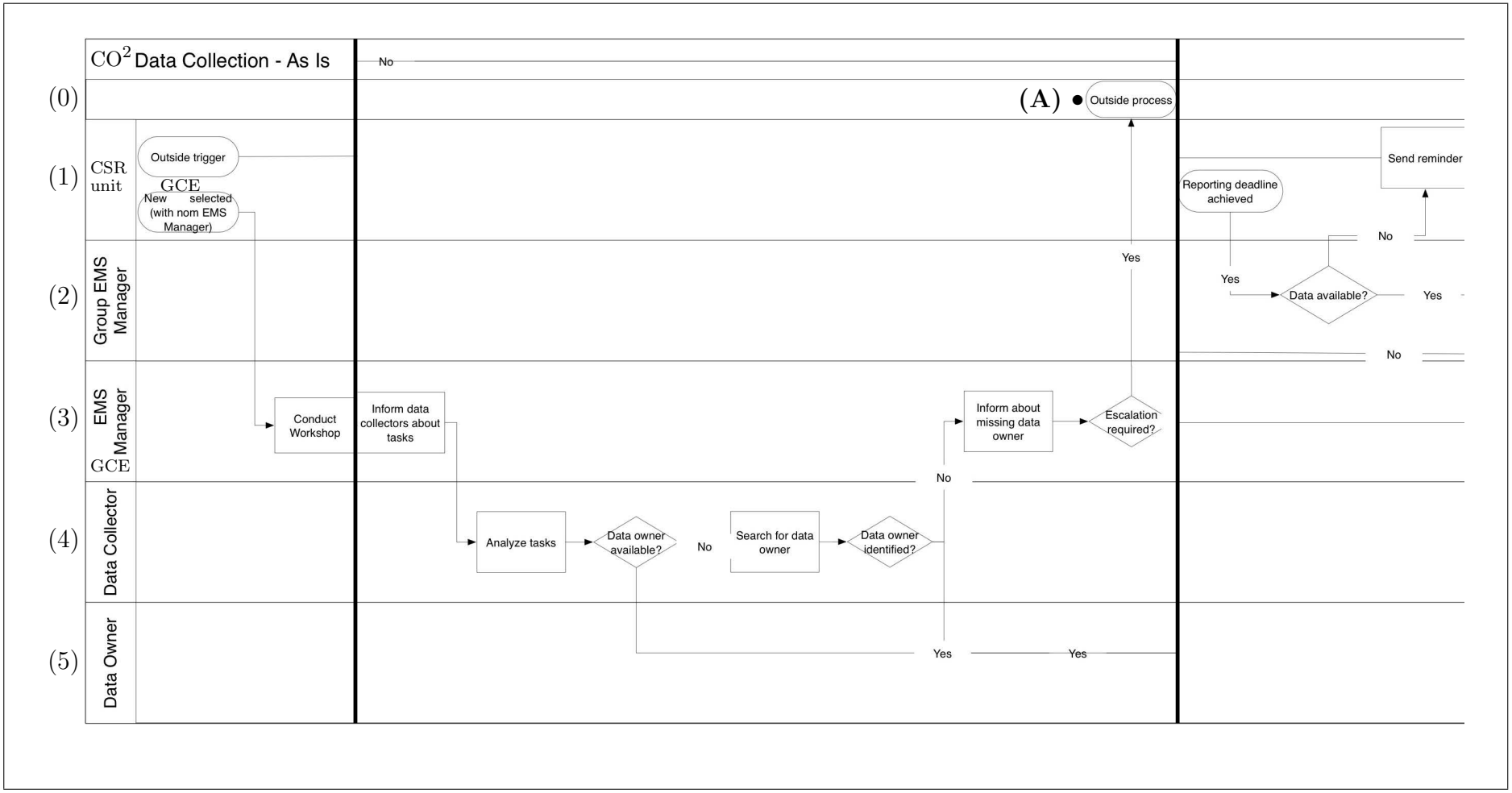
(providing insights in the 'top' three levels) exhibited the complicated work realities on the ground – and allowed to understand their contingent and non-plannable character. Power relations cannot be adequately understood in a simplistic hierarchy.

However, such understandings as I am trying to develop and convey in this book, were not at all the point of this graph. This graph sidestepped actually engaging with activities and the formation of data by putting them in black rectangles, diamonds, arrows and so on. Even though, during the construction process of the graph, members deconstructed some of their work practices the main orientation was to reify them. While, similarly, an audit would check formal processes for whether they are generative of compliance with a policy rather than substantive work (Power 1996, 302), the process sketched here was also serving to gloss over the substantive distributed work of enacting data and, hence, allowing to imagine and perceive the data collection process in a clear way: in the graph, the process was *shown* to be not neat, to be complicated; it did not guarantee that all data was actually accumulated. Only stating that the process, as they had enacted it in the past, had been chaos would have ridiculed the past performances by the EMS-Team. For the transformation process it needed to be shown that there was a carbon emission enactment process available for optimisation; and this past process already consisted of available actants which were merely not yet configured into a suitable form. Making these actants available on a chart is '*indexical to [members'] cultural performance as a "doing" manager* and their appearing to be "in" resistance or "in" control' (Munro 1999, 636-637). This means that members performed vis-à-vis each other and collectively that they understood data collection, that they could resist specific mechanisms of the data process and, thus, control data enactment.

The graph depicted these myriad actants; brought them to the surface, as it were. The modelling of the business process enrolled actants (Vidgen 2005) which formed a network inscribing a straight-forward message: the data collection process needed to be transformed – technically and in terms of 'governance'. Decoupling the representation from the messy reality on the ground allowed the transformation team to prepare designing an optimised process (Schwartz and Tilling 2005, 9).

Accordingly, over a phase of several weeks, EMS-Team members and FDSO staff set out to redesign the data collection process. Several changes over the drafts can be noted. First, the heading changed: an initial graph of the transformed process was still entitled 'CO^2 [sic!] Data Collection Process' and later versions got rid off the '^{2}' and then even the 'CO' altogether. The troubling trope had disappeared.

Second, the visual complexity was reduced: visually, the first draft seemed modelled upon the version we saw above; and its authors seemingly tried to imagine an optimisation of the data collection process by distributing it over ten-plus-one levels (rather than five-plus-one) and shortening the length of the process by about fifty percent. Thus, visually, they managed to increase the height of the document while decreasing its width.



Artefact 4.4.1: 'CO^2 Data Collection As-Is' [three extracts separated by vertical lines; extracts edited, rendered anonymous, marked]

The next version of process model drafts was divided into several subprocesses, each neatly fitting a page or two. Thus, the last draft was broken down to (a) a process to identify for which Key Performance Indicators (KPI) to collect data at all and (b) a process entitled 'To-Be Data Collection & Group Reporting'.

Third, in terms of business process modelling, the authors managed to delete all open beginnings and ends in the later version of the process: only a singular starting point and a singular conclusion of the process was now existing. This increase in formal coherency was paralleled by even adding new elements, promising more certain data, such as a rectangle called '4-Eye principle' or the enforcement of GCEs' data delivery.

Finally, relative to the 'As-Is' version of the model I like to point to a significant expansion of GFQ's data collection process. In addition to the HQ's bosses, the transformed EMS models included in the top hierarchy level (now accounted for as one of the additional levels) the presence of the NGO partner GGCA. The latter organisation had, in this model, fully merged into GFQ's internal process.

What has allowed this redesign of the carbon enactment understanding? It was the literal (black)-boxing of activities like 'Search[ing] for data owners' or the 'Input [of data] in System'[106] which construed immutable, combinable and mobile activties (Latour 1987, 227). These actants were represented as objects editable in MS *Visio*'s business graph package; they could be put on paper and projected onto walls. Latour's (1987, 228) postulation of selective pressure at work is mirrored in the change in drafting the graphs. Business process models appearing less complicated, which could be put on a single page, were treated as more stable and mobile. The different subprocesses could in principle be shifted from unit to unit and recombined with other processes. Producing these simply digestible carbon enactment models allowed for the imagination of control over long distances (Robson 1992), not merely of carbon data but also of humans. The versions of carbon data governance imagined here were to persuade other GFQ actors as well as the auditor that GFQ had its data under control. The notion of persuasive storytelling (Suchman 2000) is shedding light on the newly designed models. Using the graphs, members could persuade each other to enact together the imaginary of control vis-à-vis each other as well as their superiors and external actants. The models symbolised clearly bounded activities, which have been orderly rearranged, promising orderly effects.

Both, the 'as-is' as well as the to-be chart mobilised 'formal elements to exhibit and authorise a certain "impression of rationality"' (Lynch 1991, 11). Data collection, reporting was rational action – in the graphs. Such a visualisation 'unifies and mathematises the phenomena it represents' (Suchman 1994a, 185). The transformation visually ordered actors and practices; and rendered them qualculable. And, yet, the chart was not supposed to be full of action and its effects. Rather, most space of the graph was to be left empty. It was a 'prohibited space' (Lynch 1991, 15). More elements put in the space, meant more pollution. Ideally, the charts would simply point from the utmost

[106] 'System' here referred to a database application like ESDR.

left to the utmost right, without interjacent entities.

No one would imagine, or at least not dare to voice, reasons to discuss that such a neat business process could have unintentional side effects or might not perform according to its formal purpose. Data collection and reporting were enacted as completely *object*-ified through these models. Except of evading being grouped as relating to CO_2, the visual elements could not resist. And audiences were lulled into flabbergasting excitement over the control at hand. Of course, control, here, was primarily at the hands of those workers who were able to edit the files. But this fact was not emphasised.

A decisive move which made sure for the time being that no resistance was voiced or voiceable from within the graphs was that specific humans were kept out of the representation. No personal human signifier was inscribed in the models. Similar to making the methods employed to gather ecological data as independent as possible of the character of data collectors (Star and Griesemer 1989), the process models imagined human characters to be negligible. Ideally, the models implied, the tasks and decisions modelled would be performed by automated machines. Another take to interpret the situation is likening the transformation exercise to an operation on the data/carbon body. In Mol's (2002, 126) account it is physicians who may try to keep a face out of an operation as the face might throw up. The personae of the humans involved in data enactment were a risk to the models' neatness; the individual human actors might be meddling in the model or in the substances implied. This discussion indicates that members' form of analysis and re-imagination of data processes was to produce neat and unproblematic actants. Decisive for this was access to the digital process files and the ability to operate on them or to layout their relations in line with the prescriptive aesthetics and semiotic structure of business process modelling.

During my field work phase, in two ways, a closure has been achieved on the question of how to approach this transformation *practically*. First, the governance of environmental data collection was being redesigned, promising a coherent and effective collection and processing of data. Second, the alliance between Victoria on the one hand and ESDR-Frederik on the other has been disentangled and the data enactment assemblage ESDR-Frederik was to be rerouted to GFQ's organisational and digital thrash. In the following I show how the latter trajectory became quickly dominant.

The transformation team had decided that any successful implementation of a new governance model and data collection machinery would need to be tested in GCEs. For a variety of reasons the team opted to carry out the tests with the internationally operating GCE *GlobalCapital* as well as with a nationally bounded GCE, the German GFQ branch. Representing the German GCE officially in the meetings, Jack was, henceforth, part of the team. The effect was tremendous: Jack now entered the EMS-Team's workplace delegated to participate shaping the future EMS – organisationally and technically. In a discussion of a meeting within the transformation project, Jack took a distinctive stance towards the then current material configuration through which the EMS was enacting carbon, ESDR. I had prepared for the meeting a list of wishes and needs by EMS actors on what an IT solution should attend to. Correspondingly, in

the meeting, members discussed the prospects of continuing to use ESDR. Formally, nobody had decided against the platform. Yet, it has already been clear for me since my entry in the field that ESDR was to be phased out. This was what Victoria had let me know on my first day working for GFQ. Still, the struggle had not been over.

Field Note Extract 4.4.c (Jack gaining profile vis-à-vis Frederik)

In this discussion, Jack performed himself as an expert. He made clear, 'the idea of ESDR is bullshit'. A FDSO junior expert looked at him – and they detailed the problems. Somebody said that no software should be planned as an jack of all trades; this would be its death.

Frederik defended ESDR in between. However, my perception was, in this group, Frederik faded into the background, vis-à-vis Jack, as a relict of old times. While Frederik was present as well able to utilise ESDR, he did not perform himself as advancing the promising path of innovation. My impression of Victoria, meanwhile, was that in her view ESDR was ruined.

ESDR was not subjected to any single or differently temporally focussed trial of strength (Latour 1987, 78). However, in meetings like this, gradually the transformation team was enacting a situation in which it became utterly manifest that ESDR should not be built into the transformed EMS at all, but an SAP based data collection platform. In this particular situation, the list of needs and wishes by ESDR users which I collected as part of my job raised the question whether ESDR should be updated to accommodate these wishes or how else the needs and wishes could be attended to. To enact their decision finding as a proper process management according to GFQ's management lore, the team had to rationalise for each user need which platforms to consider as a potential solution. However, while EMS-Team members and FDSO staff officially also tried to enact this transformation as a case study for receiving a certification of their management abilities, Jack was able to speak more or less freely. Thus, he spoke quite plaintext: Jack, hence, could ensure in the resulting discussion that participants of the meeting recognised both, that ESDR was troubling virtually any normal user – and that, if they wanted the powerful German GCE to participate, they had to move away from ESDR. He advanced a configuration of different IT elements which would as a network accommodate the EMS actors' needs, rather than tweaking ESDR even further. ESDR had lost the trial which never properly took place.

And, concurrently, Frederik's occupancy of the GFQ environmental manager position was emerging as organisationally ridiculous. As already discussed above, Frederik's approach to enacting carbon emissions had been criticised by the auditors and Victoria had signalled that he was too much 'out of control'. In the context of the transformation exercise Frederik was also taking the position in the interaction as an old-fashioned number-cruncher not able to go for the innovative solution which had already been opted for; all informal signals had communicated the latter clearly. He did not leave the sinking boat (ESDR). His capital was devalued. Sticking to it did not help to keep up competition. The field was restructured.

Positioning himself this way made it unwise for other actors to enact any alliance with him. If indeed players in the organisational game wanted to minimise and constrain zones of uncertainty (Crozier and Friedberg 1979, 42-43) it was rational for players to distance themselves from Frederik and his aura of idiosyncrasy. It became clear that his access to the control centre of the EMS had to be minimised, i. e. he had to be stripped off capitals available to him till then, in order to ensure his uncontrollable activity would not worsen the situation. I propose that not the uncertainty attached to the actor in itself was the problem but the configuration of actants, capital distribution. The problem for Frederik became that he held on to ESDR.

As the field had been restructured such that it constituted a capital to align oneself to a substitution of ESDR, members could try to occupy distinctive positions in this transformation process: Jack offered himself as an ally to having a new and promising machinery in place. And being in touch with the organisational trajectory of opting for the SAP path predisposed him as the manager-to-be of the new machinery. Jack, thus, was seen as the future manager of the post-ESDR machine. This access to a resource provided him the possibility to do distinction (Burri 2008b). In consequence, the SAP-solution emerging was already equipped with a promising human interface, a new assemblage was ready to be employed. Not only ESDR was to be mustered out. Frederik had lost as well; the Frederik-ESDR assemblage was at its end.

In a larger context, the CSR unit, especially Victoria, had worked for a long time to stabilise a path for a configuration of the data collecting machinery and humans which would gain the support both within GFQ as well as from AfC and GGCA. Aligning environmental accounting to allies constituted a significant strategy in her actions. As an internal ally she used credibility of the financial accountants (FDSO) and vis-à-vis the auditors the enactment of a homogenous space (Mol and Law 1994, 648) of accounting. She performed this space by integrating environmental data into financial data collection. This increased the odds in favour for having the new assemblage being accepted by the external world of accountability.

Finally, a key standard to evaluate any environmental accounting assemblage was its coverage performance; any new system was supposed to perform better in the evaluation. Coverage can be compared to capital requirement in the banking sector. Financial services providers need to posses capital. This is denoted 'capital adequacy ratio'. Knowledge of this ratio is useful to evaluate an organisation: do you want to trust them, do they actually have capital as a backup? Both, coverage and capital adequacy ratio help to make sense of the information provided by an organisation. Manipulating this ratio was a much discussed explanation during the financial crises (taking place while this book has been written). Like a bank can doctor their finance representations, GFQ could tinker with its coverage. [↪107] For that, the very story of innovation constituted a persuasive ally. Within the transformation team it seemed a workable solution for this expected trial to provide a result of a coverage test which

[107] The following discussion is relating to Field note extract 3.4.g (on page 191).

would construe the new assemblage as having performed better. The newness of the substitute assemblage was projected as an explanatory resource enrollable to defend a higher coverage. Thus, success could be ensured by choosing an appropriate test which would deliver the desired result (Mol 2002, 69). The team possessed the key capital in this respect, the interpretational sovereignty, i. e. the ability and authority to define algorithms and the interpretation of variables and indicators representing the EMS's calculatory assemblage's performance. And they had the feel for the game. They were able to exploit the glitch (Prior 2008, 316), make creative use of the missing scepticism that the transformation was expected to meet when presenting 'new' data.

In these (non)-trials, of course, only a restricted choice of judges was available. Most ESDR users have not been invited to participate in deliberating about the promises and expectations of ESDR or any projected substitute system. The present members seemed to imply that they work for the environmental good, thus, represent well enough the climate's interests. Consequently, the solution to the EMS infrastructure crises was to be an SAP based data collection process with Jack as its future manager.

Stabilising '*the* Solution' Notwithstanding that the solution was soon embraced by everybody, maybe excepting Frederik, problems did not disappear. On the one hand, introducing financial accounting managers to engaging with the EMS meant that their understandings of accounting had to be accommodated. On the other hand, the CSR head was still asking Victoria to reduce the scope of environmental data collection.

While members of both, the EMS-Team as well of FDSO, hoped and promised each other that the new system would run well, counter voices subtly, hardly noticeable, signalled the boundaries to this degree of optimism. Lisbeth's reaction to a claim by Victoria illustrates this well:

Field Note Extract 4.4.d (A promising hope?)

> *Victoria: the hope was that we capture more data by means of SAP. Lisbeth gestured tentativeness and frowned.*

This moment took place at the end of a meeting. The closing of the meeting consisted of letting us know that the project group's leader became a parent the day before. Yet, what did Victoria's *more* refer to? The aim of the transformation project was to improve the quality of carbon emission counts of GFQ by increasing the coverage. At stake in this situation was *to not question* Victoria's speech act: by declaring this abstract hope, Victoria had specified the corporate position on the transformation exercise. Rhetorically, Victoria had invited comments on her statement. Yet, at the end of the meeting it was self-evident that nobody was to reopen a discussion. And Lisbeth was not positioned to lecture her colleague in the meeting that this expectation might be ill-founded. Much rather, she was to stabilise and support the transformation project. This involved not focussing on more fundamental problems. The promissory future referred to by Victoria was co-extensive with the substitute platform SAP. Being able to perform this platform as a foundation for the hope of proper data handling

constituted a resource through which to stabilise ones position in the accounting field. It was not rational for members to destabilise trust in this infrastructure, which was carrying the promissory solution. Therefore, only in a subtle way, Lisbeth indicated that Victoria take on SAP was somehow wobbly. What she gestured was made explicit more and more throughout the timeline of the transformation project.

↪[108] A month later, Frederik repeated the aim of the transformation exercise: constructing a *correct* data base for carbon management. Bill questioned the feasibility of Frederik's aim. For the transformation project's leader, data depended on the person who put the data in. Thus, he made explicit the dependency of the correctness of data on actual agents at GCEs who were dealing primarily with financial data and were modelled (in the governance chart) as those who would enter environmental data into the SAP based system. The structure in this situation likened the one just discussed: a member of the EMS-Team declared a promise of the transformation exercise; and an accountant strategist checks the hope, indicating eschewal. ↪[109] Partially, even EMS-Team members acknowledged the limitations of their hope. When, another two months later, Bill suggested that data *quality* would not be better after the transformation, Victoria asserted his analysis. Above, we already identified compelling explanations for this: those agents who put data in depended on data sources. To recap: if, as was made explicit, US utilities do not break down consumption data of gas, water and electricity, the substitute system would encounter exactly the same problem as ESDR did. Thus, for these three aims (accumulating *more* data, more *certain* and, thus, of *higher* quality) the transformation team had encountered 'limits to managing the environment' (Lippert 2011c). However, engaging with these limits did not constitute desirable goods to boost ones position. Much rather, participants in the transformation project focussed on enacting reality to fit the team's milestone plan – another visionary boundary object.

This collective, focussed, approach allowed members to swiftly proceed towards fleshing out the two test cases. Precisely while (and because of) enacting this movement from the flip-charts, white boards and business process modelling editors to the fleshy reality of humans and machines the associated problems re-emerged with even fuller force in meetings; here is one instance:

Field Note Extract 4.4.e (Making prerequisites recognisable)

Somebody explained that at each GCE data is entered into a device called IC. Lisbeth then pointed out: if we start to request environmental consumption data the question is 'do the accountants want this at all?'

Later the question came up whether pilot GCEs did work at all with IC. Victoria reported that in her conversation with GCE GlobalCapital *colleague, Denis Legard, she had been told that GCE* GlobalCapital *does not not use such an IC. Bill intervened: 'I have introduced this – when I was still working for IBM'; GCE* GlobalCapital *possesses*

[108] The following discussion is relating to Field note extract 4.1.j (on page 252).

[109] The following discussion is relating to Field note extract 4.1.d (on page 245).

an IC. He pointed to a box on the flip-chart. Victoria repeated: Denis says this is not available.

Thus, getting from the drawing board of neat business processes towards implementation involved engaging with the actants presupposed and black-boxed before. This likens Newman's (1998, 254) account of software engineers using textual-graphical representations and proceeding through moments of deconstruction and reification, switching between both moments. Unboxing (required to understand) and boxing (required to make manageable) the represented matter is practiced alongside each other. Two stakes voiced in this interaction are of interest. First, the SAP device 'IC' had to be available. And, actors from a test GCE let Victoria know that this prerequisite was not given. Members discussed this and provided competing evidences. Bill, pointing to a sketch of how data gathering was to be implemented using available SAP accounting devices, postulated that the GCE's reality had to fit the plan. I propose, for this case contestation was possible because the evidence was suspected to be easily further narrowed down and if not already present, the required reality could be brought about.

In parallel, the second stake was not discussable: Lisbeth's recognition that not only needed the device to be present but it also needed to be used by human operators was ignored. In contrast to the question of whether a device was present, ensuring the required usage was not a simple issue. One could easily cast this case as a classic problem of socially adequate technology implementation. For example, Burschel (1997, 300-302) proposes that environmental technologies need to be implemented by employing organisational measures to adapt workers to environmentally friendly innovations. In other words, the SAP based solution, like '[e]very human tool[,] relies on, and materialises, some underlying conception of the activity that it is designed to support' (Suchman 2007, 31). The transformation project implied the need to format a variety of actants to fit the new assemblage: including software as well as human elements. The transformation project's effect would not neutrally fit the work practices in the corporation but would reorganise the situations in which carbon is enacted. The activities have to be adapted to the tool. However, STS studies also repeatedly pointed to the expectable 'transfer troubles', when models are to be implemented (Rowland and Gieryn 2008). There is no way a model can prescribe all the details which are necessary for a technology to work; and the prescriptions given cannot be 'neutrally' translated from one medium (e. g. the model on the screen) to another (e. g. a list of prescriptions for accountants of how to handle the new work within IC).

Yet, problems arising in the course of design and implementation are not necessarily allowed to voice. In GFQ's discourse, problems did not exist – only challenges. This systemically constrained what could be articulated. Problematic reality could not be foregrounded if members were not able to offer a solution. The SAP solution as a visionary boundary object allowed, just like other boundary object, 'cooperation without consensus' (Clarke and Star 2008, 121). Members were able to relate to the promise without having to confront each other with associated contradictions.

While participants of the transformation project recognised analytically decisive limits to the possibility that the SAP based solution would be able to succeed in fulfilling the tremendous promises, overall the team acted as if the limits were not significant. Munro's (1999, 637) take on the performance of management can be used to attend to this phenomenon. He proposes that manages can act 'as if' a certain reality were given. Thus, he finds that these actors may go beyond merely reproducing a given and perceived reality and, instead, stage and indicate what ought to be taken as self-evident. Collectively, members exhibited such a practice. They staged together the SAP based approach as possible to implement and, thus, as a 'solution'. As it seems, the field of the transformation exercise was structured such that members struggled for keeping the project going, heading for some form of implementation, rather than questioning how GFQ's work realities would fit the models. Members could sustain their position by investing in the promise that the SAP-based approach would be a solution. And, later they could move on, to other corporate positions, different firms.

Like physicians, when attending to a patient's disease, 'do not need a reproducible fact [but] a decision' (Mol 2002, 74), attending to solving the task of making the EMS fit for being accepted by superiors, auditors and GGCA did not need members to scrutinise the problems they encountered, or document them: what members needed was a neat model, hard enough to resist the imagined agency of GFQ's top managers. Correspondingly, in the practical situation of discussing the transformation, for members it was always too late to take a step back, study a process, document or engage with problems. When reconstructing the transformation project based on those documents advertising the solution it is hard to imagine how one could identify all the silenced problems and implicit choices taken. Extending Waterton's (2002, 183) argument to this case, if the process by which the tools to enact carbon emissions were constructed could not be fully traced back carbon facts themselves are unlikely to be fully retraceable either. Thus, even in a post-[ESDR-Frederik] assemblage, reversibility cannot be expected in the transformation of invoices to carbon emissions within GFQ.

In comparison to Frederik, who often performed himself as committed to detailed numbers and minute exactitude, Jack took on activities to fill a position within the environmental workplace that could be identified with performing trust in the visions of efficient data handling. Thus, once, when I met Jack on the floor chatting about the accounting frame and software cultures, he declared:

Field Note Extract 4.4.f (Pure numbers, stripped off of comments)

The idea to get pure numbers with the SAP system is great! Without comments!

Stripping off comments meant that Jack wanted to have the flow of information from GCEs to GFQ's environmental manager purified: off with their experiences of data construction and contingencies. The implication of Jack's take was that numbers would be naturalised. This 'means stripping away the contingencies of an object's creation and its situated nature' (Bowker and Star 2000, 299). Jack's vision was one of a much more focused corporate carbon mind, not getting confused and distracted with local

complexities (Lippert 2011a). Following Latour's (1987, 108) notion of interest, we can understand both, Jack and Frederik, to have been interested in numbers. Numbers lay between them and their goals.

However, if both were interested as environmental managers in numbers to report them then we might have expected them to want similar number techniques. As it seemed, Frederik was fond on the possibility to gather comments for task-forms whereas Jack was not. Latour's notion of interest, thus, does not lean itself to explain their different takes. Employing, Bourdieu's (1985, 200) notion of interest is generative.[110] A solution to this puzzle is that we figure Frederik and Jack as playing different games. While Jack's interest in silencing complexities was meeting the game which also the transformation project was pursuing, Frederik's interest in recognising complexities was relating to a game which others did not want to play any longer. The playmates had left Frederik. The goals of them differed. We can elaborate the implications with Appadurai's (1986a, 57) take on exchange and interests. He proposes that in commodity exchange a 'broad set of agreements concerning what is desirable, what a reasonable "exchange of sacrifices" comprises' exists. However, as he continues, these moral, social frameworks have a tension to be broken by the commodities themselves.

> This tension itself has its source in the fact that not all parties share the same *interest* in any specific regime of value, nor are the interests of any two parties in a given exchange identical.

Jack and Frederik were both in the trade of carbon data, exchanging data production and numbers against wages. Insofar as they tried to enact carbon as a commodity, their interests in this commodity differed. For Frederik it did not seem reasonable to sacrifice what he was able to 'capture' with comments. I propose that engaging in commodity exchange with GFQ, i. e. releasing the commodity to the company so they had emission facts to emit, was bound to break the moral and social framework. A first breach took place with Frederik being replaced by Jack. What happened to Jack? I keep this question open for the end of the book.

Meanwhile, the idea of purified data allowed Jack to stage the imagination of a coherent data collection assemblage. This assemblage would be one in which data was to be devoid of qualitative pollution or human remnants. Decisively for the trajectory of change was that GFQ's CSR unit was disposed to engage with Herbert's claims for efficiency. Herbert'stake on environmental accounting and Jack's take were compatible in so far as both enacted the space of carbon enactment as free from non-quantitative elements. Therefore, for Herbert, it must have seemed possible to rearrange and optimise the enactment of data within this numeric space by means of employing simple calculative optimisations.

[110] With him we can construe theoretical classes and their theoretically objective interests. He would stress that a social class and a field are the author's construals. This implies that the goals and the rules of the game are also construed by the author.

Jack was ready to enact an alliance with Herbert; the compatibility of their positions became explicit in a meeting between Victoria, Jack and me.

Field Note Extract 4.4.g (Offering something to cancel)

We thought and talked through how to know whether indicators are actually relevant. We discussed that someone has to count how many subsidiaries enter data for which indicators. They called this 'deep drill'. Cautiously, I mentioned that Elise would have to do this, because I did not have the capacity for such additional work. We considered whether ESDR could identify this information. I suggested that the database would not have this capability and it would not be worth it to have this programmed. Jack agreed. He proposed that using the GCEs' environmental balance sheets one could learn this. Hard spreadsheet labour. Victoria: oh no! Do we really have to make this effort? Jack replied: 'Herbert likes to cancel some indicators. [This] warrants [the effort].'

This conversation took place several months after the new business process model for the EMS had been sketched. Members were preparing the implementation of the solution in the two test GCEs. In this context, Jack's position to meet Victoria had become more and more legitimate. Victoria trusted him to be able to devise strategically the reconfiguration of data collection. Herbert wanted his subordinated environmental worker, Victoria, to plan for increased efficiency in environmental accounting. I perceived him as wanting to ensure that no irrelevant indicator would pollute GFQ's capital accumulation practices and bureaucracy. Hence, Victoria asked Jack and me to support thinking through how scrutinising the accounting boundary object – the list of KPIs and their subindicators – would be possible. Adapting to thinking in a way legitimate in Herbert's discourse, it was self-evident for members that counting and constructing new ratios would potentially provide an acceptable ranking of indicators along a quantitative scale. Here is a reconstruction of three significant ratios:

$$Usage\ of\ indicator_a = \frac{count\ of\ GCEs\ reporting\ data\ for\ indicator_a}{count\ of\ participating\ GCEs}$$

$$Contribution\ of\ emissions\ associated\ with\ indicator_a = \frac{Emissions_{indicator_a}}{Total\ emissions}$$

$$Ranking\ organisations'\ interest\ in\ indicator_a = \frac{Weight\ given_{indicator_a}}{Weight\ given_{all\ indicators}}$$

In effect, members performed environmental accounting as possible to quantitatively optimise – an interpretation initiated by Herbert. The qualculative character of the effect of this translation was not an issue any more within this meeting. Much rather, the doing of these calculations was discussed in relation to another quantity – the time needed to enact them. Victoria and me tried to evade these calculations – maybe because we were not allowed to voice substantial resistance against the calculations. The potential opportunity costs were high: having these calculations actually carried out would have required using significant human and temporal resources.

In Jack's interpretation of the situation, it was worth, however, to invest these resources in order to offer Herbert some indicators which he could drop from the list.

This was perceived as a promising strategy because members figured Herbert as wanting to exercise agency on environmental accounting. Offering Herbert some least relevant indicators (i. e. in terms of the ratios sketched above: indicators which resulted in comparatively low values) would provide him a toy to play around with and exercise his destructive will to control. They provided the CSR head with the space to stage the game he wanted to play. Thus, members emerged here prepared to offer indicators as a sacrifice to continue doing any environmental accounting at all.

In this discussion, clearly the relevancy of Herbert's formal position as the boss emerged. His take shaped what strategies were considered successful in the environmental workplace. As Victoria made explicit another time in a personal conversation with me: Jack had the ability to engage in these strategical discussions – an engagement which Frederik resisted. To be accepted as fit to manage environments, agents needed to perform acting strategically. And being accepted in this way resulted in privileged access to shape the actant 'list of indicators'. Herbert, nevertheless, was positioned as a contingent passage point, rather than an OPP. Data could be produced, after all, in different ways and they merely needed to strategically satisfy the boss, rather than having him directly govern them.[111]

♢ *End of Section* ♢

This section retraced decisive practices that allowed transforming the EMS to be sustained as a key trajectory of optimistic change in members' workplace. On this way we encountered the changing forms and configurations through which carbon was to be enacted. By attending to practices of enacting this change process we identified constraints and heterogeneous effects of the envisioned solution. As a conclusion I emphasise that while GFQ managed to stage a process of organisational and technical change, members themselves made recognisable that, backstage, fundamental problems and contradictions existed; these needed to be ignored to sustain their hopeful discourse.

Fundamentally, the transformation exercise was positioned in a tension: whilst the EMS-Team had to continuously perform trust in its carbon enactment assemblage – i. e. in its promise to achieve objective data – the transformation trajectory signalled at the same time, that this trust had been shaken. It had become common ground for the EMS-Team that the increasing participation by globally distributed GCEs could no longer be effectively controlled by the assemblage Frederik-ESDR. Crystallising at the narrative of the increasing coverage of the EMS, the understanding has been developed that not only a different data stream through 'technical' machinery was required but that the humans revolving around these streams needed to be reconfigured, too. Post-reconfiguration processes were to be under closer control by the HQ. This study points to eight sets of discursive practices which performed and made accountable among members an organisational shift towards effective control, to collectively imagine the possibility to intervene and manage.

[111] Readers may note that this constitutes a classic neoliberal set-up. Subjects govern themselves, rather than being controlled by the boss.

(1) They assumed that control over carbon can well be understood in terms of individual agency. The software solution was staged as merely a question of the right tool for the job. (2) Members posited that, through externally positioned and independent managers, control of these individual humans, data as well as software, would be possible. (3) The transformation team was not interested in engaging thoroughly with data collection processes and experiences as they took place in the context of Frederik and ESDR. For the team it sufficed to perform the past as not structured optimally enough. Correspondingly, an analysis of prior processes and experiences was not necessary.[112] For this step of the argument it suffices to stress that many understandings and ideas were silenced in the team's discussions; these knowledges were translated into absent problems in next-step qualculations (Almklov 2008, 879). (4) The specific way in which the ordering of data collection's actants was performed was shaped by the materiality of an analytical tool, the business process model. In-so-far as an analysis took place, it was constrained by the aesthetic and semiotic prescriptions by the school of process managers. (5) It had soon became evident within the EMS-Team that the transformation project would not only result in switching from ESDR to SAP but also switching the human elements of these technologies, i. e. from Frederik to Jack. With Horton (2003, 75) we can understand this situation as Frederik having used ESDR as material for performing his identity as GFQ's environmental manager. The database was a significant generative element to perceive the environment. Thus, ESDR had become part of Frederik's habitus.[113] However, while for Frederik ESDR was generative, for others it was not. (6) Rather than engaging with the limits to manageability, the transformation team's meetings assumed that technical and human elements could be formatted and reconfigured according to their 'Data Collection To-Be' plan. The risk that the model could fail to discipline the imagined actants (Briers and Chua 2001, 266) was not discussed even though some members explicitly pointed to substantial reasons why some of the presupposed actants, also within the SAP solution, would dissent. Just like ESDR-Frederik had problems to 'completely' draw together data to enact GFQ's emissions, any substitute system would misfit GFQ's organisational reality as well (Rowland and Gieryn 2008, 379). Consequently we can expect that ever more 'space for another accounting technology' exists (Briers and Chua 2001, 267-268). (7) The model of the solution only needed to satisfy in short-term GFQ's top managers – as a model which needed to attract internal funding. Whether and how the solution

[112]Thus, unlike members in a field who were studying the contingencies in processes, coined by Thévenot (2009, 797) 'critical historians', in the transformation team's meetings a detailed understanding of the network was not needed. Different than in Riles's (2000) case, for the seemingly fundamental change of data collection, the network around ESDR did not need to be made explicit. If, however, knowledges of actual data ordering were in principal available to members (Mol 2002, 27), we should be able to study them. The subsequent chapter turns to this issue.

[113]The notion of habitus to incorporate material elements is not new in STS. Callon and Çalışkan (2005, 28) (cited in Callon 2009) posit that the habitus concept is useful if it is extended to include materiality. (I refer to this text because the reference to Bourdieu has been purged of the later version of the paper (Çalışkan and Callon 2010, 25).) More extensive discussions of hybrid habitus can be found in Sterne (2003), Prior (2008), Lippert (2010a).

would be working in long-term and distributed over GCEs was a different question altogether. During the transformation project it was clear, that the model needed to avoid being crashed in the HQ during very specific decision meetings and conversations in between. (8) Finally, Jack had emerged as an actor who possessed a desired skill: the performance of strategic action and the making of compromises. For top managers, such an environmental manager was promising because this allowed them to actually imagine themselves as shaping and guiding the manager and his EMS; they could identify with being in control. In contrast, Frederik had performed himself and ESDR as too stable a black box, which, therefore, needed to be disposed of.

In this field members struggled for keeping the vision of the SAP solution alive. For that, members enrolled two groups of actants: a) members of the EMS-Team and FDSO as well as the promissory object SAP and b) charts which claimed to represent past or future activities within the data collection processes. The latter group could not resist very much on their own. The practices of data collection were represented by the humans present in the transformation team's meetings. Performing oneself as skilled and willing to control and manage these actants secured access to the design of and control over future environmental accounting devices.

Despite all the efforts invested into the transformation project, this study suggests: the so-called solution would in many ways decrease the transparency of doing carbon. The team designed the model such that its relation to organisational reality was obfuscated. With Bloomfield and Hayes's (2009, 479) sensibilities I need to point out: the model of the transformed EMS was materialised. It was not merely a rational myth. Change took place not only at the level of language but in biological, cognitive and material reality: heterogeneous sets of practices and actants have been substituted. 'The solution' was to materially reconfigure GFQ's hybrid carbon data infrastructure.

Nevertheless, the transformation could not take over control. While members prepared to replace the 'grounds of organisational commitment and accountability with a scheme of standardised, universalistic categories, administered through technologies implemented on the desktop' (Suchman 1994a, 188) control over data under the substitute system would be restricted to the desktop. This constitutes a case of organisational change in which control could be performed at a surface level. 'Change', here, was enabled because managers' access to the generative situations in which data was enacted was restricted. Thus, not only was there different control over carbon possible but also less. Control over carbon is situated in the distributed and hybrid enactment of data.

The next step leads us to this 'social' location at which carbon was 'decided' about, meetings. These were the relevant places in which not only the transformation exercise had been shaped but also members' encounters with environmental data.

4.5 Meeting Data

This chapter set out to study how control over carbon was enacted. We learned that members' engagement with data quality through databases and spreadsheets did not guarantee control; and neither could markets control GFQ in relation to the corporation's emissions. Also, control was not taking place via auditors, standards or GFQ's partner NGO. And while the transformation project promised the control dreams to come true we found this promise to lack foundation. Studying these assumed locations of control, moments of inscribing documents – ESDR or other materials – with data, we met humans. This section argues that the meeting of several humans and data was decisive in shaping the latter.

Consequently, this section turns towards particular moments in which members encountered, translated and – in effect – decided upon data. I follow Mol's (2002, 82-84) take on analysing the doing of things, i. e. asking how things hang together, Latour's (1990, 60) dictum 'look at what *draws* things *together*'. Mol proposes that they do not hang together as systems, discourses, paradigms or cultures, but rather through things, practices and their effects like paperwork, correlation studies, formulae, meetings. The meetings I encountered at GFQ could be characterised by GFQ's claim that staff would be allowed to speak freely. These encounters were to be performed as open, tolerant and flexible. However, as Kunda (2006, 219-222) indicates, these symbolic performances of reality should not be taken at face value. To contrast, figure the qualities of a meeting compared with a shopping cart: a supermarket's shopping cart is a transformative device that translates users' constraints into physical constraints; it helps users to coordinate each other, their social networks (Cochoy 2008). Inspired by this take, let us imagine meetings as a physically and temporally constrained space, generative of data, decisions, discourse. I argue, it is a device to transform members' issues into a shared or diffused responsibility. It socialises the issue.

By experimenting with a sociology of meetings I scrutinise how they connect elements to enact data and how these moments have structured control. For that I proceed by engaging with four kinds of moments in which data was first, given weight to and seemingly not altered, second, formulated by members, third, regulated in terms of how other members would encounter data and fourth, questioned and contested.

Affirming data We have seen that members engaged with data often by simply performing data as adequate. For that, I developed the notion automatic affirmation point. It is time to deepen the depth of this notion, to emphasise the effects enacted.

EMS-Team members had much agency in deciding whether adequateness was given or not. It was also possible for them to perform such an affirmation of data as objectified by referring to a corresponding past or by enrolling materials like calculators or definitions. In effect, data – and relations of trust in actors providing data – were stabilised. Furthermore, when engaging with the transformation process of the EMS and coming across a meeting between Victoria and Jack it became visible even more of how such

affirmation of data structured the workplace's relations. As part of their 'deep drill' investigation, Victoria was discussing with Jack the relevancy of a variety of KPIs and their sub-indicators and the impact of deleting them. In addition to seeing how Victoria affirmed data the following extract makes patent how data practices were ratifiable.

Field Note Extract 4.5.a (Challenging KPIs)

☞ discussion at Section 5.2, Section 5.4

> *Victoria asked whether the distinction between long-haul and short-haul is really relevant. Jack explained that the German GCE does not measure which flights are long-haul and short-haul. His GCE simply declares continental flights as short-haul and inter-continental flights as long-haul.*

In this meeting between Victoria and Jack data was only encountered indirectly by Victoria – via Jack. Much rather, she came across Jack's *account* of engaging with a particular kind of data. Thus, Victoria here came face to face with the substitute assemblage to Frederik–ESDR, namely Jack–and-his-data-practices. For Jack it was self-evident that the German GCE did not reconstruct their data collection system in order to collect data fitting into the categories of the group-wide EMS. Rather, he had decided to carry out the practice of mapping alternative categories of recorded flights onto the EMS's categories of flights. Thus he adapted the data such that it could be processed easily without upsetting anyone or anything.

The silent practice of filling forms with some data which seemed realistic caused less trouble to all participants than asking EMS-Team members for support or, even – as some GCE's environmental managers did – for adapting the ESDR's data collection categories to fit local data categories. In the next chapter I engage in closer detail with how, by way of providing his account to Victoria, Jack achieved to receive an affirmation of the assemblage of which he was part. For now it suffices to point out that Victoria effectively lent legitimacy to data as a complicated effect of the network of humans, data, practices and trust. In general, then, we can assume that in meetings when data is affirmed also the underlying actants and their relations are stabilised. In this particular case, at stake was precisely that the generative assemblage was affirmed, rather than questioned by Victoria. We can understand this moment as illustrating how Jack progressively enrolled Victoria and how by that they started to form an alliance. If there was a struggle at this moment, it was about how to perform the deletion of items from the list of environmental indicators as unproblematic. To be more specific, when humans encounter and affirm data, they do not simply *lend their weight* to specific quantifiers and qualifiers but may also *de-problematise* personae, their practices and the assemblages they form.

Formulating data A second quality of the encounter between humans and data was that data often was not 'simply' transported and given weight to, but also packaged into formulations, thus alter-modalising preceeding data conceptualisation. Meetings were generative, for such new formulations could be tested, contested and agreed upon. A series of observations on such form(ul)at(t)ing moments revolved around the difficulty of assessing coverage and its contingent quality. In this process I encountered an

interpretative performance of coverage information which produced a consensus of how to formulate a coverage fact. In a meeting for the transformation exercise, Victoria told us:

Field Note Extract 4.5.b (Coverage rephrased)

> *I have found a formulation: our EMS covers through its measures 84 % of the employees; and we have pure data of 77 % of the workers.*

This understanding allowed members to embrace both realities, the limited coverage understanding suggested by the reference figures produced by ESDR and singularised by Frederik, i. e. the 77 %, as well as the teleological coverage interpretation voiced so well by George, i. e. that the carbon emissions represent all the GCEs participating in the EMS – through which 84 % of GFQ's employees were organised. Victoria's formulation merged 'truth elements' of both understandings and, thus, spoke of the decisive question of how representative GFQ's carbon emission data were. However, for example, the plural of coverage facts was not explicitly embraced in her formulation. Significant was that – by means of providing a text which she proposed as stable enough to defend two realities – Victoria offered a new and different practical meaning of coverage: coverage would now be related to two factual claims which she rendered present as well as the absent reality of plural coverages. In this moment it was decisive that other members would not question these two factual claims and neither the three relations.[114] This meeting between the preceding version of coverage, the new formulation and members has been a success: the effect was the decision that inscribed in this formulation was indeed an agreeable fact. Thus, control over the coverage fact was situated in the meeting, rather than in some independent reality.

While the shaping of this new formulation can be discussed in terms of the performance of relating factual claims to each other, also relating explicit strategic claims to data could shape the formulation of data. ↪[115] We can identify such a strategic claim in a phone meeting which Frederik and me had, discussing possible results of qualculating GFQ's average data quality. We had looked at several algorithms and their solutions. One argument enrolled by the environmental manager was that low numbers would make GFQ appear amateurish vis-à-vis corporate competitors – a strategically disadvantageous position which GFQ did not want, he explicated. Hence, he implied, we should go for another algorithm and solution. In this meeting, Frederik merely informed me about 'what GFQ wants'. The decision over the formulation of the solution to the question 'what is GFQ's average data quality?' was to be influenced by this specific actant, his strategic statement. I was not positioned to question him when defining how GFQ wanted to appear to some *unspecific publics*. Within the meeting, therefore, we can picture a process by which the formulation was being checked in several respects and related to a variety of factual and strategic statements. An outcome of the meeting

[114] The three relations have been: two relations to *presented* factual claims ('coverage'–directly-covered-workers, 'coverage'–covered-GCEs), one relation to an *absented* factual claim ('coverage'–multiplicity-of-coverage-fact).

[115] The following discussion is relating to Field note extract 4.1.g (on page 249).

between Frederik and the average data quality fact was that the latter turned different relative to its state beforehand. It's existence had been enriched amongst other things by its new relation to GFQ's strategic interests.

Overall, when formulating data in meetings it was important for members that other present actants would accept the formulation. The form of data, and therefore data itself, could be altered by relating data to factual or strategic claims. Hence, formulating data was not to reduce data to some abstract factual core and, then, add a neutral formulation, a con-text. Much rather, a formulation of data is implicated in altering the modality. The meeting in which the formulation is performed as successful does something: it renders the *alter-modalised* formulation accepted.

Regulating data Of course, data often had a partially specifiable past and future. This means in any present meeting of members and data the latter could be regulated to fit for specific purposes. This did not only entail seemingly binary questions of whether or not data was submitted to a potential recipient, it also concerned the form/format/formulation of data itself. [116] When engaging with how members prepared the response to the CWC Ranking questionnaire, I met Marion, data and an imagined recipient of that data. The imagined recipient was Frederik. He was only present in the meeting through our representations, rather than corporeally. Marion and me were highlighting specific qualities and units in the questionnaire form in order to retrieve the required information from Frederik: he was supposed to provide the data corresponding to the questionnaire's (now highlighted) textual elements. By this practice we were deciding to a large degree about the data to be put into the questionnaire. And we believed that Frederik liked it that way. Marion once had told me that Frederik panicked when being confronted with strategic and political questions. And the interpretation of the questionnaire definitively required the reader to make strategic decisions on how to interpret the text.

This issue of the political-strategic needs to be more detailed. Here is a brief excursus: in order to imagine that we can induce Frederik to inscribe fitting data in GFQ's response we had to employ a conceptualisation of how Frederik was working. When conceptualising Frederik as evading political or strategic decisions we exercised a differentiation exercised by other members as well. Their action premised that politics and numbers were separate. Hence I encountered a distinction between the 'political' and the 'non-political'. The latter has been the norm for how their work was to be characterised. In an everyday perspective, members performed their work as non-political. That is, they related to two aspects of reality: on the one hand they staged their work often as merely revolving around 'numbers' – and on the other, they staged these numbers as not entailing any qualities, decisions or strategic elements. Thus, while this book is useful to conceptualise how mostly every action and actant has effects and is, therefore, political, members used the notion 'political' to refer to a seemingly clearly

[116] The following discussion is relating to Field note extract 4.2.b (on page 259).

bounded reality, namely that of qualities, decisions or strategic elements. Frederik had been known in the EMS-Team for keeping at arm's length anything he classified as 'political'. Thus, he was trying to keep his field of action seemingly pure, free of any investments and participation in the politics of number-making. He performed himself as merely doing calculations, thus denying their qualculative character. He engaged with *boundary-work* (Gieryn 1983): Frederik actively redrew the boundaries around what constituted the desired way of doing data, aiming to defend the right way of carbon enactment. And, as shown above, an implication of the shared conception within the EMS-Team that Frederik did not want to and was better not confronted with elements he would consider 'political' was that members deemed him not suiting the role of GFQ's environmental manager.

For this understanding, Marion and me had performed together the needed translation of the CWC Ranking's questionnaire into a document with highlighted categories and units. We had aimed at a document which Frederik could not that easily resist; this document was to not be readily available from his point of view as classifiable as 'political'. Hence, analysing this meeting is indicating how imagining an envisioned user of data is informing the meeting of how to form and submit the data which it is translating. In comparison to the discussion on the prior two forms of data operations in meetings, when regulating data, a *specific audience* for the data is known or imagined and may directly guide the meeting's formation of data.

Contesting data Engaging with moments of questioning or contesting data allows to zoom even further into the internal processes of meetings. Clearly, sometimes translating data was not that straight forward for members. In such cases, EMS-Team members discussed or attended to how actants hang together and which implications specific translation options might have. This argument needs three examples.

The first instance to look at took place in the very early stage of setting up the transformation project. Members of the EMS-Team met with Jacob. Victoria reported that she had sent off a description of the current status of the EMS and its data collection to the colleagues at GFQ's management training centre, inviting them to provide assistance in the transformation project. However, the contents of the description had not been agreed upon by all beforehand, causing irritation.

☞ discussion at Section 5.4

Field Note Extract 4.5.c (Master of numbers)

> *Frederik reacted fiercely: we do not have an error rate of 40 %! He made clear that he cannot comprehend some numbers which are in the paper. Victoria replied: the people at the training centre hinge a bit on statistics. They want to feel that it is not only about soft facts. Frederik: there is no 'return on investment; [. . .] I use to shy away from' handling numbers that are not clear-cut. Victoria responded: 'you are the master of numbers', we do recognise this.*

As already noted above, members had tried to use the transformation project as a case for training themselves in organisational change. To prepare collaboration with them, Victoria had to introduce trainers to the EMS, its problems and reasons for the

transformation project. To explicate the EMS's status, Victoria had construed the situation as quantitatively measurable. Using 'false number' may help rationalising a process, rather than subverting them (Lampland 2010). Victoria's understanding of staff's schemes of perception at the training centre was that they wanted to see that the transformation project was about a significant change in GFQ's operations where improvements can be achieved – and measured. While this moment also illustrates how the trainers' calculative space is extended and subordinated the EMS's own categories for describing itself, I like to focus on the fleeting discussion. At the surface of it the key question here was how their recent data collection was to be represented vis-à-vis trainers. However, if we accept the argument that GFQ's approach to data collection can be better understood as the assemblage Frederik-ESDR then Victoria's 'error rate' claim was not merely representing ESDR and a formal governance chart, but included Frederik. Therefore this moment also was a significant evaluation of Frederik's work.

Given a nomos of purified social and technical realms in this meeting to play according to the field's rules members had to reproduce the analysis that Frederik and ESDR were not linked through their identities. Trying to enact himself as a skilled player, when Frederik wanted to distance himself from being associated with such an error rate he could, thus, not voice feeling described wrongly by Victoria's claim. To distance himself from the claim, he had to distance the data machinery from it.

He tried to achieve this distance by making ontological claims, say, that certain figures like the error rate were wrong or did not exist at all, and by calling for a strategic approach to stick only to well-known and obvious numbers. The concern he brought to the meeting was primarily about ontology and secondarily about strategy. Victoria's response granted Frederik the sovereignty to interpret and steer numbers. Thus, in line with the argument developed above, we find Victoria not simply trusting Frederik (whether she actually did, we cannot know), but performing trust in him: naming him as the 'master of numbers' and declaring a generalised 'we' which would recognise his position stabilised the nomos for the transformation project. Frederik was given, again, the authority over the EMS's numbers. However, this issue of authority had not been Frederik's concern. The meeting was transforming one kind of matter into another, ontology into authority. Extending Latour's (2004b, 232-233) style, the meeting – the Thing (Germanic notion for court *Ding*) – established what was the cause (German, *Ursache*) of the concern (*Sache*) between competing agents (*Widersacher*). Meeting and matter at hand, the Thing and the thing, occupy the same space. This assemblage controls – not some grand social force. Or, is it?

Note that Frederik did not substantialise his contestation of the data enacted by Victoria. As she had already performed *her* version of the representation of EMS's data collection, Frederik was positioned quite defenceless. If he had wanted to contest the continuing enactment of the numbers-sent-to-trainers, he would have had to follow these numbers, i. e. visit the training centre and voice his opposition. Such a move, however, was not well advisable for him: he would have ridiculed Victoria's performance

and this would have implied that he would have had undermined his own performance as acting as GFQ's environmental manager. Thus, Frederik's position required him to not struggle against the specific effects of Victoria's claims. If he wanted to keep his position, he was only allowed to declare vis-à-vis Victoria his disagreement with both the specific numbers as well Victoria's strategy. The conditions under which this meeting worked were shaping Frederik's possibilities to exercise control.

Thus, while Frederik seemingly possessed a capital which allowed him to *demand* being reinstated as the rightful agent of authoring numbers, Victoria was anyway listened to by non-EMS-Team agents when she performed facts. In effect, then, Frederik at least managed to distance himself from Victoria's numbers, thus not declaring himself responsible for the latter. While this meeting eased the tension between Victoria and Frederik for a moment, this retrospective meeting of Frederik with Victoria's data could neither undo her performance nor did it provide evidence that in future Victoria would not simply again perform numbers on her own, sidestepping him. For the environmental workplace, this meeting was useful to reproduce the formal rules of the game, i. e. of how data was to be shaped. However, this analysis suggests that it did not modify doing data itself. Actual data did not matter.

In another meeting with Victoria and Jacob, Dieter challenged a proposition of which emission reductions to include in GFQ's carbon balance. [117] Jacob had proposed that the emissions reductions accumulated by a specific GCE, SigBa, should be utilised in the EMS to reduce GFQ's overall emissions count. However, that GCE had been sold shortly beforehand for its financial performance during the financial crisis had not been well enough. In the meeting, Dieter intervened in Jacob's strategy by mobilising a standard's stipulation, declaring that the former GCE had to be disintegrated from GFQ's carbon balances. At stake have been three issues in this meeting's moment: the reduction of emissions on GFQ's balances, adhering to a standard's stipulations and who was assigned the right to define the situation (i. e. which of both former stakes would supersede the other). Thus, in this meeting was not only regulated how GFQ's emissions would be calculated, but also how the elements GHG Protocol, SigBa and GFQ's carbon balance would hang together.

While Jacob was able to claim (because members enacted his formal position) the right to interpret GFQ's strategical interest in reducing its emissions on environmental balance sheets, Dieter accessed the symbolic resource of GFQ's formal commitment to adhere to the standard. Both, the standard as well as GFQ's strategical interests did not speak by themselves to the meeting but were translated by participants of the meeting. Thus, being trusted as an adequate representative of any of both was a decisive capital for the agents to invest in their stakes. And that trust can be traced back to agents' claims to their knowledge and understanding of 'the situation'. Having the meeting was decisive in shaping data because the meeting's nomos – giving primacy to following the standard – co-regulated the enactment of hierarchy between the elements. Without

[117] The following discussion is relating to Field note extract 4.3.c (on page 311).

the meeting, other concerns might have superseded that nomos' existence in actually governing data formation. To some readers this might suggest that by subjecting data formation to actual control in meetings, the participants' rules may have a better chance to be enforced. However, at the same time it is recognisable that only those norms can be expected to be enacted which are defended in the meeting. The most modest norm will only be effective if members enact it – and even utopian strategies become realistic if they are put into practice by members.[118]

The prior two cases scrutinised the role of meetings before or after data was emerging from the meeting: we looked at both, a retrospective account of data which did not anymore shape the data discussed and a forward-looking meeting in which the shaping of data was regulated. Finally, I turn to the midst – to a meeting which was positioned right in the middle of reviewing and shaping data: the maintenance of GFQ's carbon memory. This provides us with insights into the strategic shaping of numbers. The following instance took place during a meeting of the EMS-Team in a period dedicated to smoothen the EMS and its data such that it can easily transit to its future form. We discussed a request by Bret Fletcher, an US GCE agent.

Field Note Extract 4.5.d (Plausible data)

☞ discussion at Section 5.4

> *Frederik indicated that requests still exist to update old data. Victoria: it is not envisaged to update old numbers within SAP. Then she asked: 'is this about corrections in which emissions improve?' Frederik: they will be more 'plausible'. Victoria: do we have to update them at all? Frederik explained: Bret has not reacted. Frederik had told him that numbers do not fit. Then, numbers of 2007 had been altered; the 2006 numbers hadn't.*
>
> *Suddenly Frederik asked Victoria: Victoria, what do you pay for a kilowatt-hour (kWh)? Victoria: 18-19 EUR cent/kWh. Frederik: correct. And Belgium pays 140 EUR/kWh for biogas electricity. 'The comma simply got off the mark'.*

I argue this meeting was positioned in the midst of data enactment because the discussion took place after data had been entered into ESDR by GCEs and after GFQ's environmental balance sheets have been officially finalised. However, as this book proposes, it is analytically not productive to take 'finalisation' for-granted. This meeting attended to GFQ's distributed carbon storage and considered to adjust data already inscribed. Whether or not data would have been altered, by way of opening this issue and deciding again, whatever the meeting would have done, it was lending its weight to the data. And thus the data was changed through the meeting – data was then part of an assemblage which included also the informal actant status 'reviewed in meeting X'. Hence, this meeting was positioned both before and after data was shaped.

This particular moment of the meeting was very much structured by Frederik. He put the topic on the agenda because it was intersecting with two issues relevant to him. First, Frederik wanted numbers stored in the distributed memory to fit. And

[118] Whether or not to endorse a proposal akin the suggestion to move carbon enactment into meetings requires, however, a more detailed understanding of the practices by which data was ordered within meetings. The subsequent chapter turns to this issue.

in this particular situation he had identified several GCEs which were still associated with data he deemed not fit. Second, the imminent shift from ESDR to an SAP based system implied that correction of existing data would not be possible any more in future. He was equipped, though, with a resource which allowed him to propose how to proceed. Frederik's stance was based on a knowledge of the costs of the goods and services utilised by GFQ. He believed and performed himself (as) able to assess whether data reported was realistic. In this case, a GCE's environmental manager had requested to adjust data already transmitted. However, at that point in time, corrections and adjustments were not invited anymore by the EMS-Team. Now the criterion used by Victoria to decide whether to update old data or not was whether new data would produce a more *favourable* situation. Note that Frederik did not take the risk of following this rationality: he evaded it by suggesting that the data will be more *plausible*. However, he then made sure Victoria would decide in favour of updating the data by suggesting an analogy: if another case, claimed to be a straight-forward instance of the same category, was inviting data adjustment, then also Bret's GCE's data should be updated. Frederik understood the old data to be *obviously* wrong and the correction would produce a better data basis of the EMS.

While Frederik invited such a change of data he did not want to perform this change as politically motivated. Like in Porter's (1995, 118) account of French engineers using mathematics as evidence of their 'disinterestedness and expertise', Frederik substantiated his proposal for change by appealing to understand his intervention as initiated by expert interpretation. Porter reported that the mentioned engineers would never make up numbers. 'Negotiating mutually acceptable numbers was, however, another matter.' (ibid.) Following an earlier interpretation of mine (Lippert 2011a), we can conceptualise the negotiation between Victoria and Frederik as drawing on a shared reality – that of market prices for a specific type of energy service. Mobilising this resource allowed him to imply that it was recognisable for Victoria that GCEs' agents sometimes merely got the position of the mark wrong, whereas the digits entered were correct. And the idea of correct digits, i. e. numbers, simply having been wrongly entered met the nomos present in this meeting that non-political errors should be corrected if possible. From this point of view, there was nothing to discuss. Frederik, thus, had rendered present in the meeting several elements which he carefully aligned into a persuasive story of a technical error for which Victoria could take the political responsibility to ask him for adjusting the data. In this meeting, then, Frederik appears as having enacted – in the field of carbon data shaping – narrative elements as a capital which he could enrol and align to support his cause.

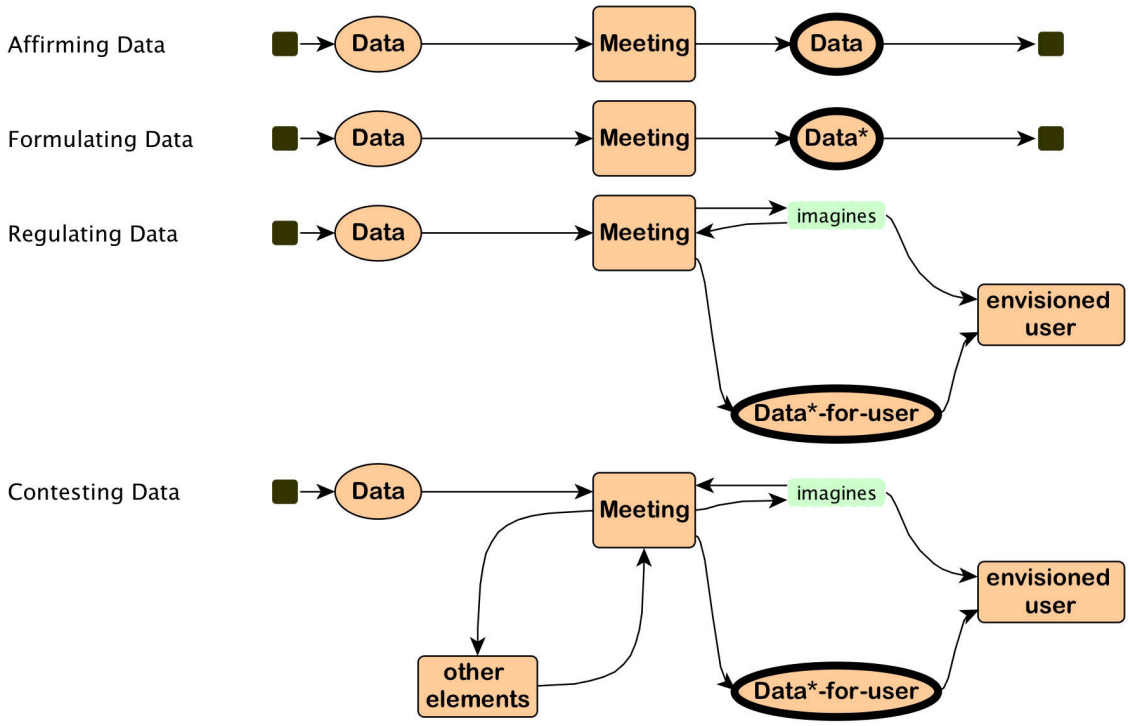
◊ *End of Section* ◊

This section focussed on reconstructing how meetings structured the shaping of data. For that I turned to this kind of moments and reconstructed four modes of how meetings translated data. These four modes should be understood as analytical differentiations. When meetings took place in practice all these modes could be observed. Yet, to

distinguish particular effects, I differentiated meetings.

As indicated in Figure 4.7 when data was being affirmed, the form of that data was strengthened. I argued that this happens because in this mode, the actants, relations, i. e. the assemblages formed by them, are stabilised and de-problematised. Further, in meetings data was spoken about and, thus, existing in formulations. The latter were changed in meetings. Participants in meetings sought approval for 'their' formulations. When (re)presenting data it was linked to other factual or strategical claims and statements. When accepted these statements became part of the data. Thus, a meeting can be seen understood as altering the modality of data. Data is translated into Data*. However, data was not merely translated from some form into another. It was also brought in forms and states of existence targeting specific users of that data. In a meeting, specific data users can be imagined. Rendering the user present in a meeting can help members to regulate the formation of data and, ergo, its users. Finally, in meetings, often data was contested. This means that members related to a variety of other elements – such as humans, responsibilities or all kinds of statements – in competing ways. The meaning of the relations between members, data and these other elements were not necessarily shared. Then, the meeting's nomos provided a constrained room of possibilities of how members could order the relations. Vis-à-vis other elements, data was not necessarily being the main issue at stake. A meeting can order relations between elements and the specific formation of data might then be a contingent side-effect.

Figure 4.7: An analytical differentiation of how meetings shape data



Of course, in meetings, every of the four modi is mostly present in some way. The key point is that when zooming into the kind of moment in which data is shaped we find members do not exercise some global form of control over data. The identity of data is necessarily affected by a meeting though which it has passed. Data is brought into some form of order in meetings. The order is changed. This formation, however, was not taking place in some isolated space of pure data but in intersections with issues like the transformation of the EMS including the struggle between members and the reproduction or modification of the EMS-Team's nomos and its distribution of capitals.

To sum up, environmental work meetings were enacted by members. We found that meetings defined and shaped the situation within which data existed. In these meetings, members offered elements to re-order data. Consequently, meetings and its participants configured elements. And meetings entered the assemblage of data enacted. Once enacted within a meeting, the taken-for-granted neutral container of organisational decision-making became part of the meetings' effect, data. Thus, meetings reconfigured data and are part of controlling what matters. Meetings act. Like humans, meetings were not acting freely. A meeting was existing through the relations between the elements which were relating within the meeting. They were a location at which temporary orders of control over carbon could be negotiated. That control, however, was situated in the relational web of the meeting – not attached to specific substances. Employing the Germanic notion of 'Thing', it seems obvious: the Thing (the assembly, meeting) and the thing (data) coincide. We found that carbon data assembled into itself the participants of the meetings through which it meandered.

♢ *End of Chapter* ♢

This chapter was about power and control in the environmental workplace. EMS-Team members constantly staged hope and projects aiming to control, i. e. direct, data enactment. To conclude I first summarise the five versions of control analysed in this chapter. Thereafter, using these findings I reconstruct the *field of carbon enactment*. This reconstruction underlines the reflexive constitution of the field through members' practices, recognising their struggle to control while not being able to. This field, I shall conclude, was utterly dependent on members' capacities to view data and act on data in appropriate ways.

Summarising This study shows: control over carbon was bound to stay always incomplete. To generalise, control can never be complete. Control is always taking place at particular locations, using specific infrastructures; control is situated.

Control through indicators: The EMS was to be controlled on the basis of performance indicators. Data quality was one of them. I showed that what this indicator captured was a very reduced notion of quality and it was not clear what it was actually measuring. Rather than postulating that GFQ should know what they measure, the analysis suggests that qualities of data cannot be found out there. Quality is an

effect of members' particular practices. In GFQ's approach to improve data qualities they prepared to move from *measuring* quality substantially to *assuming* that formally purified processes would automatically result in high data quality. Thus, they ceased aspiring to control by means of reflexive feedback in favour of defining their future performance as generative of high data quality.

Control through markets: Markets are supposed to optimise capitalist economy by means of switching investments to more green companies. A decisive condition for this to be possible is information. Rankings are to provide market participants with information on companies' greenness. I showed that GFQ provided data to rankings which was directed to be acceptable, to not induce surprise among market participants. Data on GFQ's emissions was used to stage emissions as stable rather than turbulent. Neither ranking nor GFQ's data submissions were allowing to account for the fluidity of data, its contingency and precariousness. As a result, market failure is hard-wired into the market approach to take carbon into account.

Control through quality assurance: Studying the everyday relations between quality assurance institutions and the EMS-Team's carbon enactment practices yielded several insights. Overall we found it more apt to conceptualise their relations as a legitimising network, rather than as a quality scrutinising machinery. The basis for this suggestion was that institutions like auditors, standards or an NGO were not getting significant access to the workplace and mostly official spokespersons of these institutions were absent. In the everyday, their presence was mediated and enacted by EMS-Team members themselves. And members had learned that it was better to not confront these organisations with the problems and contingencies of data enactment. To adapt their practices to the norms of quality assurers meant that members had to silence the overflows, rather than commit to practical engagement with them.

The community of practice revolving around carbon data was for the most part separated from the legitimising network. This network lent a shine to GFQ's emissions' – as having been evaluated, being comparable to other firms and, thus, being governable. The legitimising network's organisations were, at most, co-regulating the surface of emissions but not the decisive processes through which data was enacted. For GFQ's agents these organisations were of use to attach the organisations' labels to members' claims, within GFQ and publicly. GFQ was positioned, in principle, to switch between specific organisations. The structure of quality assurance was stable: any organisation would primarily be used to align GFQ's emission with legitimacy.

Control after organisational change: GFQ and the legitimising network lost trust in a decisive assemblage entailed in the corporation's enactment of carbon emissions – the hybrid actant consisting of the database ESDR and the corporation's environmental manager, Frederik. As a reaction, members set out to transform the EMS. Environmental data collection and management was to be moved to another technical platform, SAP, and integrated into financial data gathering. It became obvious that not only ESDR needed substitution but also its key user, Frederik. The alternative to this assemblage

was one combining SAP with Jack. Both assemblages had the capacity to generate carbon emission recognition patterns and specific types of action and strategic-political orientations – i. e. habitus. And both assemblages were specifically configured, fixing respective generative trajectories.

Imagining the switch between both assemblages as sufficient to achieve all the desired scores in relation to internal indicators (data quality and coverage), rankings and quality assurance by auditors and their partner NGO required members to silence specific matters. They needed to ignore those problems which the substitute assemblage could not solve (e. g. data collection concerns at subsidiaries). Members had to resist engaging with the work practices of the humans involved in the future assemblage (e. g. bookkeepers). Thus, the transformation exercise was preprogrammed to require much articulation work if the new assemblage was to be performed as successful. And I showed how members prepared precisely for such performances. However, in the new act, control would be restricted, more than before, for the substitute assemblage was even more out of touch with data collection at subsidiaries than the old one.

Control in meetings: In parallel to materialised configurations which directed carbon enactment, control was also very much situated in human-data encounters, in meetings. Members in isolation could not direct carbon. Rather, control emerged as an effect of the relational web constituting a situated assemblage – involving heterogeneous materials (e. g. profit, database configurations, politics of numbers, members' formal rules of engagement). GFQ was not in control over carbon. Much rather, carbon was controlled by diverse actants and their concerns relating to each other.

Reconstructing the carbon enactment field Reconstructing a field means attempting to develop a coherent understanding of how practices were able to result in order. For this I set out with the ontology of GFQ's carbon emissions. These have not been present, somehow accessible by the EMS-Team. Much rather, the latter needed to do hard work to bring carbon into presence. In this work, they acted as heterogeneous engineers, bringing into play humans, files, paper. This constituted a hybrid machinery. It was at this level of practice that control was situated and control over carbon was always situated in the relations between these assembled actants.

Their work drew together decisive resources; their various practices were themselves crucial. These resources needed to be invested to enact carbon. And, to some degree, these resources could be invested into other resources. I proposed to conceptualise these decisive materials and practices as capitals. This underlines a specific character of resources that are also capital: without them members could not participate in the constitutive practices of enacting carbon.

Examples for such capital material practices have been all kinds of elements and activities which enacted data, promises for better data or legitimacy of data. And these elements and activities could not be sustained in isolation. Much rather, they needed an infrastructure – repositories or devices actively maintaining, adapting or developing the specific relational webs around data.

Exclusive ownership of a capital meant owning a decisive resource which was required to enable the community's practices. In classical ANT, a necessary device through which a practice is enabled (e. g. transmitting data) and exclusive ownership thereof is grasped as an OPP. In my analysis I rarely, if at all, came across any OPP. Even if devices were formally owned by a singular agent, in practices, mostly, devices were under shared control of several agents. And even if, formally, specific actants needed to be used to channel through carbon, in the reality of practical situations, rarely, if at all, these formally required actants were *necessarily* implicated in agents' practices. Around the EMS-Team capitals have been mostly distributed over several humans. Even if ownership was exclusive, possession was shared. I found little obligatory; but I identified contingent passage and automatic affirmation points.

An analysis of members' practices for what they struggled for with their specific approaches to do carbon, yielded three general stakes:[119] members were doing carbon – and tried to do carbon well; they tried to attract and align legitimacy with the emissions they enacted; and, for the problems they encountered collectively, they sought to rationalise promises and hope in specific solution devices. Associated with these stakes have been general nomoi: doing carbon and solution devices were to be enacted such that they were likely to be alignable with legitimacy.

Sometimes the capitals available were not configurable to meet the standards set by particular versions of nomoi. Then, the pattern of the relationships between available and configurable capitals, nomoi and stakes resulted in specific contradictions; structural problems. Such a problem was the relationship between the nomos that carbon enactment should be as machinised as possible, optimally devoid of biological human traces, and the fact that any carbon accounting machinery was necessarily involving humans, at the least as designers or ultimate reviewing agents. Another problem was that enacting data according to technical standards required worker's committed action to repair the gaps between prescribed reality and the off-standard carbon artefacts crystallising within GFQ's carbon accounting machinery. Yet, the more action was required to fit data to the technical standard, the less was data accessible to auditors.

At the same time that we recognised these in-built contradictions, we found that capitals and stakes were *interdependent*. Reaching a stake required having reached another stake and being able to employ it as a resource. This circular, reciprocal relationship – which Star and Griesemer (1989) would call ecological – was distributed not only within the EMS-Team but extending to 'external' organisations, such as a ranking agency, an auditor, a technical standard and an NGO. This structure resulted in a decisive shaping of how these actants were able to direct carbon: if we are to grasp it as control at all, at the most it was multi-directional control, or in members' terms 'out of control'.[120] Enacting GFQ's global carbon emissions did not require the

[119]This analysis has been supported by a secondary analysis as laid out in Appendix B.4.

[120]Of course, reality was even more complicated. Interferences existed. A crude example: the production of carbon emissions reconfigured the bonus payments to senior managers of the multinational, GFQ. They received part of their payments as a result to the carbon emission reductions

'presence of centralised [...] control' (Timmermans and Berg 1997, 274–275).

Thus, while the nomoi prescribed carbon to be under control and carbon enactment to be constituted by neat work processes, we encountered the effects of these impossibilities: contradictions, resulting in practical friction; multiple and reciprocal directions of control, resulting practically in non-control. Members resolved such substantial and practical stress by *staging* control. The analysis of how members structured their own workplace suggests that this resolution constituted the easiest way out (compared to making a fuss about what concerned them, what matter caused stress).

The finding that carbon enactment was staged as under control points us to two significant implications. First, the *audiences* of this performance were different kinds of publics. Probably the biggest group among these publics – for which the EMS-Team assembled emissions – were the anonymous investor or concerned citizen. For them GFQ enacted carbon as under control. And this target group had, basically, no access at all to the practical reality of GFQ's carbon emissions. Compare this group with the ranking agency, the NGO, the technical standard or the auditor. They had at least some access, albeit very marginal. If we rank these groups in terms of their access and possibility to participate in GFQ's carbon enactment, with Bourdieu (1985, 198) we would have to recognise them as occupying different *class positions*. Classes are theoretical products – they appear in an account of reality. GFQ's internal agents had most power over GFQ's carbon (even if that power was shared and not under control). Vis-à-vis them, the legitimising network and the ranking agency had a quite weak position. And the consumer, the citizen, the investor – if they were not managing to get into GFQ – were practically devoid of capital.[121] And there is another group, relevant for this book: ecological modernisation theorists. They argue that environmental concerns became more central in modern societies. My analysis clearly shows, accounts of carbon emissions, presence of environmental management systems, do not necessarily indicate that environmental concerns substantially move to *the* centre. Rather, at least in the GFQ case, staging concern, staging having environmental impacts under rigorous control was the practical focus of activities.[122]

Second, I need to defend the idea of the *stage*. Among others, feminist scholar Butler (1990, 1993) and ANT scholar Mol put much work in showing that entities, such as sex or a disease – or for that matter carbon – are not only epistemologically but also ontologically performed, i. e. enacted. There is nothing but stages. 'The opposition between surface appearance and deep reality has disappeared', writes Mol (2002, 37). In that respect my take on a staged performance may be perceived as

they were able to account for. The topic of interferences relates, analytically, to the construction of a field. I discuss this in a moment.

[121] Although, I should note, precisely because the decisive resources to participate in GFQ's carbon enactment needed to be enacted (capital as practice) anybody might *take* positions forcing GFQ to open its emission enactment practices.

[122] A methodological note is apt. Studies of ecological modernisation that are not attending to en*act*ments of environments are likely to misconceive the modernisation of staging control over environmental impacts with entities actually *caring* for how environments can be made present. Yet, whether care is likely to be found in capitalist enterprises is a bigger question (Callon and Law 2005).

questionable. While I position this book firmly in the tradition of interventions stressing performativity, it seems apt to underline the notion of stage to emphasise a specific quality of enactment: members enacting an entity may be aware of their practical achievement work and, yet, decide to *(re)present* that work to audiences *differently* relative to *their* understanding of deep*er* reality. To illustrate, EMS-Team members certainly were paying attention and strategically engaging with the practices by which they brought accounts of carbon into discursive reality (by which they enacted carbon). However, this does not necessitate that members translate their knowledges of their enactment practices into *accounts* of the entities or of how they enacted the entities. A case in point were team members in the transformation exercise: they recognised well that bookkeepers' work and subsidiaries' invoice realities were practically not fitting their grand transformation project. They ignored their knowledges of enactment work; that is, they did not give much voice to that work in favour of stabilising the EMS transformation discourse. Staging the transformation project as likely to succeed in solving all their problems was an enactment. And the notion of stage implies members' recognition that backstage another version of reality is known.[123] This discussion concerns me because this book has to relate to the grand promises of transparency ranging from Habermas (1991b) to CSR and sustainable development discourses. And the notion of transparency implies a normative commitment to tearing down the curtains.

An account of the carbon enactment field has to acknowledge that members ordered realities through their practices. They were neither free nor determined in ordering data into emissions. For GFQ was a normal corporation, plans, prescriptions and instructions existed in abundance. However, members had to relate to these entities always in particular situated action (Suchman 2007). Users, even of hard-wired scripts such as prescriptions inscribed into database forms, needed to interpret scripts and adapt them to the practical circumstances. Prescriptive devices provided orientation.

Orientation was, however, not only entailed in explicit or materialised prescriptions. Members also found orientation in discourses – which they, respectively and simultaneously, co-constituted – to organise their practices. As laid out above, discourses of sustainable development, ecological modernisation and climate change were used as reference points by EMS-Team members as well as by the legitimising network or the ranking agency. Examples for such reference points were visionary boundary objects like the 2° C aim or the transformation project as a solution to the shortcomings of the prior EMS configuration. Implicit to notion of legitimising network is that that institutions like standards, auditing and NGOs or civil society are (re)cognised by members as valid reference points as well.[124]

[123] And, again, a staged performance may be supported using *material entities*. For instance: that the ESDR-Frederik assemblage was characterised with a high error rate by Victoria was more than a rational myth. Members recognised that her numbers have been false. And they enacted that error rate anyway vis-à-vis other agents. To support their myth, Victoria used a digital file. Thus, a staged myth may be as materially enacted as any other other enactment.

[124] Further orientation, not specific to the field of carbon enactment but fundamental, was certainly

Members and institutional actants organised each other to not break up their co-operation. They were so reciprocally connected through their practices, requiring each other's presences (and, therefore, enacting each other into presences) that it was in all their interests to maintain their relations as smooth as possible. This implied: it was not of interest for them to disturb the practices through which they related – e. g. by being too committed to (re)presenting troubling carbon concerns.

Together they were able to reorder some of the key devices positioned at the centre of the field, i. e. getting rid of the qualculative assemblage ESDR-Frederik. The resulting SAP labelled system was construed by the NGO, by the auditing firm and various powerful internal actors as delivering what GFQ needed: clarity and no comments potentially giving rise to questioning the myriad qualities and quantities underlying GFQ's emissions. While members came across various troubling concerns (potentially fundamentally threatening the promise that the new assemblage could realise all the hopes invested in it) they managed collectively to ignore these and reconfigure the field. In this conception, the field structure is as enacted as GFQ's emissions themselves; the field structure is held together through heterogeneous material practices and texts. The materiality of the structure may be a suitable indicator for how stable such a field is. This does not suggest, however, that superficially hard-coded materials, like a database structure, are necessarily the most stabilising elements. Recognising the switch between the two assemblages in the field proves this point. Stability can be designed by constructing assemblages which include highly creative and sentient elements, like human brains, eyes and hands, and which include highly adaptive and floating elements, like shared ideas and promises.

The practices discussed in this book also had a large scale effect. Collectively, members and the other institutions legitimised and naturalised carbon. They reproduced and strengthened a discourse of 'the environment' and 'climate change' in which carbon is a quantifiable, manageable and governable entity. In that sense, this field was structured (through members' practices) to contribute to the hegemony of a specific techno-managerial take on 'human'-'nature' relations. The notion of hegemony, now, should be traced back to Gramsci (1971). Compatible with the analysis of control over carbon as staged control, actants in this field were intentionally and strategically configuring the field to naturalise carbon as a manageable commodity.

However, we must recognise that these actants should better not be conceptualised as 'free' actors, pursuing rational action. EMS-Team members, VfU, GGCA or CWC Ranking – they all must also be understood as effects of discourses, providing the very categories through which actants acted, which have been inscribed into their reference institutions. This suggests that hegemony only captures a part of what was enacted. A better conception would have to address that members' enactments were part of

the very field of labour relations. EMS-Team members have all been subject to dependency on GFQ's HR agents to not stop paying them wages. An ultimate threat against workers was, of course, relocating them within the organisation or firing them. I conceptualise such relations as constitutive of another field, overlapping with the one of carbon enactment.

actor-networks and that their enactment of carbon was an effect of building into their assemblages specific entities, like documents, which had the widely spread entity of 'manageable carbon–carbon ought to be under control' folded into themselves.

Bourdieu's (1989) notion of *symbolic violence* is of use for precisely such a purpose. It does not imply the purposeful 'manufacturing' of hegemony (Bourdieu and Wacquant 2004, 274). Symbolic violence refers to the fact that in a given situation members employ socially shared categories to make sense of the world (e. g. all the dichotomies like male/female, black/white).[125] And members use these categories to shape the world – treating others through these categories. Carbon is such a category. Members' practices were situated in a field which was constituted by this very category. Carbon co-configured how members' practices were meaningful. Thus, members could not control carbon – but they were disposed to engage with carbon.

Being positioned in these ways, members were interested to enact carbon, in effect structuring their community of practice, but also the wider field of carbon enactment – encompassing (now) all those (parts of entities) who or which struggled, hoped for and legitimised doing carbon. This likens Latour's (1993a) account of entities actively associated to pasteurise France. They ordered and enacted society. Doing carbon enacts society in particular ways. Hence, ordering enacts order (Berg and Timmermans 2000, 49) – the order of things (Foucault 1989; Bourdieu and Wacquant 2004)

To be part of this enactment, actants have to interest others in enlisting them – reciprocal enlistments. To be successful in participating, actants have to be equipped with a feel for what others might be interested in. This 'what' refers to capitals. And these capitals need to be enacted themselves.

In the GFQ case order was not fully present.[126] And, in parallel to staged control, GFQ's carbon enactment take was bound to not result in full order. Ordering creates specific disorders, monsters, overflows. EMS-Team members recognised that their assemblage was generative of a variety of problems – misrecognised as 'challenges'? After all, then, humans had to deal with these concerns. Thus, we arrive at the last step of the argument: human agents were central to carbon accounting.

I emphasise that agents of ecological modernisation were (and can be expected to be) required to engage with extensive articulation work to run the EMS, be it within the pre- or the post-transformation configuration. To achieve ordering in the right way, members had to cultivate a fitting habitus. Frederik-ESDR did not have the appropriate generative schemes of perception and action. However, also subsidiaries' environmental agents were not necessarily equipped with the right habitus. Also their schemes of perception and generative schemes were not producing the desired performances of consumption data.

Staging carbon well was eased considerable by data which accorded with HQ expectations. Hence, when the EMS-Team prepared the workshop to teach subsidiary

[125]For lists of dichotomies, see e. g. Haraway (1991c) and (Bourdieu 1989). For a juxtaposition of Bourdieu's (2000) symbolic violence and Gramsci's (1971) hegemony see Burawoy (2012).

[126]This, of course, is no exception. All cases scrutinised through an analytical method like the one I employ, can be predicted to show disorder.

environmental managers members they targeted their generative schemes of perception and action. Victoria pinpointed what the schooling device was concerned with:

Field Note Extract 4.b (Aim of workshop: how to look at numbers)

This is the issue: how do I look at numbers?

She expressed what mattered to run carbon accounting well. It mattered whether GCEs' agents were equipped with a suitable perception which would inform them of whether data was meeting the *implicit standards* of GFQ. Unspoken by Victoria was the assumption that if agents recognised numbers 'appropriately', they would take apt action. Appropriate action was to deliver appropriate data – e. g. not too extensive deviation relative to a prior reporting period, only relevant comments, numbers of similar magnitude as those numbers submitted by other GCEs.

GFQ needed environmental agents as plug-ins – insertable into the EMS. Insofar as the EMS was transformed and proceeding, the Frederik-ESDR plug-in got outdated. Latour's (2005, 209-211) discussion of plug-ins links to Bourdieu's notion of habitus. Latour presses the point that members are equipped with acquired abilities which allow them to interact with other members. Members have to share standardised equipment; i. e. the habitus has to be collectively organised. Members need to share schemes of perception and action to act together.[127]

And members can be schooled to enact the right vision (Goodwin 1994). Controlling carbon, thus, was dependent on members' schemes of perception and action. For the field of carbon enactment was reflexively constituted by members' participation in the field, the next step of this analysis has to detail patterns in members' ordering practices.

[127]Similarly, I argue for accounting as operating through shared and distributed cognition (Lippert 2011a).

CHAPTER 5

Achieving Order

The argument has evolved from recognising the constructed character of carbon at the subsidiary level to drawing out the performances by which 'global' and 'sustainable' carbon emissions took shape. We found that to a large degree carbon enactment practices have been – as members phrased it – 'out of control'. Focussing on the quality of the settings and situations within which control was assumably located provided insight in the configuration of control over carbon: it was always situated. These situations formed patterns, a field. Members enacted carbon in a field characterised by particular dynamics, characteristics of data and the materiality of the devices which served for inscription and transformation of data. Data, devices and humans – all played into and established the structure in which they organised their practices. This field was not a simple terrain for members to accomplish their tasks: it was laden by uncertainties, friction and contradictions – in other words, it was everything but the clear, determinate reality depicted on work process or data flow models and organisational charts. This chapter outlines some of the most decisive ways by which members attempted to achieve order in the midst of this *messy* (Law 2004a) reality. We, thus, turn to the particular practices for drawing and blurring boundaries between order and mess.[1]

If, as it were, members' co-operation and struggles resulted in highly organised presentations of coherence, clarity and control, then the question emerges: how did members – through their practical work – achieve order? Lynch (1999, 227) suggests to use ethnomethodology to study the 'life-world inhabited by competent masters', who – as it seems – created such well-sorted carbon emissions. The ethnomethodology approach suggests that members know what they do. Thus, while not construing facts as lying in the field to be simply gathered by sociologists, ethnomethodology turns towards actors to teach us about how they deal with the world. Why is this promising? It is so, because inhabitants of the real world use (in)formal tutorials to teach other inhabitants how to engage with their life-world (Lynch 1995, 327), because members' activities

[1]The theme *blurring boundaries* resonates with Beck and Lau's (2004) work and that by Böhle et al. (2004). Their reflexive modernisation take analyses knowledge practices with *scientific* knowledge as *the* point of reference; I engage GFQ's ordering practices for emissions *sui generis*.

simultaneously serve to manage the situations in which they encounter and engage with the world and to make *account-able* (Garfinkel 1967) to others that their activities are appropriate. Treating the EMS-Team's practices as sources 'of theoretical and methodological instruction' (Lynch 1999, 226) allows us to ground theorisation of how members enact order and mess. If the corporate discourse on sustainable development and CSR with its claims of transparency is to be taken seriously, then investigating how members enact accountability while they construct carbon emissions promises to provide us with key insights.

EMS-Team members recognised many of the problems their work was confronted with. In the *logic of representation* (Czarniawska 2001), i. e. in the patterns by which members would perform official accounts of their practices, GFQ agents would point us to the promises to transform the Environmental Management System (EMS). The transformation exercise was the official GFQ approach to bring about order in carbon. As I have shown above, their take was fundamentally problematic. Rather than dwelling on the official narrative of organisational change (although I continue to refer to it throughout), this chapter extends members' analysis by scrutinising which micro-strategies and practices they employed to achieve order. Thus, I argue that even though members produced clear representations, their managerialism creatively recognised and engaged with messy realities.

For this argument, Chapter 5 employs four steps. All attend to members' practices as taking place in a contradictory setting and ask how members order their environments such that they can work together. That is, I explore the social production of order by means of four strategic sets of practices. I set out from focused sets followed by wider discussions: first, I turn to the ways members accounted for adjustment of data. Second, we turn to the relation between order and the blurring of definitions' boundaries. Third, I investigate members' strategy to employ humans as solutions to problems, betting that the human body has some capacities which would effect the desired order. Finally, I argue that members accepted the uncertain and unstable character of carbon data, and, that accommodating such mess allowed them to sustain order.

5.1 Adjusting Data

Members established that getting *adequate* data was key to the whole EMS. Throughout the preceding discussion it became obvious that it was not entirely unexpected for members that, nevertheless, the data which they actually 'sourced' from subsidiaries was, too often, not adequate. Members faced dramatic data disorder.

In this section I argue that a significant level at which members produced order was the practical achievement of *adjusting data*. That is, members undertook particular interaction with data, inscription devices and data sources which would *make* data adequate.[2] Thus, data has been adjusted. Engaging with practices of data adjustment

[2]If readers recall the formal outline of of the EMS – adjustment of data was not part of the plan.

necessarily entails to engage with how members established the *difference* between data which was adequate and that which was not. Therefore, part of this section is to ask with Mol (2002, 115), how things differ: '*[w]hat is it to differ?*'

The following extract exhibits members' concerns well. Victoria was talking in her office with a visitor whom I could not identify. She introduced him to the history of GFQ's environmental management activities and its data collection:

Field Note Extract 5.1.a (Wrong numbers)

> *'The biggest problem was initially to collect numbers – and which numbers?', Victoria said and provided this example: people quote 300 EUR for each kilowatt-hour (kWh); we are paying 12 cents. Something must be wrong about this. 'Each and every number has to be checked because they are so awry.' The other person replied: it is the foundation, isn't it! Correct, affirmed Victoria.*

In this situation Victoria provided a perspective onto the EMS which constructed their situation as intricate. Whilst the data collection exercise was fundamentally based on a decision which data the HQ should request from GCEs, the question of what would be delivered was a different story in principle – and often in practice. She illustrated the reality of the quality of data collected by pointing to a non-adequate discrepancy of data compared between two sites. Victoria knew, 300 EUR for a kWh did not reflect an adequate datum; and many readers probably share this knowledge. As Almklov (2008, 878) describes, members use experiences to interpret data. Victoria was able to draw on a range of experiences, including invoices for her personal electricity consumption: that number was wrong. In contrast to prior numbers which we encountered, this wrongness did not liken Lampland's (2010) 'false numbers' which served to establish newly introduced quantitative regimes. 300 EUR was implausible.

Her method of using the instance of the GCE which (erroneously) reported having paid 300 EUR for a kWh as an example may be interpreted as a specific type of ethnomethod, a *documentary method*. This is a method to which Garfinkel (1967, 78) refers. It entails using a specific occurrence as documenting a general pattern. Suchman (2007, 48) explains this understanding by pointing to humans who regard 'appearances'

> as evidence for, or the document of, an ascribed underlying reality, while taking the reality so ascribed as a resource for the interpretation of the appearance.

In this section, I explore the use of this method by members while they make alterations of data accountable to each other.

Victoria used implausible data as a document of the general problem that the data that the EMS was founded upon was uncertain. With actor-network theory (ANT) we are able to analyse the significance of this uncertainty. Victoria pointed to a fundamental problem for a system which claims to be based on facts: a carbon management system requiring to be equipped with facts could not do with implausible facts. The practical *solution*, which she pointed to, was a specific mode of engaging with this decisive data:

The formal outlines of the EMS can be found in Chapter 3.

checking data. What she did not say was that if data was found to be wrong, it was sometimes repaired. In any way, Victoria tried to convince the other actor that to reach the goal of carbon accounting, the EMS had to constantly check data. By that she construed these checking practices as an Obligatory Passage Point (OPP). Callon (1999) suggests that an OPP can be constructed by implying a goal which other actants should help to realise. For GFQ to manage its carbon emissions, thus, according to her, checking practices were required; data was to go through these practices. The reaction of her visitor indicated that she successfully enlisted the support of her visitor: she construed the EMS as in need of other data. He shared her interpretation that the EMS should be equipped with other, adequate, numbers. To satisfy such a need, sometimes data has been altered retrospectively.

Victoria's problematisation of data in general was linked to the widespread practice of correcting erroneous data. Sometimes GCEs requested from the EMS-Team authority to update data. We find two corresponding realities: just as it was normal for Rick to correct data erroneously reported to CWC Ranking (i. e. data adjustment 'outside' of GFQ), repeatedly data was adjusted within GFQ's EMS ('internally'). Recognising that the EMS transformation promised (and nothing else) to put a stop to these internal adjustments, this section argues that at the margins of any EMS data must always be made to fit. Fitting data into members' understandings of what was adequate data was sometimes a question or routine – in other cases Victoria showed interest in correcting data if the data would indicate more favourable representations. To engage with the variation encountered in the practice of data adjustment, this section discusses adjustments of data in three respects: how and under which conditions have adjustments be initiated and practically achieved, which meanings have HQ members attached to these changes and what is the micro-political economy of these adjustments? I organise the discussion in two steps: first, I attend to the politics of data adjustment within the EMS-Team and, second, between the team and GCEs.

Consequences of data adjustment within the EMS-Team On a winterly wednesday, midday, at a meeting of the EMS-Team the numbers of the Columbian subsidiary have been reviewed. Members discussed correcting its numbers.

Field Note Extract 5.1.b (Significant difference?)

> *Victoria asked Elise whether the new numbers make a significant difference and suggested she believes so. Elise agreed. Victoria replied: therefore, I would recommend to correct this. [The meeting continued; after lunch I chatted with Frederik.]*
>
> *Frederik commented this on the new numbers of the Columbian GCE: then you need two further workers and you will get the balance next year.*

In the first part of this extract, Victoria successfully aligned Elise to the numbers reported by the Columbian GCE.[3] This alignment deserves being spelt out. Victoria

[3]The notion of *alignment* might benefit from an example. Suchman (2000) discusses how bridge-building requires engineers to align material and social elements and reproduce their alignment

achieved it by first providing a factual claim (significant difference) about a problem and then explicating that the data should be 'corrected'. The criterion for the change is difference. However, immediately afterwards she changed the framing of the issue to one of correctness. While the former framing is a question of degree, the latter enacts a dichotomy (correct vs. wrong). This dichotomy suggests a positivist frame. In that frame, wrong data *necessarily* had to be repaired. The frame, thus, has a very powerful normative modality attached: data has a clear status and treatment is organised in a corresponding dichotomy – keeping the number or correcting it. (Contrast this with the earlier framing of difference; that framing provided a space for different histories and future actions.) Victoria switched registers; from a more differentiated one to a dichotomy. At the same time, the way she figured this change implied a *generalised* approach to deal with such situations. Considering that any action should fit the officially acceptable running of the EMS, her reasoning (therefore) suggests that in similar situations she would also advocate data adjustments in a positivist light.

This distributed conversation points to both, the agency of agents in deciding whether numbers were to be altered or not as well as to the economy of such changes: changing a number required checking numbers derived from the original data. Victoria's approach is also characterised by her 'recommending' this change, rather than enforcing it. This created a situation in which Elise could be seen as having the agency to not pursue this adjustment. This fits well to the imaginary of their de-facto organisation structure we have discussed above. Victoria was performing the role of the strategical head rather than a number cruncher. In the relation between Victoria and Elise, the former would allow the latter to perform the data expert role. The latter, of course, also implied respective responsibilities. Formally, Victoria did not dictate altering data even though she asked for it. This reading suggests that Victoria not only achieved positioning Elise into a relation to the Columbian data which would result in another carbon reality, but also that she managed to assign the immediate responsibility for these changes to Elise.[4] At the same time, by orientating Elise onto this trajectory of data adjustment Victoria indirectly positioned Elise to engage in a certain way with their main tools, ESDR and environmental balance sheets☞. Through this, the alignment also spread to encompass material actants. After all, Victoria wanted the numbers changes to be inscribed into a material media. If the data adjustment were not to be translated materially, it could not have any longer lasting effect in the processing of data within ESDR.

Victoria left quite open just how exactly Elise was supposed to organise this adjustment. I propose to read this as a specific quality of managerialism. While this conversation also exhibited the character of two experts communicating (who share many knowledges which are not accessible immediately for novices) they also engaged

constantly to stabilise the bridge. When studying the production of an environmental impact assessment as part of the work of accountability which engineers had to accomplish, she observes how engineers had to align various humans and non-humans and persuade them to accept the social and/or material positions engineers had figured for them.

[4] I should note, however, that this interaction was totally peaceful at the surface; I have not experienced any overt conflict between both Victoria and Elise.

with each other on a professional management level: within this setting of an EMS-Team meeting, they did not want to perform positions of knowing what their counterparts actually do when tending their data. The characteristics of this situation, which configured the adjustment of data, differ in a significant way from the observations by Garfinkel (1967). He found that 'good' reasons may exist to keep or produce 'bad' records or practices (Suchman 2007, 203). Suchman further pointed out that technologies of accountability may be designed such that their users can use a 'kind of discretionary space or manœuvring room [...] to maintain a reasonable relation between prescriptive representations like schedules and the actual contingencies' of their instrumental situation. In the situations described by Garfinkel it was rational for workers under the practical circumstances to keep superiors 'appropriately misinformed' (1967, 194) in order to permit workers to perform well vis-à-vis other organisational obligations. In Garfinkel's (1967) report, workers needed to misinform superiors in order to keep customers happy; work-to-rule disturbs formal productivity. In contrast, the alignment configured by Victoria was directed such that she would not enter a position in which she knows about the socio-technical details of data adjustment. Significant for this alignment was that she instructed Elise that and how she wanted to be appropriately misinformed. Part of the game was that members had to learn what their superiors did not want to learn about. The reason for Victoria's move against engaging with the nitty-gritty could have been either or both, namely a) that Victoria did not want to be associated with the risk of knowing the likely-to-be out-of-order realities of data adjustment practices or b) because it was professionally polite not to interfere with Elise's exercise of her competencies.[5]

In this setting, Victoria was able to argue for adjusting numbers because she constructed the situation as recognising that the new numbers differed significantly. If the numbers had been perceived as not differing notably then changes would have not been economical. When, in the second part of the extract, Frederik pointed to the economy of such changes, it became visible that the general implication of Victoria's approach would be that *his* work load increases. Not only would this trigger costs but it would also delay the overall carbon emission construction process (of which the environmental balance sheet was a prime part). In their division of labour, Frederik would have been held responsible for such delays, while a different data reality would not qualitatively affect him. I propose to think of this situation as element of the micro-political economy co-constitutive of the field of data construction. Changing, updating, correcting data – I refer to these practices as adjusting data – implied practical obstacles for members and at the same time chances.

This micro-political economy meant that data adjustment involved struggles. These need to be detailed. The following instance took place about two months after subsidiaries were to finalise their data input into the database ESDR. Before a scheduled

[5]This theme, of courses, raises ethical questions: what kinds of practices would have allowed Victoria to enact different accountabilities; how would running an organisation look like if all the masses of carbon information were not withheld? I return to these questions in the conclusion of the book.

phone conference of the EMS-Team, while Victoria, Frederik and I were waiting for Elise, Frederik and Victoria briefly discussed access to ESDR. Victoria made explicit:

Field Note Extract 5.1.c (No further change to data?)

Well, I have access. Frederik retorted: we will not accept any further data.

During further discussion Frederik, seeming vexed, emphasised that GCEs should not be able to adjust any more data. While, technically, a number of agents had full access to the data stored within ESDR, Frederik tried to control the alteration of data. Technically, any of the users with full access was able to change data within the database.[6] Frederik was only able to draw on his symbolic-formal power as GFQ's environmental manager to prevent other users from changing data. In their brief confrontation, Victoria voiced her agency as an *individualised* manager, the 'I'. Frederik could have understood her as underlining that she was an official spokesperson for the *collective* 'GFQ'. Yet, Frederik performed her statement as an individualised manager's one. In the face of that individual he positioned a 'we' which he wanted to be interpreted as controlling the black box of data collection. His 'we' could have referred to either, him and Elise or the collective 'EMS' itself. In his relation to Victoria the configuration of ESDR was decisive. The database's configuration did not mirror the organisation's formal hierarchy. Victoria, the *de-facto* superior of Frederik, was able to alter data by herself. This was a threat to Frederik. Why? On the one hand, this situation involved an *economy of responsibilities*. Who is assigned which responsibilities and do they also have been assigned corresponding powers of control over data? On the other hand, data adjustments implied – in Frederik's perspective – an administrative burden: he presented himself as documenting all changes in data.

Field Note Extract 5.1.d (Changing data as requiring documentation)

Frederik told me: each and every single change generates a plethora of work for them. Whilst he will be on holiday, Elise has to organise and file a huge pile of paper, i. e. documentations of changes. Frederik: ESDR doesn't make it easy.

In his construal of the issue, it is the change which increased their work load. Any change constituted a document of manual work, filing. Within the division of labour between Frederik and Elise, it was her who eventually was assigned the task to do the paper work. Why was this paper work necessary? Implicitly, Frederik pointed to the norm that data should remain fixed after the data collection period has been closed officially. However, exceptions to this norm occurred often. Therefore, they enacted a routine to respond to such changes of data. While he would have preferred ESDR to be able to handle these exceptions routinely, in the situation I was part of, humans had to handle them. How did they approach this change? Frederik would access ESDR and document a data set before and after a change. The documentation accumulated in the form of printouts. They were to be filed; heaps of paper were produced, documenting the hybrid reality that data was not given, but touched by humans. This resonates well with Latour's (1993b) finding that 'modern' society is constituted by these hybrids;

[6] Elise, Victoria, Dieter, me – as well as GFQ's IT administrators had full access to data.

the human is always part. However, for GFQ, as a modern organisation, was based on the norm that environmental data was not to be touched by humans, Frederik had to document the marked facts. This can be considered a form of accountability management. By printing those ESDR task-forms☞, which were changed, he made observable the change which enabled any observer to recognise that his compilation work was exercised in relation to the norm that data was not to be altered. The observable-made-changes were document of the transparency of their data practices. This corresponds to how Crabtree (2004, 198) understands the point of accountability. In order to achieve compliance with the cultural norms to which one is accountable, action is organised as having orderly features which are observable. Frederik performed a documentation of the changes (they probably still exist at the time of writing these lines and, in that case, are continuously brought into auditable existence by not ending their existence actively) and, by that, constituted the *changes as an orderly feature of* their *data practices*. Action has been designed such that other people can see and say what data has been adjusted (Button and Sharrock 1998, 78).

The cheapest labour involved was to handle the filing; if the database could not, the next cheapest agent was Elise. However, in absolute terms, Elise's work was not cheap – and Frederik was to use his time resource efficiently, as shown above. The decision that the cheapest possible means of production should be employed for filing the documents was 'obvious', i. e. this was part of a stock of knowledge about what 'goes without saying' and is 'beyond doubt and investigation' in that culture (Sharrock and Button 1991, 63-64). Thus, it was straightforward for Frederik to struggle against this increase of filing loads. By sharing the prior statement, Frederik made accountable to me that he had a reason for this struggle. Accordingly, on the next day, he explained Victoria the situation.

Field Note Extract 5.1.e (2.7 kilogram (kg) of paper)

We had to alter data in heaps. Two packets of paper. Victoria replied: each packet 2.7 kg of paper.

To underline the load caused by changing data, Frederik evoked the image of weight. Vis-à-vis any auditors, the symbolic weight of documents would proof that he was not covering anything up. Figure the heaps: a room full of files cannot tell lies. By sharing the view on these heaps with Victoria he made the work generated visible and prepared an account of needing more resources to engage with the resulting manual work caused by changes. Whilst Victoria could have reacted to this unfortunate material reality with disgust, she did not. Rather, she dissented from this possible reality, i. e. she did not perform the heaps of paper as documents of unpleasant and in-prinicipal-avoidable work. I read their interaction in this way: he wanted to convince her of the material load created by putting the heaps of paper firmly onto the virtual table of decision-making. Normally, members tried to evade having to engage with material obstacles. The strategy of his statement was, thus, that Victoria should have announced to not cause any more of this unpleasant material reality through her decisions.

However, their conversation did not unfold accordingly. Rather, she opted for shifting the materiality of the load into the virtual dimension of number crunching – in which Frederik was recognised, and wanted to be, as a competent master. Victoria employed humour as a resource to mobilise this shift. They, thus, followed competing strategies of social ordering: enacting the paper heaps-to-be as spokes entities for different patterns; i. e. they tried to enrol the heaps as documents of competing orderings. Frederik's social pattern was, hence, not reproduced.[7] Her statement did not allow Frederik to contest her factual claim. He could have contested the shift of the topic. However, that was unthinkable in their discursive setting: it would have performed as well an accusation. Thus, Victoria successfully translated the relations between the threatening actants 'heap of paper' and limited work resources into a properly classified, quantified and, therefore, controllable non-material reality, i. e. numbers and qualifiers. Simultaneously she realigned the elements while demonstrating competency of the situation, resulting in a complete reconfiguration. The production of hybrids was given room to proliferate; no promise by Victoria against growing paper heaps.

Data adjustment between GCEs and the EMS-Team If we take a step back and investigate the kind of routines resulting in adjusting data, the relations between the EMS-Team and subsidiaries manifests. To engage with these relations, I review how GCE agents were aligned to produce values which would not require data adjustment. Afterwards I turn to the interface which Elise was confronted with when reviewing subsidiary data, checking for the need to adjust data. This discussion enables our engagement with similarity versus difference in the field in general. I, then, turn to the EMS-Team's discussion about GCEs' (non)-strategic orientation to data.

A prime concern for members was the norm that reported values were not to signify sudden changes over time. In reaction, members turned to data which represented pasts. By that, evidence of several moments in time, pasts and presents, could be compared. This required that members both knew that data existed, they had to be familiar with the whereabouts of this data and that they had access to these locations.

The central database was designed to provide subsidiary agents with precisely such information. However, that information was only provided to users after entering new data in an task-form. That is, when they first opened a task-form they would not be shown data on the respective indicator from the past. Only when they tried to save data, the task-form's internal mechanism would reveal data from the same task-form of the prior reporting period☞.[8] Thus, after saving, a user would be shown how the data entered compared to data entered in the previous reporting period. The task-form called

[7]The documentary method is highly relevant for the (re)production of social order because by explaining the occasions with this pattern the pattern is reproduced (Marcon and Gopal 2003, 4). In social interaction members need to make their ideas of patterns accountable. Therefore, the underlying pattern is 'subject to a consensual process of meaning making' (ibid.), otherwise it is contested.

[8]For the display of previous period's data, see Artefact 2.1.3 (on page 81), below the task-form's heading 'REVIEW', mark 'G'. Precisely because the task-form would show the prior task-form's values only after trying to save, the heading in the form reads 'REVIEW (Updated on Save)'.

this comparison 'Deviation'. Users were free to enter and edit, i. e. adjust, task-forms as long as the EMS was officially in the phase of 'data collection'.

There was, in addition, a more complicated mechanism built into ESDR. When saving a task-form, the database calculated the deviation. Now, if that deviation was exceeding a certain *threshold*, mostly 10 %, then the user was required to explain the deviation in the task-form's 'comment' field. These threshold values were configured within ESDR, i. e., they were not hard-coded. All quantitative indicators within ESDR had been assigned such a threshold.[9] This mechanism determined to a large part what constituted *similarity* or *difference* between data from different reporting periods. Hence, environmental consumption activities (or whatever else was represented in a given task-form) were judged as alike if numbers differed by less than ten percent.

GCE agents were also shown lists of those task-forms which they were responsible for.[10] These lists allowed users to review the status of their tasks. In these lists, if a task-form's 'Deviation' value exceeded the threshold, users would be shown a *red exclamation mark* associated with this form. Thus, 'low' deviations were not problematised; 'high' deviations asked for additional attention by users.

The pattern we find here is that if a users' numbers were within the threshold users did not have to account for difference; outside the threshold they had to account for difference. ESDR was, thus, co-managing accountability work; it was technically part of achieving order. For values exceeding the threshold were problematised by ESDR, adjustment of data was inscribed as the norm for subsidiaries. That norm can be spelt out as: change is acceptable as long as numbers' degree of change is below ten percent (and, technically, the direction of change was not so much of interest).

As GCEs' data was reviewed by the EMS-Team, problematic data attracted attention. Reviewing data, thus, concerns us again.[11] The ideal case – 'normal' data – is appropriate to conceptualise data adjustment. When Elise and me discussed on the phone the status of their approach to gather data

Field Note Extract 5.1.f (Data needs being cleaned up)

> *she told me that the data of a West Asian's GCE has not changed much. Elise mentioned having to clean up the data which does not fit.*

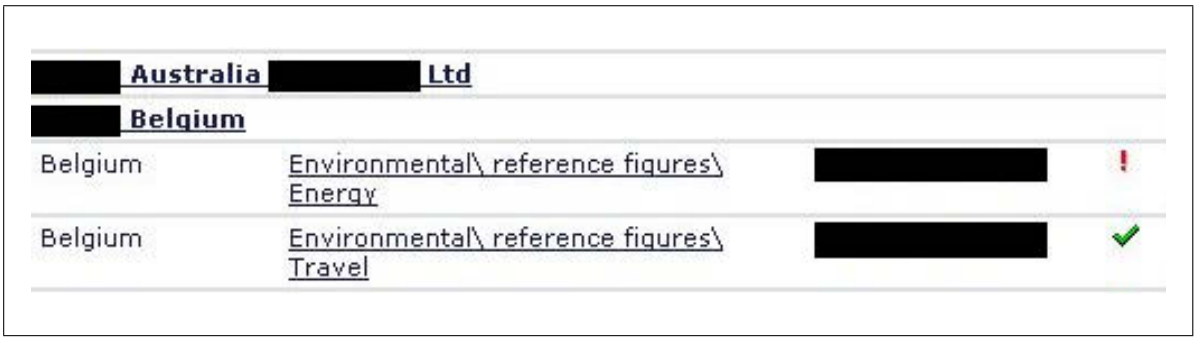
This statement was only possible because of the regular review of GCEs' data by her. Elise screened each GCE's data input, checking for inconsistencies. In that process, she communicated with subsidiaries – much data was adjusted to fit into Elise's understanding of what was normal data in a respective reporting period. Her act of telling me was element of her accountability practice. By informing me about her review of data she made me see that she saw. I, thus, had to recognise her as exercising an accountable view on GCEs' data. At the same time, she presented the adjustment of data

[9] The history of each specific threshold remains outside the scope of this study. It suffices to say, VfU did not specify the threshold. However, the ESDR handbook recommended to database administrators: setting a threshold of 10 to 15 percent would be meaningful.

[10] See illustration in Figure 3.2 (on page 148) and list shown in Artefact 5.1.1 on the facing page.

[11] Above, in Section 3.2, I introduced the review loops part of EMS 'data controlling'.

as an orderly feature and in compliance with the norm – which constituted reflexively the latter. The social order of data adjustment was produced not only by changing numbers but also by giving accounts of processes which resulted in adjustments.



Artefact 5.1.1: List of task-forms

ESDR supported Elise's review of data by highlighting data sets which deviated more than 'normal' from the previous reporting period: as Artefact 5.1.1 indicates, she was shown red exclamation marks if data was problematic, and green ticks for 'normal' data. The red sign asked for attention. This artefact represents task-forms of GCEs – to all who had access to the Belgian GCE's data (i. e. Belgian environmental management agents as well as EMS-Team members). Thus, everything what follows, was reciprocally made recognisable. Changes by anybody would be viewable by others. ESDR, in that respect, supported the accountability work necessary to enact subsidiary and HQ based agents as working together. The two lower rows shown in the list represent task-forms which had been assigned to so-called task owners. Their names are anonymised by means of a black bar. These task-forms concerned reference figures☞;[12] but they could have represented any (other) environmental data. Each task-form was assumed as a document of the general administrable issue at hand. The red exclamation mark indicated that the reviewer needed to pay particular attention to the reported data because the numbers were complemented by a comment. Elise was to ensure that that if comments were provided, they would establish an acceptable and auditable reality. If they were not, she would get back to the GCE, asking for further explanations or suggesting adjustments.

For the general aim to carry out data collection and reporting as smooth as possible, such additional attention was perceived as uncomfortable. It took away time and potentially opened up the black-boxes of reported numbers which should have better been kept closed. Adequate data, in contrast, was characterised by the green tick. With Suchman (1983, 322) I argue that through ESDR the criteria of adequacy was, thus, established by the algorithm built into the database and the configurable threshold.[13] Similar to other contexts, the orderliness of files and accounts was oriented to audiences, such as auditors. This likens our discussion on auditing and on CWC Ranking.[14]

[12]These specific task-forms claimed to represent the count of employees whose consumption of energy and travel has been captured by the GCE's enactment of an EMS; see Section 3.4.

[13]This contrasts with criteria for adequacy in other contexts, such as in a clinic (Garfinkel 1967) or in a standard accounting office (Suchman 1983).

[14]See especially Section 4.2 and Section 4.3. When I studied members' preparation of data for CWC

In all these situations, the assumption was that data of a later year should liken the data constructed for its preceding year. HQ agents had the power to define (in the case of ESDR: to inscribe) whether data was similar enough to not pay further attention to the deviation. For members, whether at a subsidiary or at the HQ, it was better to achieve constructing numbers which were classifiable as alike. Small changes were accepted; to detect huge changes they designed sensibilities. The latter would point to more than normal deviation. Humans, then, had to investigate whether the data was credible. Ideally, in this socio-materially configured setting, members would enact small incremental improvement over time.

Their rationality implied first accepting quantities as suitable to represent a certain reality, second, to enact the dichotomy between data alike vs. data not-alike as a useful differentiation and, third, to assign some actors the agency to decide whether the relation of two numbers were alike or not-alike. Similarity of values is enacted by humans; it is them who decide and inscribe rules for establishing claims of same values, i. e. *equi*valence. A development over time characterised with largely similar values is produced in this specific configuration. For its relations were designed to prefer similarity over difference, a representation of a smooth trajectory of emission reduction cannot be understood as simply mirroring realities out-there but has to be recognised as inextricably linked to the perceptive and reactive patterns embodied in humans and ESDR. Finally, the discussion of ESDR's thresholds and deviation calculations points us, again, to the EMS's emphasis on *relative* conceptions: we have seen already that GFQ focused their emission enactment of relative emission per employee. We now find that not only were emissions enacted as mattering relative to the count of employees but also relative to themselves, thus constituting a directly self-referential system.

Having introduced the socio-technical configuration which directed humans' attention to deviation, calling out for data adjustments, I turn to members' strategic engagement with data adjustment. Strategy was one part of the circumstances of engaging with data. These adjustments have taken place after the period for data input had been closed. In a meeting of the EMS-Team, Frederik reported on deviations of the numbers reported between the current and the recent reporting period:

Field Note Extract 5.1.g (Comparing to base line)

The US GCEs seemingly did not really recognise that 2006 is the base year. That is to say, GCEs were allowed to adjust the numbers for 2006 and 2007. The US GCEs

Ranking, Frederik once pointed explicitly to his orientation to ensure that data reported now would liken data of a previous reporting period. He told me how he constructed a reply in the questionnaire: he copied the same text into the file which was used last year. That text was authorised by Victoria. This is practice is similar to Victoria's orientation to prior year's data, discussed in the context of Field note extract 4.1.f (on page 247). We see that members used the response of the previous year to formulate a new response. The same rationality was performed by CWC Ranking itself. One of its questions asked 'Do emissions for the reporting year vary significantly compared to previous years?' My analysis suggests this norm: EMS-Team members were to produce statements which were not inviting critique. This norm explains the practices of copying and pasting the information provided in a preceding year to the succeeding year: if the information did not generate attention the year before, it was not expected to do so now. And ESDR's deviation algorithm materialised this norm.

> *apparently corrected the ones for 2007, such that in comparing 2007/2008 they look fine, but not when comparing 2006/2008. 'The question is, which numbers to enter.'*

In this statement, Frederik linked several interpretations of him to collectively constructed facts and an epistemological-strategical comment. First, he pointed to some organisational actants, i. e. the US GCEs. These Northern American organisations were co-performed by actual humans who he silenced in this account. By invoking them as organisations he alluded to the expectation that the organisations should act appropriately and repair the weaknesses of the work of specific individuals as a collective apparatus. Frederik implied that his expectations of how that US collective actor should have performed were not met. He judged their qualculations wrong (Lippert 2011a). Furthermore, he ascribed to this black box the ability to recognise. The modality 'seeming' ensured that his colleagues would recognise that his account provides an *interpretation* of the GCEs' recognition. The re-cognition which would have been appropriate to enact by the GCE was this: by adjusting data of prior reporting periods, a GCE could have enacted itself as having achieved higher emission reductions (ibid.). To illustrate, a GCE was able to 'correct' emission data from the past by arguing that a specific emission source had not been accounted for in the baseline year. Frederik referred to this year because in this particular period, GCEs were allowed to adjust data from prior years, including the base year 2006. Emission reduction can be achieved by increasing past emissions and keeping current emissions as they were.[15]

For these differentials mattered, it was straightforward for Frederik to doubt the US GCEs' numbers. The strategic implication of such performance of scepticism has been stressed by Munro (1999, 631): numbers and facts may be doubted in order to not have to enact their 'logical' organisational effects, such as organisational change – in my case – to reduce emissions by means of other interventions.

Frederik, thus, suggested that these GCEs' carbon emissions did not fit relative to this baseline. His interpretation was that the underlying reason for the appearance of non-fitting carbon emission counts was a *lack of re-cognition* on part of the GCE. We may read his account this way: he used this appearance as evidence for the significance of the norm that GCEs understand the form and function of environmental data. Adjusting data, in his perspective, presupposes a specific way of recognising and understanding data and the framing of data. Of that framing, here, he referred to the baseline. Considering that his account was compatible to the views of other members, we may generalise, thus, that non-fitting appearances of data were related to the way subsidiary agents 'miss'-understood data and their framings.

The way in which Frederik made the case of the American GCEs recognisable to others evoked an image of an instance of a general pattern, which resulted in raising the general question 'which numbers to enter'. By using this case as a document of the

[15] If you need numbers to imagine this, take these: increase average emissions per employee in 2006 from 3 tonne (t) to 3.2 t; keep current emissions at, say, 2.8 t. As a result, emission reduction will have increased from 200 kg reduced to 400 kg reduced; i. e. from about 6.6 % reduction to about 12.2 % reduction. *Actual* numbers have been visually analysed in Interlude II.

general pattern of GCEs not having grasped the mechanisms of data construction, he provided an account which legitimised future work force requirements. Implicitly, he made clear that the pattern will result in the need for data adjustments.

His take on data points us again towards members' epistemologies and ontologies. A couple of days later I talked with him on the phone, and he elaborated the issue:

Field Note Extract 5.1.h (Normal to alter data retrospectively)

> *Obviously some colleagues did not get that the base year is 2006. Those GCEs, especially the ones which recently joined the EMS, retrospectively adapted the numbers of 2007 because these did not fit the numbers of 2008. However, they did not consider 2006. For Frederik it is very normal to retrospectively alter numbers. He said: 'numbers have always been changed' and continued saying that especially when starting something new or initiate the collection itself then they learn a lot: in the second year one has more reliable data; for the first year it was simply a rough approximation in order to get numbers into the system.*

GCEs' agents had to learn constructing the data such that they fit into the EMS. The numbers themselves were not as important as having numbers within the 'system'; in that respect, an assumed truth value of data was not necessarily significant to run the EMS. GFQ was only able to run an EMS by continuously collecting and reporting numbers. The quality of the numbers were supposed to improve – over time. Hence, adjusting data would merely document a process of learning.

His interpretation that agents' construction of data was result of learning implies: normally their understanding would, over time, fit his expectations better. GCEs would learn the rules of the data game after all. As Bowker and Star (2000) suggest, the past is indeterminate; pasts are retold based on new experiences. EMS-Team members' take on accounting allowed making sense of the effects of data construction practices.

In the two accounts of Frederik above, he drew out explicitly a practical epistemology which allowed members to make social sense of the data. We learned that he interpreted data as socially constructed by learning agents. His reflections suggested that agents would translate what they learned into action. Such action included the entering of data into ESDR. This indicates the practically necessary constructivist take to collect data. This constructivism was not a strong version, as in anti-positivism. Rather, his learning model implies, here is a more nuanced version of constructivism which allows for a reality out-there that is independent of humans, preceding their actions. I interpret Frederik as an epistemological constructivist and a practical realist.

While GCEs' local environmental managers were expected to learn producing numbers which would fit, the EMS-Team also provided for the multiplicity of realities which the EMS was supposed to cover: not only numbers were adjusted but definitions as well – such that the system may run. Thus, Frederik argued:

☞ discussion at Section 5.2

Field Note Extract 5.1.i (Vague definitions)

> *we defined the indicators extra vague, 'not totally unintentionally', because in other countries some definitions simply do not fit. If one uses definitions too narrow, GCEs often will not be able to deliver (data).*

Again, at stake was whether data is delivered. Frederik pointed to a mechanism by which data suppliers' path of data delivery would be made more smooth: adjusting definitions. What does the existence of this mechanism show? For Frederik, the fact that sometimes definitions did not fit is a general pattern. By rendering this pattern visible, he constitutes the need for a mechanism to deal with this problem as an orderly feature.

This has two relevant implications for this study. First, Frederik can be read as a reflective agent. This is a meaningful interpretation if we take his second statement as showing a reflection about the characteristics of definitions. Second, underwriting the analyses above, data did not consist only of the quantifiers but also of the qualifiers, such as the definitions of indicators. To produce a system of environmental data which would run smoothly, any of both could be altered. Frederik was very aware of the multiplicity of realities in different locals. However, his argument gives also rise to a different reading. If subsidiaries were willing to submit numbers while the qualifiers did not work out, it was also possible to not play according to the games' official rules. GCEs were not immediately sanctioned by their HQ when they submitted numbers in non-rule-abiding relations to qualifiers, as long as the quantifiers were perceived as fitting to the centralised expectations.

♢ *End of Section* ♢

This section showed three types of performances through which order has been achieved. First, managers ordered their perceptions of subsidiary data by interpreting it. Second, adjustments have been carried out to strategically order the corporate memory. Third, members ordered the economy of responsibilities, and through that the economy of risks, by distributing knowledges about and tasks of who would have to deal with the complexities of the socio-technical mess. The latter requires clarification. Members employed documentary ethnomethods and by that constituted data adjustment as an orderly feature of data practices. They made their practices accountable to each other and by that spread the responsibility from oneself to others.

The rationalities of the EMS-Team, thus, accepted multiple realities, learning, errors and corrections. The multiplicity coped with was characterised by diversity, i. e. non-uniformity. Practical engagements with these included adjusting numbers to fit into explicit and implicit standards, definitions as well as adjusting definitions to quantifiers. Changes were possible at any time. They were to be documented. At the same time, strict control over changing the data was not possible. At every review loop of data, data was either accepted, and thus confirmed, or selected for questioning and potentially adjustment. Insofar as members' rationalities allowed for learning and 'improving' data collection procedures and definitions, then, carbon data was again and again subject to be reconstructed. Thus, the combined practice of reviewing data and deciding/acting on a given data set constituted a repeating and ongoing moment of constructing data. Data was put into its place continuously and was offered to be read at any time (by any users of the database). Hence, we find, conceptualising carbon data as being contingently enacted by members seems cogent.

5.2 Blurring Definitions

Definitions are key to make sense of carbon. They shape what an Environmental Management System (EMS) is about – as much as what carbon accounting supposedly does: as it were, carbon was to be clearly and completely circumscribed; what carbon was and how much emissions the company produced had to be characterised by marked boundaries. Yet, in members' work practice, carbon did not submit to the grand definition projects members ran. To get on with their work, members accepted that definitions did not govern carbon accounting. This section argues that definitions are key to understand the ordering of carbon emissions: for on the one hand, definitions shaped the ways members staged emissions; and on the other, members needed to organise their work around these peculiar prescriptive entities. The presence of definitions was consequential, albeit not in the manner performed by GFQ's representatives.

In managers' discourse, it is seen as self-evident: they imagine they can manage only what they know; and that knowledge requires at least adequate objectivity; this links to measurement. As, Porter (1995, 94) puts it, 'we can only claim objectivity when we know what we measure'. Managing, correspondingly, requires objects to be defined. As we have seen above, GFQ's EMS was staged as well defined: members circumscribed the EMS itself as well as Key Performance Indicators (KPI); and they drew on standards to legitimise the definitions of, e. g., carbon conversion factors.[16]

The notion definition suggests that members described an entity completely by making its discrete boundaries explicit. Defining a group of entities is trying to force these entities into the same boundaries. Therefore we can think of definitions as standardisation devices. An EMS strikes us as an imaginary of standardised precision, carbon accounting as a machinery of universal measurement. The presentation 'EMS for GFQ' (*EMS4GFQ*) was a schooling device employed by GFQ to teach environmental agents about the system's definitions.[17] This presentation was designed as a tool which HQ agents could hand over to GCEs' agents: here is the tool, go off and use it. A definition is designed as self-standing tool. As it were, agents merely needed to apply it.

Of course, GFQ's distributed agents did not always apply definitions in the 'correct way'. At least, this was the take employed often in the field. [↪18] In my observations of members putting together the materials for their response to CWC Ranking, Frederik accounted for uncertainties of environmental data. He suggested that the definitions are explicit and, by that, implied that the definitions govern data input practices. At the same time, however, he asked how honest a reply GFQ should provide in the response. By posing this question he made recognisable that it is legitimate both to not be honest as well as that sources of CO_2e data's uncertainties might be more numerous than the two main sources he had suggested ('data quality'☞ and data gaps). He proposed

[16] See Chapter 3 for the definitions of the EMS and the manifold boundaries members set; Section 4.3 discussed the role of standards.

[17] I introduced this presentation in Chapter 3.

[18] The following discussion is relating to Field note extract 4.2.g (on page 267).

to read the fact that subsidiary agents sometimes did not provide expected data as idiosyncratic factors. Clearly, he translated their discursive presence in the conversation into an instance of unknowledgeable – in short: stupid – actors. And he concluded by putting forward an informal explanation, namely that GCEs' environmental managers could self-evidently not turn into knowledgeable agents simply by means of a short training by telephone. We may understand him as postulating a better training of the local agents. Definitions need to complemented by an effective schooling process. At the same time, however, his take implied: definitions are explicit and precise.

To make sense of definitions, consider the origin of the concept 'precision'. It is a combination of 'prae' and 'caedere', i. e. cutting in advance (Oxford Dictionary 2011c). I suggest that it is useful to think through how precision is achieved by members within the situated 'application' of definitions. I focus on how definitions cut data collection or how they themselves are cut. This approach, I propose, helps to establish a better understanding of the quality of precision of carbon emissions.

The correct tailoring of definitions is key to grasp realities. Performativity of economics scholar Lépinay (2007), in a study of definitions in financial product development, suggests that financial services providers need to be interested in precise definitions. Studying product developers' engagement with new products, i. e. not-yet-fully-described entities, he finds that definitions are often the 'bone of contention' (ibid., 91). The problem of course, as in the case of carbon, was that products had characteristics which made them slippery. They fought their descriptions; full descriptions were very difficult to establish. For product developers this caused much trouble. I shall argue in the following that producing carbon emissions may give rise to a very different story: although carbon realities were unruly and often did not fit in, members were *not* too concerned about carbon slippage.

While we have seen in the prior section how agents ordered data by adjusting numbers, we now turn to the ever ongoing engagement with qualifiers of environmental realities: language and devices had always to be adapted to the realities supposedly represented; full descriptions to the end were impossible. And where definitions are present, this section shows, they should better be understood as imprecise.

↪[19] At the end of the prior section, I returned to a particular characteristic of carbon data: that its quantity is actually not determined only by numbers. Rather, numbers emerge in relation to qualifiers, units and accounts.[20] We met Frederik in a situation in which he gave voice to a special mode of ordering data. In this mode the definition of an account is trimmed to be *less* sharp. He proposed that the definitions which they used to construct environmental data should be open enough such that a variety of local environmental realities could be reported within the EMS's database.

This mode may be contra-intuitive to many. One would have expected Frederik to be the one who would focus on precision. Technically, precision is about the repeatability

[19] The following discussion is relating to Field note extract 5.1.i (on page 376).

[20] This theme has been introduced in Sectionb 2.2 (on page 88).

of a measurement. The definition should be intelligible and clearly bounded enough to signify the same signified when repeatedly employing the definition. A first glance at members' practices, however, questions the role that definitions have to make mutual intelligibility achievable. To address mutual intelligibility Garfinkel's (1964) work on every-day discourse provides a generative proposal: in his approach, every-day intelligibility is not organised as rational or logical discourse, but has to manœuvre in a *vague* social reality which cannot fully be described. Therefore, members are entitled and entitle others to be specifically vague in shared discourse. If we consider definitions might be specifically designed to be vague, this may mean that they are not a stable set of assumptions which needs to be applied to get carbon right; rather the orientation to get carbon right may be a question of the practical purposes of work. The question then is: where do members locate the relevant orienting devices? Maybe sufficient anchoring devices for statements were not located in, say, *EMS4GFQ*, but elsewhere.

Then, of course, the question would be what all the performances of precision are about. This section posits that precision is a specific kind of project – not one of mutual intelligibility in terms of doing data but in terms of staging ecological modernisation. This project is a practical project. In this practical project of performing precision, the proper degree of vague precision has to be enacted to be accepted as a competent member. The imaginary of universality within an EMS then may not be relevant to produce carbon statements. At the same time, however, we see e. g. that GFQ's Sustainable Development Report is very much about performing this imaginary. The hypothesis, then, may be that in top management staging precision is important whereas this rhetorical imaginary is not relevant to get carbon work done. In a condensed version what we may find is this: members' work is about carbon; and for the epistemic practices of doing carbon definitions are only of tangential relevancy, whereas for the ontic politics of doing carbon definitions and the enactment of precision is the foundation. This take presents an utterly shifted view on the precision of those prescriptions supposedly governing data translation practices. Two competing statements existed; performed by the same actor in the same organisation: precise definitions, in principle and effectively able to determine work practices vs. definitions as open and having to adapt to local circumstances.

One way to read these accentuations (which I read as analytically distinct) of doing carbon as two modes of discourse (Gilbert and Mulkay 1984) or as two registers (Latour 1999b, 90). That is to say, rather than assuming that members are struck by false consciousness and the like, for all practical purposes of their work members ignore or tolerate the analytical tension between commitment to precision and practical work. We find the rhetorical imaginary of precision to neither interfere in practical work nor to be threatened by the practicalities of enacting carbon. They peacefully co-exist.

What we have to expect, thus, are performances of completely and precisely circumscribed entities as relevant to stage accurate (i. e. closeness to realist true) values while for mutual practical intelligibility definitions are not decisive. The prime questions,

then, are: how did these statements relate to achieving order; how does the parallel enunciation of both statement contribute to doing carbon? To address these questions, I explore the practical production, engagement and enactment of and with definitions.

I set out by discussing the definitional labour invested in the qualculation of the entity 'financial emission intensity'. I am focussing here on the work done to make qualifiers fit. Afterwards I turn to definitions supposedly shaped by national 'cultures' – studying the definition of 'drinking water'. This makes us more sensitive to the contingency of the desired effects of definitions. Subsequently I turn to how members faced realities which diverged from their definitions. While some of the mess could be well brought to order, other could not. And whether such order was welcomed was a different question, altogether. This, finally, guides us to the politics of defining. That underlines that neither setting nor communicating boundaries are self-evident.

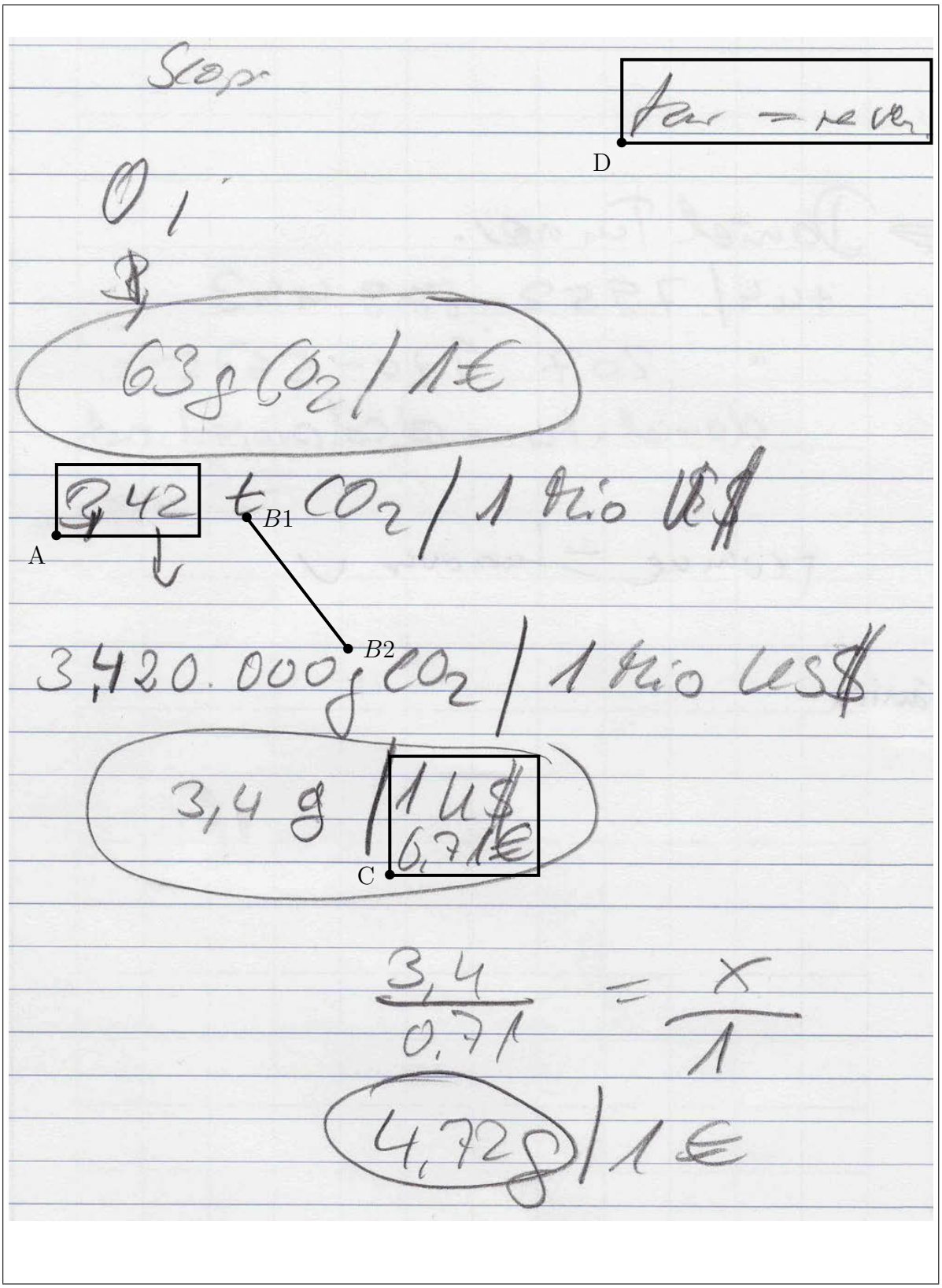
Financial emission intensity The case of calculating GFQ's financial emission intensity provides an apt example of a n^{th}-order definition. That is, a definition built upon many other elements. Such definitions are normal in the field of financial business. In this discussion we follow the practical application and enactment of definitions. We learn how a qualculative entity is enacted *as* defined.

↪[21] CWC Ranking aimed to compare organisations in terms of the relative impact on the atmosphere for each euro of turnover. Victoria wanted to provide a reply to a corresponding question by CWC Ranking. She understood the ranking's question as enquiring how forcefully GFQ contributed to global warming relative to its financial success. For a start, she had turned to the assumed equivalent value reported in the prior year to CWC Ranking. Thus, she used the prior year's value as a defining entity of the value which she was about to construct. By that she constructed the prior year's value as showing a pattern which the value (she was constructing at that moment) should map onto. However, we then figured out that while the quantitative value seemed similar the qualifier was not. Both, question and response were worded differently. For that reason, Victoria set out to calculate a new value for the prior year in the *form* of the current question. The prior year's value was provided as t divided by 1 million USD. The new value was to be given as gram (g) divided by Euro, $\frac{g}{EUR}$.

She made this calculation clearly recognisable to me with pen and paper. Her practice resulted in Artefact 5.2.1 on the following page – a material sketch creating *certainty* (Verran 1999) as much as a *stage* of calculation (Barany and MacKenzie 2011). It allows us to retrace Victoria's translations in detail and explicate several kinds of definitions she drew on. The data point '3.42 t CO_2e / 1 million US $' was in a form very different to what she could compare the new number with. The box marked A, 3.42, was the quantified sum of GFQ's prior year's CO_2e emissions.[22] The similarity between the

[21] The following discussion is relating to Field note extract 4.1.f (on page 247).

[22] She used as the definition for this sum the prior year's report by GFQ to the CWC Ranking. Alternatively, she could have used the environmental balance sheet's carbon data. However, as the prior section showed, this value might have well been adjusted by now. Therefore, as she was trying to



Artefact 5.2.1: Financial Emission Intensity: Calculation Notes

new and the old value was defined by both, outlet (i. e. in this case CWC Ranking) and the signified reality (i. e. financial emission intensity). A technical obstacle was this: the unit *t* was not fitting; and neither was '1 million US $'. In response, first, Victoria used a metric translation of tonnes into grams, indicated by marks B1/B2. Thus, she represented 3.42 t as 3,420,000 g. Relation B1/B2, is an instance of defining GFQ's carbon data as subjectable to metric transformations.[23] As I argued above, this was useful for many kinds of second-order calculations. Moreover, the denominator '1 million US $' did not fit. To alter this, she cancelled out the six digits of both, the nominator and the denominator, resulting in the relation:

$$\frac{3.4\,g}{1\,USD}$$

And, still, this relative value was not in the form which CWC Ranking asked for. It was supposed to be given in euros, rather than in US American dollars. Therefore, Victoria turned to a freely available currency exchange database on the internet as the defining agent of the exchange rate. Mark C points to this definition; i. e. defining the exchange rate as 1 USD equalling 0.71 EUR. Victoria, then, used these values to derive the amount of carbon emissions in grams for each Euro turned over. Her calculation would formally be represented in this form:

$$\frac{3.4\,g}{0.71\,EUR} = 4.72\,\frac{g}{EUR}$$

$4.72\,\frac{g}{EUR}$, thus, was the con*cise* version of GFQ's financial emission intensity. Concise means that the signified has been cut down to the core meaning. This qualculative statement promised precision, to capture entirely what it signifies: this statement co-defined GFQ's emission reality. Interestingly, the maths of this cut down definition runs counter to what my calculator suggests now; at the time of going through the calculations with her, I noted that we concluded the same numbers. Well, by now, the calculatory reality changed and, according to high school maths, the result should be $4.78\,\frac{g\,CO_2e\ emissions}{EUR\ turnover}$. As Lave (1988) articulated so well: high school maths does not offer a predictive theory to practices of calculation (in her case, in a supermarket; in my case, in the Sustainable Development Unit of a multinational corporation). Why am I pointing to this? The result drew my attention during my analysis and I zoomed into this issue. One of the findings was that on the day Victoria and me performed this calculation, one of the freely available online currency converters now proposes the exchange rate to have been 0.75 EUR equalling 1 USD. This value, again, would alter the numbers a bit. Thus, depending on the provider of exchange rates, calculations might be classified as wrong or correct.[24] For the purpose of this analysis, the core

compare the new value with the old value, she did not look at the internal old value, but, rather, at the published former value. This links to the issue of multiplicity. I draw it out in Section 6.3.

[23] This kind of definition may be understood as an instance of a widely shared mathematical literacy among graduates of the natural and engineering sciences as well as of managers working within and for finance businss. See Section 2.2 for the general adequacy of metrical quantitative operations.

[24] Below, in Section 6.2, I turn to an engagement of how exchange rates measured to doing carbon.

insight is the contingency of such an evaluation; it depends not only on the sources of all the data but also on the margin of error deemed acceptable by agents. In the practical setting at hand, we then turned to the numbers to be reported to CWC Ranking.

It was at this point of the construction of the value of GFQ's financial emission intensity that Victoria and me recognised that we were not having a definite understanding of the difference between the concepts 'turnover' and 'revenue'. These concepts were understood by us and CWC Ranking as suitable to represent the financial reality of GFQ. Victoria considered two authoritative sources of definitions: her contact at CWC Ranking and Wikipedia. My field notes and the artefact provide the conclusion to the question, mark D: we had used the wikipedian voice. The reason for this is open for interpretation. It might have been that calling Rick would have represented GFQ as too weak a player. Or, it might have simply taken too much time to call Rick's office relative to the importance of this issue of definition. In either way, the space of possible definitions was cut to encompass only *one* definition, the one by wikipedia.[25] Three further definitions have been used to calculate the emission intensity: GFQ's profit and turnover as well as its total CO_2e emissions. We used two separate algorithms which resulted in two values for GFQ's financial emission intensity: the turnover's emission intensity and the profit's emission intensity. Thus, financial emission intensity existed in parallel as two versions.

$$\frac{total\ CO_2e\ emissions}{turnover} \quad and \quad \frac{total\ CO_2e\ emissions}{profit}$$

The newly constituted instance of GFQ's turnover's emission intensity was about 10 % higher than the prior year's value. The new value was, finally, constructed and accepted as an adequate document of the kind of value expected. Alongside this documentary production of a number, the discussion shows that turning towards a variety of sources constituted orderly features of defining specific informational entities.

At the same time, the reader probably wonders whether an n^{th}-order carbon construct like financial emission intensity is prone to be difficult to handle because of its meta-information qualities. Some readers may also suggest that a less abstractly defined signified will be treated very differently. Therefore, as a next step of our investigation of members' achievement of order in carbon emissions, I turn to a supposedly clear cut definition, to the case of water.

On the culturality of 'water' This discussion engages a 'low order definition', a seemingly clear and tangible entity, water. In that process we reconsider ways that constitute how water is circumscribed; and I propose that this constitutes a *cultural*

[25] Of course, the singular definition by wikipedia, was not very stable. The very point of the platform is that concepts' explanations are subject to change and seemingly unlimited negotiation. And, of course, unlimited negotiation is not practically possible and, therefore, wikipedia is a power-laden site, a site of knowledge politics; a site in which the rules of the community defining concepts is an object of concern rather than something naturally given (Pentzold 2011).

question.[26] We find how agents implicitly and explicitly deny to each other their statements of what constitutes water and how much water has been consumed.

Here is an introductory phone call between Dieter, Elise and a new environmental manager of the Mexican GCE, Hector Treviño. The EMS-Team members used the phone conference to ascertain in how far Hector knew about the running of his GCE's EMS. He had just taken over the responsibility from Osvaldo Morales. Within this conversation the notion of water as defined in a 'German' manner occurred: the specific relation to the nationality of the definition was related to the history of GFQ's EMS, which a German manager once helped setting up.[27]

Field Note Extract 5.2.a (German definition)

I had joined Dieter in his office. He asked his colleague whether she would be fine if we turn the phone's speakers on so I would be able to listen. These were my notes on the phone call's elements.

Hector *I have to absorb the responsibility.*
Dieter *you know the framework.*
Hector *not really. Osvaldo updated me periodically.*
Dieter *the EMS is in fact a CO_2 management system. That's why we need your data for 2006 and 2007. The history is: we aim at 85 % coverage. You, GCE Mexico volunteered. We are very happy, that you are on board.*
Hector *[laughs] Was that information completed?*
Elise *we need data for 2006 and 2007.*
Hector *in this part of Mexico we have geo-thermal energy or oil.*
Dieter *your supplier should know the energy mix.*
Elise *supplier has the number.*
Hector *we have no train.*
Dieter *Osvaldo said you have the tequila train.*
Elise *data is needed by Friday.*
Hector *this is a problem: I am out of the office for the next two days.*
Elise *I send you the definitions of water.*
Dieter *the definition of drinking water is a bit German.*

Elise reads out of an environmental balance sheet☞ file to clarify for Hector where data should be entered. They talk about the sheets in the file (A-, D-. . .). Dieter tells me: Hector has another sheet; this, however, he cannot disclose.

Dieter *Is it ok for you Elise?*
Elise *Yes.*
Dieter *I will authorise you for ESDR.*

Dieter talks about the workshop.

Hector *I will come. Please reserve 1 day before and after.*
Dieter *great that we will meet in person.*

[26] Above, in Section 2.1, I referred to Latour (1987, 201) and his proposition to understand culture in terms of the elements which show up as tied together when claims are contested.

[27] See also Section 4.3.

Hector *I need to smuggle some tequila.*

I sequentially discuss key elements of this conversation. The first four turns provided the ground for engaging in actually aligning the Mexican agent to HQ's definitions. Part of this was Hector making recognisable that he was now the contact for the EMS-Team. However, for the latter, knowing who would be their contact at the Mexican GCE was in itself not promising enough that the GCE would fit into the EMS. Therefore, Dieter enquired whether Hector knew the way the EMS worked. As a reaction, Hector positioned himself as needing more information while, at the same time, ensuring that he would be recognised as not a totally dependent novice. Dieter, then, pointed out what the EMS, in fact, constituted; a CO_2 management system. By this he translated the EMS into a specific kind of project. He defined the EMS implicitly in terms of its ability to collect carbon data. Thus, he pointed to the dependency of this kind of enterprise on GCEs to provide data. For him, the Mexican GCE was a document of a data delivering entity which would support GFQ to reach its coverage☞ goals. Hence, Dieter had to align relations between the GCE, Hector, the HQ, the EMS and the role of carbon data. These turns successfully set the frame for a discussion of data.

Accordingly, Hector immediately turned to the stake constructed through this definition of the EMS: what is the status of data delivery? Recognising the stake resulted in an exchange between Elise and Hector; they made the status mutually accountable. Elise, in this respect, had the role of (one of) GFQ's carbon accountants. She had the authority to define the carbon terms for Hector. Dieter was supporting her with information on carbon data and with managing the 'social'. I argue that the information on carbon data included the Dieter's assumption that energy suppliers suppliers existed as well as that these would know what energy they provided the GCE with. These assumptions may be read as instances of the general assumption that data should have sources. Further, Elise set the expected pattern for data: it was to be quantitative.

Of the subsequent conversation, I focus on two moments: Dieter's joke about the train as local knowledge and his characterisation of the definition of water as German. The role of trains in the phone conference was based on the KPI travel including a subindicator 'train travel'. Thus, trains were an orderly feature of travel techniques expected by the HQ. However, in Mexico, the subsidiary of GFQ had no chance to use trains. Why was this the case? The passenger rail network of Mexico, once encompassing 10.932 miles (Powell 1921, 31), was demolished to favour bus companies. Only a few passenger trains remained in operation; mainly used by tourists. The tequila one was document of this history. However, by naming the train, Dieter made recognisable that he had some local knowledge and that, by having this knowledge, he transformed the relation between HQ agent and local agent into a non-equal relationship: while Dieter possessed local knowledge about the situation in Mexico, Hector was not positioned to claim local knowledge about the HQ.

I interpret Dieter's joke as a technique (whether intentionally enacted or not) that centred him and peripheralised Hector even more. Hector was not positioned do the

same kind of joke. Although Hector was to travel to Germany, that never happened. This differential degree of knowing each others' locales was relevant because, in this exchange, the GCE was put on the spot. The conversation was about them and their data. Train travel was part of GFQ's official environmental reality. The exchange was partially formal. If Hector had been able to reciprocate with an own joke, the HQ-subsidiary relation would have been balanced. However, for Hector could not rebalance the situation, the formal weight of HQ agents was more stabilised. The HQ was putting Hector in a situation of more surveillance: Dieter enacted a document of the HQ ability to check the Mexican subsidiary's environmental data.

When these three actors were making data gathering operational, Elise announced that she would provide the definitions of what water was to Hector. By saying this, she implied that water was to be accounted for according to these water definitions. However, this approach to align the local agent with the definition of water was immediately challenged by Dieter. He pointed out that these definitions had a taint: their origin in a German dimension. Dieter's statement was changing the modality of the definition: being universal. He recognised and made recognisable and, by that, constituted as an orderly feature of definitions that the HQ definitions were not necessarily fitting the local realities in Mexico. In that respect, this approach likens the one by Frederik which we encountered at the end of the prior section: Frederik had pointed out that intentionally, definitions were cut in a way to allow for a variety of local realities. Frederik had also recognised, that the HQ could not know all subsidiary realities to such a degree that they would be able to provide narrow definitions fitting everywhere. This suggests that the relation of definitions between the local and the global deserves more attention (we turn to this below). While Dieter challenged the universal adequacy of the definition of water, he could not offer an alternative. Whereas Frederik's move could be to allow definitions to encompass more diverse realities, Dieter was not positioned (in this formal schooling phone conference in the presence of other official EMS-Team members) to offer Hector alternative definitions. The decisive point here is that both, Frederik and Dieter ex*cised* the claim that HQ definitions easily fit universally. Globality was removed, cut off.

This leaves us with the confrontation of how a definition can be considered German and what effects that might have. [↪28] For that, I discuss one of the definitions of water, the case of 'drinking water'. This definition was found in ESDR task-forms☞ for drinking water. Artefact 5.2.2 on the next page provides us with the definition. Users had been *ordered* to review the definitions for each task-form before marking the form as completed, and, thus, digestable by the carbon calculation machinery.

[28] The following discussion is relating to Artefact 2.1.3 (on page 81).

Drinking water: purified water with drinking quality, withdrawn from groundwater, water sources or surface water
Water consumption includes water use for

- sanitary installations
- air conditioning
- cooling systems
- cafeteria, garages, sporting areas
- indoor plants
- external areas, e. g. parks

The use of water for cooling or heating purposes, where it is led back to its source without treatment is not water consumption as defined in this section.

Artefact 5.2.2: Extract of definition from a task-form for drinking water

A superficial way of identifying this definition as German could point to the word 'sources' in its first line. The German employee who had defined the indicator originally probably had mistaken the word 'source' as the translation of the German concept *Quelle*, which normally is translated as a 'spring' (Oxford Dictionary 2011d) with respect to the hydrosphere. More substantially, however, the definition is a document of the German drinking water infrastructure:[29] tap water is called drinking water *and* is considered by many drinkable; the HQ definition excluded the usage of water which was delivered in cans – even though the carbon profile of canned water can be considered uncannily high (Gleick and Cooley 2009; Botto 2009). Above I argued: for the EMS, cans were monsters☞. History, thus, was inscribed in the definition – a history presupposing certain infrastructure configurations. The definition had been cut to fit these configurations. Definitions are not only cultural through language but also through particular material arrangements. And Dieter had been recognising that these configurations were not universally present.

This discussion underlines two points: we recognise the contingent realities inscribed into formal definitions; and we find that HQ based members recognised and made recognisable to me that formal definitions needed to be open if they are to embrace the global multitude of local realities. Nevertheless, the more prevalent concern of the same members was that they wanted the the definitions to steer members' data input practices. EMS-Team members suggested that if subsidiary agents read and understood the definitions provided through ESDR data input would run more smoothly. When I discussed with Frederik and Elise their analysis of the current state of ESDR, Elise complained about subsidiary agents.

Field Note Extract 5.2.b (Subsidiary's environmental agents do not read definitions)

'They are not reading our definitions', she said. And Frederik agreed.

The implicit idea here is this: for definitions to affect data input, users of ESDR were considered as needing to *care* for the definition. When ignoring definitions and, yet, putting data into the database which Elise (during her data reviewing practices) would regard as within the normal parameters (say below the threshold of 10 %), the data would

[29] I elaborated this issue in Section 2.1: in Germany tap water is suitable for drinking. Elise had defined that the account for drinking water should include the consumption of tap water.

still end up within carbon emissions calculations. Only when a member constructed any relation between data, task-form and normality as an (implicit) problem, other members would intervene. Again, if we recall Section 2.1 we find that the subsidiary agent, Nick, had made explicit which water consumption types he had included in 'his' task-form for 'drinking water'. He noted these types in a *comment*.[30] The problem Elise had encountered was that Nick had conveyed how much water his GCE had come by, transported in cans. Subsequently, Elise had informed him that only water received through a system of pipes was to be considered drinking water. Her specification of the correct application of the definition was not easily expectable by Nick. Had he not made explicit what exactly he had included in the account, Elise could not have responded. To Elise, a red exclamation mark in the listing of task-forms signalled that the marked task-form's data could not be treated as a black box.[31] Sketching the possible relations between a) a local agent's comments on her data and Elise's review of an task-form and b) the deviation yields a matrix of options; see Table 5.1.

Table 5.1: A matrix of possible relations between reviewed comments and the deviation

	Does Elise perceive comments as indicating that definitions have not been regarded?	
Deviation	**no**	**yes**
below threshold	data classified as fine	data/comment to be improved
above threshold	data is to be explained (in comment)	data to be improved and explained

This discussion of the definition of drinking water and the practices crystallising at it indicates two points. First, a range of temporal/historical and spatial specificities are not merely a property of complex data constructs (such as financial emission intensity) but also of taken-for-granted categories (such as drinking water). Second, while the received view is that the effectiveness of definitions depends primarily on users' ability to apply them, my observations suggest otherwise. In contrast, I found that the quality of definitions' effects is contingent. The effects depend on several issues which I analytically differentiate in three groups:

- the relation between subsidiary agents and HQ agents,
- the thinkable, doable and meaningful options of implementing definitions and, this implies,
- the management of the necessarily existing friction between global definition and local reality.

[30] See Artefact 2.1.3 (on page 81) for the comment, mark 'C'. The comment was oriented at the task-form as a data set.

[31] A list of task-form has been shown as Artefact 5.1.1 (on page 373).

In order to scrutinise the friction revolving around the local-global dichotomy, the next step turns to situations in which documents of diverging realities surfaced.

Diverging realities Just as scientific definitions are ultimately inscribed with historical, temporal or spatial specificities – which makes them fundamentally local definitions (Wynne 2010) – so it was widespread that EMS definitions did not fit GCEs' realities. In the following I argue that this constituted an orderly feature of the EMS, rather than causing a collapse. For that I draw on three cases, two of which, again, revolve around the KPI water. In a conversation with Elise, she told me about data from the Taiwanese GCE and pointed out that pumping water from the ground would not fit their definitions. She made the issue recognisable as a problem.

Field Note Extract 5.2.c (Pumped water does not fit definitions)

It's is our own fault: 'we have to adapt our definitions'.

Uttering this statement, Elise made clear that she understood the EMS as responsible for the provision of implementable definitions. Additionally, the plural in 'definitions' indicates the general character of this problem. What was this problem? I argue that she referred to the divergence between local reality and global definitions. To understand this, we need to recognise *how* definitions were global. They were so by being visible in each task-form as well as in the *de facto* EMS guideline *EMS4GFQ*. In addition they were cited in emails and telephone conversations. Thus, a definition became global by being reiterated repeatedly *as* a definition. It is this reiteration, the distributed citation of the same statement, that makes it global. In these citations, mostly, they were cited as self-evident and as a directive. Even though EMS-Team members suggested that these definitions were problematic, that they *in principle* were adequate was a shared and useful fiction.

This fiction was a prerequisite to the very accounting take on carbon and environments: the idea that task-forms for a particular indicator, say drinking water, could store data which pointed to commensurable realities was inscribed into GFQ's database. It is a general characteristic of accounting systems: one links specific data sets to a shared indicator (such as expenditures to a certain year or a category like 'food'). Data within a task-form should represent the respective quantities of the qualifiers of the task-form's linked indicator. Then, in order to collect data in a way to fit globally to shifting local realities definitions of indicators have to be under constant revision. This, however, compromises the aim of a comparable baseline of data for carbon management.

Yet, still another problem for definitions to affect the collection of consumption data was that it was quite common that organisations did not differentiate materialities in the way presupposed by the EMS. Elise pointed to this when she was upset about the water data from Indonesia:

☞ discussion at Section 6.1

Field Note Extract 5.2.d (Facebook transfer of data)

'Alas, Guys!' She told me that she is 'negotiating via facebook'. Elise had enquired whether they would not have a water meter. Yet, she learned: according to the lease contract, water use is covered by rent.

The Indonesian case likens the Malaysian and the US cases encountered above: lump-sum contracts, a normal legal instrument, do not quote separately in invoices all the entities which are part of the contract.[32] The kind of contract was perceived as a document of data quality (which the EMS transformation was to improve). Unfortunately, the solutions which some members had hoped for – solving the problem by asking the suppliers to change their invoices or employing GFQ's accounting department, FDSO, to solve the problem – were both recognised as not a realistic option.

I argue elsewhere (Lippert 2011a) that Elise's account points to two forms of breakdowns of GFQ's engagement with carbon. These breakdowns are relevant because they allow us to recognise this engagement as element of an infrastructure (Bowker and Star 2000) or a machine (Guattari 1995), rather than as part of something *given*. One breakdown concerns a human alignment issue (and this she could easily repair, for facebook was *available*) and the other one a design problem. The latter one shows how unfit definitions could not be that easily overcome. The EMS was grounded in a set of assumptions that defined *which and how* (data) realities GFQ's carbon accounting could re-cognise. To repeat, if data was not provided via invoices, the EMS had problems to access the imagined carbon implications.

Above, however, we found that EMS-Team members had enacted a structure of relations in which they were dispositioned to somehow perform access to GFQ's environmental realities even if it was not easily possible. ↪[33] One way to fit somewhat available data to the definitions prescribed by the EMS involved careful interpretation and reconstruction of data realities. Frederik tried to provide for comprehendible and useful accounts of realities which did not fit into ESDR: he employed a data construction technique to reconcile the local with the global machine, circumventing the practical limitations of the definitions of the consuming (and, thus, polluting) entity. The problem he had faced was that the consuming entity he had to account for was an assemblage of several GCEs. However, the data he had been provided with was associated with a single building. His technique translated between these differently defined entities – practically successful and acceptable, yet not accountable from the point of view of auditors. At my first meeting with Frederik, he let me know that auditors had acknowledged this problem. By that he had set the stage and made the misfit between the calculatory reality and the organisational reality an orderly feature of GFQ's EMS.

To sum up, EMS-Team members sensed the divergence between local realities and the EMS's definitions they reiterated all over GFQ's universe. Albeit members experienced this divergence as problematic, to some degree they could not do much about it. They had to accept that sometimes data did not fit. And Frederik's move to repair this problem on some occasions was retrospectively sanctioned: auditors, and the EMS

[32] While in differentiated invoices rent is charged separated from payments for e. g. the actual water, electricity and gas consumption, a lump-sum contract based invoice only charges an overall rent for the offices including all utilities without specifying the quantities consumed. I discussed the problems around lump-sum invoices, above, in Section 4.1.

[33] The following discussion is relating to Field note extract 4.1.c (on page 243).

transformation, reframed Frederik's approach to data engagement as unfit for the corporation – it was performed as too indefinite. This devaluation of Frederik's take on repairing carbon accounting breakdowns affirms the interpretation that the divergences were a shared recognised object, objected to but also conserved in the EMS's design.

Definition politics Definitions have not only been an issue in situations in which they were supposedly implemented or were supposed to be implemented. They and their relations to local realities have also been explicitly brought into social and organisational reality. I argue that members were aware and willing to accept that as-a-matter-of-practice, definitions could not be enforced and neither was it advisable to make the actual reality of definitions *transparent*.

↪[35] A useful entry point to this is the discussion between Victoria and Jack on the flight indicator. They had met in order to redefine and transform the EMS. Victoria's boss, Herbert, had repeatedly asked to reduce the amount of accounts used by the EMS. Victoria made recognisable to Jack that she was open-minded regarding changing definitions which would, in that instance, result in the collapse of the distinction between several types of flights. The latter were part of the KPI 'travel'. Victoria was engaged with refocussing the EMS on its relevant elements in order to show that the system has been optimised. The distinction between these two types of flights was a document of the issue of *relevancy*. Was the distinction relevant for the EMS or not?

Jack's move was to translate the 'political' relevancy issue into a document of practical implementation techniques. He made this understanding recognisable by explicating how the GCE (which he was overseeing) practically dealt with the accounts: they did not bother about the definitions literally, but accepted the meaning of the accounts' definitions as flights-are-to-be-differentiated. Thus, Jack presented to Victoria that they simply remapped the EMS's accounts onto other categories which had emerged within his GCE. By that, he did neither formally suggest that the distinction would be relevant nor that Victoria should get rid of it. Rather, he showed that practically the definition did not matter in its officially presumed form. I propose that, precisely because Jack recognised the political character of the definitions, it was rational for him to reframe the question as an implementation problem. While this got him an approval of his implementation technique, Victoria was implicitly invited by his statement to decide freely upon the distinctions' relevancy.

At the surface, these instances indicate a fragility of the formal reality of the EMS. In a discursive environment in which 'the god of definitions' was ruling (see Chapter 3), it could be interpreted as striking that not even the top environmental managers strictly performed definitions as the highest norm. However, I like to suggest that the normativity of definitions should better be understood differently. Definitions provided a conceptual framework to which members were to relate in their practical activities. Definitions were not simply ignored or 'completely' implemented but, rather,

[35] The following discussion is relating to Field note extract 4.5.a (on page 345).

constituted temporarily stabilised points useful for directing actions of oneself or of others. That definitions were fixed and in general implemented was a useful fiction for both EMS-Team members and GCE agents. In their practices, members simply could turn to these statements as one of many orientation points.

When, early on during my field work, members were not clear about the EMS's actual emission reduction target, it was not the case that the available reduction targets were simply ignored or all of the defined targets in parallel aimed at. Instead, the question was how to socially engage with this definitional equivocality. In a meeting with those who worked on the transformation of the EMS, Victoria explained

Field Note Extract 5.2.e (Mistiness, equivocality, vagueness, obscurity)

> *that uncertainties exist: it is certain that 25 % [of carbon emissions] should be reduced. On top of that, further 25 % have been postulated. It is unclear whether in total 50 % are to be reduced or whether first 25 % and, based on that line, additional 25 %. Reaching the reduction target is not possible anyway. It is definite, however, that GCEs are to reduce. The remains of their emissions will be offset by the corporate group. I want to eliminate the lack of clarity first. That's why we did not communicate [the new reduction target] to the GCEs.*

Victoria's statements provided her colleagues with an account of both, the content of the reduction targets as well as the politics of communicating the state of targets' definitions. The underlying history of her statements involve various decisions by GFQ's board of directors, which had set a variety of targets. Victoria classified the 'additional 25 %' as reductions, which have been *called for* by the board. Alternatively, she could have had accounted for these additional reductions as required. In that moment, she constructed a reality in which the emission reduction target turned into a multiple and which was not well-defined. Even more, Victoria suggested that ontologically, meeting some of these available targets would not be possible. She employed this misty state to defend that GCEs have not been updated about the changes of the target(s).

At the same time, she made recognisable to her colleagues that she had the situation under control, that the general aim was still clearly defined and would continue communication to GCEs as soon as definitional clarity would be restored. By that Victoria ensured that subsidiary agents would have a clearly defined reduction target to which they might orientate and which would be the base for their interaction with the HQ. If she had introduced the mistiness to the communication with GCEs, she was potentially confronted with a situation in which negotiations with subsidiary agents would be more difficult. The difficulty of managing agents who relate to a multiply defined object is that these agents have more options of how to manœvre which constitutes a shift in the balance of agency. In a way, then, Victoria presented to her colleagues a mode of achieving order. That mode consisted of strategic information about the definitional state of a key identifier of their collective project, i. e. the mistiness of the targeted degree of carbon reduction. This mode resembles the strategy described by Bowker and Star (2000, 43) to reject a 'marginality in favour of purity'.[36] In the GFQ case, the

[36]Bowker and Star point to a similar phenomenon when they discussed how any kind of modification

marginality is the discursively constituted marginality of obscure definitions while the purity is the acclaimed state of a singular definition for a singular entity.

Definitions, thus, are interwoven with politics. Closure of definitions is as much enacted as the entities linked to the them. In GFQ's take on carbon accounting, subsidiary agents did not need to be confronted with these strategic questions; they did not need to grasp the political nitty-gritty of the task-forms they were asked to fill. And, of course, we find that the distribution of knowledge over definitional politics was risky for HQ agents. Subsidiary agents might question the authority of the centre if or when they recognised that even the foundation of carbon accounting was indefinite.

◊ *End of Section* ◊

Carbon realities were produced by means of imprecision. This section crystallised this book's argument at the site of definitional realities. I argued that members staged realities as defined and definable; and I showed that this character of their performance allowed them to get on with their work – which was very much about unruly realities, not graspable by definitions.

The ways members engaged with definitions contributed to ordering these realities in four ways. First and foremost, those at the top of the hierarchy uphold and performed the ideal of precise definitions. Their performances presumed definitions to have been cut in the past, adequately fitting to current and local realities. These performances allowed for two significant effects. On the one hand, the assumption that definitions determined practices and accounts legitimised their commensuration practices. On the other hand, the same assumption had an implication for a moral economy: the responsibility to fit realities into universalised categories and classifications was shifted to individual agents. The corresponding overarching responsibility that the machinery works according to the definitions was assigned to the top managers of the EMS and presupposed that definitions' shapes were cut precisely and were able themselves to cut realities to fit into the categories of the GFQ universe. Members' shared understanding that definitions were defined *to be* adequately tailored explains why definitions have not been openly disputed. In a way, they were performed as taboo to interpretation. The formal way to alter definitions and redesign or adapt them was through processes which were enacted as highly political, involving senior managers. The outcome of any such changes would have to be celebrated, again, as precision.

Second, yet, members accepted as-a-matter-of-practical-engagement the limits of applying definitions and fitting realities into the predefined categories. They accepted both, that external realities were out of hand for them as well as that local realities simply were configured such that HQ's universal machinery could not adequately digest subsidiaries' data. I suggest that only by accepting these actual limits, members could bear that they themselves as well as subordinated were not able to reconcile realities-at-hand with floating universal definitions.

of a Harley motorcycle is constructed as constituting an assembled motorcycle (marginality), while only the single original Harley is accounted for as a Harley (that is, the pure one).

Third, when members encountered the limits of pressing data into predefined categories several options were possible. Foremost was that they could accept that a definitional statement was orienting their action even though they might accept that the statement's universal claim did not hold. Thus, they would, as a matter-of-fact, find that realities diverged, such as their practical situation from the situation as defined by the EMS. Then they could either a) ignore that problem, b) circumvent the problem by way of drawing on actual possibilities of action (even if they were not officially legitimised or appreciated) in order to produce as meaningful-as-possible data for the category or c) they trimmed definitions such that more diverse realities could be fit into the category. In any way, in the situated practice of encountering that the pre-cut limits of a definition did not fit the boundaries encountered in practice, definitions emerged as rather indefinite. So, members had to decide, i. e. bring to a settlement, of how to engage with the diverging realities. What was settled in these decisions, however, were not out-theres but members' working relations and situations.

Fourth, they recognised well that the definitions were not the sole thinkable reality. This allowed them to propose alterations, innovation or adaptation of definitions. Only then would definitions emerge as a matter to contention.

In all these ways members achieved order vis-à-vis the constantly present quality of situations, which was that definitions did not fit many realities – that realities did not settle in line with GFQ's definitions – and that definitions and informational entities built upon these realities were precarious to a large degree. This analysis, thus, suggests that workers facing definitions, which have been shaped in advance of a practical work situation, are well equipped with these four modes; they allowed them to cope with these diverging realities. That definitions did not work was an orderly feature of enacting environments and not a source of trouble. I like to criticise, however, the aspect that workers are required to uphold the definitional ideality despite so much evidence that this ideal does not fit to realities and does not allow transparent communication.

5.3 Betting on Bodies

The power to control carbon emissions in the 'right' manner was supposed to lie within the machinery elements of the Environmental Management System (EMS). However, members in charge of different components of this machinery were well aware that these elements could not guarantee a firm base for carbon management: neither the hardwired and hardcoded elements of the machinery or members' formal organisation in themselves nor any of their combinations ensured control. Above, in Chapter 4, I showed that managers could only enact control in particular situations; that control did not, and could not, extend beyond situations. Control over doing carbon was fundamentally linked to particular *human bodies*. A contradiction is central: while the EMS was to be transformed in order to involve less of Frederik's bodily practices, many more bodies were foreseen as required to secure the success of the transformation

project, controlling agents.[37] The concept of body highlights that human agencies, such as the will and particular skills, were *carried* by *wetware*.[38]

In this section I shed more light on this pattern: achieving order in carbon implied aligning human bodies in particular ways, enrolling more or different of them, figuring humans as solutions to problems. At the same time, members were recognising that the procedures, the patterns of aligning bodies, did not secure solutions. Nevertheless, members bet on bodies. That bodies would solve the machinic troubles was a useful fiction. It allowed members to continue business. In the midst of hardwired and -coded material elements, wetware, bodies, were employed in their buffering capacity. I argue that bodies buffered against the breakdown of GFQ's carbon accounting. Betting on bodies helped members to enact carbon order.

This argument takes three steps. First, the EMS was decisively co-constituted by human GCE agents. In members' conception, in the last resort, these humans needed to be forced to take on the designated positions in the machinery. Second, however, bodies occupying certain positions could not secure that appropriate data was entered into ESDR. Consequentially, third, EMS-Team members invested their capacities in overseeing the outcome of GCEs' data practices. This move guides us to the bodies positioned at GFQ's HQ. Within the EMS-Team we observed a division of labour; however, this division was also troubling and, a significant element to solve this trouble, was to change the bodily composition of the EMS. And, yet, while members bet on the new composition, they tried to secure themselves against other bodies' failures. As a safeguard I find the enrolment of further bodies. Thus, this section attempts to show how figuring carbon as ordered was inextricably bound up in betting on bodies.

Forcing humans The EMS-Team was dependent on GCEs to deliver data. Here is an instance through which we may familiarise ourselves with the subtle techniques of steering GCEs' agents. I worked with Dieter on an intranet website, explaining the EMS to GCEs. We played through a variety of formulations to encourage GCEs to join and support the EMS.

Field Note Extract 5.3.a (Voluntariness and force)

> *We consider to add – as Dieter puts it: 'if you want to join [the EMS], contact. . . '. Dieter withdraws the idea immediately: well, no, this is a political question. Recently, GCEs have been forced to participate in the EMS and might be puzzled if we announce voluntariness on the portal.*

The underlying issue of this situation was that Dieter was interested in recruiting more GCEs to join the EMS; this was relevant to approach reaching GFQ's coverage☞ target.

[37] Frederik's physical appearance in the midst of processing data was seen as a problem - - a problem of the presence of wetware. In contrast, purely non-biologically constructed machineries were imagined as promising hard(er) facts. In short: in the field, *human* resources were problematic insofar as they were a biological entity, wetware rather than hardware.

[38] Of course, many further conceptions of the body exist. This section does not try to reconcile and engage with debates on bodies in general. The notion of body used here serves as the *container* of human characteristics in general and does not relate to, say, bio-chemical discussions. I briefly relate to the latter in Interlude III.

The first suggested formulation can be read as a document of this issue. However, while the EMS was dependent on GCEs' participation and support, he was aiming to instantiate the EMS as a nice and welcoming organisational entity. Dieter, then, recognised that his invitation was related to the realm of 'the political'. He made explicit the way this invitation was political by pointing out the consequences: GCEs, which had been forced to join the EMS, might be puzzled. Note how in this take, bodies and GCEs were interchangeable. For members, human agents constituted, for almost all practical purposes, GCEs. Puzzlement was to be avoided. In this moment, Dieter imagined how GCEs would be interpreting the statement he was about to make public (within the GFQ universe). He recognised that his proposed statement would position GCEsthat had once been forced to participate in a contradictory setting. Such a setting was not welcomed by him because it was likely to increase friction. Thus, by not offering the statement to GCEs, he aligned GCEs' readers to a non-contradictory perception of the EMS network. By positioning GCEs in this way he co-constructed the orderings between GCEs and the EMS-Team.

↪[39] Whether or not GCEs were participating voluntarily or forced, their formal participation did not secure that GCEs' agents were actually delivering data. Thus, in practice, a subsidiary signing on the EMS was only loosely coupled with workers' bodily practices of drawing data together and pressing particular buttons in ESDR. A repeating theme in this book – as Frederik remarked – GCEs were 'out of control'. However, this state was not acceptable for members. While they recognised and shared with each other the observation that their means did not work to keep GCEs on track, they turned towards clarifying who of them would control which GCE. Thus, EMS-Team members foresaw that they needed to type letters, send emails, talk on the phone. They also discussed how to employ their trump, communicating the status of GCEs' data delivery to the mighty bodies assembled in the board of directors – in particular Ivo. The latter was performed collectively within GFQ as a punctualised source of power. Victoria was to let GCEs know that she would involve this powerful actor if they were not providing the desired data. A threat was under preparation.

EMS-Team members required bodies located at GCEs to perform in particular ways. Built-in in the HQ approach, bodies located at subsidiaries were to control GCEs' carbon accounting. The EMS was built on the bet that these bodies worked. However, in everyday work practice, members repeatedly recognised the practical limitations of their approach: members found that they could not steer subsidiary bodies. Here, then, we encounter a significant contradiction. To perform the EMS they needed to bet on bodies at GCEs even though they often found these bodies to not perform well and were not in control. The practical working in this contradictory setting was incomprehensible and could not be articulated. However, members worked – they simply continued working in this setting even though they could not articulate it. Of course, they had a model to comprehend the relations between GCEs and HQ (a hierarchical model); in

[39] The following discussion is relating to Field note extract 3.2.j (on page 162).

line with the model, they imagined involving the board of directors. Thus, control was to be put to work by investing more power, assigned to Ivo's body. But that model was unworkable. The lack of control was to be solved by means of enrolling other bodies; but the contradiction could not that easily be resolved.

Reframing the problem of control as an issue of governance, members attempted to solve the problem by means of transforming the configuration of the EMS. [41] Early on in the process of drafting what the transformation should bring about, Jacob proposed to align GCE environmental agents equivalently to how financial agents were ordered. He explained that GCEs' financial managers (i. e. CFOs or CEOs) would be fired if they did not deliver data. Firing these agents was understood as an effective sanction. Jacob made recognisable that this harsh sanction could well be employed as an orderly feature of the EMS. He suggested to his colleagues from the EMS-Team three ways to conceptualise GCE agents who did not deliver data.

Agents might not have the will. This conception means that agents were seen as idiosyncratic humans. Ideally, Jacob implied, these agents did not have a free will. Unfortunately, the EMS still required these bodies which embodied the free will – an unfortunate appendix to the organisation.

Agents might lack creative initiative. He framed it as an issue of 'phantasy', i. e. as a question of creative imagination; this imagination needed to be employed by GCE agents in case they had problems to 'find' data. Thus, in this second option, agents were seen as embodying the capacity to improvise against lack of data. Workers were expected to draw on their capacity to creatively enact data where none was present. Those who did not manage to deliver data, then, were not exercising this capacity enough.

Agents might not be governed well. In this perspective, the bodies, which were to deliver data, were to be controlled by other, superior, bodies.

The last version returns to the model of control seen above. However, the first two conceptions indicate a key point: the body is to deliver *any* data. These understandings of agents (later built into the transformed EMS) were not sensitive to the quality of data. Frederik and Victoria shared Jacob's conceptions. For members, thus, the hierarchical model of control was secured through the transformation exercise. The model was a useful fiction – it allowed members to co-operate. That it did not help to understand the practical reality of data was of no organised concern. Maintaining this fiction was fundamental to achieve order – a shared dream of manageability.

Qualifying data Yet, even if the EMS-Team had been able to enforce delivery of data, they would still face the problem of the *content* of data. Elise, facing the Belgian GCE, provided this account, undermining the very dream they had to share:

[41] The following discussion is relating to Field note extract 4.4.b (on page 325).

Field Note Extract 5.3.b (They should do it the right way)

> *Elise told me about the difficulties with Belgium regarding the conversion factors. She explained: this is how one has to do it – such that they do it the way I want it to be. Elise pointed out that it turns out to be more work for her when the Belgians use more exact conversion factors. At the same time, the sum would not change. I replied: didn't we want more exact conversion factors? Elise: yes, but it is of no use. She then explained that one has to make others recognise that her proposal is better for her* and *constitutes less work for the Belgians. Elise told me that Dieter is good at this. She continued to explain: 'this is the way one has to do it', i. e. in the way that people are convinced that they have less work. The aim is 'that they do it the way I want it to be done'.*

Aligning GCE agents in particular ways was relevant to ensure that ESDR was filled in with *adequate* data. Elise considered data which did not change the sums of no use, and thus, not relevant. The latter points to an orderly feature of classifying entities which interacted with the database. For her, the maintenance of the corporate carbon memory was to be policed in terms of the relevancy and adequacy of alien entities. Users and data were only supposed to engage with ESDR if they added adequate content or context. In this case, more exact conversion factors constituted not adequate content because the quantitative outcome of data gathering would not have been affected.

At the same time, the introduction of different conversion factors would align herself to *more work*. In order to suppress this effect, she wanted the Belgians to recognise the negative effects of their request. Less work for actors constituted a good, more work was to be avoided. After all, however, she proposed that she simply wanted subsidiary agents to do what she wanted them to do.[42] For Elise this promised a correct and smooth outcome. Towards this end, Dieter's work force was significant: he was to do the alignment. This involved *persuading* GCE agents to perform according HQ guidance (Lippert 2011a). Yet, the maintenance of the network was not sufficiently secured by aligning GCE agents. It also presupposed that Elise and other members aligned themselves threefold: to the database, to data as well as to subsidiary managers.[43]

Thus, we find, from EMS-Team members point of view, delivery of data did not necessarily imply delivery of *useful* data. It was in this context that members positioned the various schooling devices, from definitions of indicators to documents like *EMS4GFQ* or training sessions. As Victoria postulated: subsidiary agents needed to understand how to look at numbers in the right way. In her analysis, the EMS-Team should invest its agencies to generate at GCE-sites the correct vision. The solution to the problem of adequate or useful data, thus, seemed to consist of bodily practices. As I suggested above, members needed to develop (or be selected in terms of) a fitting habitus – an

[42] Elise's statement that she wanted subsidiary agents to adhere to her guidance fits to the ethnomethodological observation that members are never able to make explicit all meanings and rules relevant for a certain action (Garfinkel 1967, 24-31). Therefore, they use generalising signifiers.

[43] Above, we already came across a technique by which HQ agents and GCE agents reciprocally aligned each other. Elise had engaged in a negotiation with the Indonesian GCE about their water reality. She performed this negotiation using facebook. Aligning humans was, thus, dependent on a material infrastructure which enabled contact and stabilised the quality of the contact between them.

embodied generative scheme of perception and action. Victoria wanted the EMS-Team to bet on bodies. Yet, if subsidiary agents were not successfully aligned, retrospective data adjustments were in order. This presupposed HQ's agents, some*body* else, i. e. Frederik or Elise, to be aligned to the proposed alteration.

Dividing labour To achieve order, the EMS-Team also tried to organise itself as in control. A significant part of this approach was their performance of the division of labour. I argued above that contributing to an orderly enactment of carbon required, thus, to perform hierarchies well, to know and stage playing according to the rules of the game. However, as noted as well, the organisation of labour within the EMS-Team was everything but harmonious.[44] As part of the transformation project, Frederik was to be substituted by Jack. This switch was backgrounded by the norm that the EMS was to be impersonal, to be independent of specific bodies and people, to allow automated data processing. The occupants of positions within the management system were to perform *jobs* – they were not to be marked by any deviant characteristics and idiosyncrasies (Acker 1990). I shall argue now that this move to switch bodies was part of betting on bodies and that even this bet was not seen as a guarantee of success. The EMS was designed to exist by means of jobs and positions; but bodies were always in the way and resorted to to solve problems. Tension and conflict between and about bodies, then, is part of the story.

To approach the problematic reality of dividing labour I turn to a narrative by Dieter. He gradually introduced me to his understandings of the relations among his colleagues. According to him, many subsidiary managers had problems comprehending and following Frederik's outlined structure and work flows inscribed into ESDR. Dieter linked this problem to his generalised understanding that Frederik was positioning himself as taking care of the EMS's operations while ascribing the 'political' to Victoria. This is how Dieter detailed the relation between the two:

Field Note Extract 5.3.c ('Entrapping in numbers')

> *Frederik is good with numbers. However, he lacks a strategical perspective. Dieter had asked Frederik how they could support GCEs to carry out measures aimed at reducing carbon emissions. According to Dieter, Frederik replied by stating that they would not be able to tackle measures for GCEs. Dieter continued: he 'identifies as someone who requests [environmental data and then] disgorges [CO_2 numbers]'. Frederik would not feel responsible for consulting. Frederik and Elise consolidate data and, thus, do not have room for conceptual work. Victoria, however, takes the stance of 'you entrap yourselves in numbers'. Thus, principally, Frederik perceives: 'she is the client' and he the server. Dieter illustrated this with hands: they are relating this*

[44] The subsequent discussion requires us to zoom into the relations between specific EMS-Team members. This, of course, touches upon very personal issues. The reason to pursue this analysis was that these issues were consequential for carbon emissions. Bluntly speaking: Victoria and Frederik experienced quite a bit of friction in their interaction. Such relations exist in most organisations. My point is not to tell a personal story but to focus on the collective circumstances in which carbon was enacted. And carbon was enacted by people – who were sometimes happy, sometimes annoyed. I focus on those specificities of members' relations which were consequential for carbon. I am not criticising the personal relations I discuss below; perfectly smooth interaction is not possible.

> *way, rather than that way. First he had his one hand diagonally below the other; then he put his hands to the same height. A misunderstanding results.*

By informing me about his analysis, Dieter both used specific categories to classify his colleagues and, by that, indicated of how the work context may legitimately be grasped. Thus, he made his evaluation recognisable. The terms in which he classified Frederik and Victoria were a) the way a member related to numbers and b) how a member engaged with the strategical dimension. His presentation affirms the reconstruction proposed in Chapter 4: members differentiated the 'operational' from the 'political/strategical' work. This conceptual division of labour was frequently employed by members as an ordering device.

Dieter also accounted for how he had established his knowledge about this pattern: in a conversation with Frederik he had experienced the GFQ environmental manager as not willing to support GCEs in planning measures. He learned that Frederik and Elise took care of the numbers. Dieter classified this work as non-strategical and conceptionalised Frederik's reluctancy to participate in planning as an instance of the corporation's environmental manager to not exercise a 'strategical perspective'. Interestingly, Dieter's story exhibited a translation of 'supporting' GCEs to 'tackling' their jobs. Dieter implicitly ascribed this move to Frederik. Thus, not only was Frederik construed as not willing to engage with strategical work but also he was portrayed as not willing to help out at the construction site of the formal EMS's target (i. e. devising measures to reduce the carbon footprint).

While for Frederik, we may assume, achieving order consisted of performing his work as separate of the 'political/strategical', for other EMS-Team members his performance was resulting in disorder. For Victoria and Dieter, for example, Frederik was supposed to attend to the 'political/strategical'. However, as Dieter reasoned, Frederik was not willing. The will of the worker emerges, indeed, as a problem. For the will was linked to the body, the problem was associated with Frederik himself: Dieter showed that the official view, in this case Victoria's, was even more radical: numbers were considered as a trap; and Frederik got caught by engaging with numbers as an end in itself. The body Frederik performed data practices in particular ways. And his colleagues understood his identity precisely through his practices. This likens Butler's (1990, 145) account of 'identity as a *practice*'. For members, what they were was constituted by their practices and not by some hidden or preexisting personal entity. Frederik was identified as a problem because his practice was problematic in relation to the EMS-Team.

Frederik, thus, performed the division of labour differently compared to other EMS-Team members. In result, Victoria had to take on a more central role in the EMS than she wanted. As Frederik was not willing to stage engagement with the 'political/strategic', and Victoria was mostly not willing to condescend to the 'operational', frequently they experienced confrontation and, as Dieter put it, misunderstandings.

I am *not* suggesting, however, that either of both agents was 'really' not acting operationally or politically and strategically – both attended to both 'levels'. The

point is that they staged themselves as acting on distinct levels which did not coincide. For practical purposes, though, they normally were well able to cooperate. For this performative structure, their practical interaction was quite complicated.

To show how their relation affected doing carbon I turn to a situation in which they had to co-operate and practically work around the tension. When GCEs increasingly started to carry out carbon offsetting activities, members felt this needed to be integrated into the database. For that Frederik had contacted – months before I joined the field – a colleague of Victoria, Nora King. She was an experienced coordinator of Information Technology (IT) projects. I had taken over the responsibility for ESDR updating processes from her. (My job was to mediate the relation between Frederik, ESDR and its chief programmer, Han Liu, and Victoria.) On a Friday, midday, shortly before I was about to leave the office, I had a phone discussion with Frederik on possibilities to account for offsets within ESDR. We could not agree about a course of action because he classified the topic as 'political' and, therefore, wanted to discuss it with Victoria. Yet, from her point of view, finding a way to integrate accounts of offset carbon into the environmental data processing machinery was a technical issue. Follow me, introducing the topic to Victoria. I knocked at her door and a moment later:

☞ discussion at Section 6.3

Field Note Extract 5.3.d (Neutralisation and professionality)

> *11:40. I told her that my discussion with Frederik did not run well because he conceptualised the issues as political and, therefore, wanted to clarify the questions with her. I perceived her as annoyed; she decided to ring him immediately.*
>
> *Victoria called him, he answered at once and she asked: 'what do you wish?' Frederik reacted to that by replying: I do not have any wish – you are the one having a wish! GFQ has a wish. Then he told us, quite vexedly, that it has been known for a long time that the offsetting issue should be integrated into the environmental balance sheet☞ of 2008: in December he had informed both, Victoria and Nora.*
>
> *Victoria enquired how many GCEs are subject to this issue. Frederik replied: I don't know. Victoria and me looked squarely into each other's eyes (taxing!). Victoria probed further: she suggested, by now she came across the German GCE and Ferdinand Archer of the Australian GCE in this respect. Frederik neither clearly agreed nor did he reject her information.*
>
> *Then, Victoria asked how the problem could be solved. Frederik replied: 'manually, I won't collect any number.'*
>
> *[. . .] Frederik exacted a plan of accounts. Victoria argued that it takes much too long if we go for a solution involving Han: she expounded a time calculation, pausing, I told her mid of April, and she told so Frederik. After a while Frederik gave in: we could utilise our 'professional unprofessionality', i. e. collect data via ESDR and then Frederik would continue the calculation manually in a spreadsheet.*

The conversation continued and Frederik and me clarified some technical issues. In between Frederik was sharing information which Victoria and me, both, considered not immediately relevant. During such a period, at one point, Victoria put the phone's receiver onto the table and we were listening through the speaker.

I might have aggravated the situation by reproducing Frederik's classification of the issue as one of the political/strategic dimension. The reaction by Victoria was fierce; she clearly expected him to simply implement the offsetting accounting technologies. By framing the issue as a 'wish' she made recognisable that Frederik was not positioned to make demands. This constituted a confrontation. Frederik's move was one of turning the direction of the transaction from him 'wishing' towards GFQ asking for his support. By that he made recognisable that a core feature of their relationship was its *contractual* base. He accounted for his actions which he classified as an instance of the appropriate procedure: he had properly informed the responsible actor, Nora, that ESDR needed to be adapted to the reality of GCEs buying offsets. In consequence, Victoria made recognisable that the issue's relevancy depended on how many GCEs actually were co-constituting this reality. For Frederik, however, the topic was a qualitative one. He did not co-operate in establishing the quantitative information which Victoria had demanded.[45] Thus, we find that in this interaction, Frederik changed the division of labour by saying he would not perform certain calculations. In that moment Frederik *resisted* the incorporation of certain responsibilities. He reasoned that he had done his job in the past and GFQ could not demand more from him.[46]

Nevertheless, a solution was needed. Victoria did not contest that Frederik's course of action in the past was technically or formally acceptable. Rather, she was looking for a practical way out. Frederik indicated the boundaries of thinkable resolutions: he would not manually work on the data. Respectively, Victoria made the criterion explicit according to which she would judge any solution: how long its preparation takes. Frederik, finally, was willing to co-construct a solution. Once he was willing to do so, the solution was what he coined 'professional unprofessionality'.[47] In this situation, employing this work practice (as a device) promised a solution to their conflict.

As I proposed above, members may have voiced resistance to particular levels of work – but in practice they often cooperated. In this case Frederik voiced not wanting to do manual work as well as resisted joining in the strategic considerations. Ultimately, however, he envisioned a solution which contradicted both stances: he offered a professional solution which was characterised by manual labour (and, therefore, considered unprofessional). The solution, thus, was to be a kind of work that would make bodies tired: spreadsheeting. This particular practice would co-formate GFQ's emissions.[48]

The tension between Victoria and Frederik was the result of the historical structure of GFQ's EMS. The transformation was to get rid off the separate positions which

[45] In that situation, Victoria and me made to each other recognisable that we shared the normative interpretation that Frederik's behaviour was tiring: this rendered the evaluation that Frederik was unfit for the job (for the practical purposes of his colleagues) reciprocally visible and legitimate.

[46] Frederik's approach comes close to the technique called work-to-rule. Work-to-rule is a strike action technique; it can be used by workers to sabotage work processes.

[47] I explore the problematic nature implied by the notion of professional unprofessionality below. In short, it relates to an issue of multiplicity. See Section 6.3.

[48] As a direct result of this interaction, the environmental balance sheet was redesigned to account for offset greenhouse gases (GHG) emissions: from then on the sheet included a section entitled '8) Neutralisation of GHG emissions [...]'; see Artefact 3.3.5 (on page 176).

could be enacted as dividing labour between strategy and number crunching. If the interaction had taken place within one person the outcome might have been quite different. Contesting the devision of labour in such practical situations was about constituting the boundaries of who was to be accountable for what.

The transformation was promising to get rid of Frederik and, in his place, position a better strategist, most likely, Jack. Thus, the prospective environmental manager was to be *willing* to perform well and be accountable on both 'levels', technically and strategically. A new body was promised as the solution for the EMS. However, Victoria could not be sure that the promise would hold or who precisely would be Frederik's successor. Within this context of potentially changing occupants of formal positions, Victoria needed to secure her position as well. Vis-à-vis her superior, Herbert, she had to prove that the EMS could be transformed properly. For that she equipped herself with detailed information about GFQ's carbon reality as the starting ground for any strategical action. Once, for example, she asked me to transform a pile of digital carbon data into a personal reference booklet for her. This booklet was comprising data which she, in contrast to Frederik, had not officially access to. By provisioning herself with this data she sought to develop an alternative vision on GFQ's carbon reality without letting both, Frederik and Jack, know about her vision. Thus, while Victoria was positioned as dependent on Frederik or his successor, she tried to compensate against this risky position. The solution was to enhance her field of vision in four ways: first, Victoria was circumventing the current number cruncher as well as his likely successor. Thus, the process of seeing data was different from the normally assumed. Second, she was able to access the data substantively without Frederik's or Jack's immediate filtering. Third, she had asked me to print the data. She did not want to view the data on screen. Fourth, she made recognisable to me how I was to view this interaction, i. e. as a precarious one. For this precariousness, I was not to share the precise configuration of the situation with others; resulting in a stabilisation of her technology of vision.

To sum up, we find that achieving order was also taking place by way of dividing labour. Members conceptualised the relations within the EMS-Team as related to particular embodied identities. They performed the devision of labour as linked to particular bodies. Formally, work was distributed. Practically, the division was contested. To overcome the practical tensions in the organisation, members hoped that substituting failing bodies (Frederik) for promissory bodies would result in a well-performed EMS. While they collectively staged themselves as betting that some*body* would be able to run the EMS well, some members did not want to trust other bodies completely and, therefore, enhanced themselves with better vision.

◊ *End of Section* ◊

This section argued that achieving order was to a significant degree taking place as the management of particular embodied workers, their wills and practices. The analysis of three problematic sites of carbon accounting showed a repeating pattern. Members recognised problems in the wetware elements of carbon accounting machinery. These

elements, consequentially, were to be substituted or better controlled. I call this betting on bodies for they were sure and they could not articulate better bets. Bodies were the flexible plane onto which all kinds of promises could be projected. Further, members were able to articulate specific failures of their bets; members lost bets; better bodies did not exist – and no*body* would not provide solutions as well. For the moment we have to assume that only humans can serve as the needed flexible, intelligent and creative generator of situated repair of carbon machinery breakdowns.

Betting on bodies, thus, was bound up in a contradiction: members recognised that their bets were lost, but they continued to invest their trust and hope in humans anyway. The business had to be kept running. Order was achieved by continuously reproducing the promise that new or reconfigured bodies would perform carbon well. With respect to human agents, carbon order was fundamentally located in 'future'.

5.4 Accommodating Mess

In this section I argue that members accommodated the messiness integral to carbon. And this claim does not only hold analytically but also for descriptions of members' practices. Two notions are key to this argument, accommodation and mess. With *accommodating* I refer to a practice of providing sufficient space for an object, in this case, mess. *Mess* is a concept I draw from Law (2004a, 2); he uses it to engage with 'things that slip and slide, or appear and disappear, change shape or don't have much form at all, unpredictabilities'. For we encountered carbon as shifting form, as indefinite, as unstable, as seldom the same, 'mess' helps to think doing carbon.

As an introduction to this theme I comment on a debate of how constructivist carbon accountants may be. Reasoning for the thesis of accommodating mess takes four steps. Each step details how a space for mess has been carved out. First, members tolerated mess. They had to because they were confronted with it every day. Second, they looked away, ignoring the messy foundations on which carbon accounting took place. Third, they accounted for messiness by explaining mess. These three steps could be interpreted as addressing how members engage with mess from an 'outside'. Therefore, the fourth step zooms 'into' mingling with mess (this step may be read parallel the the prior three steps). Finally, thus, we engage with members as practically engaged with mess through artful forms which allowed mess to enter carbon accounting while not destroying the staging of facts 'proper'.

The transformation exercise can be seen as a measure to discipline mess; but disciplining mess also took place as phone conversations between members of the EMS-Team and subsidiary environmental managers or by means of deciding for one number rather than another which was to be entered into a database. Accommodating mess points to a practice allowing for mess, providing a space in which mess could exist. In a way then, with Samuel Beckett, we are engaging with a strategy of artists: Driver (1961, 23) 'enphrased' this into Beckett's voice: '... To find a form that accommodates the

mess, that is the task of the artist now.'[50] Beckett (2009), correspondingly, is read as experimenting with allowing ' "the mess" to enter art without destroying it' (Anonymous 2012). This closes the circle and brings us back to Science and Technology Studies (STS). Suchman writes:

> artful compliance [with professional and technological disciplines] necessarily involves endless small forms of practical 'subversion', taken up in the name of getting the work of the organisation done (2000, 313).

Doing carbon in the 'right' way required the demonstration of this way. I, correspondingly, engage with how members demonstrated doing carbon properly while allowing mess to exist, and, while staging as not stumbling upon mess, i. e. achieving order.

Members' fundamental strategy, of course, was to *decrease* mess. Most of the strategies discussed above were aligned to a desired state of order. But what to do with the mess members came across in their practices? Beunza and Stark (2008, 261), in their discussion of arbitrage traders, propose agents as radically deconstructionist, contrasting them with those agents who engage with entities-to-be-traded as monolithic blocks. Arbitrage traders categorically zoom into the monolithic, open it, and abstractly reconstruct them as different entities-to-be-traded. Compared to arbitrage traders GFQ's carbon accountants seemed positivist: ↪[51] the transformation project was based upon a quantification of the error rate of the prior Environmental Management System (EMS) configuration; the post-transformation system was to be better. Mess was to be decreased. Wait. Where did this error rate come from? Frederik was entirely unhappy with it. Not with the errors (yet, maybe with these also) but with the account of errors. Victoria admitted: she made up the error rate strategically to convince the corporation to consider a transformation needed and the EMS staff as able to manage. As it seems, mess was not measurable. Measuring it was, rather, a performance of the EMS as *manageable enough* to be worth more attention from GFQ.

While members enacted, and had to enact, a positivist framework, somehow, the story seems more complicated. As a background to a discussion of accommodating mess, here is what such a positivist framework implied for members' stances. They imagined that the EMS was not yet automated enough. Accurate measurement was imagined as the effect of automated data collection and processing. In this framework, messiness is an unfortunate residue of not-yet-perfected data production. Data is seen an approximation to reality out-there; ideally, this approach holds, approximations get close enough to an antecedent and independent reality. Of course, EMS-Team members were no simplistic positivists: they recognised that their carbon detection machinery was not perfect, yet (hence the transformation); therefore, they had to discuss with subsidiary agents, adjust data. Unfortunately, in the positivist take, the machinery itself may have effects on that data; but that data should be measured against the

[50] I drew the quote from Taylor-Batty (2007, 164) who also emphasised that Driver (1961) did not claim to actually have transcribed Beckett's voice.

[51] The following discussion is relating to Field note extract 4.5.c (on page 348).

reality out-there. In this take, the decisive question is: how well can data represent carbon? If we find that mess is accommodated than we should not be surprised if that question is not of paramount concern.

Tolerating mess The messiness of the EMS was so fundamental that from my start of field work on, members pointed to the required and prepared transformation of the management system. One of the key discursive reference point which legitimised the transformation exercise was a report by GFQ's auditor on the EMS. Turning to this authoritative AfC report, for the most part we find quite positivist critiques on GFQ's carbon accounting practices.[52] I emphasise three points of that report: mess as sensed, as detested and as tolerated. First, the report clearly refers to mess. AfC acknowledged that they simply did not grasp some of the calculatory apparatus enacted by Frederik. He, proudly, cited their verdict as 'out of control'. What they said was this: the '[l]ogic and flow of calculation is very complicated and hard to verify'. With Law (2004a, 6) we can understand AfC's critique as pointing so a 'simple complexity'. With that he refers to the understanding that the 'world and its structures [...] are technically difficult to grasp' (ibid.). AfC wanted the reality of GFQ's calculations to be easily *graspable*. Law goes beyond this take; he suggests that the 'world and its structures'

> are also complex because they *necessarily exceed our capacity to know them.* No doubt, local structures can be identified, but [...] the world in general defies any attempt at overall orderly accounting. The world is not to be understood by adopting a methodological version of auditing. (ibid.)

Vis-à-vis this understanding I render 'accommodating mess' more precise. I do not claim that GFQ's carbon accountants *conceptualised* mess in Law's sense; however, members willingly arranged for space in which the non-understandable worldly structures – as slippery, shifting and uncertain as they were – could peacefully exist.

Second, AfC's report, itself, was touching upon possibilities of carbon accounting to be *never definite*. For them, this was a danger. The accepted, but problematised, *non*-definite character of accounts of carbon emissions was made visible by criticising GFQ's 'choice' of implementing '[e]mission factors [... as] static' and not up-to-date. Ideally, factors would be constantly updated (i. e. dynamic, more fluid). AfC recognised that GFQ chose to employ the VfU standard. Both, the standard as such as well as the factors used, co-constituted GFQ's account of their emissions. The auditor sensed that these factors *could* be different. I should add that no factor or standard would be able to ensure the truth of GFQ's accounts of emissions. The auditor could not do more than urge GFQ to carefully consider whether, e. g., 'VfU [was] a suitable source of conversion factors'. Multiple options of doing carbon existed in parallel; and no choice was innocent. As we have seen above, members used truth less as an orientation than the practices of competing corporations. AfC could only warn GFQ's carbon accountants to take their choices carefully.

[52] Appendix B.5 (on page 608) provides an extract from that report as well as a brief analysis.

A final element of the report useful for my argument is this: AfC wanted GFQ to '[a]sk data owners to document any calculations and assumptions'. The auditors implied that a better accounting system for carbon emissions would be possible if subsidiary agents would document all the quantifiers and qualifiers that they used to generate data. The recommendation hints us to a significant vagueness: while documenting the mess of quantifiers and qualifiers might in itself discipline agents and decrease mess (so auditors may have hoped), they also acknowledged that data practices were not clear and self-evident. Documentation was recommend because auditors sensed mess. AfC wanted to have that mess documented. This call performed the idea of complete data gathering and documentation being possible. Yet, how should data owners know where to draw the boundary, where to stop documenting? Practically, this recommendation could not work. Yet, mess in reality was provided for in AfC's report, if only to a tiny degree.[53] The auditor tolerated mess. This means that they acknowledged the existence of non-self-evident, disordered, data reality; but they wanted to have that data – that mess – documented. To the degree that auditors wanted to *simply* represent mess, their *stance* can be seen as tolerating: they may have imagined that documentation does not interfere. However, if documentation was expected to shape data practices (and surely documentation is performative), then, of course, their recommendation to document may lead to interferences in the mess; and interference is no tolerance. In a performative world, the notion of tolerance becomes an issue of intentions: are agents providing for data to be not interfered with or is carbon continually messed around with? What this brief discussion of AfC's document shows is this: the auditor provided GFQ with statements which legitimised a tolerative stance to mess.

As AfC is not our main concern, I turn to engage more closely with GFQ's practices. The next step has to be towards GFQ's practices of tolerating unpredictabilities, multiplicity and shifting realities – or did they always interfere? In general, the co-existence of alternative data handling techniques – from ESDR, SAP to spreadsheets and to paper-mind-hand interactions – was accepted by EMS-Team members. While they noted that these techniques were not ideal, for all-practical-and-strategical-purposes these techniques (and that they formatted data in particular ways) were tolerated. Parallel practices of doing carbon data existed. And this multiplicity was acknowledged. Members compared versions of data representations to form judgements. The existence of parallel techniques employed for carbon accounting was mostly tolerated.[54]

And sometimes members had not much choice but to tolerate mess. A case of such a situation was revolving around the enactment of carbon emission facts as relative figures. As discussed above, GFQ wanted to measure its carbon emissions not in absolute numbers but relative to the count of employees. This meant that GFQ aimed not at

[53] Pressed on the question whether objective knowledge, i. e. complete documentation of a fact, would be possible, the accounting profession learned to emphasise that, after all, only comparisons between measurements are possible and out-there may not be directly accessible (Porter 1995, 96).

[54] Of course, one may object, the transformation exercise was precisely marking the end of tolerating the assemblage of Frederik-ESDR. I keep this issue (how the transformation project was engaging with mess) open for discussion below.

reducing its total emissions, but rather, at increasing its carbon efficiency. However, this formula invited uncertainties into the accounting of carbon. For, if the numbers of workers changed, carbon emission counts would change. [55] The count of employees depended on the definition of 'employee'. If the latter changed, so did the count and, hence, GFQ's carbon performance. Victoria had introduced as a normal feature of work that definitions may officially change. We may assume that such changes were only put through if the organisation came to imagine the change as an improvement. Such change did not only occur if the definition of what employees are was altered. It also took place when employees were categorised in a different class – for example when employees have been outsourced to external companies. They may have still been defined as employees but not anymore as GFQ's. GFQ's carbon shifted with the rhythms of their hiring and firing politics. The EMS-Team had to acknowledge this situation and *could not* interfere with the mighty HR Unit definitions of employees.

This discussion illustrated two versions of messy elements: the parallel use of calculation techniques and the shifting facts caused by enacting relative carbon facts. Such elements were well accepted, by GFQ's agents of ecological modernisation and by auditors. Mess was not necessarily contested and interfered in. Mess, thus, was tolerable. Next, I turn to how one may react to the mess, once sensed and accepted.

Looking away One reaction to mess, characterising carbon, was to look away. I employ this active metaphor of vision to underline that members did not simply sometimes not sense mess (which may have happened) but that members arranged their relations such that they would not have to engage with mess in depth. To illustrate, I use two examples; one concerns trust and the other a process of silent consenting.

The fact generating network that constituted the EMS was based on members performing *trust* in each other. [56] Victoria reported trusting ESDR because she relied on her belief that Frederik knew how to handle numbers. The premise of this rationality implied that ESDR was about numbers and the database was controlled by Frederik. The premise and her belief allowed her to translate her trust in Frederik into the facts that carbon accounting produced. This likens the observation of Power (1999, 80). His study of auditing suggests, with respect to the external checking of data, that if members were not able to check ground data in detail, then the issue was whether they trusted the practitioners to use the right techniques. Victoria trusted the practitioner and, therefore, willingly translated the numbers produced within the EMS into a globally publicly recognisable carbon reality (such as communicating GFQ's emissions to CWC Ranking). Trust in others' data practices, thus, allowed members to not focus on the mess linked to these practices while keeping up their belief/knowledge that data practices were acceptable.

The visionary boundary object that I call transformation exercise was also woven

[55] The following discussion is relating to Field note extract 3.4.c (on page 184).

[56] The following discussion is relating to Field note extract 4.4.a (on page 321).

through relations of trust; these relations were of a particular type of trust – trust that, eventually, things will work out. Trust in *hope*. This transformation was the promise to alleviate the mess which they acknowledged together with AfC and their NGO partner GGCA. However, whilst this transformation occupied members of the EMS-Team as well as agents of FDSO for many hours and they prepared GFQ to spend over a million USD, they also recognised how, partially, the transformation project could intrinsically not deliver what it promised. ↪57 Bill made recognisable that the set-up of the new system had many limitations. While the transformation was supposed to improve 'data quality'☞, all participants were confronted with the explication that the transformation exercise was not able to control all those external realities which co-determined data quality. Members tried to find solutions to the problem that flat rate contracts of office buildings did not allow for differentiated environmental accounting. Even if unappreciated, they accepted that they could not challenge global customs of accounting and invoice issuing. They recognised that the reality underlying carbon accounting was partially messy. Facing this situation they opted to hope that carbon accounting was anyway meaningful; in fact, the transformation exercise was premised on this hope. Therefore they had to shift their attention away from mess.

These two examples show, I argue, that for EMS-Team members 'truth [was] no longer the final arbiter' (Law 2004a, 153). Members envisioned other goods: trust and hope. Carbon accounting is not about establishing the truth but about the hope that actors are well advised to trust ecological modernisation to green capitalism. To maintain this hope, members often looked away from mess.

Explaining mess Members encountered mess. A third way to characterise how they engaged with mess in these encounters is to focus on how they conceptualised and explained mess to each other. I attend to three types of explanations: mess as error, as systemic problem of data handling and as a boundary practice. All revolve around the adjustment of data.

First, in an exchange between Frederik and Victoria on the Belgian subsidiary we can observe well the explanation of mess as an error. ↪58 Frederik wanted Victoria to confirm and, by that, legitimise that he should go ahead with various requests by GCEs to adjust data. He used the Belgium GCE as an example. The data reported by this subsidiary represented their electricity costs as summing up to 140 EUR for each kilowatt-hour. For Victoria agreed that these numbers exceeded the expected (700 times), Frederik could enrol this example as a document of the general situation, and by that enact this quality of the general: that data saved in ESDR was sometimes plain *wrong*. He explained: 'the comma simply got off the mark'. This meant that the mess in numbers could be classified as an exception to the rule that numbers were ok. At the same time he used this case to classify other requests as well as repairing errors. Framing mess

[57] The following discussion is relating to Field note extract 4.1.d (on page 245).

[58] The following discussion is relating to Field note extract 4.5.d (on page 351).

as errors allowed this mess to exist in a specific way – as about to be deleted; this, indeed, allowed mess momentarily to exist without destroying carbon accounting. Frederik suggested that new numbers would render data more 'plausible'. His demonstration of planning to delete mess affirmed him as complying with the norms of accounting.

In the former take on explaining mess, mess could be cleaned up. Another version of explanation, however, did not imply that mess could be cleaned up. In a situation characterised by Victoria and Frederik reviewing changes in emissions from a prior reporting period☞ to the current period, they came across what they classified conspicuous, potentially tricked, data. ↪[59] Victoria demanded to know the truth status of the alleged facts. Frederik responded with a contrasting analogy; he pointed to the HQ – as an organisational unit – which had reported a reduction of minus 600 % for one of its key indicators. This constituted a problem: the HQ data reporting could not be questioned – the centre was to be construed as working correctly. The resolution to the contradiction followed promptly. Frederik suggested that each data collector was associated with a respective 'point of view'. Thus, data representing any type of consumption would necessarily diverge if compared between different data constructors. In Mol's (2002, 10-11) words, Frederik proposed a *perspectivist* engagement with mess. The explanation was that, unfortunately, a systemic problem was the existence of multiple perspectives. A messy situation which could not be easily solved.

The third case is more difficult to grasp. I turn a meeting between Elise an me. We convened to talk about some tentative conclusions of my study. My understanding at this point had been: members preferred if data translations have been undertaken within and inscribed into their central database ESDR. It was still acceptable, I found, if they used spreadsheeting – even though AfC mildly rejected this technique. The least formally accepted method, my analysis suggested, was manual adjustment and translation of data. In response, she provided a key relativisation.

Field Note Extract 5.4.a (Depending on points of view)

> *First, Elise agreed with the preference order that I proposed as a tentative interpretation: 'ESDR* over *spreadsheeting software* over *manual'. In addition, however, she pointed to a specification. From the point of view of the HQ it is this way: each manual change is a source of mistakes. However, from the GCE point of view, each manual change constitutes increasing quality of data.*

While Elise verified my understanding of the HQ perspective, she pointed out that an *organisationally parallel* understanding existed which was no less legitimate. By organisationally parallel I refer to the presence of different conceptualisations which existed in alternative organisational settings without open conflict.

In this case, the centre was formally renouncing manual adjustments (even if they were practically highly relevant) because, as pointed to by AfC, in each manual adjustment an idiosyncratic errors could occur. If errors occurred in a spreadsheet formula or in

[59] The following discussion is relating to Field note extract 3.2.i (on page 160).

ESDR they were at least systematic and, thus, more clearly to identify.[60] At the same time, GCEs which knew that a specific data point was to be classified as incorrect wanted that data be rectified, for order to be restored. By conceptualising these different standpoints as such, Elise provided for an accommodation of alternative, if not even competing, *interested* perspectives on data.

The two perspectives differed in the meanings they attached to the object. Elise's perspectivist conception assumed both perspectives looked at the same, singular, object. That object was a practice: manually adjusting data. She differentiated two types of groups which related to this object, subsidiaries and the HQ. Here, then, is a classic boundary object or, better, *boundary practice* (Wenger 2000, 237). This concept refers to a site which is about establishing the boundary between several groups. Data adjustment was a practice which connected the knowledges of GCEs and the HQ; it required particular considerations. Elise makes us realise: her consideration are related to strategical-ontological issues. A single subsidiary may want to adjust a single set of data, 'their' data; the HQ, however, was faced with a different object altogether, the pattern of adjusting data across lots of subsidiaries. Yet, for her, the issue was primarily about signification. While for the HQ data adjustment may have signified mess, for a subsidiary it may have signified order. Clearly, Elise conceptualised the perspectives in terms of differentiated positions. In that respect her take comes close to the social construction of knowledge: actors construct knowledges while being led by interests. Mess, here, is also explained as systemic; but it is also explained as related to interests.

Mess, thus, was explained by members in different, not necessarily coherent, ways. In other words, explanations (of mess) were themselves messy. For all-practical-purposes, this did not constitute a problem. EMS-Team members and subsidiary agents were not practically required to share the same understanding of the world. An EMS enacted by agents, who exercised parallel, and competing, explanations of mess, was well positioned to accommodate all kinds of mess.

***Present*ing mess** Mess was not desired by members. But mess was part of the world of carbon accounting. The following discussion zooms into the practices of accommodating mess. I argue that making mess present was a way to make mess absent. Making mess present accommodated mess; and making mess absent was achieving order. When members did not want to, or could not, disregard mess or explain mess away, they used a variety of ways, trying to bring order into mess. I elaborate three ways with examples: embracing and packaging mess as well as deliberate imprecision.

With embracing mess I refer to a practice which is staged as a positive, generative, approach. However, just like the imaginary of battling for democracy in another country also implies tanks and force, embracing mess also tries to capture mess, contain, destroy or transform into order. We can identify such an embracing take exercised to contain the fundamental uncertainty of carbon emissions resulting from not having access to

[60] Also, members would point out: if systematic measurement errors take place, relatively, the measurements may still be of use; in contrast, absolute values of measurements would not be of use.

that which members considered 'sources'. ↪[61] Members called this take extrapolation. To a fifth part the data provided by GCEs did not cover all the offices and workers.[62] For members, it was self-evident that the non-covered part of GFQ was also emitting carbon. Consequently they extrapolated the emissions for those GFQ elements which were not covered by the data collection endeavour. The EMS-Team, thus, accepted the uncertainty of GFQ's gross emissions. However, rather than withdrawing from their attempt to produce a carbon emission fact, members approached that area from unknown emissions. They set up a gigantic, *highly visible*, machinery to transform these unknown emissions into ordered emissions: many codes inscribed in environmental balance sheets☞, the coverage☞ indicator as well as references to VfU. Members were able to explain extrapolation by explicating its technical rules. Formal assumptions could be made explicit. Through this machinery, engaging with those data ranges that were not known about constituted a fundamentally orderly feature of the EMS. The extrapolation algorithm was part of producing neat facts which covered all of GFQ. By way of enacting the extrapolation mechanism as a standardised engagement with data, the mess of unknown and uncertain data was actively attacked, presented and simultaneously hidden.

However, while extrapolation attempted to bring order into the mess of unknown data, other parts of messy reality were not of interest to members. For instance, the mechanism assumed that extrapolation *only* takes place by means of environmental balance sheets. Subsidiaries were not to extrapolate data. This assumption, however, did not hold. For creating coherent facts at a GCE, their managers also partially extrapolated data. Such processes were Other to the formal extrapolation mechanism. The latter did not engage with such practices performed in subsidiaries. In terms of ordering mess, then, we may agree with Law's (2004a, 99-100) observation that locally increasing coherency may be a problem at another level. Embracing mess by means of extrapolation, thus, was doing both, ordering mess and proliferating mess. The EMS-Team's practice of embracing mess took place as a situated practice. Verran (2002, 754) helps to grasp the scale at which the EMS-Team was embracing mess. Extrapolation was sensitive to some elements of data and carbon; other elements needed to be ignored. Extrapolation tool *place*. In a particular location. Using environmental balance sheets. Verran calls this micro-world.

> In micro-worlds, irrelevant complexity is temporarily excluded, and on-going collective life becomes rather simple. People know what they are doing now and what they will do next, and how they will tell if they did things well. (ibid.)

The practice of extrapolation was also excluding what members considered (and consequently enacted as) irrelevant complexity. The EMS-Team could tell well about

[61] The following discussion is relating to Field note extract 3.4.h (on page 193).

[62] To recap, a GCE might own several large and small office buildings. It was assumed at the HQ that it was not economical or not practical to gather data from such smaller buildings. If such data was not actually gathered, then subsidiary agents were not supposed to enter consumption data of these buildings' users into ESDR.

extrapolation. The mess embraced and the mess hidden, however, by means of extrapolation, were affected not only temporarily. Much rather, extrapolation was part of material inscription practices. These materialised traces of members' approach to tackle mess. A trace of these practices were carbon emission facts. These facts, therefore, included ordered messy elements. With Law (2004a) we might grasp these elements as manifest absence of mess. In contrast, say, the extrapolation practices taken place at subsidiaries have been Othered, rendered absent, silenced. Yet, both are part of GFQ's emission facts. Embracing mess, thus, was a way to bring order into chaos. But it could do so only partially. As much as this partiality is not accounted for (i. e. as much as *un*messy emission facts are claimed) embracing mess increases mess.

Like embracing mess, packaging mess refers to practices which make mess present and absent at the same time. Yet, different to the confrontative strategy of embracing, packaging refers to a strategy by which mess is circumscribed, positioned in a container that, ideally, is *hidden*. Thus, whereas embracing mess may even celebrate its techniques of trying to tackle mess, packaging goes together with a preference to keep things out of sight. In a meeting of the EMS-Team I came across a double breakdown of the machinery of carbon accounting. Investigating it allows us to reconstruct three levels of packaging. In this meeting Frederik told his colleagues about data which he considered vague.

Field Note Extract 5.4.b (Suggesting interpretations)

> *The review resulted in finding data that were not intelligible. Frederik reports: for example Hungary. We suggest to him: 'could it be like this?' However, he, the Hungarian's GCE's environmental manager, did not want to see it like this.*

His account was part of the process of data reviewing. Frederik reported the status of this process. He enacted the data delivered by the Hungarian GCE as a document of a class of problems. This refers to a first breakdown. Data was not intelligible. This was not supposed to take place. Their review practices resulted in identifying and drawing together all the instances of messy data. Ideally, that mess would not have reached the HQ 'level' of review. GCEs should have engaged with the mess at their level. Consumption facts were fluid. This was both a problem and salvation for environmental managers. They could and had to mould the facts to form acceptable packages. Thus, mess was acknowledged to exist. But it was supposed to exist *elsewhere*, at the location of the GCE. The subsidiary was a container. In it, mess was allowed to exist. But its interface, its packaging, was supposed to be neat, distinct, ordered.

The review process was precisely about identifying breakdowns of the ordering mechanisms within GCEs. Elise and Frederik detected packagings that indicated messy states. These had to be removed. Consequently, Frederik or Elise asked subsidiaries to clean up; and, if GCEs had problems with that on their own, EMS-Team members would provide 'friendly' proposals of how to package mess adequately. From the point of view of Frederik's position, the Hungarian case was one in which that fluid had not been well moulded and purified into an orderly state. Frederik wanted the GCE's agent to construct an acceptable object which would form a coherent appearance. Yet, the

Hungarian case constituted a problem. Their environmental manager did not agree with Frederik's reconstruction of the data. Here is the second breakdown of packaging. Frederik had become part of the GCE's mess and he tried to advise his GCE colleague how to clean up. But that agent resisted. To cut the story short, while Frederik did not appreciate this situation, he had to make the best of it.[63]

To summarise, Frederik stumbled upon mess (indicator of first breakdown). Ideally, the GCE would have restricted mess to exist within this organisational unit and would have performed facts as ordered. Creatively, Frederik offered a solution. That has been declined (second breakdown). Again, ideally the subsidiary would have accepted the corporation's environmental manager's advice. By condescending himself to his advice, Frederik allowed that mess to spread to himself; and he tried to co-construct a neat package. However, the strategy did not work. But no third breakdown was caused.

There was no third breakdown because the EMS did not bother about that remainder of mess which had survived the reviewing and purification process. Packaging mess, thus, refers to a process by which members try to restrict messes to exist in well-constrained spaces. If these boundaries to the spreading of mess are not enacted, the EMS still is a package which tries to present carbon facts as ordered at the highest level. (And one may speculate about how such layers of packaging could be traced outside of GFQ into wider discourses of carbon politics.) Thus, packaging mess constitutes a distributed and multi-level strategy to make mess absent from 'higher' levels. I argue: when visible messes transgress the boundaries, they have to be made present and brought into some form of order. Frederik's move was to make recognisable his work to tackle mess and render the GCE's mess present as a violation of good conduct. Mess became an exception to the rule. So, no problem there.

While the mess embraced and the messes packaged were still well namable and discussable, with the next step we turn to Othered mess, to an absence which ought not to be named, a taboo. This way to enact mess as ordered and into order involved engaging with violations of the codified foundations of the EMS while deliberately blurring the distinctions underlying the system. Such violations were not acceptable; they *could not even be hidden*. Or could they? ↪64 In a conversation with the EMS transformation's protégé, Jack, Victoria proposed the official change of two definitions by collapsing two indicators into one. Specifically, this concerned the distinction between types of flights. She was hoping for Jack's guidance. However, Jack dissented from her strategy. He used the moment to make recognisable to her how the respective definitions have been engaged with in the practical work he was overseeing: the definitions did not fit and his account provided Victoria with information about how Jack's GCE cut the definitions. She had to learn that the German subsidiary performed a distinction between types of flights, but a different one than the formally prescribed.

[63] Frederik simply could not steer all the GCEs' data input. If he had attempted the latter, he would have started a never ending job and he would have subverted the very idea of GCEs delivering data to the centre.

[64] The following discussion is relating to Field note extract 4.5.a (on page 345).

The information on this deviancy was Other compared to normal communication among EMS-Team members or the actors of the transformation exercise. Voicing such a strict violation of prescriptions was close to a taboo. In this particular situation, however, Jack must have sensed a strategical advantage to share this information. This advantage may be theorised in this way: as he was clearly the prospective successor of Frederik's position as GFQ's environmental manager (partially because Victoria co-configured Jack's position accordingly) Victoria would have been ill-advised to threaten Jack's trajectory towards this position. In that situation Jack could voice this controversial information without risking his trajectory. Victoria was, thus, positioned to either completely withdraw support from Jack (which would have risked her own position vis-à-vis her superiors because she had invested in the wrong human resource) or not at all. As it were, Victoria reacted by not making the violation more present; she Othered it. It was not namable. By that, I argue, she legitimised Jack's account of the German GCE's enactment of flight data.

As already shown above, members blurred definitions' boundaries. *Indefiniteness* became visible (Law 2004a, 154). It had to be accepted by Victoria because she was not strategically positioned to sanction Jack. This situation had the effect of accommodating the parallel order of flight indicators enacted within the German subsidiary. This means that at the same time Jack's move to make the disorder present resulted in accommodating that disorder. Jack and Victoria performed these alternative orders and the disorder in a way which allowed them to peacefully co-exist. Law suggests that, maybe, mess may be known through 'techniques of deliberate imprecision' (ibid., 3). I argue that EMS-Team members used precisely such techniques to not have to perform the EMS as collapsing. Throughout this book we have come across problems questioning the foundations of the textbook-managerial approach to carbon. For practitioners knew about these deviations they could deliberately direct attention from and to disorders – to make them accepted by or to hide them from others. A taboo, after all, has to be cited to exist. Othering is a collective achievement.

I hope to have shown that, in carbon accounting, making mess present was dedicated to render mess absent. The order of these examples had a logic: zooming into doing carbon, one would find these techniques of enacting mess as ordered. Embracing mess was a well visible technique. That technique, however, rendered present and attempted to order mess only partially. In parallel, Other mess was silenced. That Other mess was allowed to exist behind the stage of order. This moves us to an understanding of packaging. Embracing mess is taking place as an outer packaging. Within GFQ many other layers of packaging mess, trying to compartmentalise the existence of mess, existed. If one zooms further towards the assumed foundations of an EMS, such as its definitions and distinctions, we find that even mess that is made present can be *simultaneously* Other. In all these ways, thus, mess is momentarily made present and accepted; simultaneously these techniques successfully hide mess. In effect, making mess present/absent legitimised mess to exist in specific spaces. Other mess may have

existed as well; for achieving order, I argue, making mess present/absent can be an advantage because it is doing accountability work on practical strategic-epistemological tensions that members faced.

♢ *End of Section* ♢

This section aimed to detail how members carved out a space for mess. I proposed that, in some ways, members allowed mess to enter carbon accounting while not destroying the performance of fact-finding. The analysis made evident that members sensed many elements in carbon accounting which we may frame as mess. These elements ranged from multiplicities, the fluidity of facts to specific and foundational uncertainties. We found that that such mess was engaged with in a variety of parallel ways. The existence of mess was tolerated; but members partially turned their attention away. Thus, mess was not necessarily fought. Mess appeared in different kinds of accountability work. Sometimes it was explained as error – at other times as an effect of diverging interests related to agents' individual or structural positions. In so far as members tried to enact order in the midst of mess we find that this involved the simultaneous effect of rendering some mess present and Other mess absent. The engagement with mess, the analysis suggests, is related to a strategic-epistemological relation to carbon accounting.

Whatever members' individual metaphysical stance to mess may have been, the analysis of members' engagement with mess presented practices as not performing simple positivist patterns. This observation resonates with Suchman's (2000) notion of practical 'subversion'. To enable the performance of fact-finding members tolerated subversive disorder maintenance in the midst of carbon accounting. Rather than only *treating* data as simple representations of out-there (or as approximations thereof), members also *related* to data and carbon accounting categories as strategic *quasi-objects* (Latour 1993b) – from members point of view as objects existing in power-laden and interested relations, with Latour's emphasis as neither completely natural nor totally social but as both. This strategic relation to numbers is legitimised and mirrored in the standard VfU; their authors Schmid-Schönbein, Oetterli, and Furter (2005, 20) 'propose[. . . ,] not to strive for 100 % data coverage in cases where the effort required for collecting missing data is disproportionate to its environmental relevance'. Members engaged with data in relation to what they meant. Of course, these meanings, and this members partially recognised, were not objectively given. However, the meaning of full coverage at the level of the complete corporation was related to economic considerations. It was too expensive to strive to gather data for all of GFQ's subsidiaries. Whereas Law (2004a) argues that, ontologically, the world cannot be completely known, GFQ's EMS-Team members were enacting a rather strategic stance towards mess: was it worth it to reconcile different versions, to attempt cleaning up all the mess? Mostly it was not.

Rather than simply avoiding the recognition of mess, members made mess often present in practices which promised simultaneously the provision of spaces in which that mess could be contained. Thus, I argue, carbon accounting allowed for knowing

carbon even though that carbon was known to be touched by mess. The accentuation of my finding elaborates Law and Singleton's (2005, 341) account of managerialist epistemology. They claim that managerialism

> finds mess intractable; indeed unknowable. Perhaps more radically, managerialism makes mess, [...] because it, in its nature, demands clarity and distinction. That which is not clear and distinct, well ordered, is othered.

While the study of GFQ's carbon accountants confirms that 'managerialism makes mess' we find in the carbon case that the mess produced is managed by those in charge of order. EMS-Team members made carbon knowable precisely by means of accommodating mess. Mess was knowable by techniques of making mess present and absent simultaneously. Making mess knowable transformed mess into order and Other at the same time. To do carbon emissions, environmental managers did not demand 'clarity and distinction' as Law and Singleton would have it. Rather than straight-forwardly Othering mess, carbon managers used a more fine-tuned approach to manage mess: they accommodated mess.

To conclude, I contrast and, by that, describe accommodation carbon mess. Accommodation was different to Mol's (2002) account of accommodating tensions. She uses the notion of accommodation to refer to techniques by which conflicts and differences were pacified (ibid., 106). Although my findings agree that incoherencies exist and that tensions between them were pacified (ibid., 87) in carbon accounting, establishing a common ground was often relevant *in order* to pacify the tensions. Mol provides findings in which '[i]f there is no controversy between [practitioners], this does not signal consensus but a lack of overlap between their practices. There is nothing to fight about.' Making carbon mess present/absent, in contrast to her findings, indicates a different picture. Within the EMS-Team, if there was no controversy on engaging with mess, this *performed* consensus (despite whatever members internally felt). For this performance of consensus over handling mess to emerge, practices *needed* to overlap – to a specific degree. It was important that members could perform their practices as sufficiently separated to not be accountable for mess; at the same time they needed to know mess, needed to be aware of tensions, what not to question. Knowing mess, making the frictions and tensions around mess present, was relevant so that colleagues were equipped with the knowledges over spaces of mess. Knowing *where* or *what kind* of mess was accommodated allowed strategic *non*-interference, a premise for order.

♢ *End of Chapter* ♢

This chapter documented corporate practices of making carbon emissions knowable in situations which were under precarious control. Employing an ethnomethodological stance –that members know what they do, that they use (in)formal tutorials of how to do things to teach each other, that they make reciprocally account-able that their practices are appropriate – I attempted to study members' micro-strategies and practices that they employed to achieve order. In prior chapters we have already encountered the

contingent, complicated and unstable qualities of both, strategies of knowing carbon emissions as well as of carbon emissions, which members enacted. Following Law's (2004a) thrust, I conceptualised members as encountering mess.

This chapter attended to four strategic practices which all served to achieve order, to struggle against the messiness of carbon. We may think of them as two sets. With the first set of practices, the adjustment of data and the blurring of definitions' boundaries, members successfully managed to organise data, both quantifiers and qualifiers, such that GFQ's carbon emissions appeared well ordered. With the second set of practices, members' bets that alternative human bodies would solve all kinds of problems and members' moves to accommodate mess, GFQ was equipped with two overarching strategies allowing problematic carbon data to be temporarily moved out of the way: either they confronted such data with a body of humans who would order that data or the problematic character would be accepted, made recognisable and, then, transformed into an orderly surface and a messy background. In effect of the practices of this second set, problems would be either reciprocally (but silently) acknowledged as exceptions-to-order or employed as a challenge related to a promise that a human (or, of course, the grand EMS transformation) would sort out the problems. In both ways, order was restored – as *in principle* or *in future* given. Backgrounding problematic data enacts order.

Significant for members' practices was that their practices to achieve order were conducted while upholding and making accountable to each other a discourse of a well-defined framework for action. Members maintained the discourses of textbook EMS prescriptions in parallel to their practical techniques to get their work done and to achieve a sufficient kind and degree of order. To say this does not serve to confront environmental management reality with their norms but to prepare a critique of double standards which cloud the very possibility for transparent engagement with or democratic control over carbon.

Studying the performative labour with which members achieved to order carbon emissions allows us to conclude – to detail our conception of doing carbon: a situated strategic engagement with data. Having been asked whether members invented GFQ's carbon emissions I am now able to problematise this question. And this serves to reconceptualise strategic data practices. To *invent* something, in the received view, means to deliberately create or design. In contrast, the notion *inventory* refers to a list of things found. Oxford Dictionary (2012) suggests that both share the same roots, finding and contriving.[65] Both go together. Carbon accountants recognised that they had to invest quite some work to come to carbon knowledge. This work consisted of exactly both parts of inventing, finding elements and contriving them.

Members achieved order by doing data. This implied that they were seeking and imagining things outside of their location (external to the interfaces they worked with) and that they had to fiddle with quite a few elements to achieve to bring carbon onto

[65]This resonates with the Foucauldian analysis that neoliberal governmentality tries to invent a new capitalism by means of new inventories (Lemke 2001).

their screens. Data was not given and afterwards fiddled with; but data came into existence by fiddling. Data was under circular, nearly constant, revisioning. Data was always subject to change. It changed forms with the movements of carbon accountants and with movements of things out of their control. Trying to keep their emissions stable would have necessitated tilting at windmills for emissions were the effect of distributed practices all over the world. Consequently, members accepted mess. Partially they fought messy spaces; but to a large degree they carved out spaces in which mess could exist. Fighting mess was a strategical question: would one be able to win, how many or which resources would that necessitate, what would be the by-effects of confronting messy configurations? Any configuration was messy and involved humans – workers' colleagues. Fundamentally fighting mess would have meant challenging colleagues.

Simply Othering mess would have made risky overflows☞ very likely. The Othered might beat back. Accommodating mess, at least, allowed to *imagine* the bounding of mess. Members could prepare themselves to defend in particular messy spaces. In relation to audit culture and NGOs, then, it may have well been a safer strategy to accommodate rather than to Other mess.

The order of data was, therefore, very strategic. Working on data meant to sort out both, the relations and substances, configuring carbon – including wetware elements like humans, hard-coded forms, digital configurations, environmental consumption quantities and their definitions. Any of these objects could be used for strategic alignment work; and these entities' characteristics were employed in all their dimensions. The span of work reached from adjustment of numbers to substituting particular humans. This base of carbon allowed and forced members to constantly reorganise these entities. Achieving order implied reforming some portion of carbon knowledge practices while ignoring other sets of mess.

Achieving order in carbon knowledge, I propose, can be considered as a form of managing mess. Members did not need to treat environmental data and carbon algorithms as of substantial importance. For their work, the heterogeneous quasi-objects needed to be treated strategically for their configuration involved very real implications: doing carbon in particular ways was always related to particular distributions of responsibilities and, thus, of risks. It is in relation to such an economy of responsibilities and risks, a tactic of signalling the existence of mess to colleagues may have been an advantageous form of accountability work. Members made reciprocally accountable their appropriate (non-)engagement with mess. Such moments were then followed by hiding shown mess. In other words: members knew quite well what was going on in carbon accounting; they had to not interfere in their working relations. Achieving order was an effect of a strategic epistemology. For achieving order in carbon knowledge means to accept the messiness of emissions, the subsequent step has to attend to a new way of thinking the object, carbon.

Interlude III

Sustaining Labour Relations

Workers need to organise themselves. In this interlude I shed light on how members organised each other and how they aligned Others. I find a tension: even though members recognise many injustices, they sustain the relations that shape labour.

Carbon is the product of that labour. What appears as 'workers' could also, in contrast to carbon, be discussed as humans. By discussing workers as humans, this interlude offers a significant coordinate to make sense of carbon: the tensions of being human while being related to as workforce. For that, following the call by feminists scholars of infrastructure, I turn to those implicated human realities which were present and required for doing carbon, and, mostly silenced (Clarke and Star 2008). This enables us to conceptualise which politics of the human and the body were inscribed into carbon. For that, I change the vantage point of my analysis; to an ethnography from the *perspective of carbon encountering humans*. I conceptualise carbon akin to Verran's (2001) take on numbers. Discussing alternative ways of engaging with numbers, by people speaking Yoruba (in Nigeria) and people speaking Western science, she proposes that numbers are not simply existing and are accounted for, but that they have a form of life.

> Numbers, can be and are accounted in many and varied ways. Recognising the ontic in a new way, I added a further account: numbers, both Yoruba and scientific as having political life. To understand numbers' agency in this ontic sense we can imagine them, like all agential entities as inhabiting the spaces or intervals between collective enactments. Numbers seem to lie there mostly just out of focus in collective life, always ready to actively re-exist when we do the right actions and say the right words. I imagine numbers pulsating and quivering there in these intervals, always in potentia, apart from their brilliant, ephemeral realisation or clotting in enactment, time and time again. (2010, 112)

For Verran, what constitutes numbers is also existing between number users' enactment of numbers. What happens to carbon molecules while they quiver when not being enacted by humans, how would they encounter humans, what is human to them? To address such speculative questions I need to open how I write. To allow myself more

flexibility in speaking about humans I frame the following discussions as carbon speaking to us. Hence, I invite further voices to join the discussion. Voices imagined from the perspective of carbon. I ask carbon to help us make sense of how humans are and how humans enact carbon. Though the frame is speculative, the findings are grounded in the general methodology underlying this study. Albeit I totally make up these voices, they, nevertheless, help to understand how carbon accounting has been maintained, on what it depended and how it might change.[66] Here they are; may I introduce ... Meike: Hi! Finally, we get a voice! Tat: We gonna tell you about what really happened to us and then, yeah, let's be really subversive. Meike: Come on, my young friend. I think we should start this a bit slower. Imagine these voices this way: Meike, an older and experienced character, and Tat, a youngster, are both members of the Council of The Carbons. The Carbons exist in Carbonspace. For some peculiar reason – having to do with climate change and capitalism and thousands of diverse interests – humans started increasingly to refer to carbon. In this interlude (and, maybe outside?), every time a non-Carbon (like a human being or a spreadsheet) refers to carbon, a Carbon feels addressed.

These fictional entities help me to make the transitions between disparate parts of the assemblage shaping carbon emissions at moments where 'I' experienced difficulties to narrate how issues are linked. Tat: Oh, no. No slow entry rituals! I want to challenge the core of everything. Meike: What do you mean? Tat: What *are* we? Some of my friends say we do not exist. Meike: As you should have learned in your affinity group, there is no certainty about this issue. Tat: But! Hey, I've heard: when humans conjure us they would not deal with us completely – as if they were only partially interested in us? Does that matter? Meike: Sorts of. See, if they signify us we are changed. And where do we come from? This is also not clarified. Have we existed before humans started signifying us? Certain is only, now that we exist, many of us feel not acceptably engaged with: for if we are shaped, then many say, we should also be able to determine how humans shape us. Yet, hitherto, how we can determine humans – so difficult to say. We just know that humans' partial take on us is difficult to cope with. Tat: So, if we can can communicate with humans, can we convince them to relate differently to us? Meike: Well, many imagine that this will always be a partial relation. But, while being partial, it could be different. Tat: What do you mean? In the course of this

[66]Note, I employ these voices as rhetorical devices to, hopefully, allow a more smooth reading of the linkages constitutive of the subject matter. The claims by these voices may be read as fictional. The contents provided in the field note extracts and their discussions presented in this chapter are as fully analysed as the ones presented in other parts of this book. Actor-network theory (ANT) authors like Law (2004a) and Verran (2010) suggest that to know realities, it may be useful to exercise allegory. This, then, I experiment with on to try to study the 'human' in labor relations. Inviting this voices may also be read as a modest attempt to *queer* (Giffney and Hird 2008) what human means for the practical-purposes-of-doing-carbon. For the empirical focus of this interlude I analysed in addition to the core narrative of this book my observations on working conditions, drawing on 115 coded field note fragments.

interlude I open the frame of imagining carbon. This is an ethical and political issue: how do *we* imagine *carbon*? It is about the ontic status of carbon – and of humans. By allowing Meike and Tat to speak back to us, humans, capitalists, anti-capitalists, we may take a step forward in imagining each other. My ontological stance on carbon shapes this narrative: by society, and us, discussing carbon/Carbons, they come into being. Studying carbon and climate change, it is difficult to know what people are talking about. Carbon has become so much: carbon as CO_2, as CO_2e, as a solution to climate change, as a solution to ecological crises, as a solution to the contradictions of capitalism, carbon as salvation and as evil simultaneously.

Meike: To understand more, I guess I, we should change our perspective – let's focus on what we know about humans. With respect to this thing called GFQ, I heard from fellow Carbons it hit them quite sudden. Tat: What happened? Meike: Some say, the first time they felt addressed was when humans ticked a box in this thing they call 'ESDR' and then, suddenly, they were drawn onto a computer screen. Hmmm, but actually I believe, there must be a history about our relationship to humans and GFQ even before they utilised 'ESDR' to get access to us. Tat: What are they? I mean 'humans'...what are they doing with us? Meike: Hmm, that's a bit difficult to say. See sometimes, you are simply on a screen and then, suddenly you can't see anything happening anymore. It is as if they simply put something in front of the window! I think, what Meike is referring to in this moment is that members sometimes brought carbon into virtual existence on their computer screens and then, they would open MS Outlook and, say, organise a lunch date. The latter were an important social device which allowed actors to check whether they get along, develop common plans albeit, and because, these lunch dates were positioned outside a official formal frame. Tat: Please, I want to hear more about them – are they dangerous? Meike: I guess, this requires really a more in depth inquiry. Let's, then, focus on what other Carbons told the Council in the past about their perceptions of humans.

◊ ◊ ◊

Meike: For example, I heard of people rushing in and out of the rooms, often clearly enunciating or murmuring greetings, like 'good morning'. Here is a note showing this part of reality. Every-day; cleaning staff – mostly a woman

Field Note Extract III.a (Cleaning)

enters and greets into the room 'good morning'. She empties the rubbish bin and says 'good bye', and leaves.

This is a perfect example for why I wanted Meike and Tat to help telling this story. How do you link the production of carbon emissions with cleaners? I figured, cleaners are really important – and using these imaginary personas helped to generate an account of cleaners. Pinch and Swedberg (2008a, 7) propose that arranging economic entities presupposes a range of materials. As part of their move, they link to Marx (1887,

165-166) who draws attention to the materiality of workers' bodies which are torn down and exploited while working. To address what being human meant, I turn to a variety of workers in and around the construction practices of carbon: we investigate the conditions of work inscribed into carbon. So, how were cleaners important?

Without somebody cleaning offices and emptying dustbins, the environmental managers would have experienced an increasingly 'dirty' working environment. Law (1997) described how managers are dependent on all kinds of entities, flowcharts, telephones, secretaries. And, they are also dependent on getting rid of unwanted stuff, things considered not of value anymore, i. e. waste (Keller 1998). At GFQ, I always experienced cleaners as very aware that they 'had to' greet employees 'properly'. Obviously-within-GFQ, cleaners were not treated like normal employees. They were clearly differently clothed; they never voiced interest in the work in any of the offices which I worked in. Clearly, cleaning staff was not considered a type of employee to discuss matters of environmental management with. They were essential to keep offices clean, such that environmental managers were not confronted with environments polluted by themselves, while management workers attended to their project of enacting GFQ's more glossy emissions.

We could question the cleanliness even more fundamental. Members wanted a certain atmosphere, which they perceived as clean. An instance in which smell cropped up as an issue was revolving around workers who were to arrange furniture. One of my office mates drew a line between him-as-part-of-GFQ and these workers. It was an olfactory boundary: the odor of alcohol. He had the sense for smelling that they were part of a marked social group.[67] By this, he exercised distinction from these Others.

GFQ's CSR unit was full of temporary workers, interns, working students and freelancers. For example, Dieter and me were both employed formally as so-called working students. This was a particular way for GFQ to have access to highly educated workforce at low wages. Thinking about wages and working conditions, then, was part of discussions among colleagues positioned structurally in similar ways. This is Dieter, Maggi Becker and me discussing Maggi's position:

Field Note Extract III.b (You will be labelled socialist. . .)

Dieter suggested she should work towards earning quite a bit and then spend a good time in India. Maggi replied: 'that's not really worth it.' The money does not last that long. [. . .] She continued telling this story: the descendants of the inventor of the pocket lighter have been living on the dividends for two generations: 'this is how you have to do it.' I questioned this norm. She replied, suggesting caring for old people, carrying off waste or carrying letters is not being paid. 'And at GFQ, there is this pointless crap like investment banking. People get rich with this! [. . .] Unions should act on this.' Dieter immediately warned her: 'the door is open.' Maggi turned this on its head: 'you are labelled socialist for such an opinion'.

Maggi showed her contract. According to it, she could expect being paid for each milestone. 'Hopefully', she said, she will be paid monthly anyway. Dieter cautioned:

[67] For a discussion of the politics of smell, see e. g. Tsing (2005, 49).

> *having this McKinsey mentality floating around, you have to be on your guard. One needs 'deliverables'. Both started fetching money out of the air – with their bare hands and making fun of McKinsey language.*

This extract indicates that members at the CSR unit were clearly aware of the micro- and macro-political economies of which they were actively part. Having a career within GFQ promised a high-income professional trajectory. At the same time they recognised that the large salary was not in itself justified. While considering financial business 'pointless crap', they valued highly the work of care and of providing rudimentary infrastructure for society, like getting rid of waste and facilitating communication. However, they did not feel well positioned in their jobs to effectuate the desired change. Labour unions were seen as far more promising to bring about that change. Interestingly, they did not voice at any time that they should organise together to bring about the changes they were looking for. Maybe meeting both at GFQ's CSR department is a significant indicator – workers who want change but who do not feel empowered to enact that change themselves, therefore turning to the corporation to do good?[68]

And, within their job, they were subjected to the latest management talk, fashions, regularly updated and altered by the McKinsey-aligned managers in the unit. A significant part of the logic in which members were asked to think was the idea of *delivering*. The work of EMS-Team members had to be enunciated such that audiences could sense its adaptation to management talk. In the CSR unit, several actors had been working for or have been cooperated with the 'global player' McKinsey. Members ascribed shifts in language often to the new vocabularies, which the McKinsey-affine actors brought into the work environment. Adapting environmental concerns and carbon accounting matters to the frames offered by management talk was key to being heard by the head of the unit, Herbert. Fineman (2001) refers to this process of adaptation as one part of 'fashioning the environment'. He suggests, a second element of this translation would be slimming the ethical load of greening. In effect, he argues, it may be 'fashion*able* to appear green, [but] to fully embrace its various forms and messages is complex and confusing for managers' (2001, 27). This book suggests that *fully* embracing being green may be a contradiction in itself. A full embrace might have to be partial. Embracing has to be partial not only for epistemological reasons but for ontic reasons: if carbon is mess, it cannot be known by a management mind expecting order. GFQ's carbon accountants practically coped with carbon's mess; but they staged themselves as fully embracing carbon.

Tat: Why is all of this relevant? I argue that the ways members organised themselves, as well as the ways they did *not* organise themselves, and how they have been arranged by their superiors, were all inscribed into doing carbon emissions. Here is, for example, how some cheap labour workers in India have been enrolled to (re)present GFQ's Carbons: the McKinsey-aligned actors had introduced the partial outsourcing of

[68] Posing such questions, I plea for critical research in the working realities of, e. g., corporate social responsibility managers, agents of ecological modernisation in relation to Critical Management Studies (CMS) and theories of practice.

preparing powerpoint presentations. CSR unit employees simply had to sketch a slide – all contents had to be presentable in and performable as a few bullet points – and fax it to a company *India Graphics*.[69] It was described on Linkedin.com:[70]

> India Graphics was founded by former McKinsey Visual Graphics professionals to provide an overnight, outsourced powerpoint service, similar to that found in large consulting firms.
> Mission: Reduce low-value time spent putting graphics and text into powerpoint and powerpoint charts. Increase productivity and time spent thinking!
>
> Products: Outsourced powerpoint service. On-demand and overnight (in North and South America)

Artefact III.1: India Graphics

Shortly after the new mode of using this 'service' became quite widespread within the CSR department, Victoria enquired whether the corporation India Graphics had been checked in terms of, e. g., 'child labour'. In a meeting of the unit, she discussed this for a while with those actors who Dieter, Maggi and me would have perceived as aligned to McKinsey (let's call them McKinsey-like agents). Only after Nora translated the issue into a question of how their unit's talk about human rights and sustainable development related to 'reputational risk', the head of the meeting accepted the issue as legitimate. Reputational risk was directly linked to what Fineman refers to as appearance and I called staging. GFQ's agents were to stage their practices such that they appear green and socially just. They had to prevent that GFQ would be accused of child labour involvement. In consequence of the successful translation of the engagement with *India Graphics* into a legitimate category, members operationalised clarifying whether child labour indeed was ruled out. McKinsey-like agents immediately offered a solution: they reported that *India Graphics* had not told them that they used children as workforce. Sense the gaps! For some, this felt absurd: McKinsey-like agents presumed that *India Graphics* would have come forward in their offer with information on their labour relations. As if the service provider would add to its website 'Be warned, contracts with us imply an increase of child labour'. Nora led the way out, to solve the conflict: Victoria was to distribute a questionnaire checking criteria on human rights; McKinsey-like agents were to ask *India Graphics* to fill the form. This settled the conflict – yet, which conflict? The CSR Unit settled the conflict in their team-meeting; the Unit continued to pay *India Graphics* about 9 EUR/hour. Whoever they were, outsourced workers co-produced those presentations which were mediating carbon emissions within GFQ. The media through which carbon emissions were enacted linked working conditions, both at GFQ's HQ as well at so-called service providers, to the subject matters of the unit, such as carbon emissions.

[69] The notion of bullet points resonates with the discussion of MS PowerPoint. Whereas Tufte (2003) warns of the destructive capacity linked to a cognitive style of these presentations (its bullet points and construal of statistics), Turkle (2003) indicates the generative capacity as *simulations*. Bullet pointing carbon, of course, is not only relevant with respect to a cognitive style authors may have, but for how carbon is enacted in specific social-material configurations, combing humans, screens and talk (Wakeford 2006; Stark and Paravel 2008). For carbon related powerpoint slides, cf. Chapter 3.

[70] accessed 17/03/2011 at `http://www.linkedin.com/company/india-graphics`; reproduced here verbatim

The presentation of slides was as important for mediating emissions as the appeal of humans. This is what I experienced early on during my phase of learning the game to play at the HQ field site. I had to learn bodily (Bourdieu 2001, 181). Victoria asked me to wear a shirt or a suit while being present. The story behind this is revealing how accountability was performed. During my initial visits to the HQ I was always clothing myself like the bankers I expected and did see walking around the floors. However, after a while, I recognised that other cheap labour workers in the CSR unit were performing significantly less formal outfit. I adapted. Victoria intervened in this adapted performance of mine because she had been told to discuss 'this matter' with interns and working students. One never knows, she suggested, when auditors might visit the floor. By way of auditors entering the HQ also potentially consequential judgement would enter the building; they would exercise judgement based on hegemonic discourses and perception schemes. In this field, actors in suits were assumed to be part of the field, to be serious and honest participants in their collective game.[71] However, at the same time, she proposed, commenting on my clothing style would actually interfere in personal matters. Victoria expressed feeling sorry for that. As shown above, GFQ's managers were aware that their work did not only consist of, say, getting the numbers right, but also of presenting them well. Members had to invest time, resources, to work at both levels. While, after all, some numbers appeared on environmental balance sheets☞, we still should investigate in more depth the implications of EMS-Team members' working conditions.

Victoria generally commuted by train between office and her home. In the train she would work. A blackberry device allowed this for Victoria, effectively extending her office not only to other places but also to mobility in itself. While she was perceived by her subordinated as never stopping to work, Frederik and Elise stopped their work after their contracted time during normal working days and took 'their' days off. During a meeting for the transition from ESDR to SAP when they discussed the timeline, the work ethos of Frederik became the focus of attention.

Field Note Extract III.c (Performing as GFQ's environmental manager)

> *Frederik suggested that lots has to be done in August, even though this is holiday time. Others referred to the month as a 'bottleneck'.*
>
> *They also recognised that Frederik again would be on holiday – six weeks straight. Jacob commented that at HQ 'cuts' (long periods of physical absence from the workplace) would not exist. Frederik replied: he belongs to [. . .] GCE. Jacob retorted: either people are HQ environmental manager or GCE environmental manager.*

Formally, Frederik had been employed by a GCE and delegated to HQ to act as GFQ's environmental manager. This contractual-organisational construction was paralleled by differently imagined work ethea. Jacob, head of another Unit, made observable two points in this moment. First, he provided a pattern which he used to outline

[71] Furthermore, the invocation of auditors-as-external-observers, actually, would not be necessary at all to bring 'society' into GFQ. All workers are part of so-called society and bring with them into their working environment, encultured schemes of evaluation, perception and action.

the requirements for a high profile work ethos in contrast to a low profile work ethos. Second, he made understandable that he classified Frederik's understanding of how legitimate his holiday was as not fitting into the HQ category. Meike: See, Tat, this is quite strange. These humans, at GFQ, want somebody to represent and manage us. And they want this person to not have proper holiday at all! Tat: So what? Meike: This goes together with a straining working environment. And, then, maybe they stop bothering at all. I don't know... Several dimensions were closely interwoven. Members had competing understandings of appropriate work ethea. In addition, they were equipped with quite different human resources. Jacob was head of a complete unit with several FTEs; Frederik only had one assistant, Elise – and she was not even officially working for GFQ but for a temporary employment agency. Elise was positioned precariously which had effects also on what Frederik could rely on. Continuously, he had to ensure that GFQ's contract with the temp agency was continued. That was not always secured. Once, Frederik, for example, threatened Victoria with stopping to work if Elise, would not be offered an extension of her contract. Victoria signalled that such a thread was not appropriate. The insecurity risked Frederik's ability to *plan*. For carbon accounting was dependent on workers, Frederik struggled for being equipped with plannable human resources. Therefore, he asked Victoria for a plannable ground. She, however, did not feel able and was not positioned to effect those decisions which running the Environmental Management System (EMS) would have secured. Therefore, it was not only a serious concern and issue for Frederik, but also for Victoria – and, of course, for Elise. During my field work, the temporal stability of the contract with Elise cropped up regularly. In a way, we can understand this as taking away attention to immediate carbon data. To manage carbon, plans were necessary. Even if members knew that action was more complex than their plans, for purposes of communication within the corporation, they construed their actions as dependent *on* plans and *as* planned. The assistant's position (of GFQ's environmental manager) on the EMS human resources plan was, figuratively speaking, always starred or footnoted. It was marked as insecure.

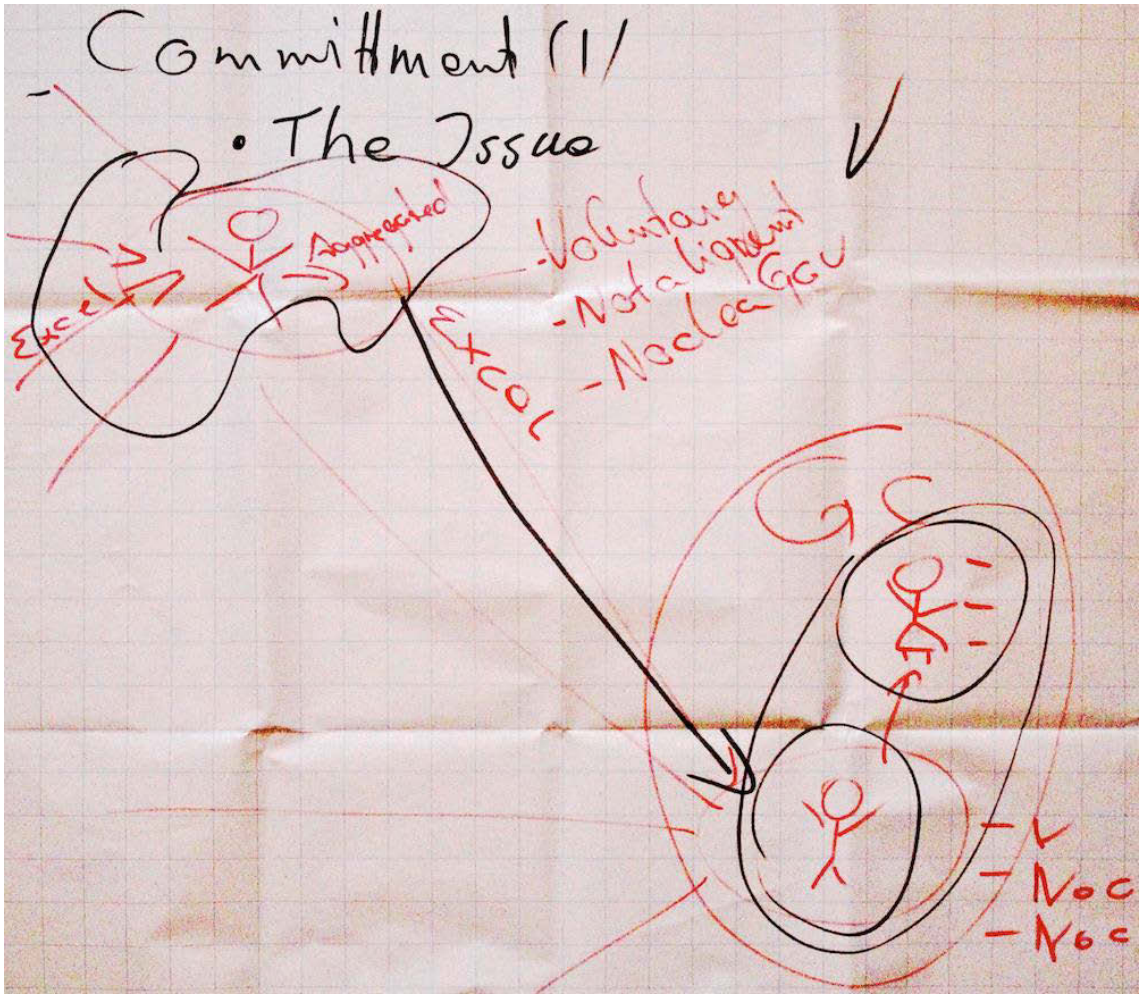
Marks in plans showed up repeatedly. They signified mess, that something was not normal, i. e. Other. Sometimes, not only were job positions marked, but also people. So, it happened that in one of the early EMS transformation meetings, Jacob marked the appearance of Victoria when he

Field Note Extract III.d (Skirt)

> *turned to a flip-chart and sketched the process of data collection. When Jacob turned to position Victoria in that sketch, he emphasised 'well, now, she is wearing a skirt'. Victoria immediately turned her gaze down, studying her trousers*

and was not agreeing with Jacob's characterisation. Throughout my observation period, Victoria was *always* wearing trousers. Artefact III.2 on the next page provides a photography of Jacob's sketch. A skirt shows up – in the lower right quarter of the sketch, surrounded by circles 'GC', representing GFQ's Centre. The lower stick-figure

signifies Frederik, the upper Victoria. The stick-figure at the top left quadrant depicts GCEs, instantiated by one stick-figure as their environmental manager. The large arrow from the upper left quadrant to the lower right one represents the data flow (from GCEs to Frederik).



Artefact III.2: Jacob's drawing of EMS data flow and commitments

Jacob did not give an account of why he drew the figure in this way. Her reaction was silent: utter incomprehension.[72] With Mol (2002) we may point out, depending on how a human is enacted, different practical problems may occur which practitioners may relate to various sexes. In talking about a person one may relate to sex differently compared to when drawing stick-figures. Jacob 'merely' wanted to represent the system of carbon data flows and governance. Enacting carbon interferes with the reality of sexes: 'each of their versions may give a specific shape to some version of the other' (ibid., 149). By using stick-figures, a highly simplifying, undifferentiating, iconicising

[72]This situation, especially Victoria's reaction, likens very much a situation described by Mol (2002, 147-149). She reports from a practitioner, who talk about not liking operating women because they are fat. But the person whom he operates is a man. The operators' female colleagues contest modestly: 'raised eyebrows and a look of exasperation. But it is real enough.' (ibid., 148)

method-assemblage (Law 2004a) (a process which simultaneously effects presences, absences, Otherness) Jacob was guided to draw a simplified icon for a human which would be gendered in a totally dichotomised, binary way. Using this method-assemblage he encountered an inability to not mark her gender. The icon betrayed him. Technically, he could have perfectly well had simple stick-figures for everybody; however, it was problematic to represent her as a stick-figure (without a skirt, unmarked) as well as problematic to represent her with a skirt (marked).

Above, in the discussion of the EMS transformation, we have come across an alternative outcome of another method-assemblage, business process modelling.[73] In Jacob's sketch, data flowed between humans; members mapped themselves. The outcome of the business process modelling exercise was contrasting in quite a few respects (no bodies anymore, a temporally organised process (see Artefact 4.4.1)); but it was still simply representable on paper in only a few dimensions. Tat: Uff, look at that sketch these humans produced! Meike: What do you think about it? Tat: It's like a cartoon. Where are we? Just in the arrow. It lacks all our details! Meike: Well, maybe humans do not get how rich, exciting and multiple we are. They may need some time to learn to portray us. Tat: But, look at this: an arrow. As if we were merely a direction. How can they ever learn? Of course, humans have already suggested quite a few ways to differentiate carbon, to address carbon's differential existence. Quite obvious, carbon is a a commensurating exercise, sometimes iconised with the signs 'CO_2e' or 'greenhouse gases (GHG)'. However, many more possibilities exist to not treat carbon as the same. Consider, for example, the difference between 'survival' and 'luxury emissions', i. e. the recognition that some emissions are caused by consumption practices which are easily imaginable as not necessary for survival.[74] The very purpose of GFQ's carbon enterprise, however, was directed in contrast to differentiating. It was about making carbon the same, it was about a clean process. And that process has been marked. With a skirt.

In the understanding of the EMS-Team, data collection was imagined as technical matter. Pointing to agents' assumed sex (Victoria was addressed as female in the society in which this study took place; and females were often symbolised as humans with skirts) implied a *deviation* from the purely technical character of the issue at hand. Jacob, thus, performed the gender of Victoria as female. This constituted the figuration of Victoria as a gendered actor. He did gender (West and Zimmerman 1987). Silently, she contested his move. In general, she tried to do non-gender insofar as the unmarked gender was masculine. Jacob effectively questioned Victoria's neutral performance as a manager and, by that, questioned her professionality as a manager.

This interpretation resonates with a wider body of literature on women in management.

[73] See Section 4.4

[74] For the distinction between survival and luxury emissions, see the introduction by Lohmann (2006, 104). This distinction emphasises through which consumption activity the emissions have been caused (a realist take). The sources of emissions are seen as not always commensurable. Lohmann traces this distinction to Sunita Narain and Anil Agarwal (Indias Centre for Science and Environment). I offer an example in Section 6.1 (on page 443).

Acker (1990, 150-154) points out that 'jobs' are in principle masculine. In Jacob's sketch, the stick-figure depicted both jobs *and* men. Insofar as men's bodies appear as order, women's bodies appear as disorder. *Victoria* was the deviation. The stick-figure excluded her, stick-figuring as a method-assemblage Others women just like the category job in opposition to the category body. Wajcman (1998), in a study of senior managers in several multinational corporations, finds that their hegemonic culture enacts women managers as different, not fitting in. Even when corporations try to render their human resource management scheme by abstracting from outcomes to competencies, women are positioned in a disadvantage because competencies are not constructed gender-neutrally (Rees and Garnsey 2003).

To perform well in a corporation, one needs to be as unmarked as possible, i. e. not attract attention as different. This also was the case for GFQ's emissions. They were not to attract attention to their particularities of existence; they were to be uniform. Marked carbon would be perceived as a failure. Thus, the 'data quality'☞ indicator, marking carbon qualitatively, was positioned in tension to the norm to produce unmarked carbon. Carbon managers as much as carbon were to be body-less. The unmarked position of managers was wearing suits; healthy, white, middle-aged agents: males. At GFQ, workers were considered employees; they wore suits – except of all the marginal workers keeping GFQ running, like cleaners, secretaries or technicians. And GFQ's professional employees were to be not affected by bodily or physical issues, they were to be secure of themselves and their work matter. This norm can be read as a masculine image.

While Victoria was positioned in an disadvantage vis-à-vis this masculine image, so was Frederik positioned precariously because he lacked decisive resources which would enable him to make plans. Elise's status as a temporary employment agency worker, the precariousness of enacting carbon: for all such reasons, stress was immanent in carbon. And stress was hidden from accounting. Meike: See, maybe it is similar for humans, just like for us: I mean all these recent references to us is quite a burden. We have to appear when they call us, totally indistinctly; and humans have to answer such a complicated interactive organisational pattern. It might be better if humans organised in such a way that they do not have anymore to deal with us. In a meeting between Victoria and Ellen on their report of carbon as well as CSR information to DJSI, stress was suddenly appearing as a silenced topic.

Field Note Extract III.e (White colour workers)

> *Ellen noted that we [i. e. GFQ] did not provide any information regarding health & safety. We usually would say: we are white color workers; no machines here which could chop off fingers. However, Ellen added, we do have quite a few employees who are psychically very much strained. Victoria agreed: there is burn-out, bosses exercising pressure, stress.*

This field note extract shows that work within GFQ was not giving workers an easy time. Their psyches and bodies were affected. For Ellen, however, it was clear that rating agencies did not have measurement devices which would allow to account for the burdens on office workers. They would merely recognise extreme physical harm.

Reporting seemingly less material forms of harm was considered difficult. Reporting also met its limits when, informally, a pregnant CSR employee had been told a day before her maternity leave: she would not need to return to GFQ. Of course, this would not appear in official reports on working conditions within GFQ.

Within GFQ's HQ, medical doctors were present to tend to workers; the wetware needed to be maintained. How have doctors been present in the field? Workers could contact them when they did not feel well. Ellen once told me about pills when returning to our offices from lunch:

Field Note Extract III.f (Sleeping pills)

she got sleeping pills from the company doctor. As a result of using them she slept 13 hours like in a 'coma'. With relish she added: 'that was great'.

Ellen had been considered by several members as working a little too hard. Even her boss, Victoria, agreed on this. Having had difficulties to sleep GFQ's physician tended to her body by way of providing a substance which promised her better sleep. Ellen was a key actor in the CSR unit for translating the various unit's CSR, environmental management, corporate citizenship and sustainable development activities into responses for rankings (such as ones for DJSI or FTSE). She could only work, if her body did not collapse. In order to allow her to actually do the work, thus, her body needed to be maintained. Within the capitalist division of labour, this was primarily her own task. She had to take care of herself, eat and sleep. In this case, however, the GFQ physician assisted the administration of the body by ministering bio-chemical actants.

Tat: Why did they let them do this with them? Why accepting all this stress? Could they not organise differently? Meike: I believe, they could. I've heard of humans mentioning a workers' council. Tat: What's that about? GFQ's workers' councils were supposed to represent the interests of all its employees.[75] While, for example, already the work by Engels (1969) (originally written in 1844, drawing on a parliamentary report assembled by Edwin Chadwick in 1842) reported on how workers were affected by urban environmental problems and radical action was deemed necessary (Enzensberger 1996, 24), hegemonic contemporary labour unions, as part of corporatist politics, engage often in friendly negotiations with corporations and reproduce hegemonic discourses of sustainable development and climate change (The International Labour Foundation for Sustainable Development 2008; IG-BCE 2009). For unions and workers' councils to address climate change issues, they may be significantly dependent on corporations to provide them with knowledge of the environmental problems caused by these very companies. Early on in my field work, I learned about the nuanced politics of sharing information with organised workers at GFQ. In a meeting of Victoria's team, she was thinking through together with Ellen how to engage with a number of criteria of rankings.

Field Note Extract III.g (Transparency and being progressive)

They consider, whether they should publish the criteria for the DJSI ranking on their unit's intranet site. Ellen likes the idea. Victoria opposes it: 'workers' councils

[75] However, note that who counted as an employee may have been subject to change. The boundaries around this category were socially produced and formed. See Section 3.4.

would like to know this very much!' Publishing the criteria would be too 'progressive' by the CSR unit, too transparent.

While for the CSR unit it was advisable to enact transparency, they also had to be strategical about it. Especially, the unit's managers had to ensure that the corporate game runs smooth. And the stake here was that organised workers might interfere in the knowledge politics of GFQ. This concerned both, which understanding GFQ performed about itself as well as how GFQ would be ranked. The position in the ranking was consequential; it would affect the stock market value of the corporate group. And the performance of how GFQ understood itself was risky to share with structural opponents. If workers had different interests than 'the management' (which was supposed to act in the interests of GFQ's owners), then it was rational not to allow organised workers to influence the interpretation of the categories which shaped GFQ's reflection. Indeed, later during my field work, Ellen had been explicitly told to not directly contact organised workers, but rather communicate with them through GFQ's management. Any contact with the organised worker was a risk.

◊ ◊ ◊

This interlude reviewed a range of working conditions under which members manufactured carbon emissions. The quality of the work environment was enabling these emissions to be actually socially produced. Without offices for members, GFQ would have not reported these emissions. Without productive bodies being maintained, GFQ would have not operated. Thus, the specific working arrangements were part of the emissions reported. The emissions have history. GFQ's carbon emissions were socially produced under harsh working conditions.

Members ensured that these emissions, however, were presented neatly. This required the various containers of the emissions to perform in 'professional' ways. Powerpoint slides were fashioned by cheap labour in India to make emissions recognisable within the corporate organisation. Human bodies were similarly administered. The products produced by managers, such as carbon emissions, were assessed by colleagues and auditors in light of members' appearance. A fresh, powerful, unmarked actor was a factor to allow actor's products to be more easily digested by the organisation.

Unfortunately, the working conditions within GFQ's CSR unit were everything but an environment in which humans flourished. Exploitation by themselves, each other and of others was the norm. The majority of EMS-Team members were paid far less than the top minority. They were not assigned the agency to ensure that they themselves would be paid to continue working at all. At the same time, they were asked to deliver reports, new presentations: everyday they were expected to perform the imaginary of the fresh, powerful, unmarked actor.

Implicitly and explicitly, members evaluated these conditions not only as unjust but also as requiring change. While – or because – members' tasks within the division of labour of GFQ was to produce reports about the social and environmental effects of and conditions within the corporation, they clearly recognised the limits of CSR and

sustainability reporting: the working conditions of office workers was to be reported as being great, nobody was to be shown or construed as being exploited, they were to ensure that workers' council actors would not interfere with GFQ's management.

In this context, a question such a situated agent of ecological modernisation might ask herself could be: how to effect any change within and against the organisation? However, this was not openly discussed. Hopefully, this book can help crystallise such a discussion. In this study, however, the move I observed was this: distancing oneself. In a conversation about the work which Dieter and me were enrolled in, we made observable to each other some structural limits. He mentioned that ESDR did not do its job, that his time is spent on endless meetings. And he concluded:

Field Note Extract III.h (Practicing not to think)

> *I am practicing to not wonder and worry about this; not anymore occupying myself so much with GFQ.*

For Dieter, thus, the ways in which GFQ operated and the paths taken by the EMS-Team aimed to do managing were not comprehendible. His rationality suggested, that many changes were needed. However, he did not see any possibilities to turn the machinery around. In the face of the conditions he encountered, he started to exercise freeing himself from work. He had been recognising problems all along, his pay was low and he was not convinced about GFQ's carbon management. The consequence for him was he had to learn distancing his identity from GFQ in order to enable himself to continue working in and for an obviously shattered enterprise.

Tat: Strange beings, these humans! Meike: It's funny, you say this. Tat: Why? Meike: Other Carbons argued once, these humans do not really exist at all. Tat: Whaaat? You are confusing me! Meike: See, some of the conversations I overheard made me wonder whether these humans... Hmm, I mean, whether it makes actually any sense to think of them as having such an independent existence. For example, uhmmm... Tat: Well? Meike: Ok, sometimes these so-called humans talked about some of their activities and plans. I got this feeling that when they talk about 'coal' this is referring to us. I just had this sensation, that it addresses us. Tat: Oh! Coal; I have heard of this. Some other Carbons said humans consider it something evil. Meike: Hmm. This somehow points to the problem. If they consider coal bad, then, why do they constantly engage with it? And. Uhh, I was pondering about that maybe these humans might actually not have the power to act freely. I mean: if coal is bad then they ought to stop engaging with coal. Tat: Yeah, and then, you could think, if they don't stop their coal business, then maybe something else forces them to continue engaging with coal. Meike: Exactly. This is what I meant. And we could then question whether it actually helps us to imagine humans as these separate, individual beings. Maybe they are some kind of multi-headed monster and together they are this organisation GFQ and together they make each other continue these references to coal. Tat: I see. A monster... Sounds funny. Meike: Well, actually, it's not so

great; consider what happens if this, say, monster is somehow in touch with, maybe, other monsters. Who can do anything in there, who can stop this coal business? Tat: Wow! Hey, maybe then these constant sensations I feel – and all the other Carbons have all over the time – is about a monster as well. Do you know what I mean? Human have this thing climate change. And when they refer to it, they refer to us in this abstract way; so some of the other Carbons I was playing with were annoyed of not being actually recognised as unique entities. I mean, if these humans engage with us at all, why not address us properly? Meike: You know what? Let's draw another line and look into this: how do they treat us?

Faithful to Tat and Meike's interest, the subsequent chapter draws together how humans enacted carbon. The purpose of this interlude was to show that being human meant silencing and reproducing, i. e. sustaining, labour relations in the midst of, and enacting, international political economy. The status of what human is was unsettled; being human – in the perspective of carbon accounting – includes how humans are figured in plans, how they are biochemically maintained, how they are transformed into labour force. Doing carbon is dependent on configuring labour. Carbon, thus, is not only ethically and politically enacted for the configuration of machinic elements like environmental balance sheets but also for the instrumentalised wetware workforce.

CHAPTER 6

Carbonscape

This book set out by recognising how, by means of the Environmental Management System (EMS), climate change was linked to the corporation's own carbon footprint. This footprint was to be reduced. What that footprint was and how it has been assessed is the core thread of this book. Hence, we turned to those at the bottom of GFQ's carbon footprinting machinery, an engineer at the basement of one of the corporation's subsidiaries, to study how the underlying data to carve out a footprint was mobilised. We established that this environmental data was not so much given but enacted. Subsequent chapters provided evidence that it is apt to conceptualise carbon accounting in general as *doing carbon*. We traced how GFQ's emission enactment was discursively intertwined with hegemonic narratives of sustainable development, ecological modernisation and climate change: GFQ's emissions did not only use these discourses as resources but also reproduced and, therewith, stabilised their trajectories.

This raised the question of how data was directed. In response I qualified the kinds of control to which data practices of the corporation's EMS-Team were subjected. Carbon enactment was not completely out of control, albeit the multinational as such was far away from direct control; much rather, I argued that their emissions were always under *situated control*. In specific situations, in heterogeneous webs, carbon was configured by members – not chaotically, but in contingent and tactical ways. The prior chapter focussed on techniques by which data was ordered. We showed that to achieve order in carbon implied making particular data non-coherencies absent and others purposefully present. Mess in carbon was managed rather than not observed.

This chapter draws these discussions together by reconceptualising *carbon*; I ask what and how carbon *is*. To recap, this is what carbon was (to be) from the EMS's perspective: it is (and ought to be) a singular fact representing, correctly and accurately, the emissions 'out-there' for which the corporation was accountable. In an EMS, *the* organisation's 'environmental effects' need to be assessed. Environmental accounting, in this book instantiated by carbon accounting, supposedly serves to provide the facts: what the material flows within an organisation are, which inputs and outputs the organisation

has. The idea of an EMS is that of a functional system. In, and according to, this in- and output model, entities are clearly defined; flows and environmental entities can be appropriately represented. If we ideally abstract this approach's trajectory, an EMS would work completely automatised with only its programmers, and a benevolent board of directors, entering the system's optimisation targets. Studying the doing of carbon emissions, however, questioned the foundations of such a project. By closely attending to members' practices, their tools and instruments, we found that the ideas of neat distinctions between carbon, data, databases and humans do not describe adequately their actual relations and their ontic qualities. Members' *formal* ontology of carbon is untenable to grasp how members *did* carbon. Their *practical* logics of carbon is a much better start. Practically, members, the objects they dealt with and their practices were all entangled. My narrative friends, Tat and Meike (in the preceding interlude), called to question the boundaries of humans, carbon and technology. How to conceptualise carbon? This is an issue for Science and Technology Studies (STS).

We move forward, then, from focusing on the doing of particular carbon facts to study the *extents* across which carbon was done. Carbon emerges not so much as a singular, coherent, punctualised fact but as forming a particular *carbonscape* in a *universe* (Guattari 1995; Lippert 2011a) of potential carbon realities. I offer carbonscape as a term we might wish to substitute for universal notions of carbon or for carbon as a 'nature-whole' (Asdal 2008). Carbon-as-natural is not what I encountered inside the corporation. Rather, I encountered a landscape of carbon. Mapping this n-dimensional space is impossible; we can only trace partial connections (Strathern 2004). However, this analysis points us to a number of *sensitivities* which we, usefully, can employ to sketch carbon in a way, more faithful to carbon accountants' *writing* processes than an environmental balance sheet☞. This chapter, accordingly, attempts to provide a carbography, a study of carbon.

At the outset of this discussion, four explications are apt: to start, I contrast my approach to structure the discussion with a linear, neat and coherent 'received view' take. I then provide brief outlines of the wider literature this chapter is positioned within, STS, as well as of the gist of this chapter, the turn to ontology. Afterwards I lay out the sections by which I establish the argument and illustrate their concerns.

First, the standard approach to concluding in environmental management would be: bundle the discussions and provide a coherent account of the actors, the machineries and the content they dealt with. Neat lists, at last. However, as this chapter argues, actors, machineries and contents cannot be neatly separated or typologised. There is nothing like a *root-tree* which would truly represent the reality of carbon performance (Deleuze and Guattari 1987, plateau 1). We need an account of carbon in its inextricable entanglements. To provide such an account, reduction is necessary. This would force us back onto the route taken in the prior chapters: dissecting and reducing encounters to limited numbers of explicit dimensions. Here I take another route – grasping the extents of *carbonspace*, i. e. of the space in which carbon existed. For that, we need

to draw lines and boundaries between and among entities; and that is reducing the phenomenon.[1] Here is how I grasp carbon.

To reconstruct and illustrate the qualities of the particular shape of GFQ's carbon emissions – a 'landscape' in a universe or space of possible patterns of carbon – I employ *five sensitivity threads* which I addressed throughout the prior chapters. These sensitivities are: attending to the drawing and meeting of *boundaries*, i. e. issues of inclusion and exclusion, in enacting carbon; taking seriously the range of *materials* required to do carbon; addressing the particular characteristics by which carbon emissions were *multiple* – distributed, floating and parallel – in the doing of emission facts; recognising distinct *temporal* arrangements employed to assemble carbon; and, therewith, paying tribute to the enormous variety of *scale-making* in members' carbon practices.

Second, focusing on these sensitivities is the effect of my grounded theory inspired engagement with fact-making practices informed by STS. Much of the literature I draw on for this book, participates in unsettling widespread understandings of how humans, technologies and contents are separated and/or entangled with each other.[2] Thus, the approach here questions the boundaries between different types of entities – such as between humans, technologies and information. There are no clear dividing lines (Moser and Law 2006, 57, 63). Moreover, these entities can be distributed over space and time. Hence, processes of knowing and cognition may very well be found to be existing across heterogeneous entities and their relations – termed by Hutchins (2008, 2011) 'distributed cognition'. In fact-making, particular statements and other actants are aligned to produce new facts, to stabilise an assemblage of entities which may work as a new material. This chapter is concerned with the object called carbon. Material is a 'continuously relational effect', says Law (2004a, 161). This is especially relevant given that, as prior discussions showed, human arrangements and practices are part of shaping carbon. And, as shown above, the qualculative work needed to frame objects, to know them, can be distributed over time and space (Callon and Law 2005, 720). Knowers draw disparate entities into a spatiotemporal frame to be able to calculate and judge them. This recent take in STS, for example by Mol (2002), Barad (2003), Law and Singleton (2005), transcends the representationalist and perspectivalist understanding and proposes that the specific ways in which entities are known by members may also co-constitute these entities. Using these considerations, this text is an intertextual effect, conceptualisable as authored between feminist techno-science studies and actor-network theory (ANT) and after. It is these fields' theoretical engagement which this chapter contributes to.

Third, the *ontological turn* (Åsberg 2010) I am engaging with deserves a preliminary contextualisation. This turn, that I am following and interpreting, includes but takes

[1] Reduction is essential to any form of representation. For a discussion of boundary-making and responsibilities of authors, see e. g. Latour (1990), Suchman (2007, 285), Law (2007, 16), Barad (1998).

[2] For inspiring or thought-provoking expositions of this idea see e. g. Callon and Latour (1981), Latour (1987), Haraway (1991a), Law (1994), Mol and Law (1994), Strathern (1996), Law and Hassard (1999), Haraway (2003), Barad (2007).

us beyond a solely relational and positional epistemology. A positional epistemology is fundamentally relational in that positions can only be conceptualised in a space in which the (dis)associations between positions matter. We do not only find this take in STS but also in, e. g., Bourdieu's (2003) and Mannheim's (1954, 266) thought. In Pels's (1996, 37) reading, Mannheim's take blurred the boundaries between fact, theory and value. This is certainly also the case for, e. g., Law's (2004a) method-assemblage. The ontological turn I am alluding to goes beyond, however, Mannheim's (1952, 163) assumption of an essential nature. Precisely because nature is untouched in his approach, researchers can only have various *perspectives* (ibid., 172). Such a perspectivalist approach is also read in Goodman's (1978) world-making. In his take, actors can exercise different versions of worlds, whereas these versions depend on the perspective. While in perspectivalism we can account for competing, always ideologically and never neutrally produced, versions of knowledge about a thing, that thing is *a given*, data, essential. Thus, perspectivalism is a significant move beyond positivism; but it is limited in its merely epistemological reconfiguration of our understanding of fact- and knowledge-making.[3] The turn I am following investigates how the practices of knowing also are performative and shape the very reality. In this approach, reality, thus, is not positioned out-there, antecedent and independent to knowing but co-configured and -constituted by knowledge practice. Nature then is not separate from culture but interwoven – therefore termed *natureculture* by Haraway (2003). As Barad's (2011, 451) reading stresses, epistemology is still essential. 'The turn to ontology does not turn away from epistemology, when knowing is recognised as an activity the world engages in.' While Barad's work engages with science and its objects and finds these objects to speak back I engage with accounting and its objects, that is, signifiers rather than the signified, i. e. spreadsheets rather than molecules. Here is a difference between scientific and accounting practices: environmental accounting does not try to capture environmental flows in a laboratory but seeks to capture representations of entities 'out there'. Common to both types of practices, however, is that they engage in specific ways with their *matter* and what *matters*. And Butler's (1993, 7) remark is essential to our understanding: ' "to matter" means at once "to materialise" and "to mean" '. Both, accounting and science, materially shape their objects and how they are significant. Consequently, mattering is highly normatively relevant. 'Accountability and responsibility must be thought in terms of what matters and what is excluded from mattering', Barad (1998, 118) writes. In enacting matter, what matters is stabilised. The aim for this chapter is, thus, to draw together and analyse modes of enactment (Law 2004b), modes of ordering what matters (Law 1994). It is decisive that we do not restrict this analysis to purely technological analyses but engage with the carbon 'machine's adjacence to incorporeal Universes of reference' (Guattari 1995, 31). I. e., I set out from the conviction that carbon is ordered by arranging heterogeneous entities and realities. Guattari's (1995, 27-28) *Universes* matter: if an Universe, say polyphonic

[3]For a in-depth contextualisation of perspectivalism see Mol's (2002) work, especially pages 61–71.

music or mathematics, has been invented, a collective cannot imagine reality without it – for pasts, presents and futures. A carbography, thus, has to investigate how a carbonspace is co-constructed by various actants of and in naturecultures, even if these actants are e. g. mundane, virtual or abstract like a digital spreadsheet or linear time.

Finally, here is an illustration of the range at which this chapter reconceptualises carbon. To typify this range, I employ examples from the previous discussion (in Interlude III). Section 6.1 (entitled *Boundaries*) addresses how boundaries mark differences and delineate what counts from what does not count: what is inside, outside, excluded, included. Boundaries are significant to classify entities – and they are hugely political. Above, we encountered how certain kinds of problems which white-collar workers encountered were not fitting into the boundaries of CSR reporting. If a report has strict boundaries and actors cannot force certain contents into these frames, these contents are at risk to be excluded. This is not always negative. Many people, for example, prefer to not be assessed in a census; they hope the boundary is porous and allows them to slip away. However, in other cases, being counted into a frame may entail advantages. Thus, the questions are about how boundaries are set – and by whom, how stable they are, what qualities they have, which effects they have as well as how effective they are. The first section, thus, addresses boundaries as edges of an abstract class and follows how effectively, these abstract boundaries shape practical carbon. I use this section to point to the larger formations and shapes in the landscape of carbon. The succeeding sections, then, provide details.

Section 6.2 (entitled *Materiality*) addresses how the *materiality* of entities matter. In the prior Interlude we came across the idea that human bodies, as means of production, require certain input and environments. At the same time, they are able to provide some services which machines cannot. What a material can or cannot do, is quite much characterised by the relations and competencies which bring this material into reality. Another example are powerpoint presentations. The relations underlying these allows far better their globally distributed production, alteration and copying (than the relations constitutive of an organic entity). In this section we explore the relevancy of the relational character of entities which were part of the performance of carbon emissions. This allows us to better grasp the characteristics of the materialisation of carbon. To address materiality, then, studying the conditions of materials to exist and their effects and how they are brought about seems apt. To reiterate once again, I do not argue that molecules are insignificant. But with the study of molecules or atmospheric science we cannot grasp very precisely corporate emissions. The second section, therefore, focuses on the specific material practices which help to bring corporate emission facts into reality. For this I bring into play Barad's (2003) argument that a phenomenon, in our case carbon, depends entirely on the material-discursive configuration of the apparatus within which the entity is studied or accounted for.

Section 6.3 (entitled *Multiplicity*) engages with the phenomenon that entities can exist in several forms at several times or spaces. I am discussing, thus, a version of

what Mol (2002) terms multiplicity. My take on multiplicity extends her approach for I address the *intersection of multiplicity with the mobility of facts*. Above, for instance, Victoria was pictured as an icon on a sketch. In that moment, within the same room, two Victorias were present. And they were able to act *independently* from each other. While the organic Victoria could go to another meeting or for a coffee, the iconic Victoria could be transported as part of the sketch to other places and make recognisable to actors that she played a role in GFQ's EMS. For the study of carbon emissions, focussing on carbon's multiplicity is especially of interest because carbon to some degree existed as digital data which was easily copyable and, then, was able to draw attention to its existence all over the place. An investigation of multiplicity intersecting with mobility pays attention not only to the practices which enact the multiple ontic existence of carbon but also to the paths of entities and how entities become represented – repeatedly and in diverse ways.

With Section 6.4 (entitled *Temporality*) I turn to how practices take place over time. For mobility of facts is directly related to time, I turn to studies on temporality. With Adam (2000) and Riles (2010), I reconstruct temporal techniques employed by EMS-Team members to write carbon well. To illustrate implicit temporality in carbon, reconsider the study of *IndiaGraphics*. Here is one type of arranging time. Over night, some workers work on powerpoint slides. While HQ managers could get a good night sleep, their files did not have a break. They were subject to the agents of *IndiaGraphics* who, in another time zone, worked hard. The market on which IndiaGraphics was offering its services was defined by saving time. Thus, the kind of time of everyday work and sleep was connected to saving costs. *IndiaGraphics* was cheaper than paying managers to do the work. Similar duration to work on slides, different pay. The pay for managers was structured monthly and their work was assumably assessed in terms of efficiency. Different kinds of times were at work in the field. The idea that any such time can have its own quality is referred to as *temporality*. A study of carbon emissions needs to be attentive to the ways in which practices differ in their temporality.

Section 6.5 (entitled *Scale*) recaptures doing carbon as scale-making. The notion of GFQ as a 'global' company in relation to the situatedness of any of their operations points to the significance of *scale*. When, e. g., Ellen suggested that GFQ produces quite a few psychically strained workers it was not only important that this quality existed. The point of her statement was that this quality was widespread. And she considered this a problem. A totally different kind of scale was, again, the reference to India. The possibility for HQ agents to send their slides to India was of interest not only because of the temporalities involved but also because of the underlying distance in space which was mirrored within a certain time scheme as a time zone difference. Thus, scales can be relevant in many ways; and scales can be made. *How* scales come to matter in the production of carbon statements is the last topic of this chapter. Most significantly, discussing scale-making challenges the measuring techniques for scales and, thus, the topologies of the things measured. With this section, then, I attempt to

address the topology of carbon organised by means of scale-making.

With these five perspectives, then, I outline key features of GFQ's carbon landscape. Read these features with these sensitivities: with feminist and post-structural accounts of time and space as *done* rather than given, key dimensions of modernist thought itself emerge as *geographic*, rather than geometric (Rose 2000). Engaging with cultural geography, Olwig's (2005) account of landscape is helpful for reconceptualising carbon as carbonscape because he links assemblies to landscape. Albeit it is merely an etymological link, it allows to delineate the course of my argument. Olwig suggests that assemblies – Things (cf. Latour 2004b) – do not only shape what is the case, how members hang together (within the Thing/thing); Things also shape the space around them. The land is inscribed with the effects of the things on it. The land, thus, is patterned by Things into a land-scape. Olwig (2005, 22) traces the notion of landscape to an 'area of activity' of a Thing, a public's gathering. Walking ways shapes a landscape (ibid.); different ways of working and doing leave marks in landscapes; landscapes can be read as embodiments of taskscapes (Ingold 1993). Just like many social groups are no longer clearly territorialised and homogenous – and, therefore, cannot be easily mapped or imagined by traditional anthropology – hence reconceptualised as landscapes of group identity, ethnoscapes, (Appadurai 1996, 48), I propose: carbon is no longer a familiar natural scientific objects, insofar as carbonscapes are no longer tightly territorialised within science, spatially, temporally or molecularly bounded, no longer homogeneous and passive. Different moments of doing carbon shapes carbonscape and, potentially, is in the way of the next carbon moment.

6.1 Boundaries

Above we have already investigated practices of classification and formatting environmentally relevant consumption data into ESDR task-forms☞. Zooming out, we traced the formal boundaries which the EMS inscribed into what GFQ's environment consisted of. We also recognised that formal boundaries were decisively blurred. I established that articulation work is necessary to produce the data that carbon accountants would use to calculate a subsidiary's emissions. Along these paths of translation I explicated the political and marginalising implications of members' work practice. These practices were oriented at producing a boundary object, i. e. an object shared by agents of several social worlds: emissions. To establish such an object, a multitude of boundaries had to be made invisible; only a few boundaries drawn were made visible. Members' practices were all about putting environments into well-bounded forms and preparing these formatted environments for commensuration projects. Thus, this section studies across the range of delineating what counts and what does not. In- and exclusions.

I investigate members' work by zooming out and relate their work to that which had *not* been included and, by that, turn to the limits of being green as well as the limited effects of greening within the measurement apparatus and the corporation.

For that I take three steps. At the outset, I visit the boundaries between the EMS and GFQ's actual business, financial services. We encounter the limits to being green. Afterwards, I turn into the EMS and investigate how some types of environmentally relevant activities were designed as 'out-of-scope'. This shows the work required to mark off any consumption activity and prepare it for being taken into account. Finally, I discuss a case of blurred boundaries and discuss how bounded the effects of the EMS are. I find that carbon accounting does interfere in specific ways with GFQ's performance but only so in decisively limited ways. Using these three steps I argue that while ongoing *exclusions* were decisive to form carbon, practices designed for inclusion could easily be performed with excluding effects. Above all, for GFQ it did not matter so much what was included but that the EMS would continue to run.

Coal and the limits to being green A first step to make sense of the role of boundaries in carbon emissions is to recognise that the corporation did not try to maximise greenness as an end in itself. To argue for this, I employ three situations, indicating this categorical limit to being green.

To start with, consider the conversation of Tat and Meike in the prior interlude. Why and how did GFQ relate to coal? An insightful moment during my field research took place when Dieter was interviewed by Matt, who studied corporate carbon accounting from the perspective of so-called sustainability management. They allowed me to join the interview process. Quite early on in this interview, Dieter told the interviewer with respect to GFQ's insurance branch:

Field Note Extract 6.1.a (Insuring evil things)

'we are insuring evil things', like coal-fired power plants.

[And, later in the interview Dieter pointed to GFQ's agency, continuing:] 'We are able to influence this . . . consider we cease insuring coal-fired power plants'.

Key to our analysis of carbon is that it is enacted – this requires acting *agents*. This premise deserves attention. To understand Dieter's statements we need to address the situated scale of Dieter's *performance of identity*. In this meeting Dieter was to *represent* GFQ. Thus, the *we* referred to the organisation which employed him. This enactment of identity was crystallising around the situational configuration, characterised by the engagement with an outsider, i. e. the researcher Matt. Dieter represented GFQ; I was a trusted colleague of both, a researcher and fellow worker at the same time. In this situation, the collective actor 'GFQ' was performed by Dieter who reiterated the position of the company, albeit in a too undiplomatic way: he made explicit what the corporation excluded from its engagement with greenness. Through the repeating citation of this exclusion, he performed the corporation's identity, as human subjects perform their individual identity, too (Butler 1993, 140).

Dieter pointed to a boundary which constrained the EMS. The EMS was not designed to have direct effects on the development or shaping of services produced by the company. GFQ would not stop insuring this kind of power plants because this business

secured profits. These 'evil' business relations, in other words, brought about a specific materialisation which GFQ valued: surplus.

An entity like the EMS needs to be able to read its subjects in order to manipulate them, as Scott (1998) argues for (the case of) the prerequisites of states to be able to govern its people. However, in this case the vision of the device 'EMS' was bounded. Lohmann (2009b, 519) calls for attention to how carbon accounting systems frame that what is supposedly accounted for or managed. The implication of such framing, as Callon (1998a) emphasises, is that parts are not recognised and, thus, not economically represented. In this case the environmental costs and carbon emissions effected by the very act of providing an insurance for this fossil energy technology are actively externalised. This was a designed overflow☞. However even if GFQ was willing to include into the EMS's framing the corporation's products, this would neither automatise the cancelling of unsustainable services nor would the the idea of internalisation promise a 'true' representation of reality.[4]

Within the field, challenging the system boundaries of the EMS was out of question. In the case above, Dieter was able to raise this issue only because he was asked in the interview to make public his reflections about the reality of the EMS. This interpretation links to a temporal framing. There was no reason to assume that ever – if we assume business as usual – GFQ would question insuring such technologies. However, of course one could ponder about changing circumstances for the organisation. Regulation, market pressure, direct action, might reconfigure the situation.

For the time being, however, it was self-evident that GFQ would not enact itself as totally green. This has been made explicit by Victoria vis-à-vis a visitor in her office.

Field Note Extract 6.1.b (Greening everything is not business)

> *Obviously, she said, GFQ offers green products. However, not everything can be green. Following their conversation I noted: it would not be worth it to green GFQ completely. There is no business case for greening everything.*

This is hardly a surprise for researchers of environmental management.[5] Thus, while GFQ would offer some green products, stopping the business relations with unsustainable industries would threaten reaching the very meaning of GFQ organising itself as a company: it was a for-profit organisation. And we can only assume that it was among the top financial services providers on earth precisely because it put profit first.

[4]If GFQ took on responsibility for their own services, this would not necessitate them to stop unsustainable services. The corporation would argue that it is responsible for the corporation's sustainability to do business with all kinds of 'nasty' business grounds, like fossil fuels or, for that matter, military exports. If they stopped this business, the financial success, which sustains the corporation, would be threatened. Thus, GFQ externalised these issues from their environmental rationality. In any way, if the EMS included such core business, if they internalised these issues, then that business would be subject to the whole range of problematics this book covers. Thus, the environmental apparatus is profoundly not a solution towards ending such problematic business relations.

[5]see e. g. Fineman (2000), Drake, Purvis, Hunt, and Millard (2003), Prasad and Elmes (2005)

Consumer capitalism proponents want to investigate green *products*. The hope would be that *if* enough customers were buying green products (which they not did[6]), the organisation's priorities would shift towards establishing a more forceful greening strategy. To unpack this further, visit a strategy meeting on green products which included, amongst others, Moses Patricks, the head of GFQ's carbon business unit.

Field Note Extract 6.1.c (Imagining green products)

An investment unit representative reported: at the current status, 73 % of investments are passively *labelled sustainable. Somebody asked what that means. Their reply: investments have been labelled sustainable by some external agency.*

Ellen replied: the question is whether we claim this to be sustainable investment. The Dow Jones Sustainability Index (DJSI) also includes coal-fired power stations.

Later, Moses made clear: we can establish a green group for customers, but not internally. And then he questioned: is a green GFQ credible?

The two moments reflected in this field note point to several important insights into the reflectivity of GFQ's agents and the greening of capitalism. First, for members it was not a difficult move to distance themselves from their external depictions as being a sustainable investor. GFQ's managers clearly imagined that it would not provide a reliable foundation to conceptualise the corporation as being largely a sustainable investor. They knew exactly that being called 'sustainable' did not pay justice to their actual business practice. In another moment Ellen made a similar claim: she proposed that buying greening electricity would not actually constitute a green act. This shows that members had higher standards of greening than they put into practice in GFQ's consumption and investment reality. Thus, the green electricity consumed as well as their investments were not perceived as sustainable. From this position it was straightforward to not assume that GFQ, as a global multinational, could ever become a green company. Moses, suggested that within the corporate group no niche for a separate green subsidiary would exist. However, he offered, it would be possible to offer customers a green 'interface', staging being green by presenting a green image. Thus, Moses acknowledged the contradiction between the norm to be green and that the company could not perform itself as too green. If it did the latter, GFQ would lose its credibility. The remainder of the meeting, accordingly, focussed on how to bring such an interface into reality.

Comparing the statements by Dieter and the strategy meeting's suggests that within GFQ in parallel several faces towards customers and other publics were imaginable and existed. For some GFQ was a green company; for GFQ actors in their internal negotiations it was made observable to each other that GFQ should not conceptualise itself as a sustainable enterprise. However, within this universal corporation it was not a problem to sustain this multiplicity of (inter)faces. Being a green company was both present and absent – at the same time. And within this reality, Dieter saw the, albeit theoretical, possibility for changes. GFQ could, in principal, terminate its businesses

[6]Dieter said: the German GCE sold less than thirty contracts for its green insurance product.

with fossil fuel companies – or for that matter also with nuclear and all kinds of other unsustainable companies. Or, could it? GFQ would cease being GFQ, it may be safe to assume, if it stopped all their engagements allowing unsustainable businesses to receive credits or to have their environmental pollution risks insured.

The consideration by Dieter of stopping these unsustainable business relations was an effect of another kind of boundary at play here. This was an evaluative boundary enacted by him. Framing coal-fired power stations as 'evil' suggests that he opposed the relation of GFQ with this kind of enterprise. However, at the same time, the idea of 'evil' renders the objection in question as substantially bad and even as part of the natural balance of the cosmology. The pair of heaven and evil are both necessary present and the speaker did not assume agency to affect the paths of beings to enter either. Thus, Dieter did not see a chance to alter this political economy. In that respect the moral economy entailed in this framing also performed a boundary to agency. The EMS-Team member did not feel positioned to stop unsustainable business. His position can well be understood with Mol and Law's (1994) differentiation between regions and networks. While GFQ, including him, was enacting a region called 'EMS' covering 100 %, the actual networks of the EMS did not extend into the practices of product design and could not encompass GFQ's position to seek profit above all. Thus, Mol (2002, 141) comments: '[h]ere, then, we have another genre for establishing difference and similarity. When the network holds, there is similarity.' GFQ was different from being green, i. e. it was not green, because its greening network did not hold all over and throughout GFQ. Business with fossil fuel industry was more important than greenness.

Emission sources as boundary projects While it was clearly outside of the EMS's boundaries to involve in the politics of products, the engagement with specific types of consumption was considered appropriate. Five groups of consumption had been made legible for GFQ's carbon accounting, the Key Performance Indicators (KPI). I turn to make explicit the range of boundaries necessary to transgress in order to imagine a sixth KPI, *food*. This shows the immense implications of any emission source indicator.

Thinking about the limits of sources of carbon emissions and strolling on GFQ's office floors with their dark carpets, I was glad when I encountered a flier directed at employees to raise environmental consciousness which suggested to eat less meat. Here was a window for change, or so I imagined. For political reasons, I tried to feed into the EMS: the carbon emissions linked to the production of food matter. Producing meat is generally seen as associated with far higher carbon emissions than, say, a vegan diet (Kim and Neff 2009; Risku-Norja, Kurppa, and Helenius 2009). To reduce the emissions linked to food, GFQ could provide information for employees about the carbon emissions their food 'choice' was causing during production.

On a winterly monday, Frederik, Elise and me went for lunch in a canteen. It was located at the office complex at which their work space was located, several miles off the HQ's centre. This is what happened when I informally tested how these EMS-Team members would react to looking at this key consumption activity.

Field Note Extract 6.1.d (Bean counting)

I asked whether food is included in the environmental balance. Frederik questioned in what respect this would be relevant. I replied that CO_2 emissions associated with a kilogram of meat differ compared to the ones for vegetables. He rejected this approach. It would be more meaningful to ask where food originates, i. e. in terms of location or being organic. Yet, one cannot collect meaningful numbers for these. Anyway, he wouldn't want to count dog-ends or beans. It would be more significant to have regional food, rather than crocodile meat on banana palm leaves. Elise and Frederik look at each other and reassure each other that this was on the menu that they had seen the other day at HQ's canteen.

This conversation links to a number of boundaries which help us unpack through which differences an emission source could take form. Interwoven with Frederik's dissociation from being a dull accountant, the image of the bean counter (Baldvinsdottir, Burns, Nørreklit, and Scapens 2009), we find the notion of 'significance' to be key. Implicitly framing certain indicators as generating non-significant data legitimised to not request such data from subsidiaries. He enacted significance as a relative project: transport-distance related emissions were *more* significant than the footprint of the consumed entity. Thus, a boundary was drawn and legitimised. Inspired by the continuing presence of the flier at HQ's floors, in another situation I tried to discuss the topic of food related emissions with Victoria. She replied that food is a personal issue and, therefore, would not be a space to act within. Thus, within GFQ, multiple techniques of enacting differences existed and were employed for the accounting of and for food-consumption related carbon emissions. Drawing boundaries is an important part of enacting in- and exclusive relations, including some entities in considerations and excluding others. I limit this discussion to four kinds of boundaries enacted: the relative importance of food-related emissions, the possibility to operationalise taking emissions into account, the figuration of agents through accounting for a specific source and, finally, the imagined efficiency of accounting for this source.

First, we find a resonance to the distinction between survival and luxury emissions. Performing this boundary suggested that some emission sources were not as important as other sources. Conceptualising crocodile meat on banana palm leaves as luxury should be understood as a situated and relational effect. The critique we sense in Frederik and Elise's comment was situated in being uttered in a country of the global North. Both, vegetable and meat, in this case, were not considered to be grown nearby. Using the distance travelled as an indicator of luxury has a cultural history (Van Der Veen 2003). At the same time an understanding of this food offer as luxury is meaningful in the relation between the specific place at which Frederik, Elise and me had lunch together and the HQ. In that moment, we have been in a building away from the HQ centre. We bodily extended the HQ to our momentary location. However, the staff canteen provider was serving different food in the heart of the HQ compared to the location at which the interaction took place. Luxury offers were attributed to the central HQ; while 'standard' food provision was attributed to the place at which

Frederik and Elise mostly worked. Thus, this boundary entails an evaluative dimension. Interpreting their distinction, I understood them to suggest that GFQ should prioritise reducing emissions of luxury consumption over standard consumption.

Second, Frederik proposed to draw a boundary in terms of the possibility to operationalise accounting for the source's emissions. He conceptualised carbon emissions caused by food consumption by linking the consumption act to the required transport of food from locations of production and processing to those of consumption. If carbon was to be characterised in this way then carbon emissions could be enframed within the logics of the EMS. The EMS already was performed as accounting for carbon emissions caused by transport devices. Thus, it should have been possible to add food transport simply to the accounting system. However, Frederik considered it not possible to actually collect the data for this approach. This impossibility was linked to the dimension of ownership. Transport included in food was not owned by GFQ, but by the service providers of canteens. The EMS was not to account for emissions linked to services which were owned by 'third parties'.[7] In a way, then, we can see how this boundary which would have been sensitive to the scale of transport was made dependent upon the scale of ownership. Carbon emissions attributed to thousands of kilometres of transports were not to be accounted for if GFQ simply bought a service which black-boxed the transport. Taking a source into account was considered impossible if, contractually, the information about the source's footprint were outsourced.

Third, in Victoria's response to my attempt to make food emissions count, we can identify a third technique to draw boundaries: making distinctions between specific ways how agents would be figured through accounting for a source. While GFQ was very happy to sell financial services to individuals, Victoria did not want to draw the boundary of carbon accounting such that food would be incorporated into its calculus. She reasoned that this would unduly affect individuals. We find her considering emissions in terms of how far GFQ would have to engage with individual's food choices. This is an interesting boundary because, of course, the EMS was very happy about teaching employees to power off their computers over night (which rarely happened – MS Windows took such long time to start up). However, in the case of food consumption, Victoria did not want to see the EMS as telling employees how to conduct. We recognise that if food was a KPI, the company would closely start to interfere in workers' bodies. The EMS was not to configure workers *themselves* as related to emissions. It would have threatened the labour relations within GFQ.

Finally, we turn to the imagined efficiency of accounting for food emissions. Frederik voiced that collecting numbers for food related carbon emissions was not worth it; the token of counting beans represented this. This criterion configures a fourth boundary drawn. This boundary was about practical efficiency. In terms of time and scale it

[7]Such services included said *transport* of entities or something abstract like employee's PC's *computing power* that was provided by Fujitsu. For a discussion of outsourcing the toxic emissions related to computing, see Appendix B.6 (on page 609). This also links us to the theme of trickle down effects.

would not be efficient to attempt collecting data on food's carbon emissions, as it were. Automatising data collection could, in principal, reconfigure this boundary. Yet, even if automatised, boundaries would still need to be drawn, to be decided upon. Thus, the location of humans in carbon accounting can be shifted but they cannot be eliminated from taking carbon emission sources into account.[8]

While, after all, food was not accounted for by the EMS, we find different types of how carbon accounting could influence in different ways human individuals, transport techniques and the animals-to-be-future-meat. Carbon emissions would be reduced in different ways depending on how food would be enframed. Thus, it is not only relevant whether something is accounted for but also how.

This finding evokes the image of Haraway's (1991c, 200) *material-semiotic actors*. With this concept she underlines that entities are nodes that are materially and socially generated. 'Their *boundaries* materialise in social interaction. Boundaries are drawn by mapping practices: "objects" do not preexist as such. Objects are boundary projects.' (ibid.) While emission sources are related to some reality 'out-there', knowable objects are not antecedent. Only by way of cutting and drawing boundaries, do objects, like those signified by GFQ's KPIs, emerge.

This is of theoretical importance for the conceptualisation of carbon. Carbon emissions are not an ontologically given but, rather, they are the effect of the actions within the apparatus to measure them. Depending on how the apparatus is designed and performed, different carbon emissions come into being. Thus, the resulting display of carbon emissions is not merely a cultural inscription which may be more or less well defended, as Latour (1987, 68) suggested when discussing inscription devices, but, rather the display is co-configured and constantly reconfigured by the material set-up of the measuring apparatus (Barad 2003, 816). Furthermore, the analysis presented in prior chapters shows that even if a specific source of carbon emissions is prescribed as to-be-accounted-for-in-such-and-such-way the actual practices of measuring emissions cannot be predicted based on the formal definitions provided by the EMS-Team – a topic to be revisited in a moment. This understanding contrasts with Bowker's (2000b, 675) point that a 'database itself will ultimately shape the world in its image: it will be *performative*'. While we can see how ESDR, or, for that matter, any SAP-based solution, influences how carbon is done, shaping the world seems more multifaceted than predictable solely in terms of the database. We share, thus, the suspicion with Waterton (2002) that databases are performative but not necessary in the decisive way Bowker alluded to. It is not only a question of whether something counts into a database and, thus, could be represented that results in a performative effect on the world. The analysis of the multiplicity of possible enframings of carbon emissions of

[8] Consider, for example, what *@UK PLC* with their GreenInsight project undertakes (see `http://www.green-insight.com/process.htm` accessed 24/3/2011). The promise is that bought products are automatically classified and immediately the organisation's carbon footprint can be calculated. However, of course automatising data collection does not in itself automatise the decision of how to draw boundaries. Rather, the GreenInsight approach black-boxes the boundary-making decisions which co-configure their measurement apparatus.

food consumption, and, recognising that this multiplicity is multiplied if agents actually set up situated measuring performances suggests that the outcome of measurement and what and how it co-enacts the world cannot be theoretically determined. No prediction is possible. At the same time, the practical performance of enframing entities to be accounted for is everything but innocent. The database ESDR, carrying the politics of these particular enframings, implies ideas of what the world is and how it can be changed (Waterton 2010, 6670).

Thus, the agency of the EMS-Team to determine GFQ's carbon emissions is contingent and precarious. The 'Thing', in German language *Rat*, cannot do more than *raten*. I introduce the *verb* here to deepen our understanding of the quality of the EMS-Team as a Thing. The verb raten can be translated in two ways. On the one hand it refers to the act of *advising*. This is what a Thing is closely related to. Supposedly it organises the presences and absences in the thing. However, the second meaning of the verb is more generative for our understanding of the EMS-Team. It is *to guess*. The Thing cannot but guess about the realities it is assembling. It necessarily also betrays some actants. In German betraying is translated as *verraten*. The measuring apparatus of carbon, thus, involves guided forms of translations but also quite a bit of guess-work and has to be classified as an intrinsically political entity. It performs realities, betrays actants and cannot be controlled by GFQ. Any knowledge of carbon emissions is an effect of the particular distinctions enacted within the apparatus.

Bounded effects of boundary projects With Haraway (1991c) we grasp that carbon knowledge is a material-semiotic effect. The last move in this section is to show *how* pursuing a boundary project of doing carbon has *effects* elsewhere. She calls a study of the patterns of effects of doing differences *diffraction pattern*.

> Diffraction does not produce 'the same' displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather maps where the effects of difference appear. (ibid., 1992, 300)

In addition to this book's project of mapping what carbon reflects, studying diffraction patterns suggests to investigate how doing carbon interferes in other realities. In order to scrutinise this we revisit Elise's account on her discussion with an Indonesian subsidiary agent. [↪9] The situation at this GCE was departing from the inscribed assumptions of the EMS regarding which realities were expected to exist in a GCE. In this case, the GCE's environmental management agent was not able to access a water meter which would have provided 'authoritative' statements necessary to calculate the building's water consumption. Elise was communicating to the GCE agent by means of Facebook, negotiating the situation. We are able to reconstruct a number of devices at play in this case. Here is a simple list (with meanings only partially spelt out).

[9] The following discussion is relating to Field note extract 5.2.d (on page 390).

The water meter was supposed to measure and visualise the consumption of water by the GCE.
A building was implied – the GCE was operating from within one.
The facility provider was the owner of the GCE's office building.
A lease contract was enacted as governing rent payments.
Facebook was the means of communication used by Elise and the Indonesian colleague.
Elise was the HQ based actor trying to mine for best available data at the GCE.
The HQ was a complex of buildings in which Elise worked.
The Indonesian agent was to provide data to the database ESDR.
ESDR was the database used by GFQ to collect environmental data.
Data – this, really, is an open question.
Water was somehow consumed within the GCE.
Money was paid to the facility provider for using the building.

All these entities were supposed to be enframed inside the boundary of the EMS. We need to discuss, however, how keeping things within the frame was practically approached and which effects that had. I point to five heterogeneous effects of GFQ's configuration of doing carbon: carbon takes form as orderly emissions, the measurement apparatus is only partially reconfigurable, the physical boundaries of GFQ's business remain unchallenged, at the same time producing universal carbon knowledge increases energy consumption and, finally, the performance of data collection is sustained.

First, GFQ's carbon emissions *took form* as orderly emissions. The reason for the GCE to not possess a water meter, was that the GCE had a lump-sum lease contract with the facility provider.[10] The EMS's de-facto handbook 'EMS for GFQ' (*EMS4GFQ*) prescribed a *normative order* of preferred kinds of knowledges; these prescriptions could, in principal, be different – a political issue (Suchman 2002, 143). Here, the meter was the source of data which subsidiary agents were supposed to access. The device 'water meter' was present in Elise's narrative as an element which was absent and, because of its absence, characterised the situation. This characterisation was possible for the source of data mattered for members. The task-form was providing a materialisation of the question, whether data had been read off a device or whether it has been established in other ways. In this case the absence of the meter produced *uncertain carbon*. Members referred to 'data quality'☞ to characterise how a subsidiary agent allegedly had gathered data they put into a form. Albeit the preferred access to the source was missing, carbon emissions could be enacted as orderly entities. I return to this crucial issue below (as the last point of this discussion).

Second, the measurement apparatus was only partially (re)configurable. Elise's tension with the Indonesian GCE cropped up because they did not have water meters; and they did not exist because they were not needed for agent's practical purposes

[10]The rent included the costs for water consumption – probably independent of the amount of water consumed. This local economic culture did not fit the assumption of the global management which Elise was trying to enact.

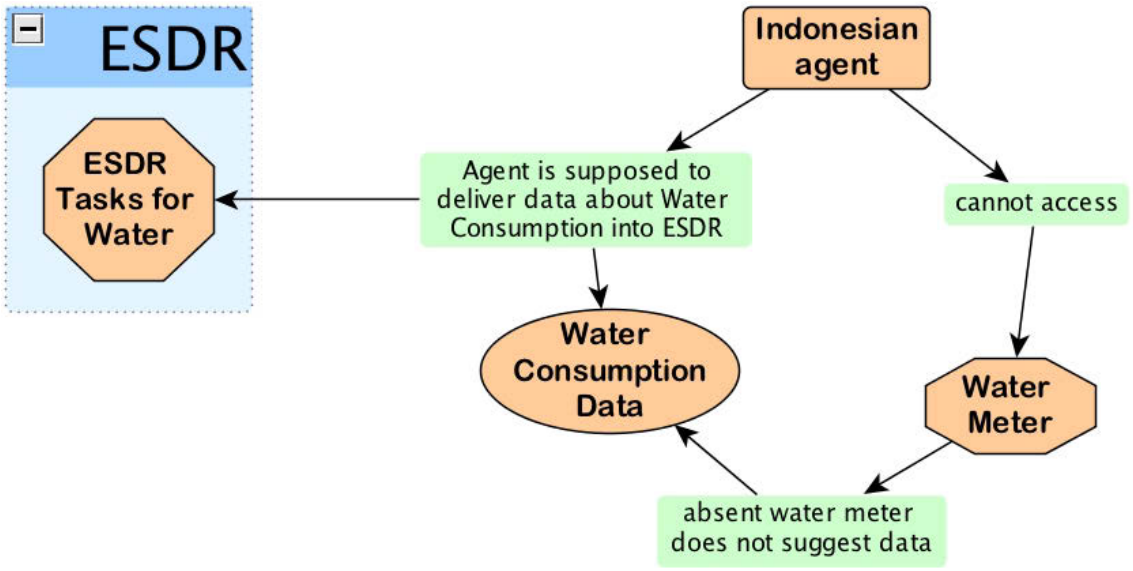
of managing their relationship with the facility provider. They drew the boundary of the necessary for facility management differently compared to HQ's assumptions. And, probably, the wish of HQ based agents for water meters to exist or for facility and utility providers to present detailed consumption invoices was not to become reality. This was the assumption, at least, by HQ based agents: they did not expect the facility provision and invoice production practices to change. Much rather, they expected the partial reality – of absent meters – to continue existing. Thus, while the *ideal* measurement apparatus entailed particular devices, less-than-ideal cases could, to some degree, not be adjusted to ideal status. Doing carbon did not interfere with those less-than-ideal realities not fitting the centre's hopes.

Third, the physical boundaries of GFQ's business remain unchallenged. Workers needed buildings. Elise and the Indonesian agent were organic components. They have been employed for instrumental reasons – at least this is the story. In a way, they can be seen as devices. For GFQ it would have been better if the functions of these devices could have been handled automatically. Yet, in this study, these devices existed as bodily actors. Such organic devices need water. For example they drink water, use toilets or water plants. GFQ used buildings as an environment for its employees to perform its financial – and non-financial – operations. Depending on how buildings have been built, workers experienced too much heat, or cold, or a more or less acceptable temperature in some globalised 'comfort zone' (Shove 2003). The usage and distribution of energy and water, for example, was regulated by GFQ's facility managers to create an atmosphere that, they may have assumed, would feel comfortable. For that air-conditioning systems had been introduced, for example in the HQ building at which Elise and me had been working. The production of atmospheres as work environments presupposed buildings as frames for these environments. After all, desks are not placed in the open air and GFQ's environmental managers did not seem about to try to prevent rain and manage the atmosphere as a regional climate (at least in short term). Using walls, doors and elaborate technical systems, the workers of GFQ were positioned in a seemingly regulated physical environment. Doing emissions was located in physical boundaries. Carbon accounting did not interfere to a large degree with the organisation of work.

Fourth, while members produced universal carbon knowledges, they required much energy. The communication between Elise and her Indonesian colleague via Facebook enacted a communication system via thousands of kilometres. And, yet, in some ways they were positioned in the same locality. They oriented their practical actions towards a similar imagined reality at and through their hands: data was to be put into ESDR. The local situatedness of GFQ was recognisable in this case because the local facility-contractual customs did not fit HQ expectations. By locally submitting data via ESDR, the GCE agent, however, contributed to performing GFQ as a global organisation. We may, thus, understand both, globality and localness as effects of concrete practices by members (Suchman 2002, 140). The internet connections underlying both, Facebook

and GFQ's intranet which was the environment within which ESDR existed, are related to the politics of data traffic and presume energy to keep the broadband connections alive.[11] Doing carbon, thus, had effects on the figuration of scale, structuring it in local and global. For doing global emissions, members needed access to large technical infrastructures, implying vast amounts of resources and energy, all over earth.

Figure 6.1: Indonesian GCE has to deliver data



Fifth, the performance of agents as collecting data was continued. For Elise, in this case, there was no reason to discuss the role of the subsidiary agent's knowledge. It was self-evident that he was to provide *local* data. The EMS-Team did not try to gather specific local knowledges about local conditions – and even less, EMS-Team members tried to invite GCE's environmental managers to share or develop theories about the conditions at their sites. The model was straight-forward: HQ collects data; and GCEs have to provide/deliver data. Subsidiary data was rendered ahistorical by putting it into the HQ frame. Its political dimension was silenced and deleted from the realm of potential debate – at the HQ or with any stakeholders. Cruikshank (2001, 390) emphasises that any local knowledge is formed in and carries respective specific political and historical circumstances. Rendering these absent is clearly a loss. That loss, however, did not matter for the EMS. Much rather, for boundaries may also *reduce* flexibility (Lee and Hassard 1999, 400-401) the configuration of doing carbon ensured that data production would not be interfered with by missing meters. A schematic of the structure of the Indonesian case helps to make the point. The subsidiary environmental agent was supposed to collect data. We saw that this constituted problems from the point of view of the HQ. Figure 6.1 simply shows that the Indonesian agent had to provide data for

[11] Cf. e. g. Plepys (2002), Vereecken, Van Heddeghem, Colle, Pickavet, and Demeester (2010), Røpke (2012).

the database *even though* the water meter was absent. A way to reconcile this tension was to estimate 'somehow' consumption data. We find that whether or not subsidiaries had access to data, the boundary project of knowing emissions was possible.

This discussion showed a particular diffraction pattern: members' enactment of carbon emissions was effecting orderly knowledges even though data may have been systematically missing. The machinery members engaged with to enact emissions was not reconfigurable to ensure that it could access decisive imagined realities out-there. At the same time, that very boundary project achieved the production of a global player with global knowledge.

♢ *End of Section* ♢

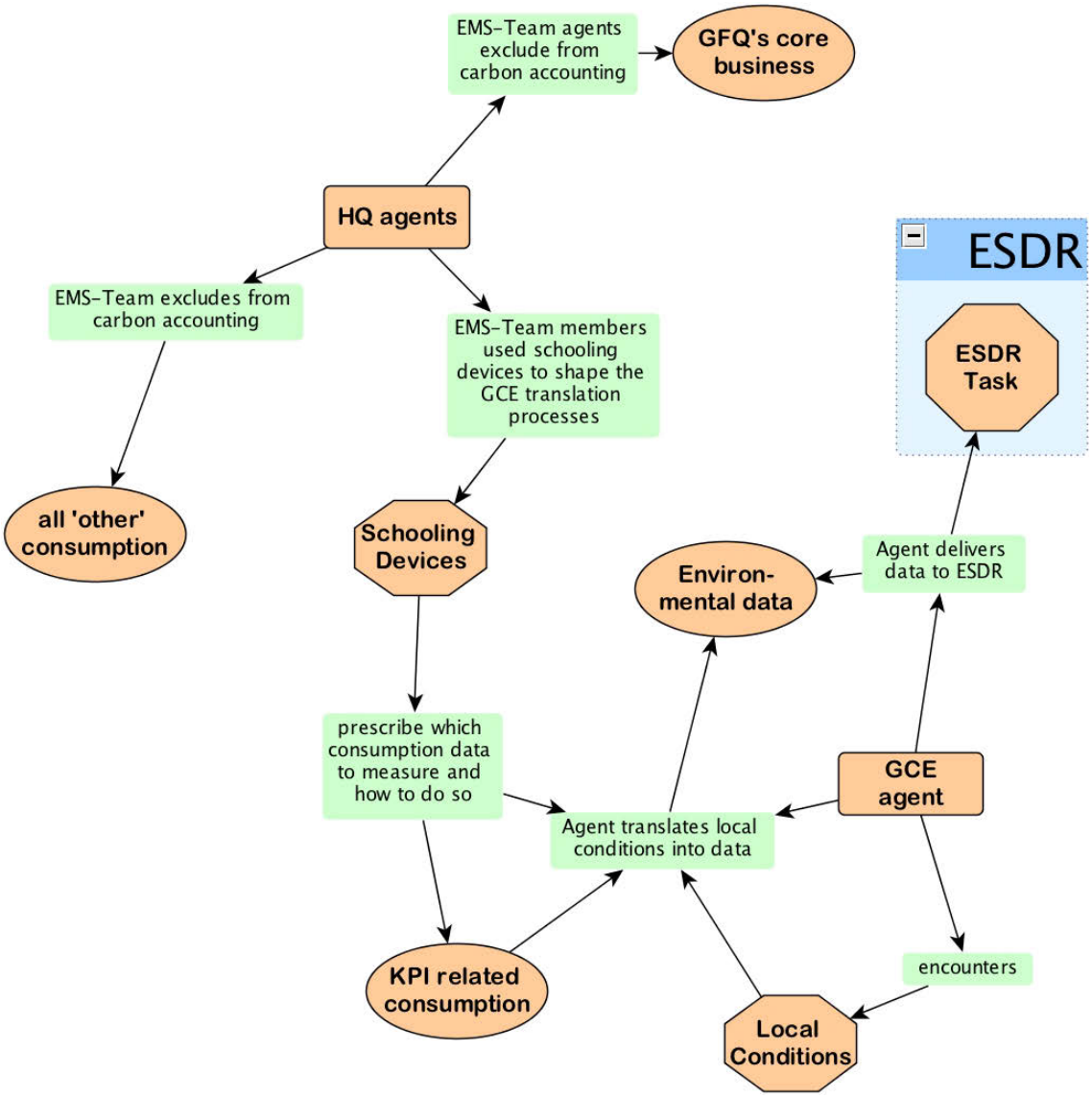
This section attended to the politics of drawing boundaries around the emissions enacted in the EMS. I have shown the ground for this claim: the boundaries that members performed were semi-permeable, with a *uni-directional* tendency.

Clearly, no EMS can attend to all links between a corporation's practices and 'the environment'. Many links are externalised. Some are designed overflows, others unintentional. The EMS's manageability depends on, and simultaneously is caricatured by, the systematic exclusion of challenges to the corporation's core business and all kinds of Othered realms of consumption. Figure 6.2 on the next page depicts these two excluded domains at the top and at its left side.

If we follow the links from the HQ towards the organisational sites of consumption (i. e. towards GCEs), first of all we come across various schooling devices oriented to shape subsidiary environmental managers' conduct of taking environments into account. These schooling devices were all about *how* environments were to be *formatted*. Knowing environments, seen from this perspective, seems like a project of boundary-making. EMS-Team members attempted to format GCE agents' translation practices: they tried hard to school the data delivering agents how to classify data. A point made by Waterton (2002, 187) seems worth noting for the case of GFQ's classifications as well: a system of knowledge depends on experience or the vision of a specific cadre of practitioners. GFQ's schooling had involved workshops, manuals and power point presentations to form such a cadre. Thus, schooling devices shaped the relations inscribed into task-forms. The GCE agent had to learn what it means to provide the desired data. Yet, these devices were not determining.

Delivering that data was often a problem. Above, we found that the content which was fit into task-forms was quite flexible. Data was the effect of practices of qualculation, adjusting and formatting oriented at inserting some*thing* into a task-form. It seems obvious, then, that data was an *intertextual* effect, rather than an independent statement (Edwards 1994, 238). A decisive point of this section is that any subsidiary agent had to engage with the local conditions and translate them into data for the EMS's database, i. e. they had to conjure up data to fit the more or less hard boundaries encountered. Even if locally no visible entities existed which were apt to play a part in performing a 'source', subsidiary agents were to render into *presence* that which was absent. However,

Figure 6.2: Relations between GCE and HQ



not the status of absence was to be inscribed into task-forms but the signified, the 'thing' of the some*thing* which was absent.

In conclusion three issues are to be foregrounded. First, along the relations revolving around the enactment of carbon, rich knowledges existed (ranging from what was excluded systematically from the EMS's attention, such as GFQ's business with fossil fuel industries, to knowledges of local conditions of 'measurement' that would not fit the HQ's prescriptions.) Yet, most of these knowledges were not only silenced from explication but they were also effectively excluded from implicitly shaping carbon emissions – that is, beyond their significant shaping of emissions by means of their absence.

Second, the data to be inscribed into task-forms needed to be enacted. Carbon emission facts were the effect of accounting practices rather than antecedent. These

emissions were, from members' perspective 'ideally', the product of heavily regulated practices. Above I have argued that control over them was highly restricted in being situated. This section underlines: while formal boundaries as part of the methodologies played a part in enacting emissions, when practical boundaries to enact data 'correctly' were met, agents were expected to circumvent these boundaries. Thus, absent environments were to be circumvented by rendering a suitable environment present.

Third, the configuration of the carbon accounting apparatus bounded its access from interfering outside its boundaries. An EMS can only affect practices within the system's network, rather than in the region designated as covered by the system (i. e. the complete imperium of GFQ). The apparatus did not systematically maintain inclusive relations with issues like food consumption or GFQ's core business, and if at all, it was very loosely coupled with the physical practices in offices themselves, such as using computers. Excluding these concerns from the measurement apparatus was making the accounting method manageable. Vice versa, the inclusive and exclusive practices within that apparatus drew boundaries and by that shaped the ways entities were present for the EMS or absent from its scope of directed shaping. Those entities simply 'out of scope' or practically excluded were left to be shaped by whatever other agencies existed – e. g. profit.

This discussion suggests that while the existence of boundaries was necessary to enact a measuring apparatus, any enactment of a boundary constituted a political move. Enacting boundaries was political because in this apparatus, much was not hard-coded. Configuring the relation between boundaries and emissions was significantly shaped by individuals' agency. That is to say, the boundaries were not only blurred, but they were also permeable. What could move through them was an effect of a particular situated configuration rather than a sole effect of grand schemes of prescriptions and official forms. Practically, however, it was more desired to exclude diverse realities, rather than include them. The realities to be included consisted of quantified and clear data. *Other* information was not to be confronted with the accounting apparatus. It is in this respect that we find the boundaries of carbon accounting semi-permeable: if things did not fit in, rather than allowing all information of local and practical conditions to enter the carbon accounting machinery, only limited way-in was granted; access was possible for those entities which would not cause trouble within the system. And the troubles from within the apparatus were not to be communicated to its outside. Boundaries were essential to exclude relations to environments. Yet inclusions were much much harder to sustain because those things included could easily be left out; boundaries were systematically uni-directionally permeable.

6.2 Materiality

This section engages with the variety of materials required to enact carbon and a range of materialisations of carbon. With this section, then, I establish that we have to take

the materiality of carbon seriously. This, of course, does not imply that the practical material engagement with carbon data is all there is. But I argue that without a study of the materiality of carbon, understanding corporate carbon cannot be adequate.

The materiality of carbon cannot be found simply and completely 'out there'. However, it is also not only the effect of language either (Butler 1993, 6). We have to account for the materiality of the signifier as well. As Butler argues, investing powerful relations in things is necessary to materialise and stabilise them (ibid., 9). Callon and Muniesa (2005, 1233-1235) show that this is not only the case for obviously material entities like a fish, but also for 'a week's skiing holiday bought by an English person dreaming of snow and sun'. Both have to be made *holding together*, singularised and reformatted in many ways to turn these into tradable goods. If they are not made material, they cannot be traded. This section shows in what directions we have to look to see how environments may be hold together.

Before diving into the discussion, I need to reiterate the scope of this book: this study is about carbon-as-present-within-GFQ. Thus, I am not discussing any type of atoms or molecules and how international seemingly scientifically or democratically legitimised bodies render certain molecules commensurable under the name of CO_2e.[12] Unlike MacKenzie (2009b, 18) describes for the case of sulphur emissions in the US, GFQ did not put any measurement devices on top of its chimneys.[13]

Rather, GFQ used complicated processes which they referred to as 'data collection' which entailed, among other practices, reading invoices, calculations, estimations, judgements and adjustments. However, even if the 'original' readings had been produced with the help of devices such as on top of chimneys, readings would have to be taken and carbon emissions would, again – like in my investigation, refer to these readings and documents which would claim to represent some kind of measurement. In other words: I maintain my argument that even if some 'sources' of emissions could be monitored automatically, a) politics would be black-boxed into such devices, b) the numbers produced would not arrange themselves but would need to be assembled with and by heterogeneous actants. Thus, this study engages with the processes of reading and writing of carbon emissions-within-an-organisation or, rather, carbon-as-organising. The following pages serve to explore how the particular materials which were used within GFQ mattered in materialising corporate carbon emissions.

Discussing the materiality of carbon emissions needs to be approached in two parallel ways of conceptualising. On the one hand, as suggested in this chapter's introduction, carbon emissions can be seen as a contingent relational effect (Law 2004a). On the other hand, carbon emissions only come into existence by bringing into play with each other certain things, like equipment or human bodies, which have differentiated competencies

[12]For carbon molecules, see Lippert (2012b). For a more general discussion on how our society relates to carbon, see e. g. Clark and York (2005), Oels (2005), Lohmann (2009a), MacKenzie (2009a).

[13]Note, an Science and Technology Studies (STS) study of such technical devices would have proceeded differently. However, the field of STS would be well equipped to investigate the way these measurement devices were constructed and configured – e. g. with Latour and Woolgar (1986) or Barad (2007).

(Law 2009). Barad (2003) provides a combined 'onto-epistem-ology' which allows to think these two aspects together. This approach is based on the thought of Niels Bohr which, applied to this study, would render carbon emissions as a *phenomenon*. Feyerabend (2009, 313-315) explains that in Bohr's philosophy the things *force* the knowing subject to draw arbitrary boundaries and enact differences; the phenomena, in Feyerabend's reading, are *necessarily* formed by the subject. In Barad's account, a phenomenon is considered to exist only in 'the inseparability of "observed object" and "agencies of observation"' (2003, 814). The world itself is *not independent* from the observer (Feyerabend 2009, 317). Without knowing how something has been observed, we cannot make sense of the thing observed. For example, one cannot understand a position of a thing without knowing its reference grid, i. e. points of measurement. Furthermore, the position-information does not exist without any point of reference. Only related together they can generate the phenomenon 'position'. In this section, I show that carbon only exists through specific 'material-discursive practices' (Barad 2003, 810) in which agencies are exercised.

Through these practices diverse human and non-human materials are related to each other. The effect of practicing these relations allowed GFQ to 'know' its emissions. In this discussion, then, carbon cognition emerges as 'socially distributed across persons and things' (Beunza and Stark 2003, 141, see also Lippert 2011a). The qualculatory practices are configured by the specific material arrangements which are put together (Callon and Law 2005, 731). By tracing how practices link materials, we can reconstruct how carbon information has been made loose of its body (Hayles 1999).

The interesting issue is how these different materialisations of carbon are more or less tightly coupled and accountable to each other. Approaching this issue by attending to the immediate practices of EMS-Team members is apt because we see how at this 'level' tight couplings cannot be ensured. Therefore I proceed in three steps. First, I analyse the practice of translating data from one digital medium into another. Second, I revisit how conflicting materialities are made fit to one another. And, finally, I study the management of data through corporeal activity.

Translating digital data First we turn to the ground of enacting efficiency. I present several materials that were assembled to allow generating a hybrid form of carbon: financialised carbon.[14] Financialising carbon was relevant for carbon management in order to relate the amount of carbon emitted for the consumption of a particular good or service to the costs for this consumption, thus *to make relative emissions*. In order to make the costs comparable, ESDR contained currency information.

After a day packed with meetings, Dieter attended to the task of updating ESDR's currency information. For that, he had received a spreadsheet from GFQ's accountants

[14] Above, we came across a type of carbon which was sharing partial similarities with financialised carbon, i. e. co-constructing carbon emissions through non-environmental data. This was the case of using the count of employees to calculate relative carbon emissions per employee, discussed in Section 3.4 (entitled *Extension of Carbon Coverage*).

containing exchange rate data for all the currencies which he required. This spreadsheet (reproduced as Artefact 6.2.1) accumulated a variety of average exchange rates.[15]

	2008 Q4	2008 Q4	2008 Q4
ISO	Current Exchange Rate December	Average Exchange RateQuarter (10-12)	Accumulated Average Exchange Rate (YTD)
	ISO/ Euro	ISO/ Euro	ISO/ Euro
DKK	7.4506	7.4512	7.4560
BGN	1.9558	1.9558	1.9558
GBP	0.9525	0.8424	0.7969
NOK	9.7500	8.9626	8.2317
ROL	40.2250	38.2127	36.8484
RON	4.0225	3.8213	3.6848
SEK	10.8700	10.2637	9.6225
CHF	1.4850	1.5243	1.5871
RUB	41.2830	36.0931	36.4530
CZK	26.8750	25.3760	24.9707
HUF	266.7000	263.4958	251.7173

Artefact 6.2.1: Average Exchange Rate Data 2008 (Extract)

Dieter was to copy exactly one number for each currency into ESDR. However, the spreadsheet contained multiple values for each currency. Actually, it contained exchange rates specific to months, quarters and years; reaching years back into the past. Thus, he had to choose from the available data what he was going to translate into the memory of ESDR. His choice was open in many ways – for example he had to decide how much time he would invest in 'identifying "the right"' selection of data or what elements of the data to perform as data, i. e. which elements to consider *con*-text and which the text. Thus, his choice of which data to use and reuse was structured as more open than, for

[15]Exchange rates are constantly changing; on a specific market at a specific time, one may learn about a specific exchange rate. However, exchange rates across markets or across moments (such as a the rate for a day) are averaged.

example the ecologists' reuse of data, described by Zimmerman (2008), whose reuse was circumscribed by explicit standards or actors' actual interests in what that data meant and how it had originally been constructed. This is how Dieter chose: he considered several options, was not sure about the meaning of a category, called an accountant and checked the meaning of a exchange rate category and, finally, settled for copying data of the column 'accumulated average exchange rate'. Fortunately, he allowed me to observe his practices of entering the data into the environmental database. This enables us to engage more closely with the material-discursive practice by which he performed the translation. For his task, he logged into ESDR, effectively entering GFQ's carbon memory – or, in other words, bringing the interface to GFQ's environment onto his screen.

Field Note Extract 6.2.a (Updating exchange rates)

> *He focused on the input of currency information. He referred to this task of updating the exchange rates as a 'rather naff assignment'. And, when I noted this, he voiced: hmm, if you must... He seemed slightly irritated about me taking notes at that moment.*
>
> *Starting his engagement with the table, he considered to copy a small number of digits right of the decimal point of the exchange rate numbers. I questioned this and he turned to copying all available digits. He started off with TRY, the Turkish currency data.*
>
> *Then he looked up CZK in the excel file which provided him with the data. Using the keyboard combination Ctrl-C he copied the dataset. RON: he clicked the edit button of the data set in ESDR, then he looked up the currency for RON in the excel sheet, copying the rate from the formula field and pasted it into ESDR [...]*
>
> *When encountering Hong Kong he asked whether we need this at all. He responded to his own question with 'hmmm, yes'. [...]*
>
> *When he entered the information for Indonesia I pointed out: The exchange rate differs by a factor of 100. Don't we have to investigate this? Dieter then accessed the internet, cancelled this and figured: '[Frederik] does know what he is doing.'*
>
> *At the end he carried out a spot check on the exchange rates: Dieter looks up Mexico and states: That's fine, I would say: 'It would stand out if something did not match.'*

After some other activities he turned a final time to both interfaces, carried out another spot check, and then sent an email to Frederik declaring the update finalised. How to think through the materiality of this situation? To address this question, I follow the entities 'enrolled' (Callon 1999) here and trace how they related to each other. For this translation several entities had to be set in place. These were, among others, Dieter, the spreadsheet and ESDR. Only by having them in the same office, could they effect the exchange rate update. However, the mere presence of them was not enough to produce the update. What was further needed was a specific kind of *forging relations* between these entities. Dieter was to copy data from one device to another. Thus, assembling the mere bodies of these entities does not reconstruct well what happened. The situation was meaningful because Dieter also brought into play in this

assemblage an *intention* (*pace*, Latour (1987) – the ten year moratorium on cognitivist explanations has ended) and specific interpretations. He had the intention to copy the data. For that he had requested appropriate data from GFQ's accountants. He had planned to use the information provided by them as the material to copy into ESDR. However, this plan could not simply be put into practice by having him, his intention, the spreadsheet and ESDR in place. Dieter first had to interpret the information provided in the file. Without interpretation the information could be attached to any of the imaginable actions-meaningfully-related-to-content. This finding corresponds to the study of qualculation in practice on financial traders by Beunza and Stark (2008, 256) in which they found that traders enacted a community of interpretation which rendered their engagement with masses of data meaningful. Similarly, Almklov (2008, 888) observes that engineers at the 'centre of calculation' (Latour 1987, Ch. 6) were also enacting a centre of 'experience-based, often unpredictable and creative interpretation' in order to make use of the specific content of data.

Thus, a story of this situation has to entail that Dieter interpreted information. But it also needs to emphasise that he used his agency to decide which information to use at all. To illustrate the issue: in this division of labour, who can grasp the potential significance of transforming, say, the YTD value for CHF from 1.5870825 (this was the number in the spreadsheet cell) to 1.5871 (this was the number displayed by MS Excel) or *vice versa*? This raises a potential problematisation: would it have been better not to have had a human interfering here? Some actors would prefer to have this process totally automated. However, no automaton can make meaningful decisions. It is humans who shape – even so-called artificially intelligent – machines to make them know what a meaningful interpretation or decision is (Kember 2003, Ch. 3). Thus, even if the the human decision-maker (Dieter in this case) was not corporeally present in the automaton, her or his role would not cease to exist. The human brain and mind is necessarily – even if only indirectly – part of the meaning-oriented assemblage of translating data.

Furthermore, this corporeal entity, Dieter, was making use of hands and eyes. His ability to see data, however, was dependent on the construction of the spreadsheet and ESDR as well as of the local computer hardware and its OS. The computer was attached to a Liquid Crystal Display (LCD) which was able to produce shapes on its dynamic interface at a wave frequency which was visible to the human eye. Thus, a key component of this assemblage was also the screen which was engineered to fit the limited and partial vision of the human eye (Haraway 1991c, 190). Thus, in terms of wave length, we may emphasise that the agency to see, and the ability for cognition, was distributed *between* the human eye and the LCD. Different agencies, one could argue, were located at each of these entities. Only by having been put in tune, visibility of anything on the screen was ensured. Thus, the analysis suggests that, not simply had entities to be assembled but also their agencies had to be configured in a specific way to allow for vision. For the importance of the configuration of agencies, Callon (2007,

320) explains these assemblages as *agencements*: these 'are arrangements endowed with the capacity of acting in different ways depending on their configuration'.

Focusing on the data in question, we can reconstruct how they were rendered meaningful as an actant as part of such an agencement. We have learned that Dieter had chosen to translate data from the category 'Accumulated Average Exchanged Rate (YTD)' into a form provided within ESDR. By using his hands, operating a mouse, clicking onto a field in the spreadsheet and then onto MS Excel's formula line he selected a number to be transferred to the environmental database. He then copied the data by exercising a keyboard combination into the computers' Random-Access Memory (RAM), followed by activating the web browser to access ESDR and pasted the data into a field (which, of course, he had activated at some time before). This activity was literally manual. *Manus* refers to hand. We saw earlier in this book that members of the EMS-Team considered 'manual' data transfer as prone to errors. However, the manual transfer also allowed to recognise the data and manipulate it. Dieter, in this case, had proposed to only use a limited number of digits of the exchange rate number. This would have reduced the visibility of complexity within the calculations surrounding the environmental data. Hiding complexity was a form of accommodating mess, reducing mess in one way and ensuring mess in another. Such a move was entirely consistent with the overall project of reducing complexities in the process of carbon data construction. Meaning, thus, was entirely built-into the carbon apparatus. As Barad (2011, 450) puts it: we may grasp

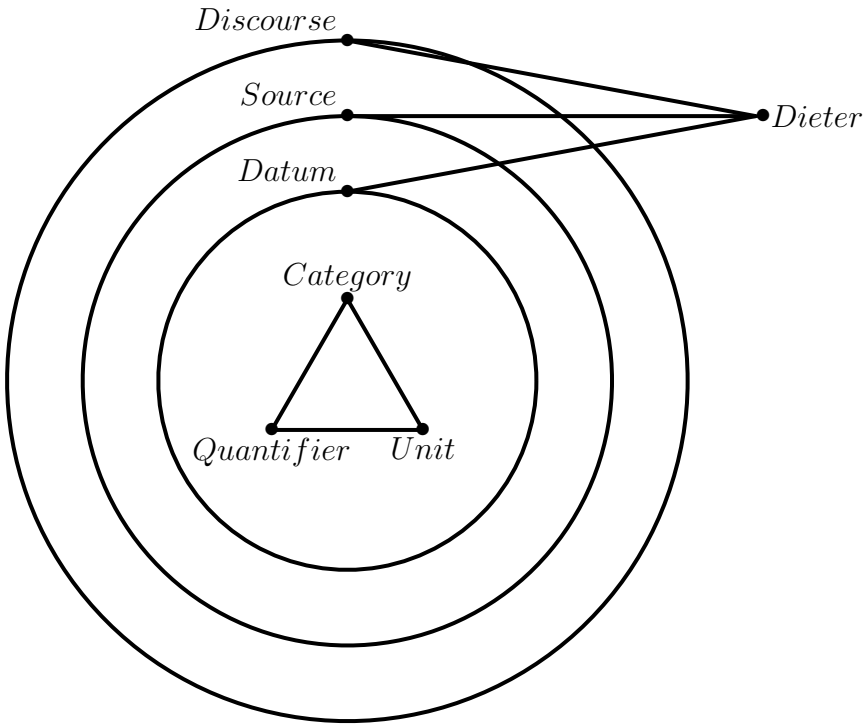
> apparatuses as material-discursive practices that are simultaneously the conditions of possibility of meaning making and causally productive forces in the intra-active materialisation of phenomena – that is, apparatuses are about mattering in both senses of the term.

How data comes to matter as carbon is dependent on the qualities of the relations which members do and redo. This includes the relations among humans themselves.

The data provided in the spreadsheet was provided by GFQ's accountants. Dieter was positioned, formally and practically, to trust their numbers. Within the organisational discourse in this corporation, certain units were responsible for specific types of work. In that division of labour, accountants were *entitled* to define the organisationally valid exchange rates. Dieter was drawing on the legitimising resource of the organisational discourse about the source of the data in order to not question the numbers at hand. These numbers were not merely, but partly, the carrier of the trust which Dieter actually endowed into the relation between the official division of labour (and its discursive representation) and the accountants. He knew he was entitled to trust the numbers because he was expected to trust the accounting unit. The agency to bring this trust about was, thus, distributed between Dieter, the accountants, the discourse about the official division of labour and the email and spreadsheet which carried the data and were inscribed with the source of the data. Exchange rates, thus, did not only consist of quantifiers, units and categories but were also constituted by their relations to a source

and a discourse about the legitimacy of that source.[16] This is depicted in Figure 6.3. We find Dieter in an assemblage with the data, its source and the discourse legitimising the source at the same time. Only in this specific configuration could the numbers provided in the spreadsheet be used for copying. Numbers had to carry all these relations and the trust in them.

Figure 6.3: Trustworthy Data



Furthermore, the manual character of the work provided two qualities which are noteworthy. On the one hand, Dieter perceived this work as annoying. I, at least, can clearly empathise with not enjoying such a repetitious task. However, for me this constituted a perfect moment for observation because the manual character of the task made the work visible required to carry out such translations.

When I questioned his complexity reducing move of translating a certain number of digits of each datum, he immediately shifted his approach. Thus, my utterance reconfigured the relations. I interpret this shift in translating as effected by the threat of absent approval of all-who-see-the-data. It was of uttermost importance that viewers of numbers were agreeing with these numbers. Disagreement needed to be absent. Even though I did not want to threaten his move, my intervention resulted in immediate performance of 'highest accuracy possible', i. e. the translation of all available information from one medium to another.

However, were all available information actually being translated? Dieter only copied the numbers. This resulted in a multiplicity of independent exchange rates presences. His

[16] See also discussion of and visualisation in Figure 2.4 (on page 93).

technique of copying only numeric data 'demodalised' (Law 2004a, 32) the information. The exchange rate claims *by* the accounting department *of* a specific average rate for a temporal range were transformed into singular and totalising claims *for* a currency by the environmental database. Thus, the multiplicity of available exchange rates shown above, in Artefact 6.2.1, was reduced to one exchange rate within ESDR (for each currency). The different 'competencies' (Latour 1987, 89) of the digital material made it easy for Dieter to select, and by that render copiable, a couple of digital signs (like a number or a single word) from the spreadsheet. He was, seemingly, not able to access a similarly digestible informational entity which would tell the story about the source or the discourse involved in this assemblage. Also, even if he had written such a narrative, ESDR was not designed to store or make visible such a narrative. Again, this shows that the agencies assembled into this arrangement were distributed. Furthermore, we can see that ESDR was asking for a specific type of data and by that shared the agency to shape the characteristics of financialised carbon data.[17] At the same time, then, the cognition of financialised carbon was only possible as a shared enactment of data: ESDR, Dieter, the spreadsheet and all the others needed to relate in a way which allowed the cognition of exchange rates within ESDR to emerge. Thus, from wherever we view the assemblage, cognition of exchange rates extended over several actants involved.

Another 'take' on this situation entails questioning why Dieter took part in this assemblage. This links again to the role of organisational hierarchies (Frederik had asked Dieter to 'update' the data) and a political economy in which wage labour was one of the key modes of performing work. Dieter was paid to do the job without questioning any wider social, economic or political implications. This became practically relevant when he copied the information for the Indonesian currency. Dieter and I recognised that the exchange rate which was still in the respective form of ESDR differed by a factor of 100 to the new data. Dieter considered briefly checking back with online information whether the exchange rate was reported elsewhere as well to have shifted at such a large scale within one year. However, he stopped this process quickly and introduced Frederik's authority into the assemblage. This was a move allowing Dieter to strengthen his position – a precautionary defence. Dieter proposed that the number within ESDR must be adequate because it had been entered by the master of ESDR. At the same time, we already learned, the data provided in the spreadsheet was considered authoritative because it was issued by the proper organisational unit, the accountants. Thus, two statements existed in parallel which were surprisingly highly different – at least for me. However, as I was not expert on the fluctuation of the Indonesian currency I did not challenge any further the magnitude of the shift. Dieter was positioned to perform his trust in both statements – Frederik's and the accountants'. After all,

[17] Of course, ESDR was designed by humans who interacted with even more computers and programming languages, standards and, probably, lots of coffee. ESDR as an effect of their relations and practices – and of the configurations of the database undertaken at GFQ – entailed forms which constrained and circumscribed any statement about reality (cf. Riles 2006b).

sometimes currencies experience such high fluctuations. For my argument, here, it does not really matter that we simply could have checked the spreadsheet for older currency data – we would have found that within the accountants' depiction of the Indonesian exchange rate there had not been such a shift over the recent couple of years. Rather, I like to point the attention to the role of trust. Dieter carried out several spot checks (i. e. a comparatively independent evaluation of whether the manual copying had been producing only errors – it did not) and aligned authoritative institutions (the master of ESDR and the accountants) through performing trust in them. By these means, Dieter did not only enact a 'centre of qualculation', i. e. a centre of 'centre of calculation' and 'centre of interpretative judgement' but also a 'centre of trust'. Performing these centres simultaneously allowed him to temporarily *not* engage with the complexities which were transversing the assemblage – a practice effectively likening Verran's (2002, 754) micro-worlds – and, instead, to mobilise the spreadsheet's data as the input into ESDR. As Almklov (2008, 884) draws out: 'the engineer [...] black-boxes the whole socio-technical process of measuring these parameters', in this case, the cognition of the exchange rates of to-be-financialised carbon emissions. Dieter's performative and trustful engagement with numbers, thus, was positioned centrally in the circular enactment of reciprocal authority between GFQ's financial accountants, Frederik and himself.

Making conflicting materialities fit to one another For ESDR being a central part of the entities assembled to configure carbon emissions, an investigation of the materialities of consumption, ESDR and spreadsheets and their relations seems in order. Above, I showed how the consumption of specific types of goods and services, such as water, energy, paper or travel, have been translated into GFQ's central environmental database. A way to engage with all of them at once is to consider the largest unit of reporting. A GCE was the container within the logic of the Environmental Management System (EMS) in which consumption took place.

↪[18] To discuss the materiality of this container, I turn to a field note extract in which Frederik pointed to the friction which sometimes existed between the organisation-as-container and the physical reality which he framed as 'out-there', or rather 'surrounding' him. The building in which he worked had housed several GCEs. However, the local environmental managers responsible for the organisations had only access to the consumption data for the building-as-a-whole, rather than for the consumption in parts of the building. Subsidiary environmental agents were not supposed to represent parts of consumption when they entered data into ESDR. Of course, they could have 'simply' performed technically fitting qualculative solutions.[19] However, within the formal regula-

[18] The following discussion is relating to Field note extract 4.1.c (on page 243).

[19] Say, if a building houses two organisations, count their employees, assume that on average they all consume similarly, and calculate the different GCEs' share of consumption and report these respectively in ESDR. See Chapter 2 (entitled *Data Construction in a Basement*) for discussions of such seemingly simple calculations to fit available data into the database.

tions of the EMS, subsidiary managers were not supposed to do anything like this. Nevertheless, Frederik did not have any control over how much GCE environmental managers were actually shifting the shape of data such that it became translated into reportable data for ESDR. In (at least some) cases in which he learned that data did not fit into the desired frames, he had to carry out a separation of GCEs' consumption on the screen. Underlying this was the structure of ESDR. Environmental data, within the database's design, was linked to GCEs rather than to buildings. And Frederik did not have the possibility to represent any separation of consumption within the material of the environment manifested in the database. However, by exporting the data into an environmental balance sheet☞, he multiplied the data into a frame which allowed more flexible manipulation by him. He was officially entitled to carry out any such data manipulation; he was the head of the centre of qualculation. It was his job to draw boundaries into these representations of consumption and assign them to different GCEs. From his point of view, but also from the perspective of other EMS-Team members as well as GGCA and AfC such manual manipulations were to be avoided. However, Frederik proudly reported, AfC construed this activity of translating building-related data into organisation-related data as substantially necessary albeit procedurally unfortunate. Nevertheless, the auditing corporation formally accepted his practices and effectively declared that they trusted the set of practices which Frederik used to assemble buildings, organisations and their representations as environmental data. This trust was issued even though they considered him or his practices 'out of control'. Thus, trust allowed these materials to be continuously arranged and manipulated – by an agencement involving buildings, agents, invoices, parts of human bodies, spreadsheets and ESDR. The trustful relations performed by Frederik, the accountants and others, were not free. Much rather, that trust was conditioned trust: as part of the job as well as the contractual relations between auditor and auditee, members had to trust each other, rather than to be sceptical. That trust was also conditional of these contractual relations; without these formal relations, trust was threatened.

In effect, what Frederik achieved here was performing a specific phenomenon: the environmental impact of organisations. In Barad's (2003, 814) words 'any measurement of "[a GCE's consumption]" using this apparatus cannot be attributed to some abstract independently existing "object" but rather is a property of the *phenomenon*'. To perform the latter, the object (i. e. the consumption) is analytically separated from the measurement entities. Without such a successful configuration of these physical, organic, organisational and digital material 'components' the carbon emitted by these organisations would not have turned into social and economic reality. Only by acting *within* this phenomenon, Frederik was able to make the consumption observable to GFQ. For that it was necessary that the agencies of all the components, including ESDR, spreadsheets, subsidiary managers, were aligned. A prime factor which allowed Frederik to enact this agencement was that organisations and buildings had been translated into the *digital realm* within which Frederik could freely produce a suitable observable phenomenon. While reporting about his practices resulted in critical comments, his

practices within the digital were not immediately threatened by humans. In a way, Frederik appeared here momentarily as an archetypical macro-actor on top of the network of relationships which he controlled.[20] However, the components were not existing independently of Frederik in GFQ's environmental reality. A question, resulting from this discussion, is: what would happen if carbon data takes a different material form? What happens if it enters another realm?

Trashing tables An example of the significance of the materiality of *paper* in its relation to *the digital* was foregrounded in the EMS-Team's material practice of discussing GFQ's carbon reduction strategy.[21] Frederik's job entailed the assembling of carbon materials for Victoria to provide a basis for her strategic work. This situation took place in the middle of my field work period:

Field Note Extract 6.2.b (Not allowed to spread numbers)

Frederik showed a spreadsheet table and we collectively skimmed it. While doing this, Frederik recognised that something was wrong. He wanted us to return the table. Some seesaw followed: first, Victoria, Frederik and Elise traced the content in depth, checking whether, or in which cases, numbers were correct. After a while Frederik offered an explanation: he had wanted to sort the rows by GCEs. Seemingly, only the GCE column and not those with the numeric values have been sorted accordingly. Second, in parallel, Frederik suggested several times that he wanted the table, tabloid sized, returned. The other three of us, however, did not want to return the copies to him. After his introduction of the table, he physically took the tables he had given earlier to Elise and me. And he asked Victoria for hers. She did not give the table to him. They were literally tearing the material.

The situation turned when he asked for this: we had to promise faithfully that we do not use these numbers, do not show them to anybody. Victoria agreed. I proposed I would not show the numbers anybody within GFQ. He told me: self-evidently, you are not to show them to anybody outside. I agreed. The 'outside' did not crop up again. Subsequently, he returned the tables to Elise and me. We were then allowed to keep them.

In order to analyse the materialities which have shaped this situation, I follow the flow and channeling of data. This situation was taking place well after data collection had been carried out. Thus, GCEs had entered numbers in ESDR, Frederik and Elise had produced 'final' environmental balance sheets and they were now carrying out a variety of nth-order calculations.[22]

In this phase, not much new data was collected but, rather, existing data was arranged and rearranged to make a variety of carbon realities visible. The EMS-Team was to provide carbon information in varying shapes. This required carbon data not only to shift its shape (Moser and Law 2006) but also its contents (Kalthoff 2005). New carbon

[20] Callon and Latour (1981) provide a discussion of such a macro-actor and their vulnerabilities.

[21] The carbon reduction strategy of GFQ remains out of scope for this report of the study.

[22] Yet, as seen earlier, data was continuously re-done, subject to scrutiny and adjustments.

realities were enacted. In these processes Frederik exercised his skills as a toolmaker: similarly to the agents observed by Beunza and Stark (2008, 278), he was 'a craftsman of tools as much as a processor of information'. The existence of carbon in the materiality of digital data allowed him a multitude of possible qualculations. Data was mutable, manipulable and easily mobilisable. However the fact that digital data could exist in all kinds of shapes and could perform so many different representations and, yet, had to stay within electronic devices made the materiality of digital data in some respect less worth than printouts. Receiving yet another file was not that useful or exciting in itself.

Therefore, Frederik had assembled a device to make carbon visible for the purposes at hand. The result was a tabloid-sized paper which he had handed out in the beginning of the meeting. Within this form, data existed entirely differently. It was turned into an immutable mobile. This increased its value. Members were able to take the paper with them, they could scribble around on it, they could show it to others. Kalthoff (2005, 81) terms this the transport function of documents. The range of possible modes of manipulation was configured very differently compared to the range associated with a digital device.

Furthermore, this specific new inscription device was assembled by Frederik in his role as the master of carbon data. Thus, other members were interested in investigating this device. Hold on. Why would they be interested? With Kalthoff we can point to two further functions of documents: storage of information and relief. The table was to carry some knowledge. And because that knowledge is then imagined as copied to the document, members could allow themselves to forget the substantial information, merely keeping in mind where the information is. While these three functions, he summarises, are heuristically useful, my analysis shows beyond them. One significant character of the document is this: as I argued above, within the field of carbon construction it constituted a capital to know the officially validated vision technologies. To sustain their positions within the field, members had to be interested in acquiring any new official inscription device such that they could scrutinise the particular reality of carbon which was enacted through the device. This would not only allow them to know what they see, but also what they would not see with the table. As Haraway (1991c) as well as Beunza and Stark (2008, 279) remind us: any vision is partial, any device generating visibility is also blinding and silencing.

In the moment in which Frederik recognised the mistakes made, several insights appear. First, the mistake constituted a network failure. This was a disaster for the relation as a network (Mol and Law 1994, 660). Second, at the same time, this failure was immediately showing that the reality of carbon was more fluid than assumed. For Mol and Law this constitues no problem: as the data material in its spreadsheet reality was actually fluid, nothing bad happend: there was no ontological catastrophe – no computer exploded, no Fukushima[23] took place. The reality of MS Excel allowed

[23]The nuclear catastrophe which is emerging at Fukushima I Nuclear Power Plant while these lines are taking form. The reactors are located near Ōkuma in Japan. While writing these lines, originally, the 'initial' widespread media coverage/phenomenon Fukushima was first spread.

the spreadsheet to exist, to be printed and Frederik happily(?) distributed the table. However, third, for Frederik the recognition of this fluidity constituted a threat. This affirms Law's (2002, 102) proposal that

> networks tend to panic when they fail to secure network homeomorphism – at which point what I am claiming to be the hidden but necessary fluidity of objects to networks becomes both visible and Other, represented as a failure and therefore as a threat.

Thus, the carbon object existing in the mistaken shape was a 'forbidden' possibility and, consequently, this alterity was to be deleted (cf. ibid.). Frederik commenced two modes of enacting such a deletion of the immutable mobile: a reconfiguration of the spatio-material reality and a reconfiguration of the social reality.

He approached the former mode by asking his colleagues to return the paper to him. By this he attempted to *ontologically transmute* the table (Bourdieu 1990a, 85). This would have allowed Frederik simply to turn the tables into his office's paper recycling box. In effect the immutable mobiles would have been spatially relocated. This relocation could be conceptualised with Kalthoff's (2005) transport function. However, I suggest to recognise another, fourth, qualitative dimension in this respect: trashing the tables indicates a deletion function. The knowledge is not simply stored, allowing humans to forget; the information would also be *lost*. To achieve trashing the tables, he pulled the papers. However, he only partially succeeded. Victoria did not return the paper to him. This material intra-action points to a character of human/non-human agencements which Dugdale (1999, 118) describes well. She addresses the mixing of non-human materials and human participants in a policy-making meeting and suggested that the materials, like documents, 'are crucial in producing the bodies that are assembled together as subjects. It is the mixing together of such materials with bodies that constitutes subjects of a particular kind.' As it seems, Frederik was assuming that either he should totally apply his spatio-material strategy onto all of the papers or he would have to engage differently with the situation. The subjects and the materials were closely coupled in this situation. As Moser and Law (2006, 63) put it, 'what counts as information is variable: it shifts from situation to situation'. In this case, Frederik tried to shift the situation and, for that, shifted the status of the information.

The social reconfiguration, then, was about a social contract which would obligate members to perform boundaries of the travel of the devices. Frederik wanted to restrict and circumscribe the *territory* of these multiply existing 'mistaken' carbon realities. He made his colleagues pledge that they would exclude the free flow of these carbon objects from the realities which they would be enacting. Thus, we find a relation between an exclusionary practice which was to be embodied by members with respect to the existence of the new inscription devices. In the specific configuration, Frederik wanted this situation to not produce proliferating carbon realities (which he related to the sharing and amendment of the spreadsheet). He tried to control the latter. In order to achieve this control, he reconfigured the apparatus. The apparatus-without-intervention

would have allowed for a proliferating carbon phenomenon. The table might have travelled far within GFQ (and maybe it did – I do not know). However, he tried to 'intra-act' (Barad 2003, 815) with the humans and non-humans around and on the table such that they would enact another phenomenon. The erroneous carbon reality would be restricted narrowly to the present humans in the room. He invested his *trust* in his colleagues that they would act as allies in performing his desired phenomenon. This investment in turn enacted the importance of trust within the field. He was able to rely on the collective performance of these tables as absent carbon reality. Thus, all this interaction was about performing a given presence as an absence.

Writing from a distance, I could stop this performance. However, I would then encounter myself in problems with imagining myself as enacting an ethically acceptable engagement with Frederik. Rather, I like to translate this situation into a space in which public scrutiny is considering the implications of carbon phenomena. Carbon cognition depends on the boundaries drawn around and material properties enacted of the components which configure the multitude of carbon phenomena. These components are not neutrally and naturally in place. Rather, they are assembled as part of an apparatus. And

> apparatuses are not mere static arrangements in the world, but rather *apparatuses are dynamic (re)configurings of the world, specific agential practices/intra-actions/performances through which specific exclusionary boundaries are enacted.* (Barad 2003, 816; emphasis in original)

For the materiality of carbon this means: carbon emissions cannot simply be measured. Rather, carbon comes into existence only through a material and discursive agencement, which enacts carbon in specific ways. The subsequent section zooms into the latter: different practices resulted in a reality of carbon characterised by multiplicity. Different apparatuses produce different carbon. A reconfiguration of any carbon measurement apparatus will not get closer to an independently existing reality. Rather, the material reality of carbon is configured by the means by which it is produced.

♢ *End of Section* ♢

This section showed that the materiality of carbon emissions and the materials involved in performing carbon emission are fundamentally *entangled* and far more heterogeneous than they are depicted within and outside of GFQ. To draw the findings together I attend, first, to the variety of materials relevant and the (non-)pattern of their relations. Subsequently I turn to the relevancy of trust to stabilise material relations and compensate carbon's intrinsic non-coherencies and contradictions. I conclude by reframing my findings with Barad's agential realist take.

First, attempting to provide a neat table, in one column the materials and in another their specific characteristics, would fail. While we could fill these columns – the *left column* would name materials like bodies, their hands and voice, paper, spreadsheets, also in digital form, ESDR, and discourses and in between all this the intentions by agents, their imaginaries, commitments and investments and a *right column* could be

drawn up, partially extending Kalthoff's (2005) lists, including storage, relief, transport, deletion, the linking itself (what else do minds do; and for that matter storage devices, text?), i. e. relational work done by these materials – we would not be able to neatly separate these columns and their items, not to speak of identifying exclusive one-to-one relationships. A mind can store, link and delete knowledges; and so can paper. Digital media possess utterly hard characteristics and floating at the same time – like a flip-chart. All kinds of valid comparisons may be made between the enactments of materials. The materiality of carbon is only possible because all these materials are entangled, constantly transformed, adapting to each other, reenacted.

Thus, carbon emissions come only in existence through the practical use and alignment of heterogeneous entities. Nevertheless, practices revolving around carbon-on-paper materially and discursively *situationally* (as in situated control) differ from ones around carbon-in-digital-spreadsheet or around carbon-within-ESDR. Thus, the characteristics of a database (be it in paper-, mind-, spreadsheet- or ESDR-form) are co-constitutive of the agencies of entities in interaction with it. However, we also saw that these data containers were not having fixed shapes and materialities, but rather were constantly and contingently performed. Human agency necessarily comes to matter within the material construction of carbon. This is a significant point: the material assemblage which effected carbon was hold together by all kinds of actants – including humans, their imaginaries and discourses. Here it is again: Guattari's (1995) *machine* grasps this phenomenon so well. The carbon accounting machinery does not only consist of cables, bits and bytes, but of blood, flesh and emotions as well. This thoroughly entangled constitution enables not only the smooth production of emissions or its failure, but it inscribes the normativities and politics into the apparatus which generates the emissions. There is no simple measurement of the material of carbon.

Second, we find that trust stabilises the precarious relations constitutive of carbon. These precarious relations were materially grounded: data material was not providing for a singular existence of carbon. Rather, multiple emissions exist in parallel – independently of the perspective. I shall turn to a deeper investigation of the character of multiplicity in the succeeding section. For now I like to stress: while carbon is depicted in some, parallel, ways (e. g. quantitatively) and allows for corresponding steps of processing and transformation (calculations), non-quantitative narratives are constantly produced and silenced, sorted out. Thus, what carbon is was distributed over parallel inscription devices and members' minds. All the narratives were not, and could not, be unified and brought into a coherent form. These devices (e. g. environmental balance sheets, printed versions, powerpoint presentations, flip-charts, conversations, biological memories) were materially only loosely coupled. The materials did not protest against non-coherence. Members had to pay constant attention to work towards singularity. The examples I discussed in this section were all focussed on practices located within the EMS-Team. As shown above, in GFQ's relations to rating agencies, auditors and their NGO partner, the pattern of loose couplings extends to all of them. Carbon, in

the interorganisational space between these entities, was principally fluid.

However, these precarious relations did not cause disintegration of that space. Data is not only interpreted, made commensurable and transformed in calculations (Beunza and Stark 2008; Almklov 2008). A key dimension which allows data to be (kept) drawn together was that agents invested trust in each other, in organisational agents and discourses. They were employed, entitled to and dependent on that trust: positioned to trust. But this position did not determine them. Members could always ask for more confirmation – even when this was causing friction. The discourse of quasi-scientific demands on knowledge quality implied that one was legitimised to appeal to these discourses' differentiations, such as error vs. correct data. But members would not and could not constantly question each other; they had to trust their respective qualculations. Thus, at GFQ we do not only find a centre of qualculation, but also a centre of trust. In order to trust numbers (Porter 1995), agents had to trust each other. We learned that the trust in people and in numbers may be made dependent on each other: the socio-technical network is co-configured and materially stabilised at the level of trust in human and non-human entities.

In conclusion I return to the onto-epistemological ground of this section. With Barad (2007, 89-90) we should understand carbon not as a mere issue of representation where subjects and objects are neatly separated. Much rather, they are intermingling within the apparatus in which and through which carbon is enacted. Molecules may be part of this apparatus. A complete map of carbon is not possible. This section does what suffices: it provides the evidence we need to get beyond reflecting on the accuracy of certain representations and helps us to start seeing carbon as an emerging phenomenon, always becoming and never given. While Pinch (2011) questions whether Barad's (2007) agential realism is lacking recognition of the social positions and the social construction processes required to produce carbon facts, her point is to go beyond this constructivism. As I have shown in this section, the positions of subjects matter, as well as those of the objects – as well as their material capabilities. And none of them are fixed, antecedent, nor arbitrary: they are interwoven and entangled. The material analysis of carbon shows that carbon is not merely uncertain (that it is, too) but that it is ontologically indetermined (Barad 2011).

The way in which carbon was materially present in this study was diverse and contingent. Carbon had to be materially and collectively enacted which excluded some realities from materialising. The material-discursive practices which members had to use in order to engage with the various forms and shapes in which they encountered carbon may have seen 'out of control', yet *situated* control was possible. The material apparatus of producing carbon emission accounts was involving both heterogeneous engineering as well as mess; and any phenomena of carbon entering the wider social-economic reality is inscribed with such heterogeneities.

6.3 Multiplicity

The following discussion serves to address *how* carbon existed within the carbon accounting apparatus. It, broadly, asks: what did the apparatus's configuration do to carbon? To address this question I investigate the variety of forms in which carbon entities existed. With this move I also contribute to our understanding of multiplicity, illustrating how Mol's (2002)'s work is generative to understand the ontology of corporate carbon emissions and, in that course, extend her notion to address multiplicity in relation to mobility and characteristics of the digital.

Till this point we have emphasised that carbon at GFQ existed in various material forms. I have proposed that multiple versions of emissions coexisted, and continue to do so. In this section I illustrate several ways in which sums of carbon entities emitted by one and the same organisation existed alongside each other without being considered equal. Why does this matter? A statement like 'the carbon emissions of GFQ totalled 3.8 gigatonnes in 2007' claims to represent a part of reality. And, of course, it seems totally valid to copy this statement and reproduce it: 'GFQ's total carbon emissions in 2007 equalled 3.8 gigatonnes.' This statement has to be accepted. The information representing carbon emissions is and ought to be identical independently of how often this statement is copied. I understand copying to be defined by this very quality: the result of copying is an informational identity of the copy with the original. Otherwise the 'copy' is a 'failed copy'. However, in the reality observed at GFQ, *in parallel* we may also find the statement 'the carbon emissions of GFQ totalled 4.1 gigatonnes in 2007'.[24] Audiences of all such statements are positioned to consider these statements as adequate representatives of carbon entities. All these spokes entities claim that they are identical to each other and they are invested in the idea that they are identical.

This section argues three points: first, the existence of several and diverging informational artefacts claiming to represent the same reality cannot be well addressed by relativist, perspectivalist and pluralist thought. Second, these diverging informational artefacts, entitled carbon emissions, have not been and ought not be made materially consistent. Emission statements referring to the seemingly same object multiply. They are not all joined up. Third, the processes which produce multiple carbon emissions are in-built and essential to carbon accounting – as are the never-ending exercises of containing the multiplicity of carbon. I found systemic friction and contradiction.

To lead into this argument I open by tracing how Mol's (2002) take on multiplicity is helpful to understand carbon. Subsequently, to analyse the doing of carbon, I need to extend her approach. Conceptually, what I do is this: I combine the dictum 'follow the actor' and ask with Mol 'where' the action takes place. This directs us to closely follow *what* and *how things* happen while carbon *travels*, findings its (and whether there is a singular 'it', this section questions) way through the carbon accounting machine.

At this point, it seems apt to reconsider the partially multiple ways of translating

[24] If you like to see these divergencies visualised, revisit Interlude II.

carbon into carbon accounts. We have seen above how the consumption of drinking water is translated into GFQ's database ESDR.[25] For such a process, many different paths are possible, some of which have been enacted in parallel. For example, some quantities of the consumption of drinking water are related to invoices while others are related to emails. There are multiple sources of emission data. This includes the possibility that in an organisation some actors might not imagine a source while others would imagine that very source. Also, within the number representing the amount of drinking water consumed, a part of the quantity may be estimated by the agent who enters the data into the database, while other parts may be copied from a file. Thus, a variety of 'data qualities'☞ of sources may and do exist within consumption facts. Furthermore, these facts can be translated into carbon language by a variety of conversion factors. In principle, thus, very *diverse* carbon facts can be translated from a single consumption fact. In that respect, this study identifies a similar ontic multiplicity like Mol (2002) did. She found that a single body may be enacted in multiple ways. At GFQ, a single carbon emission fact – and even a single consumption fact – was (sometimes) the result of a variety of parallel practices co-constructing the same object which was to be represented. For example, when Frederik and me calculated the average data quality of GFQ we came to multiple results. Mol (2002, 63) asks how coherence is achieved in such a situation. Frederik found a solution: we deleted the last digits of the numbers and, voilá, the result*s* were turned into a singular result. In this situation, the singularity of carbon was *produced* by way of defining both results as informationally identical (they needed to be demodalised for that). Retracing Dugdale's (1999, 125) argument – that a contested medical device is simultaneously singular and multiple and that this may be necessary for a collective to engage with the device – I need to allude to this effect: Frederik brought into being a singular data quality. However, the multiple existence of that quality is *still existing*. It was not eliminated. What it means that multiplicity continues to exist is something I explore through the remainder of this section. Now, let's return to retracing Mol's notion of multiplicity.

While this example simply refers to one occasion, the comparison of data with the respective data treated as representing the same object's status of the year before was a practice engineered into ESDR, and which systematically produced multiple results: both carbon emission facts were to be alike. If they were not, the prior year's value was taken as the standard to judge the new data. By this process, data has been assessed for how strange it was. If the deviation, i. e. quantitative difference, was too high, the new carbon version was to be reassessed. This required agents to have a feel for the numbers – and a feel for the game. The prior year's value was just one standard. Another was whether a number was judged to be realistic by members: and, yet another one was whether a number was constituting a social or political problem. The latter likens Mol's observation that decisions over medical operations may depend on social questions, such as: is the bad leg a problem for a patient's social life? If it is not, then no intervention might be called for. Similarly at GFQ: decisions over intervening in

[25] See Chapter 2

data were sometimes showing their clearly strategic dimension. Mostly, of course, this was hidden. Data was to be seen as neutral. However, it was not. Thus, in enacting carbon emissions multiple standards were present.

Another case in point was the transformation of the Environmental Management System (EMS) and its data collection process: Victoria was deeply interested in comparing the data produced by the two differing apparatuses (ESDR vs. SAP). She assumed that the data produced would differ and it was self-evident for her that GFQ had to know how *much* carbon emissions captured through the apparatuses would differ. This take is similar to the understanding by Mol (2002, 75) of different instruments measuring different objects. Within the EMS-Team it was assumed that the SAP based apparatus would have access to at least partially different representatives of consumption. With the EMS's transformation, only the latter versions of consumptions were to be translated into carbon. Summing up carbon emissions into a sum literally summarised carbons and turned heterogeneous versions of carbon into a single entity (cf. ibid. 56). This process of summing up entailed the doing of commensurability. In the moment of adding up numbers that which they represented was enacted as commensurable. A sum could be translated to other audiences – within the EMS-Team, GFQ or to the wider world, such as the CWC Ranking. Above, I already pointed to carbon emissions facts as a boundary object. Bowker and Star (2000, 282) also recognise a form of multiplicity: objects may be naturalised in several social worlds. Members of more or less distinct social worlds can relate to the same object differently; it appears differently to them. This is a perspectivalist point. My point by inviting Mol (2002) into the discussion is to underscore that that object in itself was multiple, entirely constituted by all kinds of practices through which a different version of carbon was co-achieved. In summaries of carbon, some elements of these enactments have been made public, others not. Which ingredients of enacting carbon were included in a summary was a strategic choice. Thus, in the glossy reports produced by GFQ, they would include in their summaries their 'partnership' with GGCA but would not shed light on the qualities of *how* the NGO had been absent-present. The explicitly emphasised elements in the published summary of carbon were numbers, units and qualifiers,[26] rather than processes and data quality. Carbon would exist socially and politically and, eventually, environmentally differently if it was not stripped off of so many details and histories. Who would believe a one-page description of a carbon emission representative? Better would be a detailed story summarising what carbon is and how to conceptualise its qualities. This is what this book can offer.

We have seen carbon as not only a heterogeneous crowd but also as existing in multiple versions. Only some of which got translated officially into GFQ's carbon reporting. However, in its process, many versions of carbon existed; some were silenced, others selected to be reproduced. This is how the transformation of the EMS with its new SAP based system was to alter this configuration: the new apparatus would

[26]For an abstract presentation see Figure 2.4 (on page 93); for the empirical version compare the environmental balance sheet☞ (page 176) with Artefact 3.5.1 (on page 206).

have different access to carbon. And the new standard for which carbon GFQ emitted would be what the SAP entailing apparatus would state. The expectation was that this apparatus would produce a single representative of carbon, rather than many versions. The carbon of this new apparatus was supposed to win. It stabilised a certain kind of version. However, this does not mean that this version in itself would be anyhow good or an improvement. Certainly, members would be less in contact with the multiplicity of carbon. Yet, the transformation would not engage with the multiplicity but silence it. We have come across a way to grasp this phenomenon above: accommodating mess.

Common to all these carbon versions (which this book focuses on) was that members enacting them and intra-acting with them participated competently in this exercise. Some of the actors stressed another kind of carbon as well. This was the kind of carbon to be reduced through measures (such as asking employees to turn off computers over night or buying more energy efficient screens throughout the multinational). Treating carbon emissions, i. e. intervening in the production of carbon emissions, also took multiple forms: three techniques of reducing carbon emissions were officially recognised as measures (reducing consumption, substitution consumption and offsetting) while the fourth form was recognised as part of carbon accounting (adjusting numbers). Thus, in this respect, I tend to agree with Mol (2002, 93) again: treating carbon emissions treats an object. And that object may, or may not, be similar to an object diagnosed before. The specific stories contained and constitutive of emissions are disregarded when the singularity of carbon is constructed. Commensuration requires demodalisation and singularisation.

While multiple enactments of carbon were present, the range of this multiplicity was limited. For example, GFQ did not support the People's Global Action Network or, say, the transition town movement,[27] nor did they enact carbon as a communal object which all employees would be responsible for and therefore would require the transformation of the corporation into a workers' co-operative. No – no such debate among the members of the EMS-Team. They sticked to enact carbon versions as an end-of-pipe phenomenon that the HQ would bring to attention across its globally spread subsidiaries. The latter, GCEs, were supposed to help provide accounts of carbon and, eventually, reduce carbon. Even though sometimes members questioned politically disreputable acts in the processes of carbon enactment, such as sexist treatments by bosses or colleagues or the financial entanglement with the fossil fuel energy industry, the facticity of carbon seemed not intersubjectively challenged.

For this take of GFQ, the singularity of carbon was key. Members imagined that they could only convince the wider corporation if they produced hard facts. The successful silencing of all kinds of actants can be considered a 'remarkable achievement' (ibid., 5). Members intra-acted with invoices, experiences, spreadsheets and ESDR which resulted

[27]The transition town movement is perceived by many as significantly less radical than the People's Global Action Network (PGA). For an optimistic account of this movement, see e. g. Connors and McDonald (2011). PGA connects actors from all over the world to work towards a just distribution of and access to resources (Gordon 2008, 22).

in multiply existing and potential carbon emission representatives which, however, were organised such that a joined up summary was produced. Any configuration of an apparatus enacts a particular – and not a universal, objective or even neutral – version of the representation. There is *difference within* carbon. And this difference is glossed over in summing up carbon.

We have, thus, seen, that frictions exist in wholes (cf. ibid., 115). Politics is not anymore separate from science (Haraway 1991c). The question for Mol (2002, 115) turns into: how do things differ?

> *What is it to differ?* How many styles of differing are there, how may different entities or actors clash and show interdependence, what is the character of the 'sides' involved, what kind of materials (and socials) are they made of?

In the following, I visit three examples to consider two further *kinds* of multiplicity and, by that, friendly extend Mol's notion. At GFQ we do not only find alterity within, but also *difference between carbons*. Not only is singular carbon many carbons but Mol's kind of multiplicity is multiplied and we find many carbons which are multiple in themselves. In the first extension of multiplicity these multiple representatives of carbon emissions are neither existing to form a whole (like several parts of equal carbons which would be added up) nor are they a question of perspectivist perception (like several people having different perceptions about carbon representations – which of course also is possible but I do not discuss here). In the second extension of Mol's notion of multiplicity, a single carbon representation is teared apart with different meanings associated with different carbon numbers.

Empirically, this section is about what happens to these joined up spokes entities discussed above. Again, these joined up internally heterogeneous carbon representations are not simply the constitution of a layer of social or natural order. We found – in the words of Law (1994, 1) 'there is certainly no order'. Rather, we find 'multiple occasions and forms of orderings' (Suchman 2000, 313). Carbon representations are always in all kinds of ways being maintained, adjusted and cared for.

Multiple inscriptions and inscription devices ↪[28] As an introduction to the existence of parallel carbon sums, reconsider the moment of Frederik's and Victoria's clash over the process of accounting for emission offsets: Frederik had lamented that ESDR was not yet able to process carbon offsetting information. He wanted the central database to be able to take into account this kind of carbon. In their heated conversation they considered three parallel techniques of taking into the carbon accounts the new information: adapting ESDR to allow for and process the new information, manually collecting data and integrating it into the balance sheets, collecting data within ESDR and process the new information within environmental balance sheets.

A significant element of their discussion was about the location at which data would be stored and processed. *Where* would carbon data exist? Within ESDR, in

[28] The following discussion is relating to Field note extract 5.3.d (on page 402).

spreadsheets, in hands? Above, I have shown that each of them was linked to specific distributions of the capital 'being able to edit and adjust data'. We have seen that members considered spreadsheet-based data processing as prone to errors because it involved manual configuration of spreadsheet formulas. (As if the code underlying ESDR was not manually programmed!) All these solutions involved what members called 'data collection'. This did not mean that any HQ based actor would go (fly, etc) to meet a GCE representative in person and have handed over carbons, nor the carbon representatives. Rather, data collection was enacted as data copying, i. e. *data duplication*. This required that some parts of a carbon (or carbon offset) representative could be mobilised to be inscribed elsewhere, in another inscription device. Throughout the book we have encountered a number of inscription devices. Two devices have been considered and recognised as fundamental to the construction of a carbon emission balance sheet: ESDR and environmental balance sheets. An agent would select digital information within ESDR, copy it into the computer's RAM and insert it in another digital device. Or copy it from file to file. As most of you know, copying implies that the original information continues to exist. Data is multiplied. Copying files may also take place in hospitals. Mol (2002, 80) presents one; and does not detail the consequences. In this study, copies of carbon matter. One of the risks of engaging with several inscription devices was that they might get out of sync. *Once data was multiplied, they existed ontologically multiply. One might be altered, the other not. Or they might both be altered – but differently.* This is where difference between carbon representatives can be identified. Several carbon representatives all claiming to represent exactly the same emissions of a GCE in a given year. We can now see multiple carbon emissions representations. And we have seen above that within each representation multiplicity exists. Thus, we find a *multiple multiple*. Within different (a) inscription devices (ESDR[29], a spreadsheet, another spreadsheet, a printed version) (b) carbon representatives could be differently reconfigured. In principal, the mobilisation of a carbon representation allowed its replication to end up in various apparatuses and, thus, in multiple phenomena. Imagine Mol meeting Barad. Each apparatus would configure carbon differently.

What we found now is a fundamental technique used by EMS-Team members: duplicating data to process it. This involved backups, it involved tests of carbon representations, it was to end up in final accounts of carbon emissions. This form of multiplicity could be called *multiple-as-duplicate*. Multiple-as-duplicate versions (all

[29] And ESDR did exist multiply as well: in the main body of this text I refer to ESDR as a singular. This was technically wrong. In brief: ESDR was a data container. And the data container had been copied. Several ESDRs existed. In my job of improving the configuration of ESDR I mostly tested configurations within a test-version of ESDR. For the training workshops for GCE's environmental managers, Dieter used a training version of ESDR. Sometimes local agents entered their data in the wrong ESDR. This caused confusion. Even entering data in the 'correct' ESDR did not guarantee that every top ESDR user would be able to access the data. The single 'correct' ESDR was running on several servers. A load balancing mechanism was used to synchronise within this single ESDR. This single ESDR could, thus, experience multiple memory states at the same time. For a further discussion of this issue, see below, Section 6.4 (entitled *Temporality*).

representing one entity) could be treated differently.

The duplication from one inscription to different devices is possible because carbon is fluid. Mol and Law (1994, 661) use the notion of fluidity to underline how the notion of networks coined in early actor-network theory (ANT) is also limited. They point to

> a difference between fluid and network spaces. For in a network things that go together depend on one another. If you take one away, the consequences are likely to be disastrous. But in a fluid it isn't like that because there is no 'obligatory point of passage'; no place past which everything else has to file; no panopticon; no centre of translation; which means that every individual element may be superfluous.

To conceptualise carbon as fluid emphasises that carbon representations can be duplicated and translated to various inscription devices and other actants which carry data. Stabilising carbon requires trying to control this fluid. Data can be adjusted. Spreadsheets can be deleted. SAP can substitute ESDR. People can be schooled to handle carbon 'correctly'. Data can be fitted into the CWC Ranking. Just like medical information, environmental information is shifting its shape and fills the respective forms through which it flows (Moser and Law 2006). All these locations, processes and flows need to be stabilised to get this characteristic of carbon under control, i. e. to ensure the identity of multiple carbon representations which all represent the emissions of a company at a given year.

Duplicated representations – techniques of accounting For Frederik the multiplicity of representations constituted also a problem and, I would argue, even a threat. Once, in the midst of my fieldwork, I had asked Elise to forward some environmental balance sheets, in order to experiment with using their data quality inscriptions for calculating the data quality relative to the amount of emissions. Later that day, when I was talking on the phone with Frederik, he

Field Note Extract 6.3.a (Ditching balance sheets)

> *refers back to the environmental balance sheet which Elise had sent me earlier today: 'best would be to ditch them'; they are old. And new ones are available.*
>
> *[Later on I noted on this occasion:] Frederik told me not to distribute them; he does not like when people ask him about balance sheets, which he did not send out. Everybody should have the same balance sheet.*

Environmental balance sheets were a key inscription device for carbon emissions. This was the reason why I was using them to do the calculation experiment. At the same time, the uncontrolled proliferation of these inscriptions constituted a potential problem for Frederik. He was the formal source of all environmental balance sheets. However, if versions of these sheets were circulated that he had not approved of potentially competing carbon representations would be on the loose and could threaten the authority of those inscriptions which claimed to represent the same but were not joined up. Therefore Frederik asked me to get rid of these sheets. He wanted me to use

the official spreadsheets. In a way we could think of him as trying to domesticate the wild emission representations out there. Ditching emissions constitutes waste – again, *matter* out of place. These carbon emissions were to be excluded from reality. Humans consider certain carbon emissions not valuable.

The environmental balance sheet form provided information to support the EMS-Team *against* the proliferation of various versions. They had added several identifiers at the top of balance sheets. As a result, a balance sheet was not only considered to be identifiable through the name of the GCE and the year for which emissions have been reported but also by the date and time of the ESDR report upon which this balance sheet was based. Thus, to identify carbon emissions the *context* was considered relevant. Moser and Law (2006, 62) say: '[w]hat is important here is context-sensitive, if not context-dependent.' In the real world the emissions of an organisation of a given year exist in different versions. As the environmental balance sheet shows, emissions have a version. *Version: 20.04.2009 10:22:42* (see page 176). Con-text matters. These versions are not solely the effect of 'interpretive flexibility' (Bijker 1990). These versions are the real phenomena produced in differing apparatuses. Many of these versions are not simply pro*vision*al. They are not simply about looking beyond a threshold, preliminary. Much rather, they are the effect of a movement: data moves on. A particular data-point has a place in time, it moves through the apparatus. Behind it (spatially, temporally), the datapoint may have changed. Meanwhile, any data seen is visible because it got there or was made to be seen there before one could see the next data coming in. Data was always moving ahead. German language offers a concept to grasp this better than provisionality: the adjective *vorläufig*, *vor-* (pre-) and *laufen* (walking). It indicates that something is moving ahead of something else. Carbon data is always ahead of carbon data. One version follows another. Differently versioned carbon representatives link to a different amount – if not even kind – of matter. 'Mutability is the order of things.' (Moser and Law 2006, 64) Thus, in order to know the status of a carbon emission representation you need to know its relations to its authors. Are these emissions abandoned, are they wild, are they domesticated, how, by whom? Not what is their 'best before' date, but what is their production time stamp?

However, even though members have designed environmental balance sheets such that they could better cope with the multiplicities they enacted, the ideal was still that out-dated emission information would be forgotten. Kalthoff (2005, 81) relates this ideal to the materiality of information. By storing emissions in documents or files data can be stabilised – as well as deleted or destroyed. How many carbon emissions have been trashed? For members the possibility to delete files and to update fields carrying data within ESDR was a convenient technique to forget the specificities of emission realities. Of course, in order to prevent 'erroneous' multiplicities from mattering, data, ideally, would be entered and translated only as a singular. Rowland and Gieryn (2008, 378) observe: '[t]he likelihood of errors on data-entry is reduced if the data are entered only once'. Less data translations – and less moments conceptualised as

data-in-contact-with-humans – was seen as resulting in more singular data.

However, even if strategies for enacting less multiplicities in carbon emissions existed, after all, several inscription devices and multiple inscriptions existed. Within GFQ many carbon stories travelled and rested. To a large extend, once leaving the main stream of carbon flow, stories could quite peacefully co-exist. And they could be read more or less independently. This is true for both, within and outside GFQ: different members could access multiple versions of carbon and would not need to fight. And, say, competing investors could read multiple GFQ carbon accounts and decide for themselves of how to react to the carbon reality they have been confronted with. In contrast to Mol (2002) discussing the treatment of an ill patient, the carbon emissions diagnosed do not need to be joined up into singularity. There is no singular emitter. GFQ's emissions are performed at globally distributed locations – at each location differently – each time differently.

Thus, through different practices and apparatuses different carbon phenomena are produced. Carbon emission data is not immutable. And it is mobile. On its ways, it changes its shape and it is duplicated. We are not simply seeing either 'immutable mobiles' (Latour 1987) or a 'mutable mobile' (Mol and Law 1994) but *multiply and multiple mutable mobiles* that are not floating within a single fluid; but carbon data flows and data may leak, leave the main stream or the reservoir and flow somewhere else or be trapped in a little tarn. The fluids may be disconnected and start to exist independently from each other. Carbon fills a space with movement, rather than existing as a singular stable point.

At GFQ, carbon did not have to be coherent. Its heterogeneous agents left carbon incoherent. While Mol (2002, 87) describes how multiple enactments were able to exist in tension but without conflict (just like the observation of Frederik singularising data by putting multiple results in the same shape and, thus, rendering the multiplicity unrecognisable), I like to stress that carbon emissions may be simply so far practically detached, that nobody would even consider conflict. Competing emissions might be stored in the same mailbox and this might not constitute a problem because agents would not connect them through any practices. Mol (2002, 88) also observes that multiplicity may exist if the diseases are not conflictingly practically connected. 'Work may go on as long as the different parties do not seek to occupy the same spot. So long as they are separated between sites in some sort of *distribution*.' The aim in the hospital is intervention (in disease) rather than in struggling over consistency of facts. As long as in the practices of intervening in the disease there is no conflict, the multiple diseases can coexist. For both cases, Mol's study of atherosclerosis and my study of GFQ's carbon emissions, the visualisation of the status (disease or carbon) is key. While different hospital techniques enact different diseases and, as it seems, this multiplicity has to be joined up in a single treatment decision, carbon emissions do not need to be treated singularly. The distortion created by the discursive presence of Interlude II is caused by making the multiplicity of carbon emissions *visible* rather than

their ontological existence within GFQ. For an environmental manager it is important that the multiplicity of emissions is contained, accommodated, because it is not only the case that members contain emissions (representing them) but also that emissions contain agents: emissions are related to the agent formally considered responsible for their representation. Here is an intransitive relation. The emissions to be ditched are not simply waste, they are toxic waste: they may constitute a problem for those agents responsible for their enactment. And toxic waste may be having effects on people's lives or, in the case of carbon pollution, on sea-level rise even if nobody is able to locate the waste. Considering the structure of the field and recognising that Frederik only temporarily occupied the position as GFQ's environmental manager allows us to move a step further. The multiplicity of carbon emissions was not appreciated. And these emissions were containing Frederik. When Frederik was substituted by Jack, towards the end of my field work, Jack was positioned as able to construe the troubling multiplicity of emissions as linked to the body of Frederik rather than to their bodies' position in the network. The responsibility for duplicate emissions could easily be linked to specific actants rather than to their positions. This would allow to not question the relations between positions and the structuration of the network.

Dividing meanings – techniques of giving an account GFQ performed itself as emitting a specific amount of carbon each year. Above, we learned that carbons are produced through multiple practices and heterogeneous ingredients. Selected versions of carbons are translated from one inscription device to another. Finally, not a single carbon fact is produced but multiple ones. However, GFQ took great emphasis in construing these final facts as joined up. Singularities are presented. 'Each GFQ employee travelled on average 488.41 kilometre (km) by train in 2006', would be a typical one.

Interestingly, the sums of carbon emissions were divided in these final accounts given. In line with the language in the carbon accounting universe, a final carbon sum was split up in three different meanings. Here is an extract from an environmental balance sheet's last sections, representing 2007 emissions:

7) Direct and indirect GHG emissions of 6) in tons (kg per empl.)
7a) GHG emissions of direct energy use (6a)
7b) GHG emissions of indirect energy use (6b)
7c) GHG emissions of other indirect energy use (6c)

Artefact 6.3.1: Divided Meanings in Carbon Sums

Most environmental balance sheets included this differentiation. Members enacted this differentiation by drawing on the carbon conversion factors which specified what kind and which quantity of these three types of carbon emissions was linked to an indicator. For example, VfU's short-haul flight carbon conversion factor introduced in Table 2.2 (on page 101) was constructed of these ingredients: 0.165 kilogram (kg)/km are direct emissions from burning kerosine and an additional 0.161 kg/km are indirect

emissions related to the production of an aircraft, infrastucture, maintenance, operation and kerosine. The result is 0.326 kg/km for short-haul flights (VfU 2007, D2-EF GHG). On a sunny monday Victoria explained that WBCSD simply did not add the indirect emissions caused by flying to the direct emissions caused by a flight. According to the indicator table, for short-haul flights the indirect emissions caused are nearly summing up to half to the direct emissions caused by burning the fossil fuel. Utilising this difference between standards, GFQ used the lower WBCSD factor.

However, these differentiations within carbon were not enough for some members of the EMS-Team. In winter 2009,

Field Note Extract 6.3.b (On real and offset emissions)

> *Frederik told me that GCEs in Germany and Australia offset. He thinks, GFQ should show this. The standards require GFQ to separate real carbon emissions, offsets and their result.*

For Frederik it was nearly effortless to add a line in the environmental balance sheet template and account for this additional differentiation in meaning. Adding offsets to real emissions is a simple calculation for Frederik and for a spreadsheet. The reproduced environmental balance sheet (Artefact 3.3.5) provides a view on the adapted balance sheet. Further carbon sums are presented. Thus, GFQ's agents did not only perform final carbon sums but also even more final carbon sums – those sums from which offset amounts had been subtracted.

Here is, I argue another form of multiplicity. Carbon is not only the effect of doing commensurability. Frederik is telling a narrative about incommensurability: some carbon sums differ from other sums because they include performances-outside-of-GFQ. Similar to the observation by Mol (2002, 71) that doctors may not treat the disease of a patient, but the illness of a patient which may be located in the patient's family: she tells of a patient whose children want treatment.

> Such different elements together make a patchwork. A patchwork singularity, the disease-to-be-treated of a specific patient. A composite reality that is also a judgement about what to do.

A carbon sum can be considered such a composite reality. It is an assemblage enacted and produced by means of varieties of qualculations. GFQ's carbon not only includes the NGO GGCA or their auditor AfC. It also includes the qualculations by Frederik who related to reference entities, standards. Using their legitimacy, he achieved another division within the assumed homogeneity of carbon: environmental balance sheets were enriched by several further lines, adding new sums. Not only is there multiplicity in the process of doing commensurability and in the existence of many carbon emission representations. There may also be multiple post-commensurability divided meanings attached to carbon. Some carbon sums claim to represent actual emissions. Other carbons are called 'final' and represent carbon sums and their qualculative post-operations. A problem, in this respect, is of course: various carbon enactments may be interfering

with other realities. When Victoria once asked the EMS-Team whether certain numbers are real, the reality of data production and the reality of epistemological norms clashed. Again, Mol (2002, 149) helps to make this point explicit. While she discusses what it means to say that a disease may interfere with the enactment of sexes, I like to underline this: each of the configurations of these two realities, i. e. the reality of data production and the reality of epistemological norms, reciprocally shapes one another.

♢ *End of Section* ♢

This discussion on the multiplicities of carbon emissions agrees widely with the work undertaken by Mol (2002). She emphasises that by closely observing practices the objects which practitioners engage with multiply. This book indicates such a kind of multiplicity as well. Carbon experiences shape shifting from location to location, over GCEs, over focus on carbon as emission, as data exercise or in terms of measures and carbon experiences shifting shapes over time: the EMS is transformed, some technical devices are substituted, many humans left the apparatus. Carbon is enacted in practices and different practices enact various kinds of carbons. The main focus in this book, however, are two other kinds of multiplicities which might be more specific to carbon as *digital representation*.

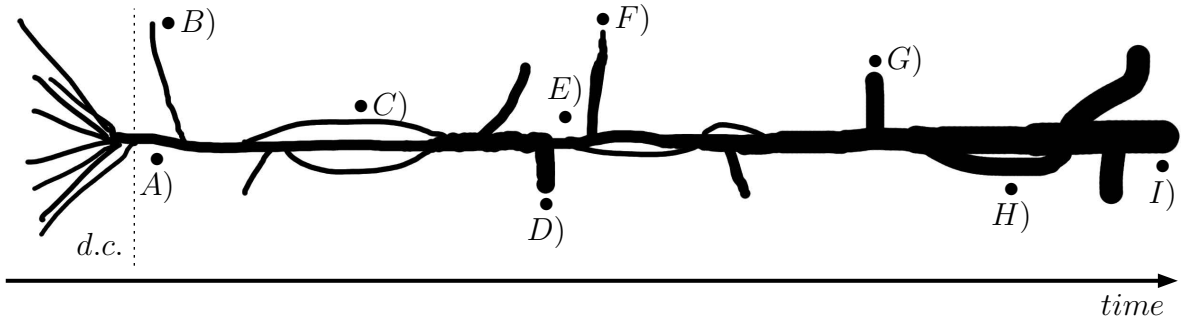
To recap, Mol (2002, 61) showed that under specific conditions, practitioners may manage to enact an object as joined-up, as single. Enacting an object, in her version of multiplicity, may require much work of coordination. 'Coordination into singularity doesn't depend on the possibility to refer to a preexisting object. It is a task.' (ibid., 70) Thus, singularity is an achievement. The same is the case for the carbons I observed. Various versions of carbons are 'added up, subtracted… fused into a composite whole' (ibid.): members tried to enact carbon as a singular fact and they tried to transform the EMS into a singular and simple organisation.

The study of the enactment of corporate carbon emissions also indicates that the multiplicity identified cannot be reduced to many representations and perspectives on carbon existing. Rather, carbons are inseparably constituted within practices and practices are not all joined up. Carbon is not one object. Making it coherent needs work by different workers. However, in a key respect, carbon differs from Mol's discussion of a disease. In her case, the various practices constituting their versions of a disease and a body were to be joined up in a single body to be intervened in. A question which Mol does not discuss is this: what happens to the body which dies because of a completely different disease before it can be treated for atherosclerosis? If the body was of interest for different practitioners, the latter might make this body travel all over the world and the body might, eventually, not be joined up. This is what happened, at least partially, to Agnes – famously engaged with by Garfinkel (1967). To carbon, this is what happens through and through.

Carbon is materialised as digital data. Therefore, it has an ontic ability and tendency to exercise mobility. Data even moves without being changed on the server: copied every day to a backup device, defragmentation of file systems. When carbon travels it

can change on its ways. Inside nested and overlapping databases and outside. Where does multiplicity of carbon contrast with Mol's? In duplication and movement. Carbon sums are duplicated. A file is copied, sent by email, entered into a database. Suddenly, many copies exist which claim to represent the same entity. Here is a *flow* of statements. While flowing, these statements *adapt* to the forms through which they form. However, on the way, the stream can be *split*. The main stream of carbon statements within GFQ did not always join up again with its bourns or becks of carbon data. The geographic dynamics of data flows produced inlets which resulted in dataholes. Members worked heavily on keeping the data flows in check. Nevertheless, the EMS was based upon multiple data flows. There is an in-built contradiction between keeping singularity of versions and spreading the information. GCEs were asked to send versions to the HQ and actors within the HQ required repeatedly carbon emission information. Here is a story showing that multiple, non-identical and non-coherent enactments of the same thing, i. e. claiming to represent the same, exist. A single coordinate, a single designation, names the supposed singularity: GFQ's carbon emissions in 2008. This is supposed to relate to a single number. However, in practice there are many numbers. GFQ's carbon emissions in 2008 fact exists multiply. Figure 6.4 visualises *schematically* the flow of carbon information. Each point (right of its separation line on the left) in the central stream and its inlets claims to represent the same: GFQ's carbon emissions in 2006. The width of the central stream indicates the quantity of the carbon emissions at a point in time. However, at each point different numbers may exist. I observed no mechanism within GFQ ensuring that the pasts' emissions grow (or for that matter, do not grow) – as they did in some of the GCEs.

Figure 6.4: Schematic Data Flow of a Singular 'Fact': thickness of the line symbolises the amount of carbon emissions. The y-axis indicates an unmeasurable (thus, no scale) degree of otherness relative to the central fact, i. e. relative to EMS-Team's central maintenance of the emission fact. At each point (A to I) I indicate cross-sections (discussion below).



By using this figure I illustrate key qualitative characteristics of carbon data flows. Left of the dotted line the area indicated as *d.c.* the figure depicts the phase of 'data collection' (d.c.). GCEs entered their data into ESDR and this would, after a while, result in a carbon emission fact, 'A)'. Members differentiated the phase *d.c.* from

everything afterwards. During *d.c.* no adequately complete knowledge about GFQ's carbon emission existed. Afterwards (after the line), such factual claims could be made. However, this fact may become outdated because another GCE might suddenly be bought up and this GCE's emissions ('B)') would be added to GFQ's carbon emissions. During a data adjustment loop, the emissions of GFQ looked quite differently – they were 'C)'. This small flow of data was, after another while, linked back to the main stream of facts. Fact 'D)' indicates GFQ's emissions when it still included a huge GCE. This fact was quite wide spread within GFQ. It existed in many locations and documents. However, 'E)' indicates that after only a short while the EMS-Team managed to subtract the huge GCE's emissions from the fact representing GFQ overall. Thus, the emissions are much smaller at that moment of reporting GFQ's emissions for 2006. Fact 'F)' is presented to an investor. Maybe these emissions are smaller. 'G)' refers to an inlet of data flows – these are the emissions reported to the CWC Ranking. It did not differ much from the main stream of facts claiming to be identical. However, this fact was never linked back to the central stream. In contrast, 'H)' was a fact stream incorporated after a while in the main stream. At the moment you are reading this book, 'I)' might be the claim GFQ makes about its emissions in 2006.

If I illustrate here the counter-intuitive shape of mutable and multiple facts, all claiming to identify GFQ's carbon emissions of 2006, I also need to repeat what we saw throughout the analysis: at each location, when members interact with a carbon version the latter is treated for all practical purposes adequately. The EMS-Team perspective on this was that mostly engagement with data was accepted. Only rarely was complete non-adequacy identified or made accountable within the team. Yet, what adequacy meant differed from location to location. Doing data adjustment differs much from providing suitable responses for CWC Ranking carbon ranking.

How can this complexity be defended? Mol (2002, 74) discusses the point of physicians' relation to the object they treat. When attending to a patient's disease they 'do not need a reproducible fact: what they need is a decision.' Albeit carbon facts were not necessarily used for decisions,[30] these facts were also not to be designed merely according to the criterion of being reproducible. Rather, fact production practices were shaped to produce *acceptable* facts. For example, the EMS's transformation was supposed to produce hard enough facts for GFQ's powerful circle of all its COOs.

Mol (2002, 88) emphasises that *manyfoldedness* does not imply necessarily fragmentation. The notion of central and main stream I used to describe Figure 6.4 indicates the same: different objects hang together. However, there is no single treatment decision at the end. Although close, my analysis differs from Mol's (ibid.). This is:

> what I would like the term *multiple* to convey: that there is manyfoldedness, but not pluralism. In the hospital *the body* (singular) is *multiple* (many).

[30] Although, investors might decide about their investments in GFQ and they would relate to completely different carbon facts about the same entity.

The analysis of carbon emissions, in contrast, shows a decisively different picture. In the corporation its *carbon sums* (many) are *multiple, mutable* and *mobile* (many, changing and travelling). These facts are not necessarily joined up and GFQ is treated quite differently from formally independent actors – investors, consumers, statist regulators, partially reacting to different carbon sums.

However, the normative comments of my analysis has to be in parallel to hers. Mol (2002, 115-117) points out the contrast between science and the hospital: while in science, coherent facts are sought and, thus, laboratories are sought to copy each other, in the hospital incoherences are distributed over space, over different sites. She says: '[t]hat the ontology enacted in medical practice is an amalgam of variants-in-tension is more likely to contribute to rich, adaptable and yet tenacious character of medical practice.' Similarly for GFQ: that the carbons enacted in the practices of environmental managers are multiply connecting versions and realities of environmental effects and representations is likely to contribute to a rich and adaptable character of environmental management practice. Its agents are equipped with the knowledge resources to tell more situated and, thus, more objective stories about their organisations' carbon emissions. Not telling these stories of the complex and cyborg character of carbon is confining publics' possibilities to relate informed to corporations' multiple carbon emissions. This book provides a mere draft of such a story. I can only point to some of the relations existing within the corporation which enacted carbon emissions. There are many more stories to be told of how corporations, state authorities, investors, scientists and NGOs affiliate themselves to corporate emissions (cf. Suchman 2005).

6.4 Temporality

Doing carbon is much about knowing the past to situate the present and decide about the future. Therefore, this section draws together critical characteristics and implications of carbon emission enactments as taking place *within* and *upon* time. Time constitutes a level of analysis not only emphasised by sociology of time but also recent scholarship in Science and Technology Studies (STS) (Suchman 2007, 283-286). In the case of carbon, timing and temporality matters from the nitty-gritty to widespread concerns. This section analyses sites at which time interferes with carbon to argue that doing carbon can well be grasped as a form of temporal engineering. This matters not only now and for me but because it shapes which pasts, presents and futures matter when and how. To address timing and shifting carbon through time I build on the work by sociologist of time Adam (2000) and legal anthropologist Riles (2010).

I set out from a seemingly 'only' technical concern about GFQ's central environmental database: ESDR existed in multiple versions which needed to be *synchronised*. Analysing a moment of asynchrony draws attention to members and GFQ having to accomplish an *adequate* synchrony of carbon emissions and understandings. In order to achieve such a state, the Environmental Management System (EMS) and its agents enacted a

particular cyclic time frame which was used to orientate the globally distributed agents of ecological modernisation within the universe of GFQ. A discussion of the repeating cycle of data construction points to the temporal division of labour. Finally, turning to the understandings of members about the right time for emissions and emission reductions allows us to trace the link between members' practices and the intended and unintended global materialisation of carbon emissions.

Synchronising carbon Above we have encountered the multiplicity of enactments of carbon emissions. One way in which carbon emissions have been multiple was their storage within the database ESDR. This database was not singular: several active versions existed for different purposes – training, testing, qualitative sustainability reporting and carbon accounting proper. In parallel, passive versions existed – backups – in order to be able restore a carbon memory snapshot of GFQ of a particular time.[31] Addressing the ESDR version, which this book is all about – the one which was to be used and was to a large degree actually used for storing environmental consumption data and elicit environmental reports which summed up carbon emissions – then, again, we encounter multiplicity:[32] ESDR was supported through a system of load balancing. This allowed to better manage computing memory and bandwidth in terms of GFQ's intranet infrastructure.

And this very load balancing feature implied that information stored within ESDR needed to be *synchronised*: ESDR-on-different-servers were supposed to enact a singular carbon memory. Precisely this endeavour sometimes, temporarily, failed. Here is such an instance. We were in the midst of a period of analysing data. Elise called me and reported that she had problems with the reporting mechanism of ESDR. I logged in and wanted to access the carbon emissions report which she had asked ESDR to produce. Here is an extract of my field notes.

Field Note Extract 6.4.a (Load balancer)

> *I did not find her report. This caused me being perplexed. Both of us were logged into the correct version of ESDR. A puzzle. To solve it, Elise offered to send screenshots of the report on her screen. I checked the screenshot and could not identify any problem in it. However, I was not able to identify it in ESDR-in-front-of-me. [...] She sent me the intranet address (URL) to the report she was discussing. And I recognised that she used a different server. [...]*
>
> *16:11 I just talked to David Parker on the phone. I explained the problem and enquired whether the problem was caused by the load balancing mechanism. He explained that between the server that Elise used and the other one, I used, synchronisation could take up to twenty minutes.*

First, we need to introduce David. Located inside GFQ's HQ, he was responsible for maintaining the Information Technology (IT) infrastructure, and as part of this, the database engine, which was underlying ESDR. For him, ESDR was only one of many

[31] See also the brief description of this issue earlier in this chapter, Footnote 29 (on page 479).

[32] In fact, occasionally agents entered data into the 'wrong' ESDR, e. g. into the training version.

applications running on GFQ's multitude of globally distributed servers. I was in touch with him from time to time to coordinate updates of ESDR and its configuration. In the field, I considered him 'my' accessible expert voice about the IT infrastructure of GFQ. Indeed, he was able to provide an explanatory account for the failure of the ESDR version I had accessed in order to reproduce the reporting document, which Elise had created: she had used another server and the relation between her server and mine could result in synchronisation needing many minutes. He added that synchronisation among the servers positioned inside the HQ would need only a couple of seconds. However, Elise had only access to a server positioned outside the IT reality of the HQ (don't ask why...). The large spatio-organisational distance between her server and mine resulted in a longer time period for synchronisation. Long? For Elise the delay was too long. This temporal issue is the topic for the following discussion. However, we should contextualise this problem of having multiple versions of carbon realities within ESDR for up to twenty minutes in the parallel reality of multiple versions of environmental balance sheets☞. The latter could exist easily for days, weeks, months and years. Thus, we are dealing with a temporarily relatively limited multiplicity of carbon.

Making clock time explicit in the analysis of the emergence of carbon emissions promises to recognise some of the hidden work needed to approach carbon singularity. Different versions of carbon needed to be synchronised. Until synchrony was achieved, the realities of carbon reporting at different locations were not totally linked. Adam (2000, 133-134) points us to the unity of time and space. In our case we can see that also in the digital world of parallel computing the reality of spatial difference between memories and calculative centres inside servers had temporal implications. Software engineers needed to enable and configure different ESDRs to actually join up in their representation of carbon. This computing process required IT resources and had to cross organisational and geographical distances. Carbon emerged over time and space. With Adam our analysis indicates that recognising the temporal and spatial context of carbon is important. Against those stances of 'scientific knowledge where de-contextualization is associated with the highest levels of truth or, to put it differently, where truth is inversely related to its dependence on context' (ibid., 134) she asks for making temporal contexts of statements explicit.

Elise, during the process of multiple ESDRs achieving synchrony, experienced that ESDR was not *reliable*. Not only did the database not provide the carbon report she wanted but also I was not able to reproduce her problem because I could not find her reporting command within ESDR-in-front-of-me. In this moment we encountered an infrastructure breakdown. Infrastructure can be identified through such breakdowns (Star 1999). Members would not recognise the infrastructure upon which their work was based if it performed well. However, at GFQ, within the EMS-Team ESDR was heavily criticised also for other reasons. The black box 'ESDR' was seen as trouble. I propose that teasing out the temporal problem we ran into allows developing a deeper understanding of the temporality of carbon and the trouble of enacting carbon.

Studying the enactment of carbon as taking place within normal clock time points to the *duration* (Adam 2000, 136) of parts of members' work. Elise and me were briefly disturbed because we were not able to simultaneously access ESDR-seeming-singular. Because the duration of this disturbance was so long, the fundamental assumption in the field that the carbon emission apparatus is intersubjectively present was challenged. Similarly, Knorr Cetina and Bruegger (2002, 928-929) argue that the role of being able to observe realities simultaneously is key for establishing intersubjectivity in traders' communities. In the case we are discussing this observability was compromised. This discussion was enabled without in any way questioning normal time itself. Rather, we accepted clocks – and for the discussion of multiplicity above calendars – as a 'quantitative objective medium which is external to the events it measures' (Adam 2000, 133). This independent clock time reality bound agents of carbon construction, their database, emails and each other in conference calls.

The original problem which Elise encountered, before we stumbled upon the reality of load balancing (signifying multiple ESDR versions to run on different servers), was also one related to clock time. She had asked ESDR to produce a carbon report. And ESDR did not comply. Well, it did. Though, only after a too long break. Reporting carbon emissions was the designated output usage of ESDR. Its *raison d'être* was to compile the material used by members to produce these technical reports. And Elise had to initiate the production of many of them. For every GCE and not just once. Hence, producing carbon reports swift and without interruption was important for her. She wanted to get her work done. Others would call this focus *efficiency*. At GFQ, carbon emissions were to be enacted efficiently. Saying so means that the effect (an adequate account of carbon emissions) was to be produced with as little amount of normal time as possible. This was part of the temporal structure of GFQ's carbon. Enacting carbon took place in processes within clock time. This interpretation, thus, agrees with Butler (1993, 9-10) that matter should be seen as a 'process of materialisation that stabilises over time to produce the effect of boundary, fixity, and surface we call matter' (quoted without emphasis). In the case of GFQ, we see that carbon turned into matter over processes lasting months and years. However, the moment in which consumption data was multiplied with respective carbon conversion factors and added up by ESDR took only a few seconds. Nevertheless, normally, an environmental report produced by ESDR was not perceived as a proper environmental report itself. It had to be further tended to by translating it into environmental balance sheets and these, again, were to be checked and re-checked. Such documentary work and its hurdles, as Riles (2010, 798) emphasises, 'differed entirely from the up-to-the-minute excitement of trading'. However, it also differed much from the long-lasting non-engagement by GFQ's members with the facts they had produced and set wild, i. e. delivered to organisations outside of GFQ.

EMS-Team members can be understood through their *temporal positioning*. Their work is very much taking place before GFQ's carbon facts are finalised. Actually, their months of work finalise carbon facts. And members were also positioned such

that simultaneously to GFQ's carbon statements existing outside of GFQ they could adjust data and deliver updated carbon emission facts. Insofar as nobody challenged their statements, these statements could be used as base line for future emission reduction negotiations. Law (2004a, 32) summarises such a process well: 'once they are demodalised, *yesterday's modalities become tomorrow's hinterland*.'

The carbon emissions which this book is about are those carbon emissions existing socially, politically and economically: documented emissions. The carbon documents produced are reports for future use (such as in investors' decision making or in emission trading) and they sum up *partial* pasts. Thus, members – when producing or attending to these documents – fold future and past into the present. Riles (2010, 803) observes, similarly, how those legal technicians who attend to preparing collateral documents produce objects which fold the future *into* the present while the document moves through time. The latter is also the case for GFQ's carbon emissions. These well designed time-related objects (each carbon emission statement is specific to an emission period) moved and *still* travel through time (cf. Kalthoff 2005, 80).

The temporal framing of carbon While the prior discussion, based upon the reference frame 'clock time', allowed us to recognise how members practices were based upon establishing intersubjectivity, performing carbon emissions efficiently and spreading stabilised objects into future, this perspective is still limited. With Czarniawska (2004, 775) we can widen our perspective by not simply engaging with *chrónos*, the Greek impersonation of time, but also with *kairós*, the Greek signifier for the right and opportune time (cf. Rämö 1999). The practices of carbon enactment are not restricted to the enactment and emergence of carbon emissions on clock time (cf. Riles 2010, 801), but further temporalities exist. The subsequent discussion turns to such an alternative temporality present among members (i. e. others than clock time). I draw heavily on the work by Adam (2000, 136).

> *Time frames* can be of a natural cosmic kind such as years, seasons, moons, days and tides. Alternatively, they can be of an embodied kind such as cycles of reproduction, digestion and cell renewal. Finally, they can be of a cultural kind, the way we have already encountered them above in the form of calendar and clock time where years, months, weeks, hours, minutes and seconds constitute the frames within which social activity is conducted.

Of course, members *experienced* days and nights. Those individuals workers in the CSR unit of GFQ who often stayed until 10 pm clearly recognised how others called it the day around 5 pmish. Law (1994, 120) provides an account about the workers in a lab alike mine: even working on a sunday – a holy day in the Western universe, the day for the Family – happened at GFQ's CSR unit. 'For when you perform, clock time loses its sense and significance. You work until you drop – a fact which also had ethnographic implications.' Still at the HQ office, I repeatedly experienced how my body let me know at the end of a day that I should stop transforming the days' observations into digitalised

field notes. GFQ's workers' employment relations were co-constituted by their contracts, often including working schedule specifications. Thus, around the EMS-Team all these types of time frames can be identified: days, bodies which experienced getting tired and monthly working hours. Latour (1993b, 74), however, underlines the potential precarious status of such frames. 'Time is not a general framework but a provisional result of the connection among entities.' In contrast with seemingly unproblematic temporal phenomena, the following may sound puzzling to some students but is taken as self-evident by bureaucrats in all kinds of modern institutions.

Field Note Extract 6.4.b (Year will come to its end shortly)

> *Victoria declares: 'after all, this year ends in one, [or] two, weeks'. The reporting period☞ for 2008 starts in February.*

This was in early 2009 – to be exact on the 21st of January. Victoria provided this statement during one of the regular meetings of the EMS-Team. In this meeting Victoria, Frederik, Dieter and Elise discussed the status of data collection. Again, as introduced above, members used temporal coordinates to create an intersubjectively shared reality. However, this time, the temporal frame referred to another temporality: the temporal structure of the EMS's carbon data management process.

> *Temporality* denotes the time *in* things, events and processes which is unidirectional and irreversible: we grow older rather than younger; cars rust; growth is followed by decay. (Adam 2000, 136)

The EMS-Team had structured the time in their process of data management into *differing phases*: e. g. training local agents, data collection, feedback loops, producing environmental balance sheets, analysis, producing *the* Environmental Report. Insofar as they viewed time as always proceeding, they went along this line again and again. ESDR was designed to allow the input of environmental consumption data only for one reporting period (e. g. the consumption undertaken in 2007). If HQ's agents wanted to collect data for a later reporting period (say 2008) then they needed to reconfigure ESDR. This could be technically managed by any of ESDR's administrators; however, only one of them was supposed to do so. This was a serious reconfiguration. Albeit technically simple, a couple of clicks and typing a few numbers on ESDR's administrative interface, it had huge consequences: GCEs could only enter data for the single reporting period in which ESDR was running. Changing this data was, thus, contested. Some GCEs wanted the HQ to extend a period in order to add further data representing further emissions. Thus, the time *in* ESDR came to matter with respect to the amount of carbon emissions associated with a certain reporting, i.e., pollution period. The frame that Victoria referred to was, hence, a *key coordination mechanism*. This temporality achieved the linking of consumption/emissions to a time period. It can be considered the kairotic infrastructure. Even though a reporting period would be located in clock time, the organisational narrative about carbon emissions was organised in a kairotical account (cf. Czarniawska 2004, 776). Members related their practices very much to this temporality – the reporting period inscribed into ESDR. The EMS-Team conceptualised

its current practices through a *cyclic* and *rhythmic* story: ESDR would be reconfigured to collect data *into* a new reporting period – a brief moment, taking only a moment of a server's calculation power; a hectic period of data collection afterwards, mostly early in a calendar year; a long period of data processing, reporting and analysis. And the temporality in this time frame was configurable; flexible to the needs of (selected) members. A reporting period – above Victoria referred to the period of consumption undertaken in 2008 – could be configured to start on the, say, 16^{th} of February, or the 23^{rd} of April. Here is a clear example of the character of carbon emissions being constructed and structured in their temporality. The durability of carbon is partially constituted through the particular ordering practices which took place over and which inscribed time into the material (cf. Law 1992). The quality of carbon emissions as versioned was temporal; emissions were time-stamped. Only the most recent emissions were *to be* seen as valid. The specific temporality of versioned carbon thus is a means to *connect* carbons and *file them away* (Latour 1993b, 75).

Focussed events in time, such as the reconfiguration of ESDR's reporting period, but also the global publication of all the rankings produced by the CWC Ranking organisation, synchronised the 'collective emotional arousal' (Knorr Cetina and Bruegger 2002, 930) of members. This was another factor which enabled actors to experience themselves as a community. The data management cycle was structured through such events. Thus, time periods within the EMS-Team and within ESDR were configurable with respects to their beginnings, ends and pauses. The data management time frame was *enacted* by members alike many other things (cf. Adam 2000, 136).

The cyclic quality of this temporal infrastructure enacted and drawn on by EMS-Team members rendered all the carbon emissions produced during a reporting period into what Riles (2010) terms *placeholders*. With this notion we are able to grasp a key part of the quality of carbon statements. Like a legal fiction, carbon emissions are created to *overlook* them. A legal fiction is a way of legal technicians to make an assumption about a certain status of which all participants know that it is merely an assumption and, thus, its truth value is not of interest. I like to argue that carbon emissions statements have a similar status in the practices I observed. Riles defines placeholder in this way:

> the placeholder's central feature is that it forecloses the question of the moment for the near future, not by resolving it, but by papering over it, we might say, by creating a dummy solution subject to future reevaluation. [Thus, the] placeholder is a tool of forgetting, of putting to one side. (2010, 803)

In the future, the problem may be reopened, reevaluated. However, for the moment members accept the placeholder as a solution.[33] In the case of GFQ, we can see that carbon emissions are precarious and uncertain statements which are made for future use but refer to the past. Members would argue that the hegemonic discourse on climate

[33]Similarly, if you ask corporate or national carbon accountants, they will recognise that all figures they deal with are not about being true or false but about producing a placeholder that allows the process which requires that data to take place (such as the hegemonic approaches to 'save' earth).

change assumes that protecting 'our' future from global warming (GFQ claimed to fight warming to a level over two degree celsius than 'now') requires data about the past now to be ready for *near future* practical action. The notion of placeholder, thus, allows us to extend our understanding for what we described earlier with Lampland's (2010) take as 'false numbers'. False numbers only serve to get a quantitative administration system running. Once it runs, numbers' truth value is of interest. Placeholders, in contrast, may continually exist, forever shifting problematisation into future. During each run of the data management cycle, the rationality of the EMS assumed, subsidiary agents would *learn* to improve the quality of the data they collected. Power's (1999, 85) account of environmental management systems notes this as well: these systems are promise to engender organisational learning. Each carbon report was a placeholder for zooming into the actual operations and environmental dynamics of GFQ. Carbon statements allowed to proceed seemingly acting upon climate change while shifting reevaluations of the problem into some, promised, near future. To manage carbon well meant that carbon managers learned to promise learning.

Carbon increasingly appears as an exercise in time, with time and about the future (cf. Riles 2010, 801). Exercising carbon involves a 'temporal division of labour' (Knorr Cetina and Bruegger 2002, 929). While Knorr Cetina and Bruegger refer to the community of traders passing their option accounts to their colleagues in another time zone, the division of labour of enacting GFQ's carbon account is one of passing carbon accounts from environmental manager to environmental manager in a future reporting period. And there is the temporal distribution of labour of GFQ, financially enabling globally environmentally and climatically disastrous industrial operations – while excluding those from GFQ's carbon accounts – and shifting the engagement with any catastrophes as well as more subtle chronic illness and damages to future generations as well as to those classes and individuals affected (e. g. in the global south) who may not, in time, be positioned to make GFQ alter or stop its conduct.

The exercise character of GFQ's carbon emissions enactments was underlined by its creative engagement with the sequence of reporting periods in ESDR. Sometimes, in some presence, members recognised that consumption data was not correct or that a GCE has been sold or bought. Such occurrences were taken as necessities to update and adjust GFQ's past carbon accounts. Frederik would then briefly reconfigure ESDR's *temporal coordinates*, carry out the required changes, and restore ESDR into another temporarily correct reporting period. For whatever politics, it is clear, to tell a new kind of future, a new past has to be created (Haraway 1991b, 41). In carbon accounting, as in gambling, '*time* is a critical site for technological intervention' (Schull 2005, 66). The temporal problem of adjusting data, thus, did not cause any kairotic breakdown. Such a solved problem was to be forgotten. The Japanese legal workers, Riles (2010, 801) describes, would say '"Owarimashita." (It is over).' Like in her setting, at GFQ, interest in *past* problems was enacted as strange, it was Othered. The norm was to not reopen any problem. The conundrum this creates is, of course, that environmental and

social problems such as climate change occurs here and now, in pasts and in all kinds of futures. This kind of nightmarish problem is and will reopen itself. So, maybe it is better to attend to the problems *now*, rather than continuing present practices of shifting attention to them to *far* futures.

Timing emissions Beyond the problems discussed above, carbon emission statements were also structured in terms of the temporal coordinates of emission reduction. Emissions and their reductions were to be *temporally aligned*. With the following field note extract I explore how it matters that carbon entities were to be temporally aligned. By way of engaging with the normativity of proper temporal alignment, I relate GFQ's carbon practices to wider enactments and politics of global carbon management. In a phone conversation, Elise told me

Field Note Extract 6.4.c (Saving more emissions than possible)

> *she is working on Korea. There's something amiss. 'That bites! . . . Somehow he saves more that he has.'*

Here is the story. Elise checked carbon data. She looked at data, representing the Korean GCE. And she found a problem. A problem which can well be understood through studying its temporal configuration. The assumption was that the GCE had had emissions in its *past*. GFQ had set itself emission reduction targets. In members' logic, ideally, emission reduction measures were used to actually reduce the amount of emissions. Thus, the general norm was that emission reduction measures were welcomed by the HQ. In the phone call, Elise was pointing to a qualification of this general norm. The amount of emissions reductions *planned* was not to be larger than the amount of emissions emitted in the past. Saving emissions which could not be accounted for would have been a problem. Even though in this case the data might have simply been 'wrong', we can see here that emissions were situated in time. When do emissions take place, when are they reduced? When is the base year? Ideally, past emissions would fit to future emission reduction aims, plans. GFQ would not be able to achieve its aims if its easy efficiency gains were located in a time which was located outside the time frame targeted by the EMS.[34] What we find in this instance is a kairotic organisation of the proper timing of emission reduction. To discuss this, I temporarily treat carbon emissions as a black box – inside which we have encountered a plethora of stabilities and instabilities, contestations and many moments of not questioning, multiplicities and achievements of singularities.

I argue that Elise pointed to a tension within the carbon management infrastructure. For any infrastructure to work, gateways are needed 'that permit the linking of heterogeneous systems into networks and internetworks' (Jackson et al. 2007). In our case, carbon can be considered such a gateway which allowed all kinds of systems within

[34]This has also been a tension which environmental managers of other multinationals told me about during my phase of establishing and negotiating field access. An environmental manager who has to achieve emission reductions or other forms of environmental improvements has a hard time in achieving these aims when all kinds of cheap improvements had already been carried out in the past.

GFQ as well as with seemingly 'external' organisations to perform the service of doing carbon management globally. To run smoothly, planned carbon emission reductions by a GCE were not supposed to exceed its emissions. A total *negative* amount of carbon emissions by a GCE was almost deemed suspicious. My analysis does not suggest that such a negative sum would constitute a chronological problem. Rather, I propose to consider the tension a kairotic issue. For a carbon narrative to seem sound, within GFQ (in contrast to, say, HSBC), members considered the claim of carbon neutrality (i. e. no carbon emissions) or a negative carbon balance counterproductive. Within GFQ non-positive carbon balances were perceived as *naturally not possible*. After all, companies emit. I venture that for Elise it would have constituted a violation against the natural order of business and production to construe non-positive carbon sums. Such sums would have undermined the possibility of carbon quantities to perform their roles as gateways in the global mechanisms of carbon management. If we imagine ourself taking the place of Elise we might feel the sensation – ouch! At least I experience an embodiment of the temporal logic of first emissions taking place and, subsequently, planning emission reductions – at maximum planning emissions reductions as much as the amount of emissions identified. More planned emission reductions have to be aligned to future emissions. Thus, planned quantities of negative emissions would have to be postponed to next reporting periods. These latter temporal containers were the connector for the alignment of emissions and the measures countering them.

Thus, the story is one about the *tempo* of reducing emissions. Adam (2000, 136) defined tempo as 'the speed and intensity of actions, processes of change and transformations'. The emission savings by the Korean GCE had been too fast. The intensity of greening was to be limited at least to the amount of reported emissions. A GCE ought not construe itself as greener as a climate neutral player. Carbon emissions, thus, have not only been temporally structured in terms of the temporalities inscribed into them during their enactment by adding-up but also in terms of how they were the product of past planned or even carried out and potential future emission reduction measures.

Carbon constituted not only an exercise within and upon pasts and presents but also about futures. Carbon emissions are planned, planned to be reduced and needed to be reduced. The carbon management infrastructure claims an efficient attack against future climate change and GFQ, as part of this, had announced a future emission reduction target – 25 %. Similar to the workers observed by Riles (2010, 804), Elise was not enacting herself as utopian – except, maybe, in the way of believing that the carbon machinery which she co-constituted would help tackling climate change. Riles describes how the legal technicians who provided documentary services to traders were not interested in any kind of distant future. Their work was about handing over a normal moment to the near future. This contrasts very much to the 'long now' argued for by Jackson et al. (2007). They propose that decision-makers should tend to the histories of the infrastructures they are employing in order to responsibly reconfigure and build these decisive machineries.

My observations of problematising carbon neutrality at GFQ contrast with the realities enacted at carbon markets. In these spaces negative carbon sums are not merely appreciated but are constitutive for trading. A document certifying an amount of non-emissions can be traded for money to a buyer who is, then, entitled to emit that amount. Within GFQ there was not, yet, an internal trading mechanism available – in contrast to, say, BP.[35] Within GFQ an internal emission trading was not seen as necessary because the accounting system allowed the offsetting of emissions at the level of GFQ. Thus, subsidiaries did not necessarily have to actually reduce their emissions to ensure that the multinational could reach its reduction aim. Miller (1998, 174) points to the fact that all accounting techniques are subject to change and move within organisational fields. Companies and their collective organising efforts try to ensure that they keep the licence to regulate themselves. This includes their carbon management.

This links us again to Elise's reaction to the Korean GCE. The tension she felt towards the discrepancy between the GCE's emissions and its reduction plans could be understood as being about enacting carbon in a way which sustains GFQ's licence to pollute. Carbon would cease to be an effective collateral in the relations between businesses and society if the latter start to be interested in the actual material underlying the collateral. Riles (2010, 802) points us to the symmetric risk existing for the collateral in itself. A collateral indicates that parties are mutually entangled in the present. There is no way out.

♢ *End of Section* ♢

This section showed implications of the enactment of carbon over time. By understanding the temporal quality of carbon emissions we can better appreciate the achievement by practitioners to turn carbon into social, economical or political matter. If carbon matters, we need to engage with how, where and when it matters.

Fundamentally, corporate carbon is about trusting corporations that they get climate change right. However, the study, so far, calls into question whether trust in carbon should be recommended. Only a matter of time, global publics will be faced with the intersubjectivity created through partially dwelling in a precarious socio-ecological system; climate change, some recognise now, impacts their lives now; others will only recognise later that carbon accounting did not suffice to turn the economy away from damaging climate; and corporations are positioned to want these recognitions shifted into far futures. In a similar way, Adam (2004, 13) discusses characteristics of environments which indicate that humans cannot adequately grasp both, natural and environmental dynamics as well as the role of humans in these dynamics.

> The socio-environmental conditions are at odds, therefore, with base assumptions that underpin the 'management' of the environment which include the belief that visible symptoms can guide ameliorative action and that clock-time and linearity exhaust the range of temporal facets. Time lags, latency periods and broken

[35]For an introductory account of the history and political relevance of BP's internal emission market see Gilbertson and Reyes (2009, 28-29).

> event chains as well as the gap between perception and impact, between *Merk-* and *Wirkwelt*, transform the quest for certainty, calculation and control into an impossible dream.

An illustration for this grand critique is the adjustment of baseline emission facts, shown in Figure II.2 (on page 230); immediately, it makes us recognise what Bowker and Star (2000) call 'The Indeterminacy of the Past': there is not a singular past but multiple. Thus, we have not seen only multiple temporalities but also multiple pasts and futures. The risk is that organisational narratives about carbon might do what Czarniawska (2004, 774) encountered: 'we had failed to notice that it is the ending that chooses its beginning, not the other way around'. In gaming, time lags are interfering with possibilities to absorb money from customers, we learn from Schull (2005); in trading, time lags underscore the vulnerability of an automatised profit-oriented investment routine, show Beunza and Stark (2008, 281). For traders and gamers seconds can make a difference. Time lags are consequential for carbon too. With what time lag will who recognise that environmental balance sheets did not grasp well corporate environmental destruction? Carbon accounting is enacted *as if* it is possible. The breakdown of this machinery, however, is externalised, again. 'Again' because allegedly carbon accounting was all about internalisation. Insofar as carbon accounting does not work in the long run, the crashes are and will be distributed. Oops, an overflow☞. They are shifted in space and time. Accountability is managed, temporally and spatially. By not engaging with these Other issues (e. g. shifted into absent pasts and futures), quantifying carbon is staged in the global North as working.

Emissions of the baseline year are subject to change. Schull (2005, 76) tells us: gamblers abandon their bodies, enter another temporality. When corporations enact temporalities in which climate change is prevented – they may celebrate; yet, who shares this temporality is a different question altogether. Gambling with the climate is a risk. Whether GFQ's changes of the baseline facts – and their temporary freezing – have been or will be adequate remains to be judged by others than me: I am thinking of affected in the global South and Other marginalised in various presences and futures.

I refer to these groups because even though the technologies I observed might be understood as 'messy contingencies' (Bijker and Law 1992, 8), the field of global carbon discourse stabilises any kind of machinery which produces carbon statements. Carbon accounting technology might be temporarily stabilised relative to some of its constituents. Yet, other constituents can be easily discarded. And a technology might manage to sustain itself by not allowing the consequences of its unintended side-effects to enter a conversation with it. Exclusion takes place: socially, spatially and temporally.

6.5 Scale

The prior sections have introduced us to key distinctions enacted by members to order carbon and we found that we can grasp carbon better when viewing carbon in terms of

boundaries, materiality, multiplicity and temporality. This section argues that, finally, attending to carbon requires engaging with members' practices of *scale-making* as a part of their ordering projects. Scale. This concept refers to both, the relative size and extent of an object and to a system of marks to measure an object, a system of differentiations. Scale-making enacts distinctions. Tsing (2005, 57) draws our attention to the scales needing to be conjured in order to imagine the global relevancy of carbon.

> Neither false ideology not obvious truth, it seems to me that the globalist claims of finance are also a kind of conjuring, a dramatic performance. In these times of heightened attention to the space and scale of human undertakings, economic projects cannot limit themselves to conjuring at different scales – they must conjure the scales themselves. In this sense, a project that makes us imagine globality in order to see how it might succeed is one kind of 'scale-making project'[.]

Imagining global climate change, in its hegemonic version, requires scales of carbon emissions. Yet, these imaginaries do not find carbon scales out there, but they need to be achieved. This section qualifies the range of scales conjured to do corporate carbon. I attempt to show how doing carbon across decisive scales shapes the topology of carbon. This sheds light on how scale matters in the emitting of carbon facts.

To reiterate, at the desks and in spreadsheets as well as ESDR, members were able to draw environmental consumption data together precisely because that data had already been formatted and enacted in interaction with, *inter alia*, carbon conversion factors. Before the HQ received environmental consumption data, that very data already has been demodalised; reduced to limited quantitative and qualitative scales. Of course, different conversion factors, different(ly enacted) standards, another baseline – all of this would measure the carbon status of GFQ differently (cf. Mol 2002, 135). This study agrees with Blok (2010, 906) who suggests: '[i]t seems productive, then, to think of the very phenomenon of climate change as occupying a fluid spatiality, hovering somewhere between fact and fiction.' Climate change turns into an issue of topology. Similarly, the prior analysis made apparent that carbon is not ontologically a hard fact to be found in 'nature', but rather is assembled by skilled workers. Yet, after all, things claiming to be carbon facts are produced; emitted into social and economic reality by way of environmental reports and rankings. The argument, then, is that at specific coordinates (measurable in terms of time-space as well as more specific scales), *some* elements flowing in the fluid are *frozen* and, once adequately punctualised, emitted. *Adequate* punctualisation is a significant scale, shaping carbon.

As a vantage point of this discussion, I follow the lead by Mol and Law (1994, 644), which is not to ask *what* carbon data is, but *where*. We found that data was not localised at any singular location. Rather, data was at once at several locations: on paper, in ESDR, in emails, in conversations within a room or in a telephone conference. The analysis about the multiplicity and temporal uncertainty of carbon indicates that it would be misleading to ask which data is *ultimately* used for reporting CO_2e emissions. This question does not have a clear answer because data can be adjusted and *is* slippery.

Of course, known well by ecologists, a recorder bias exists as well (Waterton 2002, 186): if the post/position of the local agent is occupied by a different person, data changes. Data is also located in human actors, in their education, perspectives, their habitus.

In order to investigate how scale-making has shaped enacting and stabilising carbon, I turn to these humans. First, we encounter Elise operating with respect to multiple scales simultaneously in order to satisfy the complicated requirements of her work place. In this discussion, we address carbon, in a quite thick state, semifluid, but not yet performed as a completely hard fact. Afterwards, we engage with the careful situating and manipulation of the hardened fact. We study how competing scales to perform carbon as globally adequate facts exist alongside each other.

Knowing carbon During my first dedicated feedback conversation with Elise, a year after my most intense field work period, we also came to speak about different perspectives on carbon facts. This was June, summer, in a park; we went for a walk; and it was my last day of working for GFQ. She let me know how the new Environmental Management System (EMS) approach was working for her. Earlier that year, her former boss, Frederik, had been substituted by Jack.

Field Note Extract 6.5.a (EMS transformed: Elise's observations)

> *Elise told me she recently had produced a presentation for the COOs. For that she had used updated environmental balance sheets☞. Now, she is preparing a presentation for the board of directors. Again, it will include newly updated and adjusted numbers.*
>
> *Unfortunately, Jack had sent ranking agencies the wrong (i. e. old) version of the environmental balance sheet. Thus, now Elise has to check the material.*
>
> *Elise made this clear: she knows that GFQ's current environmental balance sheet still includes mistakes. And she continued: however, I am not allowed to say so. People wouldn't appreciate at all if numbers are adjusted again and again. Therefore, she will not talk about it.*
>
> *In future, GCEs will transmit data through SAP's Business Warehouse. Retrospective alteration will not be possible. Then, GCEs will experience misfortune.*

Elise had participated in several full cycles of data collection over the prior years. The current data collection and environmental balance sheet creation process had been partially exceptional: the EMS was experiencing two major changes. Frederik had already been substituted by Jack and ESDR was to be substituted by the SAP based system (called 'Business Warehouse'). Over the prior year, while the EMS transformation had been discussed, the goal of involving the 'COO circle' had crystallised. Carbon management was to move up the scale, from mere environmental managers and one-to-one negotiations towards standardised communication procedure between GFQ's COO and the myriad of GCEs' COOs. Thus, we find that environmental agents had to relate to this *formal scale* of authority. Presenting environmental balance sheets to the board of directors can be understood as relating to the same scale. Hard facts of carbon emissions would encounter the most powerful men (few women). And these 'leaders'

were not to be confronted with mess. By sharing carbon data with these actors at the top of GFQ, Elise enabled the carbon data of her desk and her inscription devices to transcend her office and turn into 'GFQ facts', representing its worldwide operations' emissions. Similarly, Jack had provided information for ranking organisations. They constituted an external globality. Just like what happened to Elise's data, his data would also change its status from 'the environmental manager's data' to 'GFQ's global emissions data'. (Note the binary scale.) Outside of GFQ, such data could be summed up and utilised for various n^{th}-order calculations.

However, something went wrong: Jack had sent the wrong facts to the ranking organisations; that is, he had selected and sent a version of facts which was deemed already outdated. Thus, having access to the scale of 'global' carbon realities did not guarantee that the facts were somehow better. Speaking of 'wrong' environmental balance sheets has to be understood in terms of multiplicity. Multiple carbon realities have been simultaneously available for EMS-Team members. When Elise had prepared the facts to be presented to the COOs, she had used updated, i. e. adjusted, facts. Engaging with the reality of shifting carbon facts, Elise was relating to two scales in parallel. First, she needed to be able to recognise the scale of the quality of environmental balance sheets. This was the multiple scale of both, the amount of mistakes and the binary information of whether the facts were partially flawed. Second, Elise had to be aware of the scale of acceptable (approvable, legitimate) interventions in the GFQ body of facts. This meant, she had to exercise her feel for the game; imaging others' reactions to mere proposals for further adjustments. The legitimate presence of these two scales in her work reality made possible that she judged her work situations multiply: yes, balance sheet were still wrong; and, no, balance sheets were not to be adjusted. In their work, members could enact superficially competing scales as part of different repertoires – in practice both could co-exist (cf. Gilbert and Mulkay 1984).

Finally, she positioned the possibility to adjust data on a scale of kairotic time. In a not too distant 'future', where ESDR was to be eventually substituted by SAP, adjustments would not be allowed for anymore. In a 'past' and a 'presence' such changes have been allowed. In her understanding, this shift from allowing adjustments to not allowing them would have effects on yet another scale: GCEs would have to bear the consequences of this managerial decisions. They would not like if their emission facts are frozen for them. This shift would also be consequential for global carbon reality. The expectation was that some of the environmental balance sheet versions would not be voiced anymore, not emitted to audiences outside of GFQ.

In sum, this report by Elise indicates ten scales which she used and enacted to navigate in. And still others might have remained unspoken.

Access to audiences is not equally distributed. Jack had officially access to global spokespeople;

Global–local: Facts have been mobilised to move to actors who were performed as spokespeople of the 'global';

Quality of balance sheets: The quality can be differentiated in two subscales:

Amount of mistakes,
Binary information regarding whether mistakes are present;

Adequacy of interventions in body of facts (a complicated scale, folding into itself, *inter alia*, quality scales, the temporal position of the engagement with data);

The temporality of innovation promised that in future facts were to be frozen;

Consequences of freezing facts once established can be considered in two subscales:

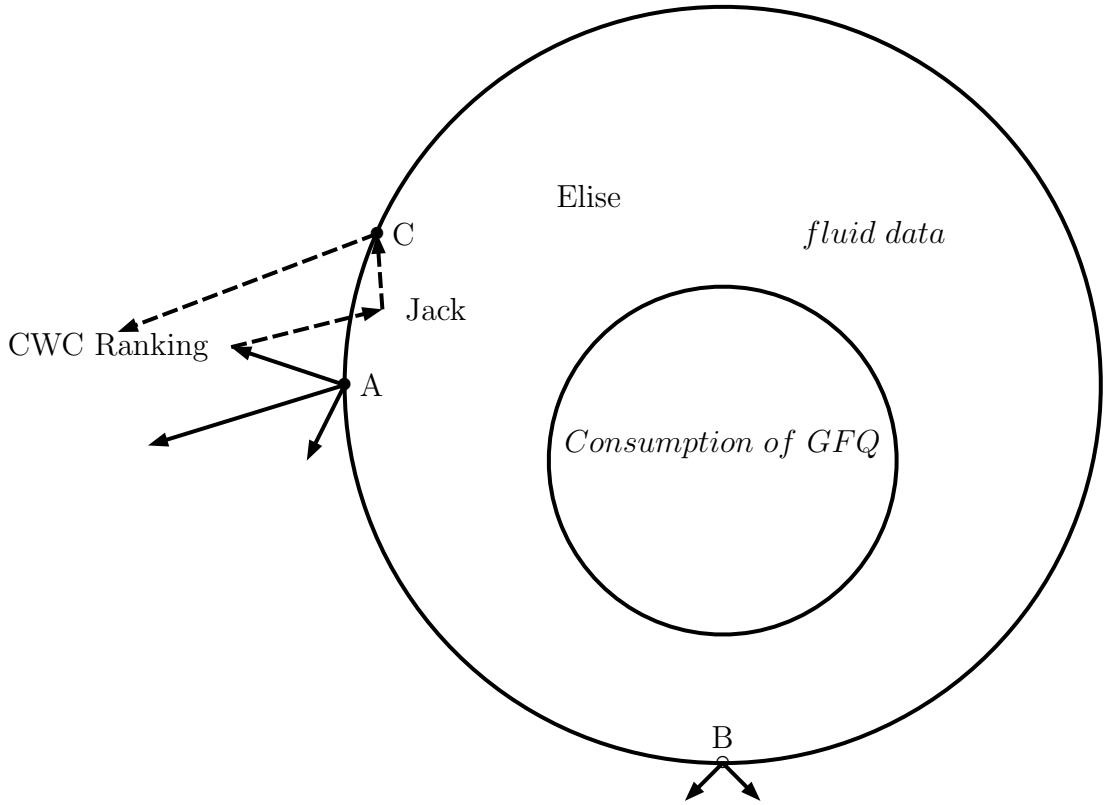
for GCEs: they would loose the possibility to retrospectively adjust the signifiers representing their emissions;
for carbon realities: they would be performed as more singular.

The presence of these scales resembles some of the fundamental concerns in Science and Technology Studies (STS). Latour (1987, 72) argues that a 'spokesperson literally does the talking for who or what cannot talk'. Elise was not positioned to talk on her own to global audiences. Jack did the talking; she prepared the data. Mostly. Sometimes her bosses would handle the environmental balance sheets themselves. And mistakes loomed in this digital-manual world. Elise's statements can be read as not perceiving mistakes as exceptional. Even if other facts were to (re)present a global emission fact, they might still partially be mistaken. We should note that multiple globalities exist here (cf. Blok 2010, 897). Each environmental balance sheet performed as 'global' black boxes slightly differing connections. And, thus, each global is associated with slightly differing overflows☞. These differences can be related to Elise performing specific scales. As part of her 'taskscape' (Ingold 2000), i. e. the ensemble of tasks which she perceived as appropriate to the engagement with carbon reality, she enacted scales by ordering her activities in systems of marked differences. Thus, in the scale of the adequacy of adjusting data we find that no or only exceptional adjustments were marked as acceptable, whereas repeated or continuous adjustments were not imagined as adequate. EMS-Team agents were also the ones who constituted the scale of the quality of and within environmental balance sheets. They could define how to imagine these forms' quality. And construing inscription devices' qualities as not-acceptable did sometimes result in re-engineering these devices. The taskscapes of practitioners, hence, partially control which differences within global emission data are enacted (cf. Turnbull 2002, 133). These scales, can be conceptualised as organising an economy of onto-epistemological practices. Using scales, members could decide how to know and, by that, enact GFQ's carbon facts while keeping GFQ's environmental household well. Whilst members were paid to produce and claim globality, they were firmly travelling on local trails (cf. Latour 1987, 250). Global facts are claimed precisely because EMS-Team members travelled, in person and by other means, to specific distributed spokesentities which claimed to speak for GCEs' environmental consumption. Again, Blok's (2010, 902) analysis of climate change seems to fit our case:

> Even the global environment produced by technoscience must be produced somewhere, and it must connect to various social worlds in order to achieve globality.

Whether a specific carbon fact is or is not moved to a global spokesentity shapes which carbon emissions turn into to globally available matter. However, the case of recognising such globalised carbon emissions does not necessarily imply that on all scales these emissions are considered global. While Elise enacted specific environmental balance sheets as global on the scale of adequacy she did not consider them globally encompassing GFQ's internal reality correctly. Deleuze and Guattari (1987, 201) note that speaking, and for that matter also seeing and thinking, takes place on a scale. The same person may, nevertheless, engage other scales which 'may or may not conjugate'.

Figure 6.5: Work Space of EMS-Team



With the help of Figure 6.5 I sketch the consequences of the scale-making practices present in the field. The small circle denotes the consumption practices of GFQ. This book is about how this cannot be 'accurately' measured and translated into a 'true' carbon emission value. For these impossibilities, a variety of representations exists multiply and over various temporalities in a fluid data space which is characterising the work space of the EMS-Team. In the example discussed, Jack and Elise have been positioned in that work space. While Elise tried to order the fluid data inside the work space (employing the help of her judgements of quality of carbon representations

and adequacy of adjustments), Jack was to catch some data, render it immutable and mobilise it for use outside of their own work space. The workers at the HQ had to compress masses of data into environmental balance sheets and select some of their versions to move them towards the imagined boundary of their work space. I illustrate such data as data points 'A' or 'B' (it could be any other data set that crosses the 'boundary' of their work space). Data leaving their work space was to a large degree immutable, and it was mobile; the arrows next to 'A' or 'B' indicate that these facts can travel further.[36] Agents' stabilisation work within this space is a tremendous achievement. They manage to ensure that GFQ is not *constantly* emitting new facts – but only occasionally. Given the elements' unstable configuration within GFQ, it would not be a surprise if far more multiple carbon versions existed. That only so few were mobilised to meet outside actors was caused by agents' work.

In his discussion of climate change, Blok (2010) refers to the notion of *fire*, a term used by Law and Singleton (2005) to address a specific topologic quality. With this notion they point to potential or actual *discontinuities* in the ways a phenomenon, like climate change or carbon, is enacted. In the GFQ case, carbon emission facts were *nearly* neat immutable mobiles (once they left GFQ) and their multiplicity was silenced. Yet, also incommensurable facts managed to leave GFQ: the workers who were part of GFQ's EMS and have left the unit or the corporation carried with them detailed knowledge of the complexities and uncertainties of carbon emission facts. This book is merely one version of such a 'radically different' (Blok 2010, 907) way of enacting GFQ's carbon reality.[37] However, to a large degree, when focussing on the work of environmental managers to enact their carbon emissions, we find that workers' practices were configured to freeze data. Even more, members were disposed to increase data's viscosity, rendering it less fluid and less distributed, more punctualised. This is what the transition from ESDR to the SAP based system was partially about. The promise was that GFQ's enactment of carbon emissions would be stabilised. The aim was to cool down emissions, faster freeze facts.

Freezing facts refers to a process positioned at another level than Latour's (1987) account of trials of strength. In these trials scientists try to convincingly defend their interpretation and their position as the objective representative of, and the sole link to, that what they speak for. Freezing facts, in contrast, operates at an ontological level. For carbon is always moving, like a river in which one cannot step twice (Ingold 2008, 77), this substance is copied at a particular point; a snapshot is taken; the continuity broken. This snapshot is rhetorically diverged from the stream of moving masses. It is frozen. Only then, trials of strength could begin, testing the link between representative and the newly created fact.

[36]Note, we have seen above that even data which had travelled into a ranking organisation (e. g. CWC Ranking) might be returning to its sender (in the figure: Jack) and asked for adjustment (then being emitted as 'C' and sent off to CWC Ranking).

[37]For other versions of radically different accounts, see Elise's stories in Interlude IV.

While the notion of frozen facts serves to depict *members' concern* of rendering carbon manageable, i. e. in control, we need to recognise that the ontological character of carbon is performative, shaped by material-discursive practices. Corporate carbon, in itself, is neither simply frozen nor 'hot air' as the critical climate change discourse would term it (Coelho 2009).[38] My analysis suggests that we need to go beyond the dichotomising struggle between frozen facts and hot air; an alternative is to recognise precisely this dichotomy as a version of scale-making. Members enact a scale in which as long as competing frozen facts like 'A' and 'B' do not meet, they keep cool. In that scalar space, if these facts are confronted, they heat up. The more competing facts are stored in this space, and the smaller the space, the hotter this soup becomes. The facts melt, they might turn into gas. Here, then, we encounter hot air and *volatility* (Clark 2010). This scale seems too natural to many. Yet, precisely the struggle over getting facts right naturalises the scale. As if carbon was a clearly distinct and knowable entity. If we are to employ scales to make sense of carbon, I propose to consider the anthropology of commodity-making: Appadurai (1986a, 56) points out that 'as commodities travel greater distances (institutional, spatial, temporal), knowledge about them tends to become partial, contradictory, and differentiated'. Frozen facts are as partial as hot air. In the course of knowing carbon, carbon takes its form and value over a long, ongoing, journey, becoming and process – rather than punctualised; carbon cannot be grasped outside of its interior flaming fluid.

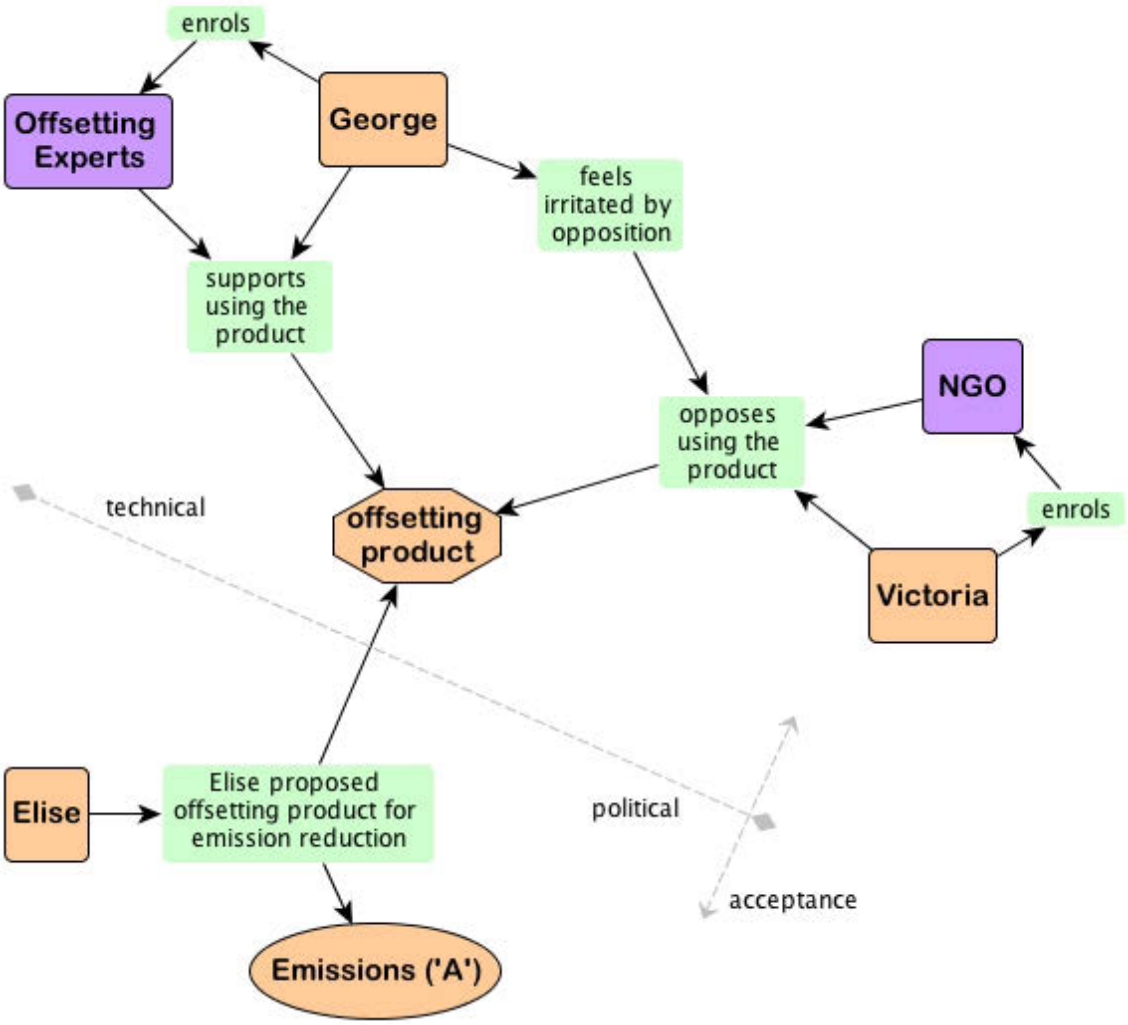
Reducing carbon To investigate how well this understanding of carbon bears beyond the prior example, I return to discussions of GFQ's emission reductions. ↪39 In Interlude I, we encountered Victoria, Elise and their internal consultant, George, contesting how to approach reducing GFQ's emissions. Elise had proposed to use GFQ's own offsetting product 'green mobility'. Victoria firmly opposed this suggestion and made observable to Elise and George that their NGO partner GGCA discouraged them from using such market products too much. George opposed her argument by claiming to have heard evidence from offsetting project experts, insisting that these projects are beyond doubt.

Analysing their interaction in depth deepens our understanding of the performativity of scales. With respect to Figure 6.5 (on page 504) we are now setting out from an emission fact 'A'. In Victoria and George's discussion no reference to the fluidity of carbon facts exists. The latter have been black boxed and the black box's volume was to be reduced. The contentious question in their discussion was whether an offsetting product was to be used. Interestingly, I observed the constellation to be structurally symmetrical (see Figure 6.6 on the facing page). George and Victoria, both appresented allies, neither of which was able to defend itself. To enter the discussion, we can grasp their disagreement in a single scale – a scale of 'appropriate means of emission reduction'.

[38] Originally, the notion of hot air was used to refer to untrustworthy emission rights or CERs.

[39] The following discussion is relating to Field note extract I.d (on page 65).

Figure 6.6: Contesting the Use of an Offsetting Product



We are dealing not with a mere technical question, if we believe Victoria, but a political one. George, as the discussion unfolded, indicated as well that they were not relating to the mark on the same scale. The moment I map here is one of 'global' decision-making; about a global policy on how GFQ was to reduce emissions. Victoria and George tried to enlist authorities which were related to respective scales of acceptance: the NGO GGCA was enlisted by Victoria, and through that she performed her scale as one of *political acceptance*. George referred to 'experts' running the kind of offsetting products which he wanted GFQ to use. By that, he underlined his performance as aligned to a *technical acceptance* scale. Thus, by enacting the political and the technical as competing, they enacted a scale in which both qualifiers mark different positions, seemingly non-compatible. Orthogonal to each mark they enacted further scales – scales of how much the offsetting product would be acceptable.

Latour (1997) argues that the way members relate to each other and to their objects generates specific realities. Time, for example, is a consequence of specific orderings,

rather than antecedent. The choice of scales has effects on the composition of carbon emissions. In the case discussed here, carbon emission can either be organised according to whether or how they would be accepted by offsetting experts or by GGCA. Both types of authorities appeal to globalities – but different ones. And we can imagine many other globalities as well. Here are Dieter and Victoria, relating to another form of global carbon emission reduction.

Field Note Extract 6.5.b (Actual reductions)

Dieter reported: because of the financial crisis, many GCEs started energy saving campaigns. Victoria stated: actual reductions.

In this situation Dieter had let other EMS-Team members know what the current energy saving activities at GCEs were. Victoria made evident that she considered this version of emission reduction *actual*: she linked companies that would reduce consumption to save expenditure to reductions. Here she employs yet another scale to judge an emission reduction promise: nature. Ideally, for Victoria, emissions would be *really* saved and, in this case, she was sure it would actually work out. After all, spaceship earth does not only signify that '"we" all live in one economic world' but also links to the environmental crisis (Gibson-Graham 2006, 120). Victoria expressed, she wanted to do something about the latter – struggling on a grand scale.[40]

And, yet, these scales are not all nicely harmonious. As already pointed to, critical scholars like Gilbertson and Reyes (2009) or Coelho (2009) indicate that CERs may be undermining the stated objectives of carbon markets. The latter are run by the very experts which George appealed to. Because of the problems in CDM projects in general (cf. e. g. Böhm and Dabhi 2009), the NGO with which GFQ cooperated required the corporation to not simply buy offsetting products off CDM projects but only consume offsets certified by 'Gold Standard'. This standard promises 'premium quality carbon credits' – a carbon market phenomenon recognised also by e. g. Callon (2009). For Victoria to enrol GGCA, thus, implied that GFQ also had to follow the postulation to only buy 'gold standard' CERs. This standard, however, also has been criticised, as reported by Blok (2010, 906, original footnote included):

> In 2007 the UK carbon-offsetting company Climate Care came under public scrutiny for selling credits generated on the basis of installing human-powered treadle water pumps in Northern India, promising to replace 'dirty diesel'. Despite

[40] To struggle on this scale, members had to spread the technical and political, which they deemed appropriate for their goals. This resonates with Jackson et al. (2007) who understand infrastructure as 'accomplishments of scale'. Carbon infrastructure is about the extension of carbon discourses, units, standards.

> [C]onsolidation is achieved through the development of strategic intermediaries, or gateways: technologies, organisational solutions, and/or protocols for interconnection that allow for mobility, conversation, and traffic between otherwise incompatible systems.

GFQ participated in CWC Ranking, they applied GRI documents and by that they consolidated the global carbon universe. Also within GFQ, the carbonscape had to be extended and continuously transformed. When I went to visit the West Asian GCE, reported in Chapter 2, I carried over quite a few of the HQ understandings and definitions. The EMS was extended to a larger scale.

> being certified as 'sustainable' by the Gold Standard,[41] critics in both the UK and India questioned the ethics of this trade in 'indulgenc[]es'.

In whatever way carbon emissions are reported and their reductions planned, thus, relevant scales proliferate. Overflows everywhere. Carbon reductions can only be understood by paying attention to the scales made to organise within carbon, reduction policies and projects. Measuring reductions, their appropriateness, amounts and even qualities, seems to be as problematic as measuring carbon in itself.

♢ *End of Section* ♢

This section showed how the notion of scale-making helps us to draw together the onto-epistemic practices constitutive of doing carbon. Aligning carbon practices requires the enactment of situated scales. Conjuring up carbon is only possible by means of intra-acting within the carbon accounting apparatus, ordering possible carbon realities along multiple, partially conflicting, scales. This discussion suggests that received notions of differentiating qualities of facts – as global, hard, good – draw together only very reduced conceptions of carbon facts. Doing carbon is far more complicated than ordering emission according to, say, three distinct scales. For doing carbon is interwoven with enactment, employing myriad of situated scale-making practices, a complete technocratic optimisation of corporate carbon is impossible. There is no god who can grasp carbonscape completely.

To conclude this discussion, I employ Mol and Law's (1994) and Law and Singleton's (2005) differentiations of key typologies. Framing carbon as 'GFQ's emissions', enacts carbon as a *regional* phenomenon. Albeit multinationals do not equal nation-states, a list of the most polluting multinationals could be read in parallel to a list of the most polluting nation-states. And within GFQ, the myriad of GCEs are rendered as distinct regions, often associated with names of nation states. All these lists render the entities as clearly bounded and measurable. This topology, thus, was enacted using a scale of bounded organisational signifiers.

Our analysis, in contrast, has underlined two more apt topologies to grasp GFQ's carbon emissions. Primarily, we reconstructed them as existing in networks and as fluid. Both of these topologies partially grasps the phenomenon well. To a large extend, the carbon emissions and practices I observed were part of a single *network*. Sometimes, however, I created links between entities which have not been part of the network anymore – I refer to Othered versions of carbon emissions; e. g. old versions of environmental balance sheets. Some of these elements had once been part of the EMS network but have been selected out later. The relations between members and ESDR and GFQ's environmental balance sheet constituted a temporally stable network. However, this machinery was shifting. The substitution of Frederik and of ESDR by the assemblage [Jack–SAP] show that the network metaphor has its limits. We can understand both, the machinery which enacts the emissions as well as the emissions

[41] The Gold Standard is an accreditation scheme for CDM projects focusing on criteria of environmental sustainability, [...] initiated by the WWF and other [...] environmental NGO networks.

themselves, as *fluid*. Versions of emissions and machinery, their transformations and mutations, existed in continuity, partially without clear boundaries. Inside the work space of the EMS-Team scales, temporalities, techniques, practices and objects existed multiply, in flow.

In this section I engaged a forth topological type, *fire*; I use it to refer to the jumps made by a phenomenon, its destructive power, its discontinuities, its requirements for presences and absences. The discussion between Victoria and George was about this: offsetting products were present in GFQ's carbon emissions; then, could GFQ clearly demarcate itself from 'hot air'? The latter was to be absent. A dichotomy between correct and incorrect carbon was enacted. In practitioners' work, it was not only no problem to switch the repertoires.[42] It was also possible to exercise contradictory discourses (in terms of formal, technocratic rationality) in *parallel*. In one moment carbon emissions were enacted as subject to relations of technical decision-making – in the next moment they were performed as political issues; in one and the same moment members engaged scales associated with different discourses (correctness of facts vs. social acceptability of adjustments). Organising carbon along these scales could accommodate the frictions between those scales.

This book argues that carbon emissions need to be addressed not simply as 'bushfire' (Law and Singleton 2005, 347) but as an *inferno*. Carbon counts signify the (appeased) presence of accounting quantities and silence the hell of qualitative accounts about GFQ's practices of financially securing world-wide capitalist exploitation. Digestible carbon emission facts exist because they exclude accounts of the qualculative scale-making practices involved in their construction and in the labour required to continuously reproduce and enact them. GFQ's carbon facts are made present by means of absenting taking seriously the complexity of engaging qualitatively with GFQ's consumption and production. Members' own navigational scale-making projects needed to be silenced to enact neat carbon surfaces, punctualised enough to submit to hegemonic environmental discourses of techno-scientific planetary management.

This discussion indicates that topological transformation is constantly happening. Practitioners engaging with carbon like to render it frozen and not heat it up. Thus, partial freezing of a fluid is possible. At GFQ, the creation of partial, insular, temporarily immutable mobiles was an achievement based upon fishing for the right facts in an ecology of carbon-waterways, an oceanic maze of multiplicity. And, yet, this carbon ocean seems far more like a fire. GFQ's carbon does not behave like the one appresented by natural science. The latter stops fire. A fire extinguisher uses CO_2. This book points to the carbon enacted in global carbon discourses. Carbonscape is an inferno and actors inside stage themselves *as if* they were ice skating. Analyses of carbon economy ought to engage with the discontinuities and the fuel firing carbon. We should pay attention to the discursive absence of those energetic and generative fluids which would make the frozen melt. Corporations may try to safe themselves from the sudden

[42] In that they likened scientists who switch between different discourses (Gilbert and Mulkay 1984) or like medical practitioners, switching attention between patient and artery (Mol 2002, 124).

'evaporative phase change' (Shields 2006, 212) to be expected when frozen facts flame. Carbon appears as a multiscale problem – for inquiry, but far more for those who suffer from carbon capitalism.

This line of thought, then, extends our perspective to a phenomenon alike what traditional sociologists of medicine call(ed) 'illness'. The social scale of a problem. Carbon problems do not only reside within carbon conversion factors, in the practices of corporate environmental managers, in their databases, in sustainability reports. Carbon problems also reside in the group of affected and relatives. Carbon can be well grasped as a patchwork space. All these different elements – also including entities like CER brokers, EarthFirst! activists, Al Gore and the IPCC – make a patchwork singularity. We need to ensure that the problems of carbonspace are not reduced as located inside only one entity, like inside consumption, accounting practices, workers, corporations, CDM projects, conversion factors, standards, Kyoto-and-after, climate governance. Carbon is connected to all of these. Singling out merely one of them is not enough. Understanding carbonscape requires us to engage with the range of scale-making practices entangled within carbon. Without this engagement, the inner topology, the ontology, of carbon is closed off from publics.

♢ *End of Chapter* ♢

The objective of this chapter was to reconstruct the ontology of carbon. For that we engaged with environmental managers' practices that structured carbon. Not assuming that corporate carbon can be reduced to e. g. natural sciences' understanding of carbon emissions provided the ground to detail the structuring practices of what corporate carbon was to be and what it was not to be. I proposed five perspectives on practices to study carbon. These included scrutinising the boundaries around and within carbon, the materiality of doing carbon, the movement and duplication of carbon in relation to carbon's presumed singularity, the temporalities employed to enact and inscribed into carbon as well as the myriad of situated scales brought into play to do carbon right.

Reading carbon through these perspectives indicates that the ontology of carbon within the capitalist organisation was not at all singular, clear, neat, innocent, stable. Much rather, carbon emerged as constantly moving, ruptured by politically relevant discontinuities, distributed over – and partially trapped within – multiple times and temporalities, materials and materialities. If we were to picture carbon, it would not be a point, a simple statement; definitively not a formula or a molecular model. Much rather, carbon is spread over a multi-dimensional space. However, it was also neither arbitrarily not homogeneously distributed within that space. To be precise, carbon accountants were constantly engaged in *shaping* carbon in situated control. Carbon was the effect of multiple – partially well coordinated, but never completely accountable and comprehendible – ordering practices. Consequently, carbon was existing like a landscape. Closure of carbon was impossible; corporate carbon was always open for redoing and reinterpretation. In fact, corporate carbon existed only by constantly

redoing it in particular, rather than other, ways. Carbon was enacted, thinged, by the assemblies who played and performed within this landscape. These assemblies were part of carbon. In other words: one cannot understand capitalist carbon without engaging with the assemblies pattering, shaping carbon and, thus, enacting *scape*.

In the case of GFQ, carbon was made and remade constantly by all kinds of gatherings of humans and non-humans; in the course of these makings, carbon was not stable in itself. If it was to be stable, it had to be enacted as stable. Stability of carbon required work. *Carbonscape*, thus, points to the qualities carbon was experiencing over time and at different places: carbon was pulsating (it became more or less; with changing qualities) and moving (across scales; times, spaces; again: pulsating); carbon was jumping and could be at several places at once (discontinuities; exiting in parallel at several situations). Within that space, members had to act tactically. They were enacting and employing multi-dimensional coordinates (situated scales: systems of marked differences) to point to carbon, to single out a version of carbon that deemed adequate. Not-yet-singled-out carbon was, thus, fluid, multiple, distributed, with rifts in the space; carbon was not a complete continuum. The landscape was characterised by distinct boundaries – not controlling, yet still shaping. Competing versions, with the same or different contents, but always different histories, could co-exist; sometimes never synchronised, sometimes after months or years, sometimes within seconds. Members, materialities, their capacities mattered. What they did, how they went about carbon shaped GFQ's carbonscape. I shall draw this understanding out.

Carbonscape, like any other landscape, was never under complete control. The materialities co-configuring carbonscape were consequential. (Non)-human actants were entangled. Within certain method-assemblages brought to bear upon carbon, situated control was possible. Carbon landscape is, therefore, very related to practitioners' taskscapes, e. g. practitioners' carbon enactments in ESDR task-forms☞. However, carbonscape is so distributed, 'out of control', that no single taskscape maps carbonscape perfectly. Weaving carbon cannot be grasped and accounted for with technical rationality. To navigate, practitioners doing capitalist carbon need a feel for the game. Only with such in-explicable, slippery approaches, well attuned to particular situations, could members locally, temporally, materially optimise the non-coherencies of carbon. This means also that the apparatuses digesting, storing, reformatting, reorganising, re-relating carbon would never encompass carbonscape as a whole.

I am asked, then, what the relation between carbonscape and carbon 'out there' is. While I argue that a full answer is impossible, this book attempts to approach an answer. At the outset to summarise the connection between carbon and carbonscape, recalling the purpose of doing carbon, is helpful. And acting towards a purpose implies that some things are maintained, that others are dissolved (Haraway 1991b, 215). Some realities of carbon are similar enough to what members expected and material technologies' formats presupposed – and, thus, could be grasped, taken into account, transformed into GFQ's carbon emissions. Other realities were not same enough. Frustration, for example, was

to be excluded from carbon accounts. Data in carbonscape was not to cause problems. Yes, carbon data was to induce change within the corporation, to provide incentives for greening, but, no, that data was not to unsettle anyone. Unlike postcolonial discussions of archives and database technologies – doing generative and uncomfortable work to engage with conflicting metaphysics and different strategies of world-making (Verran and Christie 2007; Verran 2010; Waterton 2010) – GFQ's carbonscape was shaped by distributed activities to render carbon comfortable. Carbon was done to allow the corporation to flag up 'yes, we are concerned about climate change – we act'. Other than that, carbon was to be hidden, a smooth process not questioning financial services practices. Even more, carbon was subjected to the core of financial services practices: carbon data was integrated *into* financial data management. Celebrated as a success by ecological modernists (members and scholars alike) – for carbon was then even more central to capitalism – most areas of carbonscape were even moved further away from the organisation's attention. Carbon-attached-to-financial-data was no longer to be bothered with the nitty-gritty problems of environmental agents and bookkeepers – who were confronted with the frictions of translating carbon into a smooth, singular, stable corporate reality. Moving carbon into GFQ's centre, thus, had the effect of weakening the link between HQ and messy consumption realities (the prime connection between GFQ and carbon 'out there' taken into account at all). Transforming the EMS resulted in a system which was designed to be less connected to the troubling realities of coming up with clear consumption facts, facts of carbon emissions.

In that respect, the EMS's transformation was an enormous success: the corporation had managed to design a data system which was more likely to render data more consistent. Apparatuses on the corporation's carbonscape were to create an internal consistency; where inconsistency would be read as incompetence, as broken machinery, as weakness, as a problem. Inconsistent carbon was a problem because all data practices were presumably and supposed to create the same. Carbon was to be clinical, unmarked, pure. Carbon was to be fact. Members learned from their problems to ensure this consistency. The EMS transformation was a way to work backwards: to make sure that data – the entities *given* to the database – would be consistent.

In the digital realm – much of the corporate carbon apparatuses was working in the digital – such consistency was easily achieved. The possibility to edit databases, to copy datasets, delete, adjust, mend – all this allowed that data could well be managed, that data could be rendered consistent, stable. Stability of carbon reality, thus, was always an achievement. Building stable constructs of carbon, whether in an apparatus or a house, 'is always work in progress, and the best that inhabitants can do is to steer it in the desired direction' (Ingold 2010, 94). Real and stable carbon, in the digital realm, may be easily achieved; this differs from Ingold's (2010, 100) account of inertia as the result of 'contrary forces of friction that materials exert on one another when they are ever more tightly interwoven'. While Ingold sees stability as the result of closely webbed material practices, where only very specific realities can withstand all the forces,

carbon can be stabilised by detaching it from the weaving frame. Carbon realness also differs from Verran's (2010, 112) proposal of realness as 'achieved in the emergence of webs of gradually clotting', repeated interwoven performances of the same. Real carbon is merely a specific treatment of carbonscape, an effect of tactically approached situated action within an apparatus. Enacting carbon as constant takes place in the midst of the variable. The flux never stopped. Deleuze and Guattari (1987, 103) can be read alike. '*Constant is not opposed to variable*; it is a treatment of the variable opposed to the other kind of treatment, or continuous variation.' Stabilising carbon was not so much clotting an emergent effect or the production of a thing as the material compromise between friction; carbon was increasingly disembodied, translated into variable, floating, planes. The apparatus was to be decoupled from what it purportedly measures. Carbon was out of touch and out of control. For GFQ, carbon were numbers. This was how members could experience carbons: as and through numbers, as a reduced set of qualifiers, data techniques; these entities are decoupled from, say, floods. Floods (and other destructive forces) only enter as financial effects. Climate chaos is external to the office. The office is full of numbers and words – in a stabilised atmosphere, a comfort zone for standardised labour. Any carbon possible.

Carbon as numbers – enriched by a couple of qualifiers (grammes and gigatonnes of CO_2e) – was only possible by excluding many from participating and interfering in the corporate carbon apparatus. Some players part of the patchwork reality of carbon were allowed access (auditors, a global environmental NGO) but activists on the street as much as GFQ's own labour-force, workers, were not to mingle with capitalists' emissions. The peaceful presence of numbers was only possible by rendering all those Others absent. Doing capitalist carbon, thus, was a largely insular activity: within the corporation, carbon was enacted – including other key capitalist organisations; Others were silenced. The capitalist carbonscape includes designed folds, which trap the silence of all those Others – actants, things, issues. Cutting off these Others from official accounts of carbon mattered because it made capitalist carbon appear in control. Every cut matters (Barad 2008). Here is a paradox: doing carbon was about internalising carbon realities into capitalism. However, capitalists acted as clever activists. They turned carbon movements and turbulences invisible, creating tunnels under capitalism, deserting from being taken fully into account (cf. Bureau d'études 2002). The corporation managed to silence and keep carbonscape-as-such hidden. Unseen overflows. Gambling automatons are designed so its link to economic reality, money, disappears (Schull 2005, 75); carbonscape was designed such that the corporation's clearest links with environmental destruction (caused by the corporation's economic, environmental, social engagement with realities) disappear from view.

The corporation only *takes* into account a small section of its relations to carbon. And the reality of these takings are themselves non-coherent, multiple, flowing, burning. And it cannot be otherwise. We find that the corporation manages simulating taking carbon seriously. Carbon is staged as in control. This underlines Blühdorn's (2007)

analysis of the politics of unsustainability and simulation. For the corporation it was important to emit, to perform emissions. They were not to be silent, not to show blanks, in the hegemonic discourses of climate change, environmental crises, sustainable development. My emphasis of the generative effects of these simulations should not be read to imply that the corporation was completely delinked from atmospheric carbon. Neither only environmental balance sheets or ESDR were relevant; nor only molecules. The latter are imagined as accessible by means of invoices. Documents, thus, report these out-theres – molecules acting out there. Documents are proxies for all those other actors which the corporation does not really want *in* the company – but tell stories *about*. The fact that those other actors do not enter the site does not mean they are not relevant. In fact, they are relevant if we look at their histories. They are the effects of consumption activities assumably having taken place within the corporation; an invoice seeks to represent these moments of past presence. However, these representations are fundamentally partial, exclusive and only drawn into a qualculative landscape of carbon which then could be managed, of which specific facts could be harvested, frozen, and other facts would not be sold in the Sustainable Development Report.

Within the apparatuses, actants were mutually entangled in the present. Members had to trust another. Trust allowed members to draw associated actants onto the next plane of inscription. Without trusting colleagues, without the auditor and the NGO trusting the corporation, carbon may not have been well enactable. Thus, trust matters. In these circular relations of trust – insular webs of commitment to the common cause of achieving emissions – any fact was a placeholder. Like Riles's (2010) legal fictions, they were created to be overlooked. Carbon facts demanded trust and engendered trust in them. Unlike prior ethnomethodological accounts of record-keeping, doing carbon facts did not require fear of deep investigation. Members and auditors both perfectly recognised and silenced the messiness constitutive of carbon facts. Record-keeping was to be accountable – in relation not only to auditors but also to bosses and discourses of efficiency. Thus, carbon records did not have to be in order completely. Mess could be accommodated. While stability was always possible to perform for specific punctualised facts, the floating, mobile, dynamic landscape of carbon allowed members always to learn, to escape the landscape into a future. Carbonscapes, thus, were characterised also by temporal shifts: facts could always be performed as better in some future; emission facts changed – with the rhythms of hiring and firing, with changing strategies of performing the corporation as a green citizen. Learning, thus, was a legitimate strategy for the corporation to not have to commit to any fact, allowing for change whilst always presenting the best knowledge they could source from the hinterlands of carbon, carbonscapes.

Carbonscape is the effect of doing carbon. Intra-acting within carbon has constrained effects. No apparatus can encompass all the landscape. However, the politics enacted within these apparatuses have tremendous effects. Some effects can be accounted for, engaged with within the apparatus, they are taking place within the frame. Other

effects flow over the frame. Doing carbon, in other words, necessarily has unaccountable effects outside of the specific technologies employed to manage carbon.

The imaginary of 'governing' carbon is irresponsible because the ability to respond to doing carbon is practically limited. Capitalist narratives of having carbon under control add elements to, rather than clean up, carbonscape; but these narratives, and associated action, cannot singularise carbon into work packages without spills elsewhere in carbonscape. STS can offer much in showing how records of emissions are enacted. It is a creative, generative, messy activity. 'Management' of carbon is impossible. This chapter, then, is a contribution to conceptualise carbon; a contribution against planetary management (*pace* Bowker 2000b, 645). Given the failures of market politics, maybe the tendency of decoupledness of corporate carbon from atmospheric carbon may be rather lucky. Maybe we should not postulate that corporate carbon accounting informs actual decision making. The interference of corporate carbon in non-corporate realities may be disastrous. STS and the study of enacting environments can contribute one another: they can learn about the implicated and silenced actants in carbonscape, about enacting more emancipatory relations within fact-scapes, rather than subjecting these relations to paradigms of efficiency and control.

Carbonscape, therefore, is about ethics. Doing carbon is inextricably a practical political engagement with the patchwork realities entangled, living, becoming within and co-constituting carbonscape. Hence, no universal accountability is possible. However, within and around specific apparatuses, accountable relations can be exercised to and with other humans and non-humans. Better ways of doing carbon have to focus on enacting responsible and accountable local relations. Approaching responsible practices of carbon, then, has to set out to make absented carbon relations present.

Interlude IV

Companion Tales

This interlude spotlights what it might *mean* to engage with the silenced, absented relations and overflows☞ of the mundane practices of running an Environmental Management System (EMS), of doing carbon accounting. In the literature on greening, sustainable development, much hope exists. Kyoto, Copenhagen, ... – these places stand for governmental trust in capitalism to sort out climate chaos. Of course, the genre of scandals – reports by activists, scholars, NGOs alike – interferes: that quantifying carbon emissions, setting up markets and reductions targets does not automatically generate 'good practice' is easily recognisable. In the midst of carbon business, however, routines have been established. Work goes on. This book focuses on carbon. I argued that carbonscape should be understood as a patchwork reality: a fluid space of humans, other humans and non-humans, all entangled in doing carbon. By turning attention to actants' unremarkable activities of accounting turns into an exciting object to address the ontology of carbon. Carbon has been misrecognised as a natural object.

This interlude plays with making recognisable further aspects – outlining where to look for effects of shaping carbon. Inspired by Haraway (2008), I hope this interlude helps to imagine a queering of sustainable development and ecological modernisation. Carbon is a companion. So are intentions to responsibly relate to carbon. EMS-Team members may have called it managing carbon. But humans and non-humans are also both *subjected* to the technocratic project of carbon accounting. Humans voice feelings. Modestly, one may try to draw pictures of how the technocratic project is consequential also for those who could not share their feelings with me. I attempt to imagine conversations alike Haraway's (2003) with Ms Cayenne Pepper – an account positioned between taking seriously a dog and Reagan's Star Wars. 'Dogs are not surrogates for theory; they are not here just to think with. They are here to live with.' (ibid., 5) Carbon, environmental management systems, agents of ecological modernisation exist in the here and now. We have to attend to them as accompanying us – while, of course, the character of companies can, in principle, be reconfigured. As shown above, carbon accounting is systemically producing monsters☞. Demonstrating carbon realities and producing these monsters both are the effect of practices of signification

(Haraway 1991b, 226). This interlude is not so much about resignifying carbon as about accompanying actants in their struggles to optimise carbon realities – and accompany these tales with question marks.

Others caused us to raise questions. Enormous question marks. Clark (2010), studying histories of abrupt climate changes, finds bodies at risk. Bodies of what, whose? Letting Barad's (2003) apparatus meet Agamben's (2009), we may ask how, by doing phenomena, the entities constituting the apparatus are simultaneously subjected to it.[43] This concerns questions of power – and it may easily involve looking beyond the textual: Law (2004a, 97) proposes social sciences should not turn away from the 'non-rationally' accountable – feelings, horror, threat, optimism, danger. GFQ's Sustainable Development Report was providing some numbers. Nothing secret. The same during my fieldwork. Victoria told me that I won't see anything critical – neither about production nor about competition. The corporation imagined itself as a transparent actor. Corporations literally flood discourses with their enactment of transparency: thousand of reports – financial, social, environmental. They invite NGOs behind their walls. Critics stumble upon this. Holmes (2010, 229) is one of them.

> 'Why ask?' is the real message. At stake here is the function of the veil, which turns sophisticated knowledge, indeed visibility itself, into a weirdly transparent cloak of secrecy and denial.

A wonderful dichotomy: the truth is hidden, in this account. In response critical actors may expect: the truth will out. Eventually. However, I have to ask: what if there is no underlying truth? This interlude visits practices behind the scenes, out of scope for this study, but tails of this study. I can only reconstruct tales. But they are productive to link the ontology of carbon to issues of the working conditions in the green collar economy, to possibilities for green collar crime. This interlude is saturated with normative problematisations. Jackson et al. (2007) point to a general character of doing infrastructures:

> across virtually every type and class of emergent infrastructure we can identify provisional 'winners' and 'losers' – those whose positions, programs, work experiences, or general qualities of life are enhanced (or conversely, challenged and undermined) by the developing infrastructure.

We can expect 'distributional consequences' of carbon infrastructures. Doing carbon reconfigures the relations between humans and non-humans; carbonscapes are redistrubutional projects: who gets to bear which consequences?

I visit three sites in carbonscape, each connecting practical concerns in the field with theoretical concerns of scholars. First, we revisit the transformation of the EMS.

[43] Agamben's (2009) 'apparatus' is useful for it analyses apparatuses as used within a set of power relations to enact a certain strategic function. He points out that an apparatus enact humans in a functional way – reconstituting subjects or desubjectifying them by turning them into controllable numbers. I invite his core concern into my analysis: how do apparatuses constitute and reconfigure the selves, subjects, humans or, simply, entities they position within the apparatus' relations?

This is a narrative of organisational change. We raise questions about the implications of efficient green data production. Second, I follow an actant which floated around nearly-final carbon emission sums: an emission reduction certificate. This results in a narrative of emission trading. Finally, I turn to people. These are narratives about and from agents of ecological modernisation. I trace the paths taken by EMS-Team members, what carbon accounting did to them.

◊ ◊ ◊

The transformation of the EMS was about reorganising data processes such that carbon was turned firm enough to withhold GFQ's top managers as a normalised object of their management activity. Carbon was to be made part of general management procedures. It was to be a standard element of management within the corporation. Listen, again, to Burritt, Schaltegger, and Zvezdov's (2011, 88) take.

> By embedding information requests in established processes and functions, the overall efforts are reduced thanks to automatisation, clearer information flows, etc. These clearly decrease the transaction costs of information management, thereby improving carbon and overall economic performance.

If carbon goes central, everything will be fine, as it were. So far the grand aims. Experiences about what happened and members' takes on the EMS, however, raise questions about what it means if environment turns centre within capitalism.

About two years after my field work has been completed I met Elise in a café near a big park. It was winter and we sat outside with blankets over our knees. She smoked and I reported some of the themes of this study – not much was to her surprise. She added her stories to my interpretations. When I was suggesting that even the most purportedly straight forward elements like numbers and consumption categories were unstable, fluid, she told me this story: what a square metre is was unstable. You can have gross and net square metres. It is a question of definition: is, say, the basement included in the office square metre or not? Then, rather than spending hours with comparing our detailed observations, Elise soon brought forward more fundamental concerns. Here is an extract from my notes on a couple of minutes of listening to her account of what happened after our last conversation.

Field Note Extract IV.a (Lo(o)sing qualities)

> *Elise had to manually transfer data from ESDR into SAP. An automatised data transfer had been possible – but was not wanted. She had to manually transfer data to check the quality of data and, if necessary, adjust data. Thus, all the data from the old database was reviewed before using it as the new carbon foundation.*
>
> *Jack was very much and too much interested in the details of data, in the qualities. He had cared for differences in data. This doomed him. He had to leave the job. Elise made explicit: GFQ had replaced people and, by that, got rid of carbon data's meanings. Now they only have numbers. There is no capacity left to interpret them.*

As we learn, the new carbon foundation of GFQ, based upon the new assemblage [Jack-SAP] and supported by Elise's articulation work, was achieved by a process which

allowed the careful review of data, with associated adjustment of data, to ensure GFQ would reach its reduction aims. The new system soon proved it: GFQ had managed to reach its emission reduction target – even before the targeted year. Well done.

At the same time, Elise had experienced that Jack was too careful. Albeit the numbers were great, he spent too much time and resources – maybe asking uncomfortable questions? – on qualities, i. e. modalities, of data. Meanwhile Elise was not even provided with a firmer position within GFQ; she left. And soon afterwards Jack had to leave. His approach to carbon was too committed to details. This was her *concern*. A year later, Jack was again acting as GFQ's environmental manager.

Transforming the EMS – an innovative project of moving carbon into GFQ's central data systems – was, thus, resulting in spreading a culture of focussing on quantities, rather than qualities. Innovation becomes, here, a troubling issue. Assumably, innovating an EMS would improve the system. However, as we find, from Elise's perspective, the trajectory of carbon management was not a definitive improvement.

Her concerns resonate with critical perspectives in Science and Technology Studies (STS) on innovation and rationalisation. Suchman (2002) writes that innovation means extending one sphere into another. Innovation implies that more powerful approaches supersede marginalised ones. Then, with Suchman and Bishop (2000, 332), innovation turns into a conservative project which may reproduce existing orders, 'ensuring that, under changing conditions, distributions of symbolic and material reward remain the same'. In the GFQ case, carbon could have been used to upset the business process. The transformation of the EMS, in response, ensured that the qualities and differences related to and within carbon would be silenced. As long as carbon was quantitative, it could well be co-managed. Management socio-materially reconfigured carbon to be least different compared with financial data. This required not only to get rid of ESDR but also of the EMS-Team within the centre, at least of the cohort I discuss in this book. New human elements were employed who were decapacitated to relate to carbon data's meanings and histories as they could be remembered before. Like money being denied to record histories of values, carbon was to be stripped off of histories. So that, more easily, new stories could be told – innovative stories; that is, stories structured like the ones the financial service industry had already much success with.

We find that the EMS transformation was reconfiguring the social, biological, material fabric of the apparatus enacting corporate carbon. Workers and their products, subjects and objects were co-constructed (Suchman 2005, 392). The new apparatus subjected its elements to new regimes. Rationalising and innovating the EMS did not result in unequivocal improvement but, partially, in 'impoverishment' (Mol 2002, 182).

This impoverishment deserves more detail. Above, we have seen that Frederik was open to alternatives in number construction. He was spreadsheeting creatively to make digital realities fit to physical ones. In discussions with Victoria he ensured not to discuss numbers in terms of realness. Victoria, in contrast, tried to stick to the facts – wanting to have facts at hand. Showing their stances in this ways raises the question

why the number cruncher rather than the strategist was open to creative engagement with numbers. I propose that the former was intimately familiar with the contingency of the numbers he enacted; whereas the strategist needed the performance of hard facts as resources in the games she was struggling in. Now, Jack – the transformation project – provided a (re)solution; he combined both roles within the same body. This allowed him to accommodate mess within his body, mind, integrating the tensions between the two roles. Shown above, compared to Frederik, Jack was performing himself as a more strategic actor. He wanted to get rid off unnecessary qualities (like comments in ESDR task-forms☞). His moves were to make him the performed centre of carbon within GFQ precisely because he would cut some of the connections between carbon and the messy grounds. As Riles (2010) emphasises, experts can achieve their position not only despite but by means of lacking particular knowledges. Knowing too much about carbon was an obstacle for managing capitalist carbon.

Jack was an easy-going person; open for humour. Once, I experienced this interaction between him and Marion.

Field Note Extract IV.b (Fudging numbers)

> *Marion told Jack that she will contact him about the CWC Ranking. Jack replied: next week is good because he will not be in the office. Marion: it's just about some numbers. Jack: uuh, I am good in 'fudging numbers'.*

Happily Jack committed to have an easy-going relationship with numbers. Carbon was a game. He knew how to play it. Or so he believed. Eventually, in Elise's account, he had to realign himself to less meanings. Adequate carbon needs more impoverishing. Poor carbon. No histories.

Poor carbon links well to a little remark you can find in Footnote 103 (on page 326). I pointed to Frederik who indicated that, in fact, he expected that the climate change discourse would, at some point, be superseded by other discourses. As an alternative, he put the discourse of water forward. In light of the discussion in this interlude we start to recognise: carbon was to be as unmeaning as possible. Whether carbon or water – any environment enacted was to be anodyne.

Reviewing field notes with this interpretation, one can find pathbreaking moments in the history of the transformation project. In one of the first meetings where EMS-Team members and FDSO members started to practically collaborate, EMS-Team members described and sketched the way the EMS worked. Artefact III.2 (on page 429) was an artefact of this description. It depicted data flows within the 'system'. In relating to this sketch Jacob remarked:

Field Note Extract IV.c (Not 'system')

> *'I wouldn't call it system, but process.'*

For Jacob transforming the EMS took the *Gestalt* of reengineering a data flow process. For him, it was not an *environmental* system. The sketch was a boundary object. Jacob was able to relate differently to the sketch than the environmental managers. However, they were to become one social world. The transformation exercise was precisely

about this: integrating the environmental social world into the financial social world. Victoria headlined a PowerPoint slide on the project accordingly: '[e]nvironmental data integration into financial data management'. The two different perspectives on what an EMS and the transformation was were performative. They shaped reality – and would shape it differently. And they had ontic implications; this isn't merely about epistemology. The object imagined did not stay unaffected in the transformation exercise. Two (at least) ontologies were to become one. The EMS was to be transformed into a streamlined data process, not causing problems in the core of GFQ's financial business – financial data management processes. This also explains why Power's (1996, 303) prediction of organisations going for self-audit is both useful and problematic for the case of enacting auditable environmental accounting system in capitalist centres. Elise and Dieter both wanted to have internal self-audits within and of the EMS – especially of environmental management practices in GCEs. This meets Power's point. However, their bosses and the EMS transformation did not want to focus on such preparatory environmental self-audits. For subjecting environmental data to hegemonic data practices (as exercised on financial data) it was necessary to increase the distance between environments and environmental agents on the one hand and environmental data on the other hand. In that logic, we may expect that environmental data is optimised towards generic ideals enacted in hegemonic data practices while attempting to maximise the utility gained from the fluid character of environmental data.

Doing carbon data is not archiving some experiences and knowledges as the received view on archives would have it; innovating the archive does not mean that – essentially – the database is replicated and stabilised. Nothing of an panoptic enlightenment project (cf. Waterton 2010, 649). In the course of innovating the EMS, of moving the environment into the core of capitalist centres, the essence of what environment is is reconfigured. GFQ's innovated environmental data was 'less a replica than a new configuration' (Suchman 2007, 273).

◊ ◊ ◊

Corporations now have to participate in the universe of references around carbon. This discourse has clear postulations. Corporations have to emit, they have to reduce their emissions, they may even have to go carbon neutral. Activities of emitting carbon facts links – via emission trading and offsetting projects – to other companies, it is to change and (positively) impact realities outside of GFQ's digital carbon storage spaces and Sustainable Development Reports. The carbon market has become huge. Clearly, what is traded is not emissions but references to emissions. STS convincingly makes the point that knowledge, however, is not merely referential but may also interfere in other practices. In carbonscape, knowledges of carbon are produced to make a difference, to interfere. The climate change discourse demands to not just know about emissions, but to act. Knowledge 'participates *in* reality' (Mol 2002, 153).

Therefore I have been interested in how GFQ's practices of doing emission linked to wider carbon economics. This brings us back to the discussion with which this

book set out, the process of economising climate change.[44] Discussing the political economy of GFQ's involvement with GGCA and offsetting projects with GFQ's CSR communication strategist Frank, he cited the norm that GFQ ought to ensure that offsetting activities result in real reductions.

Field Note Extract IV.d (Precautions against trading 'hot air')

> *Frank talks about 'trade with hot air'. GGCA impressed GFQ with the understanding that we are only to buy CERs sourced from Gold Standard certified projects. He wants 'real' 'reduction'. Yet, he notices, many open questions exist. There is the problem of fictitious trading. Underlying this, 'so few tangible data' are available. He wants the highest standard, that is the Gold Standard, in order to ensure that, 'eventually, some solid thing is up'. He asks himself why some act as if* any *CERs can be bought. Wouldn't one need to learn from the experience with the 'financial crises'? 'Trade with hot air' may collapse. That's something we have to be cautious about. We need offsetting projects that are not only 'financially' worth it but also 'ecologically'. The latter is precisely the point of offsetting investments, isn't it?*

While writing these lines, I am travelling by train from Berlin towards Frankfurt – on the right hand, shortly after Leipzig there is Leuna – a petrochemical industrial site – associated with horrendous environmental problems. Past. Just left of Leuna there is a small wind farm. I have been often travelling along this route. Eastern Germany is full of wind power projects. I thought of them as green, sustainable. Well, high-tech; but much better than so much else.

This was just one understanding which this study had to defeat. During my field work, when engaging with GFQ's response to CDM's questionnaire, I came across an emission reduction certificate – associated with a wind power project. My green heart immediately embraced this empirical line. Here was a story to how emissions of GFQ linked to some real greening project. Glancing at the certificate I was more than excited. It even was a Gold Standard-certified project – the certificate implied. (See Artefact IV.1 on the next page, rendered anonymous). I was happy to see that there was some consistency. This project was based in Maharashtra in India.

Immediately, I started checking for the name and location of the project. I wanted to visit, follow the document to its end, see how the enactment of emissions interfered with unsustainable energy infrastructures by producing renewable energy. I failed. Well, I found another certificate, just like the one sold to GFQ; that other certificate was issued for a conference held by the German Ministry for External Affairs, the City of Freiburg (*the* city for renewable flair in Germany), a research company called Adelphi (studying and generating policy advise for sustainability transitions). That certificate made the same statements. And further references to this wind power project existed. GFQ's and the broker's website advertised the project as consisting of eight turbines, in total producing 10 MW distributed over two sites in Dhule in Maharashtra.

But, then, again, I could not find any clear identifier. Yet, I knew, detailed information must exist. Out there, huge databases of all the CDM projects existed; and soon I

[44] See Interlude I



Artefact IV.1: Certificate for 1.55 kt of reduced CO_2e [sold to a German GCE]

learned that Gold Standard also ran a database of all the projects it was involved in. Or so it seemed. I sent an email to Gold Standard – and never got a reply. No database helped to get precise data on the project. I met with three carbon offsetting specialists to shed some light on the identity of the project. First, I met a colleague from CDM-Watch, a friendly NGO. We scrutinised public databases on offsetting projects and identified two projects which were once planned as CDM projects but then the application for the CDM certificate was cancelled.[45] I tried to investigate – but did not make much progress. I contacted a friend at TÜV Süd, one of the key players in the oligopolistic offsetting project verification market. He immediately reacted, saying that 10 MW would be way beyond normal Gold Standard projects. We then turned to the certificate itself. He was quite surprised: the offset emissions were not given any identities. (Thus, I learned: in normal emission trading, an CER unit sold to a buyer would be given an identity and marked as retired, i. e. used up; these identities would be made publicly available to ensure that no CER would be sold twice.) The certificate sold to GFQ, however, did not show any sign of such retired CERs. He then sent an email to a contact of him at the Swiss Gold Standard office and got this reply:

What I understand from my colleagues is that we do not have any Gold Standard wind project in state of Maharashtra in India.

Artefact IV.2: No 'Gold Standard wind project in state of Maharashtra in India'

I was, thus, confused. Too much non-coherence. Months later I looked into materials assembles by activist scholars Gilbertson and Reyes (2009, 71-76). These are reports on how wind power projects looked like on the ground, in Maharashtra. They involve 'land grabs and exacerbate local conflicts and pollution'. Then, from Ghosh and Yasmin (2008) we learn that Maharashtra owns most CDM projects in India, many of them wind power projects. A scholarly literature on problems with offsetting projects exists now.[46] Down To Earth (2008) looks at the wider political economy of wind energy in India and provides a disturbing picture.

> The sector has, rightly, received huge incentives, but these have not upped power generation. As it emerges, companies have merrily installed plants, not to generate power, but to gain from tax and depreciation benefits. The business seems a closed loop – the turbine-maker makes deals with investor companies to set up plants. Nobody quite knows the cost of a windmill. The turbine-maker gains; the investor profits. Indeed, nobody seems really interested in selling power, increasing efficiency and cutting costs.

So, what are all these wind power projects about? Are they connected to my case? As it turns out, the evidence is even more complicated. Having learned that, somehow, my technocratic engagement with the document did not provide me with the desired

[45] CDM2481 and CDM3694. Both were 10 MW projects based on wind power generation in the districts of Nandurbar and Dhule. PDD Consultants have been Senergy Global and MITCON.

[46] For several readings on offsetting projects in India, cf. Böhm and Dabhi (2009).

insight, I turned to the certificate as such. I stopped viewing it as an unmediated signifier of the project 'out there'; I took the certificate serious for what it was: a document. Here, then, is a close reading – a verbatim transcription and translation of the document's longest sentence (original emphasis): it

> [...] guarantees that all the [emissions of greenhouse gases (GHG)] caused by the [car fleet of several GCEs] in the year 2008, summing up to 1.550 tonnes CO_2-equivalents, have been offset by means of additional investment in the high quality Gold Standard climate change project **Wind power plant in Maharashtra in India**.

Artefact IV.3: Partial Transcript of Artefact IV.1 on page 524

This certificate has been signed in February 2007 by an agent who has had been engaged in contractual working relations with GFQ before he started working at 3C Company. This reading resulted in some, only now, obvious pressing questions.[47] The CERs sold exhibited an exciting temporality: CERs have been sold before the emissions were actually enacted. At least, in my study, I had not come across that EMS-Team members directly enacted future emissions – they were mostly working on emissions of the past (and they prefigured and con-figured future emissions, but did not enact them as finalised a year ahead). Then, there is the obvious problem with the claim that the CERs were certified by Gold Standard. Doing another round of internet search on this issue, I found that – now – the relation between these CERs and the Gold Standard had changed. Both, broker and GFQ, started to weaken their statement; the link between the Maharashtra-generated CERs and Gold Standard is now described in this way: 'the project is certified in accordance with Gold Standard criteria'. The most exciting point, however, was this – and it may well explain why I had problems to locate clear references to the project in India: the CERs have been qualculated not in relation to a project *somewhere* in the global South, but in relation to *investments* in a project. This means quite simply that GFQ got CERs which were related to a specific sum of money put into a somehow existing wind power project. That project might still be in its planning phase. But investing in it as such can generate certified emission reductions. Theoretically, then, this broker could still sell CERs generated by a project if they invest into dismantling the project for some reason. Money is invested and that economic activity generates emission reductions.

Obviously, some may say now that this is an effect of the VCM. The CERs were related only to VER attempts. This, however, misses the main point: GFQ possessed the document presented above; GFQ was allegedly controlled not only by corporate auditors but also by a global NGO; and all spoke of the Gold Standard. Here, then, is the practical and multiple reality of the project. For all practical purposes the Maharashtra project was a Gold Standard project. It was enacted as such. Till now, this network is strong enough to hold. Nobody seems to worry.

This was later confirmed by Elise. Talking about the project, she was happy to share her thoughts.

[47] For a complete list of my questions (posted to the broker), see Appendix B.7 (on page 610).

Field Note Extract IV.e (Money laundering)

Elise called the wind power project of the broker 'money laundering': the sums paid for buying the CERs are directed back to GFQ's carbon business unit.

Here, then, ends a tale of sustainable wind mill projects generated by GFQ's emissions. Yes, doing carbon accounting relates to real economy. This certificate's (and others') CERs were subtracted from GFQ emissions. The emissions enacted by GFQ, thus, folded into themselves this tale. And at least three players are economically or organisationally sustained in the course of this activity: GFQ's EMS-Team managed to reduce emissions, to achieve their reduction target; GFQ's carbon business unit as well as the broker earned money by conjuring up Gold Standard CERs.

Market designers may not have wanted this, but constructing a carbon market is creatively used to help develop capitalism's interests. Alongside capitalist practices, situated concerns for real reductions easily fade into a legitimising discursive background, quite decoupled from ensuring that financial practices are somehow 'really' sustainable or ecologically sound.

◊ ◊ ◊

Finally, how did the EMS work for people? Superficially, we might note: least of the EMS-Team members continued working for GFQ's HQ three years later. The company moved on – transformed its bio-techno-social constituents of the carbon apparatus. As it were, some of these constituents were selected out – others left voluntarily. Understanding enactments of capitalist environments, I propose, has to engage with the work and life trajectories of those doing green or sustainability labour. Nearly cut off, but this constitutes a tiny but tremendous tail of carbon practices.

Victoria left GFQ shortly after my field work had ended. She voiced that her boss, Herbert, did not move the CSR Unit in a productive direction. Soon afterwards she occupied a new position – even higher – now to 'manage' the 'sustainability and social responsibility' of another foundational organisation of the capitalist fabric. But why did she leave? She wanted to move GFQ towards sustainability; but her endeavours were subjected to friction and more friction. The transformation of the EMS required too much energy. It was not that she moved against any corporate policy's stated aims; however, the trajectory of GFQ's carbon was stuck between the conflicting performances of key actors. Precisely because Victoria felt immobilised, she had some time to summarise the politics around the EMS transformation.

Field Note Extract IV.f (Political mess)

At the moment, the EMS is positioned in a situation of political confusion and mess. And she is positioned right in the middle. Other actors don't move. Her boss, however, wants her to act. *Work is stressing her – that is, because people around her are not willing to move ahead. Of course, she says, she is paid to look into this.*

She invited me to form my own opinion on a recent change in the management configuration of the CSR Unit. The position of her boss has been strengthened.

I experienced Victoria as hurt. Although she had been explaining, negotiating and making compromises while con-figuring the future EMS (the budget, the number of

FTEs, the time resources), reinventing the EMS again and again – dozens of versions of the system had to be drafted, revoked, reinstated – no stable organisational network crystallised around the proposals.

The precarious position of her negotiations for a new EMS was highlighted with a single concept, enunciated by Frank. A colleague told me how Frank had illustrated (in a CSR Unit team meeting) what Victoria was working on: who will be the future 'chimney sweep'? This metaphor indicates the discursive status of carbon management at the time. The felt status was set back to a discourse of end-of-pipe environmental management (pre-ecological modernisation). In this context, EMS-Team members had to ask themselves: what were they working for?

When Frederik was about to leave the EMS-Team to switch positions with Jack, he suggested that he was actually looking forward to not have to worry about data prescriptions any more – and turn to actual work of an environmental manager. So, here is a point which deserves further research. Their assistant, Elise, continued working for GFQ's central carbon accounting. It was very much her articulation work which allowed Jack to connect with the historically accumulated infrastructure related to [Frederik-ESDR]. However, neither Jack nor GFQ, in turn, stabilised her job.

Field Note Extract IV.g (Exploited)

Elise tells me: she feels 'exploited'.

Dieter was most outspoken about the discrepancies between the promises of ecological modernisation, environmental management and actual practices and what that meant for society. ↪[48] Clearly he saw that doing environmental management from the HQ perspective implied a reduction to quantified dimensions: data needed to be delivered; and emissions and costs were to be reduced. This was what the corporation wanted. Another time he remarked that the EMS as it was exercised was 'crap'. The corporation did not offer him enough to bear this situation. He left on his own terms. When I met him again, nearly two years later, he was about to leave the Western world and go to travel in the far East – to find back to himself. He had identified this problem of his self: no longer was he sharing the belief in the growth paradigm. Yet, as he noted: in our society one is not allow to say and think so.

As it turns out, then, doing sustainability, performing green collar jobs, does not necessarily entail satisfaction with the working conditions – and not that one cognitively supports the reduction of environments and sustainabilities to data techniques. Members have been multiply exploited: *bodily* they worked overtime, ensured their body would perform well the job. They sacrificed the coherency of their *identities*: within the settings they experienced, doing green labour could not be performed well. This implied that they had to *accept* the contradictions, conflicts and tensions resulting from their situated enactment of environments; these clashes had to be individualised. In EMS-Team meetings, it was unthinkable to attend to members' problems with their collective and situated work reality. Doing green labour entailed the unpaid and silenced

[48] The following discussion is relating to Field note extract I.g (on page 66).

maintenance of one's self: members had to be emotionally and psychically able to *not* recognise an array of problems in order to cope with the tensions; they had to bear the tension and invest their energy to not collapse.

Positioned in these contradictory positions, members developed generative schemes to make sense of their lives and order realities. Thus, one could do an MBA in Sustainability Management while criticising the foundations of capitalism; one could perform claims of truth in parallel to constructivism. Contradictions could be accommodated. In any EMS-Team meeting Sustainable Development Reports (speaking *truths* of GFQ's carbon reality) were as much present as agents who sometimes theorised the constructed and contingent character of data. Hybrid habitus were present as much as multiple discursive repertoires.

Different than Porter's (1995, 89) suggestion that quantification implies self-sacrifice (because there is no space for interests, individuality, self), I interpret members' positions not as a form of complete self-sacrifice. I argue that members had to fold into themselves the tensions they were positioned in. Doing numbers and qualities, data sets, carbon at these positions required members to reflexively, actively and creatively generate accounts that would sustain the situated tearing forces. Selves, members identities and roles – as much as jobs, materialised histories, digital and paper realities – were a significant co-constituent of the carbon apparatus. Transforming this apparatus had implications for the (self-)selection of compatible selves. Some selves, and with them bodies and particular technologies, needed to be unplugged.

◊ ◊ ◊

This interlude could be read as a scandalising text. This is not what I intend and what is my point. Of course, there are scandals folded into GFQ's carbon. While this is not acceptable, of analytical interest is more how relations are performed that have these problematic effects. For that I visited three sites at which normally absented relations around doing carbon crystallise. We engaged with the reconfiguration of the EMS and its consequences for enacting carbon; I pointed to the range of problems of emission offsetting; and I highlighted members' experiences of what doing carbon did to them.

The finding is that when carbon moves central within capitalism, what carbon is, capacities to know environments and how labour is treated is (also) impoverished. Humans may have to live with what is normally imagined as carbon and climate change. They are companions. Within the corporation the engagement with these companions is shaped by those actants who co-constituted and complement carbon. However, the way workers, carbon and the issue of climate change are enacted, enacts them as particularly capitalist circumscribed entities. Crafters of carbon, carbon itself and climate change – all perform and are performed in relation to the paradigm of efficiency and economic growth. Those entities who and which are not willingly strengthening the bonds with increasing economic performance within the market have to be sorted out. They are monsters of capitalism. Plug-ins are required to harmonise, to be of one mind, with the situationally hegemonic interpretation of what is needed to perform well. Clear limits

to any treatment of companions. Responsible engagement with carbon has to recognise the tails of carbon, the treatment of companions.

CHAPTER 7

Conclusion

This book offers a respecification of the problems of the triangular relationships between 'humans', 'society' and 'nature'. It is a new telling of how these entities are related and how we might study their relations. In my analysis, the big narratives of ecological modernisation or of structuralist marxism were not productive to understand how these three are constituted and constitute each other. Recasting their constitutive relations, this book offers insights which I deem significant for at least three audiences – scholars of science and technology, of accounting, work and organisations as well as to environmentalists.

To open this conclusion I briefly review the objective and methodological ground of the study reported here. Afterwards I draw together the focus of this book – the enactment of capitalist environments by means of apparatuses. This allows us to spell out the implications of this study for hegemonic environmental politics. For, as I argue, the dominant policy instruments for managing climate change are likely to be insufficient if not counterproductive, I then turn to lay out alternative routes to navigate the messy reality of being responsibilised for managing environmental crises.

The aim of this book was to rethink the grounds on which control over environments and imagined human-society-nature relationships can be exercised. For this, I turned to a particular site of study: the offices of corporate agents of ecological modernisation, also called environmental managers. Quite contradictory understandings of these agents are implied in environmental discourses. Ecological modernists would view as agents those who put plans, prescriptions, programmes, policies into practice. Marxists would completely disregard them because within capitalism, environmental management can only add up to greenwashing and increasing economic efficiencies. Hitherto, too few studies took these agents seriously. Most studies' methodologies ensure that preconceptions of hegemonic narratives of sustainable development do not invite attention to the actual practices of these agents. What these agents do in their day-to-day work reality is not taken seriously – and does not have to be in most methodologies because hegemonic greening discourses dictate the results of studying environmental management anyway.

In contrast to these takes, I asked myself what so-called managers do and how they achieve whatever they do.

My ethnographic journey soon led me to a generative field site: the work reality of environmental managers 'responsible' for assessing the global carbon footprint of GFQ – one of the world largest corporations in the finance industry. This site is apt to study agents of ecological modernisation while seeking answers to questions on how humans, society and nature relate for four reasons. First, carbon footprinting is a *practice* that links us to a key concern of environmental politics of the last decades – and to a recognised problem of environmental managements for centuries – climate change. A study of how this successful multinational company instantiates its effects on climate change, therefore, can be read as an economically and politically feasible approach within capitalist economy to relate to an environmental issue. Second, studying in the midst of the finance sector allows us to engage with the effects of turning climate change into an economic allocation problem (hence emission trading as a market solution). For, during the duration of the study, the finance sector was exempted from the Kyoto Protocol, studying GFQ allows us to access carbon accounting reality as an effect of economic optimisation processes – rather than as interfered with by governmental prescriptions. In addition, the finance sector is often construed as a *Vorreiter* sector in progressively engaging with climate change. This is understood by ecological modernists as signalling that, indeed, environmental concerns are moving epicentral within capitalism. Third, during the fieldwork period of this study, how carbon accounting was to be conducted was not a closed issue but in the process of being procedurally optimised. The observations, therefore, allow us to learn about a range of minute problems that members were confronted with while trying to account for GFQ's carbon emissions. Learning how GFQ's agents of ecological modernisation engaged with diverse problems is apt because it allows the reader to imagine the range of realities which smooth, black-boxed, punctualised carbon facts do not show traces of. Finally, appropriate to the position of GFQ in the finance sector, the multinational maintained relationships with other hegemonic organisations. I engaged with the corporation's links with one of the largest international environmental NGOs as well with one of the Big Four auditing companies. Hence, this study is well-grounded to generalise the findings in terms of how the triangular relationships between nature or environment, humans and society are 'well' practiced within capitalism. Studying carbon accounting practices at GFQ establishes a firm base to an argument of how environment is practiced within modern configurations of capitalism.[1]

The overall concern of this book, thus, is how an environment is emerging within

[1]While other companies and other sectors exhibit different configurations of carbon accounting, *that* carbon accounting is in particular, contingent, ways always configured is a general finding. This study is not only indicative for neoliberal configurations of capitalism but helps to consider a variety of capitalist modes: all kinds of possible modern capitalisms require corporations to co-operate in informing society and markets about products – about their costs and implications. The study of GFQ's carbon accounting practices is informative to all kinds of modes of 'governing' capitalism. I return to this topic below.

capitalist practice. Carbon accounting provides a case in point. I consider carbon an environmental entity. Asking how GFQ came to establish its carbon knowledge tells us something about how capitalism can know, and, therefore, manage an environment. These are the theses I developed in the course of this study: agents enact carbon. The carbon which GFQ was engaging with is distinctly different from, say, the carbon in IPCC discourses. GFQ achieved to mobilise a particular type of carbon in order to reduce the corporation's emissions: carbon-as-accounting-data. For all practical purposes of capitalist practice – corporate and labour – carbon emissions are data. More to the point, to a significant degree, carbon emissions are digital. Thus, this study indicates consequences for both, epistemology and ontology of carbon. Furthermore, I argued, carbon is promissory matter. Capitalist carbon promises hegemonic politics that capitalism can sort out climate change, environmental crises. No radical departure from current economic policy is required – in capitalist accounts.

Methodologically, this study set out from the conviction that studying agents' practices ethnographically allows best to engage with their material accounting practices, asking what agents hold in common. This is, thus, a study of the society which these agents were part of, a study of carbon culture and its members. I did not, and do not, attempt to translate my findings into neat checklists to render corporate governance more smooth. Much rather, I hope to support agents' struggles of counteracting capitalist usurpation of environments. Following Bourdieu (2000, 236), for action against capitalism to be seen as legitimate 'the structures that are contested must themselves be in a state of uncertainty and crisis that favours uncertainty about them and an awakening of critical consciousness of their arbitrariness and fragility'. In that light, I attempt to translate this grounded analysis into a grounded critique of capitalist reality which, hopefully, indicates points to reconfigure destructive forces upon lived human, societal and natural realities.[2]

The grounds for this book's theory reside in an analysis of environmental accounting as practical work. Thus, this book develops a grounded theory *of* carbon accounting. 'Of' matters. I have not employed some overarching theory and illustrated it with some findings from the field. Rather I scrutinised members' *practices* of doing carbon accounting and studied how in their work they drew together all kinds of elements to construct firm facts. Saying that the concept of *enacting environments* is a theory *of* carbon accounting has an intellectual history. It links back to Latour's (1987, 242) point that scientific theories are not some mere social constructions, but theories *of* particular material things and relations between them. This book is based on the material things and the practices of relating them by agents who were occupied with carving out GFQ's

[2]Of course, this study may be questioned in terms of its own contribution to environmental destruction and shattering of societies' capacities for collective organising and mutual help. My modest attempts to socially just and environmentally sustainable research practice, in response, consisted of not using planes for travel (that is, until I submitted the PhD thesis version of this text), of reducing demand on housing and hotel industry by way of mostly sharing homes with friends, fellow scholars and activists as well as wonderful people of the CouchSurfing network, of predominantly using vegan (or dumpster-dived) nutrition and clothing – and not constraining my political activities to this text. (And I am not going to calculate the carbon emissions 'saved' during the course of this study.)

carbon emission footprint. And I trace what that footprint consisted *of*. Following Star (1999, 387), this study involved describing the proclaimed and prescribed practices of carbon accounting as well as the hidden tasks to make the former practices work. For Science and Technology Studies (STS) scholars recognise that scientists' work does not consist only of saying things but very much of *doing* (Lynch 1999, 228), I set out to study members' practices by means of participant observation rather than creating interview situations to mobilise their accounts. Therefore, the findings reported in this book differ from those developed based upon an analysis of interviews. In particular, this study focused on two methodological proposals emphasised by Suchman (2007, 283-286): investigating the work to draw and delineate the environmental object, in this case carbon, and situating that object in space and time. For the most part, I constrained my analysis to how the object, carbon, was treated – imagined, constructed, enacted – at GFQ's HQ. To support this located analysis I also drew on analyses of practices in several of GFQ's subsidiaries and of a visit to one of the most relevant carbon-related ranking agencies in carbon political economy. In addition to participant observation and practical immersion in members' work practices I drew on an analysis of documents that members employed to go about their tasks. Heavily leaning on Mol's (2002) work I argue that my reports of members' practices in this book are simultaneously about their object, carbon, and about themselves and their reciprocal practical relations. Capitalist carbon does not exist without work practices. Unfortunately, corporations' official accounts of carbon accounting are untenable to understand workers' epistemology and the ontic status of carbon. However, members' practical logics and the situated action of bringing corporate emissions facts into shared, social, economic and political reality provides an apt site to study the enactment of capitalist environments.

◊ ◊ ◊

This book argues that for capitalism's ability to manage an environment, precisely that environment needs first of all being brought into capitalism. And this configures 'the environment' in particular ways. In short: capitalism enacts environments in some ways rather than others. This book's argument proceeded in the following way. In Interlude I, I show that GFQ links the corporation's profit as well as global climate change and emission trading to carbon foot-printing. Chapter 2 brought us as down to earth as the Environmental Management System (EMS) of GFQ allowed – to the basement of one of its subsidiaries where we visited an engineer who was to 'collect' consumption 'data'. In the EMS, this data would then be related to carbon conversion factors and, voilà, consumption data is translated into emission facts. Chapter 3 and Chapter 4 indicate how these facts are then accumulated, drawn together and, eventually, emitted into market, political and public shareholder, consumer or NGO discourses. However, on the way of this chain of translations, we found not much of simple entities *given* to workers. To a large degree workers had to fiddle with all kinds of entities to bring into presence those things assumed to be given. Data, I showed, was not given but made. It could not be collected but had to be carefully drawn together and crafted. This meant that

the data underlying all of GFQ's emission facts was characterised by workers' practices. Depending on how they worked, emission facts changed.[3] Interlude II illustrates the effect of this quality of corporate carbon emissions. They are subject to change, a singular fact exists in different versions, over time, the 'same' fact can rise and fall. Clearly, then, the singular fact is not the same. One emission fact – say, GFQ's emissions of 2008 – can exist in parallel many times: some of these versions may exhibit the same qualities and quantities, some not. Chapter 2 showed the ground of these emissions facts: already at the basement all the data are highly precarious, political and could be otherwise. Cleaning up data did not mean to expunge these characteristics from data but to accept and hide them. Chapter 3 established that, indeed, what I found at GFQ was not an idiosyncratic interpretation of the discourses of sustainable development, ecological modernisation and climate change. Much rather, GFQ managed to draw on these discourses and reproduce them by means of emitting carbon facts as clear, neat, promising green futures.

This raised enormous questions of whether GFQ's carbon accounting practices were acceptably in control. Yes they were. At least from the point of view of their auditors and NGO partners. Although these organisational actors problematised some of the practices by GFQ, overall, GFQ's carbon accounting machinery was accepted and on an acceptable trajectory of steady improvement. Leaving members' dichotomising concept 'out of control' behind, Chapter 4's analysis suggested that better than thinking control as existing (in control) or not existing (out control) we should conceptionalise their practices in terms of *situated* control. Neither GFQ nor the EMS-Team could access and oversee all the relevant practices in which data was handled, translated and transformed. However, in particular situations, those assembled – humans, databases, spreadsheets, sheets of paper – could well define what that situation would do to data. The situation controlled data, not any environmental manager. As Chapter 5 argues, within these situated moments of control, data was ordered. Data in itself was – for the most part – not in an order which satisfied the requirements members had on data. Thus, data was adjusted, its formats and boundaries were blurred, it was equipped with flexible intelligent sentient devices, humans, which would ensure that data was done well. Ultimately, those problems of data that could not be solved, deleted or were strategically Othered were accommodated. This meant that the mess in doing data was both recognised and, then, well hidden and silenced. The combination mattered: recognised *and* hidden mess in carbon meant that members could take precautions against potential damages caused by spills and overflows☞. Interlude III investigated some of the latter – usually silenced in discourses of sustainable development and ecological modernisation: the working conditions of agents of ecological modernisation and the labour their work presupposed in the global hinterlands of efficient division of

[3]My argument is *not* about manipulation. Data is enacted; agents pay much attention to this data and organise data carefully; and tactical, strategic considerations are part of these practices. Members would not see their practices as manipulating. Yet, they needed their hands (*manus*) to construct data. They had to manipulate realities to enact data. Of scholarly and political interest is not that members manipulate data but how and the politics of that how.

labour. I argued that the position of humans in doing carbon was significantly shaped by capitalist labour relations and that the humans implicated were systematically organised to exploit them 'well'. Chapter 6 drew together what the observed practices did to received views of carbon. I argued that members' practices shaped carbon and that this carbon was distributed, rather than punctual. Carbon was multiply existing over space and time, with rifts and always changing. Rather than thinking the carbon that members brought about with their practices as representing molecular emissions well, I proposed, that what they enacted constituted a completely different ontology: *carbonscape*. This landscape of carbon facts was constantly being worked on by workers; their tools allowed them, however, never to completely have this landscape under control. At particular locations, in a constrained set of dimensions, they were able to tactically order emissions. This allowed them to momentarily freeze some carbon, turn it into a snapshot, a fact, which could be signalled to others within or outside of the company. But a moment later the reference fact may have already changed again. Carbon was copied over and over; but carbon copies in the digital realm of emissions were not signs of sameness (as suggested by emails' 'CC') but of multiplicity and fluidity. The carbon configured by members was inscribed with capitalist considerations. Carbon was to be efficient, clear, neat, singular. Cold. But the carbon I observed did not indicate resemblances with fire extinguishers' carbon. The opposite: capitalist carbon was a fluid burning space. It flickered and could effect catastrophes within GFQ as well as – this is what Interlude IV alluded to – outside of the corporation. Cold carbon met gold; c'mon, why bother about missing messes and manipulated moves of money?

Carbon was enacted by humans. Without their work, an organisation's emissions could not exist. These emissions were structured in situations. Humans involved and referenced particular discourses – such as of efficiency or emission trading – citing them in their material practices of writing emission facts. This enacted carbon in a particular configuration. This book established modes we may expect more widely in the shaping of capitalist carbon. Capitalist carbon emissions are emissions structured to serve capitalism, rather than to question or undermine it. Enacting capitalist emissions is organised to sustain capitalism.

◊ ◊ ◊

This line of argument urges us to engage with the key analytical characteristics and implications of the apparatuses by means of which capitalist environments are being enacted. Apparatuses allow situated control in (and enactment of) regions of carbonscape. Metaphorically, apparatuses are like devices for terraforming: they are shaping landscapes at a global scale while that shaping takes place locally. For this engagement the notion of apparatus needs revisiting. I detail four practically inextricable interwoven analytical categories of relations: the material, (traditional) social, discursive as well as strategic and tactical.

Enacting capitalist environments is not about science. But it has similarities with science – and with medicine. Yet, it also exhibits differences to practices in these

fields. In Mol's (2002) account, objects to be represented and interfered with are not antecedent. Rather, they are delineated with an apparatus. Barad (2007) suggests that within apparatuses material and discursive practices configure phenomena. The fact is done rather than found. She stresses that within the space of an apparatus manifold entities and practices matter. There may be matter (the assumed object) which matters. Also, however, the ways humans intra-act within the apparatus with that matter, the techniques they use, shape how that matter is able to exist. I propose that enacting capitalist environments is also happening within apparatuses. Similar to science and medicine, those setting up the apparatus may be interested in learning about something. Environmental accounting is about letting something speak to the accountants. Some thing. Capitalism needs to listen to the environment. This is a discursive norm.

I argue that – for capitalism – what this thing exactly is does not matter much. In the (current) capitalist context it is necessary to mark an apparatus as apt to listen to some things that speak to it. The configuration of the apparatus is appropriate(d) – in that context – by means of including legitimising agents (such as auditors, standards, NGOs). Here is a self-referential network of entities brought into relation which is valued as working well the more it can operate independently of the things inside, the assumed content. The apparatus to enact capitalist environments is not about learning about the environment but about producing a legitimised ground for management. As in Riles's (2000) description of policy networks it matters more *that* the network is sustained than what the network momentarily engages with.

Enacting capitalist environments well requires members to manage their practices well. What they managed was not so much carbon 'out there' but carbonscape. They managed to perform (themselves, appropriate technology use, carbon) in a field – navigating discourses, keeping their jobs. It was not about carbon but about doing management. Managing carbonscape was about keeping carbon moving within the space, about maintaining and reconfiguring apparatuses within which they could intra-act to produce momentarily frozen carbon fact phenomena. Facts needed to be stable. To be able to have appropriate carbon 'speaking', carbon had to be always changing. And this was not purely subject to voluntaristic action. The apparatuses to enact environments were co-configured by the things they were to mobilise as carbon. The things had power. However, the relation between these things and CO_2e (imagined as 'out there') was not of much interest. If it was of interest, it would certainly not be determinable. However, the practice of letting any-thing pass as mattering as long as the phenomena were appropriate(d) challenges reliance on capitalism's enactments of environments and on how significant for capitalism the content is. For capitalism *what* and *how* environments *are* is not of interest – despite capitalism's dependence on sustainable yield.

Within the apparatus, all kinds of things and relations are intermingled. Meetings are about temporally stabilising particular orderings of carbon, socially controlling relations between data, imaginaries and material technologies within the apparatus. In all kinds

of moments, data was adjusted to fit into given frames. In other moments frames were adjusted to fit data – or the frames were simply ignored. The order was overflow. Few Obligatory Passage Points (OPP) existed within these apparatuses. For staging control automatic affirmation points fully sufficed. No singular centre of calculation existed within the corporation. Much rather, data was flowing in all kinds of ways, through pro-forma OPPs, around them and other points – and back. Uncertainties and contradictions were systemically ignored and excluded from consideration. The politics of things, the processes of manufacturing data, were not to spill the neat surfaces of carbon phenomena. No-body, no-thing was to disturb (never yet enough) smooth data processes. The agency to cut and exclude was a key condition to stage carbon as describable by few quantifiers and qualifiers. Interfering messes and masses were creatively managed. Fantasy mattered. The phenomena's performance was to be shaped by particular ideal orientations (of members) and not by any-thing else within the apparatus. Attention to detail was interfering with the smooth performance of docile facts. Where details pressed themselves upon agents, agents were to mobilise fantasy to overcome these interferences in the capitalist project of performing suitable environments.

Materially, these apparatuses have been fluid, dynamic consisting partially of namable entities. For example paper, corporeal human bodies, spreadsheets. However, what exactly, say a finger or a hand was was not defined. Manual work was detested but necessary. Digital work was appreciated but required fingers. Humans were to be excluded from the apparatus (for they spoilt carbon) and simultaneously were required to safeguard carbon qualities. Their eyes and brains had to judge whether carbon performances were appropriate enough. Carbon molecules did not matter much. Only documents did. Documents were proxies of emissions. For capitalism emissions are data. These diverse and changing entities needed to be drawn and hold together. Their relations were the effects of members' practices and the outcome of past practices. The materiality of carbon, therefore, was not only located in typical material things like the human body or a database; the material ground on which the apparatus was brought to work was also consisting of 'social' relations. With this I refer to shared orientations and commitments amongst humans. This included for instance the orientation to not challenge the statements of colleagues. The *symbolic* costs of unsettling facts are high – not only the material costs. Unlike in Jackson, Edwards, Bowker, and Knobel's (2007) account of scientific data – where content matters – in enacting capitalist environments where the content does not matter, trust has to be well invested in colleagues rather than in contents. Members learned to ignore contradictions and uncertainties. Or they had to leave. Trusting colleagues to ignore is a key kind of relation-work within the social fabric of capitalist environments.

I suggest to imagine apparatuses as significantly shapable by classical social relations. Trust is merely one of them. Barad (2007, 165) refers to 'variables', such as class, nationalism and gender, as part of an apparatus. In my analysis trustful and promissory relations loom. Oriented collectively at promises, humans were positioned to see in

carbon not only any present configuration but also future, fairy, carbon realities. In these futures, carbon was neat, disembodied, strong, cold. Trust that all humans shared this commitment allowed members to make recognisable to each other that some problems still existed – and that these could safely be ignored because, eventually, all would be well. Thus, the (non)appropriate engagement with mess was constantly made accountable vis-à-vis each other. Seldom members were confused about the messy reality. To navigate well within the fluid space of carbon realities, to not be shaken by any storm of new prescriptive devices, agents learned to know what realities to make present and which to make absent. Disposed to engage with carbon, members developed a feel for the game of appropriate carbon enactment. This is not so much intuition about a particular appropriate fact but about how to play the game. In practical terms the scripts were so useless that actors could only try to play well; good performances could not be preprogrammed in that ever changing space. Members could optimise their personal position by ensuring the ability for plausible denial of any connection to disturbing contents. Fixed content was not only not mattering it was a threat. To manage carbon well, carbon needed to not be fixed. And this required the social fabric to perform carbon as not located in any here and now but as an object for hope – that in future carbon may rest.

Discursively, the apparatus was configured to produce a diffractive pattern of three discursive trajectories. First, for the corporation it was important to emit. For that they had to perform emissions. To perform well within capitalism one may not be silent, not show blanks in the hegemonic discourses of climate change, environmental crises, sustainable development. Second, these emissions were to be legitimised. This legitimacy is informed by positivist discourses of correct facts. NGOs require the performance of trustworthy, i. e. correct, facts as much as auditors. Third, the emission enacting apparatus was to be optimised in terms of efficiency. Emissions were to be enacted as smooth and with at least resources required as possible. The interwoven enactment of emissions sought to ensure that emissions would be stable, neat, unproblematic and non-conspicuous in relation to any of these reference discourses.

Strategically and tactically, thus, emissions were heavily constrained. Plans could not simply be implemented. Carbon was not an orderly entity simply be readible off any measurement device. Members' strategy, in reaction, was to stage being in control. Practically this necessitated projects and tactics to enact temporally and spatially constrained order within carbonscape. Apparatuses served precisely for these projects. By close attention to members' specific practices the book argued that members were able to structure carbonspace. This included all kinds of adjustments and corrections of data – correcting in relation to agents' situated feel for the plausibility of numbers, the baseline, the target or in terms of deviation from the prior reporting period☞. Carbonscape was the effect. However, this structure was not stable. Much rather, '[s]tructures are specific material configurations/(re)configurings of the world' (Barad 2007, 237). Configuring carbon, thus, shapes what is emitted into social, political

and economic reality. Any specific configuring was the effect of the assembled entities amongst which corporate agents had to tactically act, seeking to stabilise carbon. While emissions would be performed *within* spectacles like a Sustainable Development Report – serving what Tsing (2005, 73) called spectacular accumulation – the emission facts *themselves* were to be unspectacular. The exciting hinterland of them – carbonscape – was hidden. In that respect, then, capitalism should be understood as pursuing a *occult* project: hiding the intra-actions, tactical movements and stories which enacted a particular singularised snapshot version of carbon. Occult means that causes are hidden (Feyerabend 2009, 287). This notion is meaningful for our analysis to highlight capitalist performances' *quality* of transparency.

◊ ◊ ◊

Having pointed to these analytically differentiable categories of relations we may move on to our next task. This is to proceed in five steps from the existence of messy but hidden environmental realities to the production of ideological delusion. First of all, we need to recognise that environmental realities are messy. These they are not only in any 'out there' and in science but especially so also in any organisational space. Capitalist organisation of enacting environments are no exception but configure environmental mess in particular ways. At the most simple level the enactment of environmental realities in apparatuses imply that what qualities and quantities are is not antecedent but enacted enfolded into the enactment of the environments themselves. Qualities and quantities are not anyhow intrinsically separate or distinct. Numbers are not substantially bound by any antecedent rules – such as mathematical ones (Verran 2001). The apparatuses this book investigates are characterised by being constantly operated and reconfigured – they continually enact shifts and transformations. A carbon fact only exists by being done and redone. This has consequences. While authors like Latour (1999a) and Mol (2002) point to grounds that allow agents to retrace their step, follow back where they come from, this book shows, alongside Waterton's (2002) account, that this reversibility is not given. How precisely environments are enacted, reenacted and transformed in the course of these steps cannot be reconstructed well retrospectively. Fleeting moments in the situated enactment of environments matter. Even though seemingly clear boundary objects were enacted – such as environmental balance sheets☞ – in fact they were only partially sharable as representatives of a specific carbon reality because often environmental balance sheets existed multiply. Different and competing environmental realities existed alongside each other. The boundary object in this situation was much more the imaginary of coinciding frames rather than actually coinciding contents. When audiences try to relate to a company's emissions they would likely relate to many different emission realities rather than a singular one. Reality in apparatuses of enacting environments is shape-shifting, dynamic Barad (2007) would say. In it, ever new possibilities for realities are enacted – yet not arbitrary ones.

Not being able to observe these moments of operating within apparatuses – or for that matter interfere in them – prevents reconstructing how what mattered shaped an enacted

environment. Neither, this book showed, can prescriptive devices tell us what happens in the enactments of environments. Numbers do not say anything clear without specifying the realities under which these numbers have been enacted. Carbon accountants can and do easily recognise so. They know well that quantities and qualities are highly contingent, translated, transformed and reconfigured. Without understanding these histories, what environmental representations mean is not appropriately interpretable. Politically, environments can only be understood by directly engaging with the assembled in the moments of assembling – whatever kinds of entities and relations they are. This causes problems for the political problem of transparency. If reversibility and appropriate reconstructibility is not given, retrospective transparency cannot exist.

Second, these messy realities did not cause decisive problems for members. Where Strathern (2012, 239[4]) suggests that '[l]ogically, it is impossible to have different perspectives on the same problem', yet recognising 'that [a] infinite and interrelated' multiplicity of climate problems exist 'out there' this book shows how not merely epistemologically but also ontologically the multiplicity and fluidity of enacted environments can be well coped with. By studying the logics of practices we found that for members it can be very practical to be maintain non-coherent arguments. Practically it is no problem that things are partially connected, that meanings are enfolded in each other (Strathern 2004), that theoretically conflicting views (Mol 2002) and techniques can accommodate each other. Coherency is no ontological presupposition of the practical doing of capitalist environments albeit it may well be a decisive discursive postulation and claim within capitalism.

Third, this apparatus is organised to allow for a high degree of substitutability. I concur with Riles (2010, 807) who suggests that not only may managers be swapped but also their objects: strategic thinking within capitalism suggests to configure apparatuses such that the environments enacted may also vary. Water or biodiversity may take the place of carbon. They are mere placeholders for any kind of environmental concern a discourse might suggest. The apparatus's infrastructure should be designed to allow treating all these concerns. Well recognised by critical scholars of environments, to make environmental contents market-ready requires to render them 'equivalent and therefore interchangeable and substitutable' (Sullivan 2010, 115). This book, in this sense, shows how 'fictitious commodities' (Polanyi 1944) are enacted and released into societal and economic discursive space. Like carbon emissions are enacted so is demand for CERs not so much grounded in atmospheric realities but in capitalist configurations of apparatuses demanding something to subtract in a calculation. Whether this thing is a *certified* emission reduction or a tampered certificate or no initiated emission reduction at all but the real emission reduction effects of the financial crisis or simply the correction of not good enough numbers – the calculation does not necessarily mind. It depends on qualculative practices within the apparatus how some things are substituted for each other. Economic abstraction takes place in situated action rather than according to

[4]In a forum article by Diemberger, Hastrup, Schaffer, Kennel, Sneath, Bravo, Graf, Hobbs, Davis, Nodari, Vassena, Irvine, Evans, Strathern, Hulme, Kaser, and Bodenhorn (2012).

grand market schemes, plans or policies.

Fourth, mess within the apparatuses of enacting environments is both of tactical and strategical interest for capitalism. Asdal (2011, 9) suggests that 'every single number, does indeed count for the extent to which an office can narrate itself as the embodiment of agency and authority'. This book points to a specification of how an environmental management office can perform itself as of authority and as a legitimised environmentalist: the office simply has to have enough numbers at hand to be able to select those which it seems fit in a given situation. For environments are to a large degree enacted in silico – like Szerszynski's (2010) weather – agents of ecological modernisation are well positioned to exploit the features of carbonscape. Pellizzoni (2011, 797, 800) points us to the instabilities and mess in natures 'out there' and suggests that these instabilities can be exploited: '[t]he more unstable the world, the more manageable[;] [t]he ontological, rather than epistemic, fluidity of nature entails an increase in its manipulability and controllability'. This book proposes that here is the danger to conflate capitalist enactments of environments with natures 'out there'. To reiterate, this is not to say that I view capitalist enactments of environments as mere representations. Rather, these enactments matter and can be linked to natures 'out there'. However, *how* they are linked is a matter of concern and that capitalism may well manage to stage being in control over its own enactments does not necessarily mean that capitalism grasps nature.

Finally, I argue that capitalist apparatuses of enacting environments serve to stabilise specific discursive formations. As the case discussed in this book detailed, a corporation may well be able to accommodate extraordinary contradictions within the environments they enact. GFQ managed to link romantic landscapes of nature, pure Nature, to promises of carbon emission reductions. Carbon has been naturalised in GFQ's accounts. Within capitalism, environments are performed as matters of fact rather than of concern. Carbon is not to unsettle anyone. The configuration of the apparatus, therewith, however also sustained hegemonic capitalist regimes: an international environmental NGO, a Big Four auditor and emission trading structures were cited into the corporation's carbon. This apparatus was full of entities. And that some things were present matters for a critical analysis of capitalist enactment of environments. That is, for carbon accounting was, after all, also relating to things like documents claiming to be linked as spokesentities to emissions 'out there'. Thus, capitalist performances of sustainable development are not merely simulative as Blühdorn (2007) would have it. Neither is environmental accounting simply an additional informational turn to make sense of the world. Enacting capitalist environments does not serve so much for an imperial strategy to conquer Nature 'out there' but to steer audiences. Publics are to perceive capitalism as being in control over the environmental destructions it creates; publics are not to worry. Modern capitalism enacts environments as troubled but cared for. It is a significant play for capitalism. For if capitalism plays badly, the hegemonic regime is bound to lose even more legitimacy. This book finds, capitalism fools: it plays

badly. Those corporations which present us with clear facts have to be understood as staging clear and neat environmental realities albeit the organisation has the capacity to know that their qualculative practices are everything but clear. As I have shown, capitalism may opt to help agents by hiding problematic masses. Playing environments as unproblematic is deluding. Systematically, in these configurations of the doing of environments, understandings of environmental realities are produced that mislead audiences. I propose a 'mis' to the leading because supposedly the environments enacted are to lead publics and corporations into a sustained engagement with environments 'out there'. However, as it seems, capitalism manages to stage leading environments to its core while actually increasing the distance to these environments. Coal business secured GFQ's core and carbon did not matter. Carbon was not part of the core and therefore where 'flourishing of descriptions', multiplicity, in the core of the financial sector may be threatening (Lépinay 2007, 88), not so for carbon. And even if environments became central for capitalism, their fluidity and multiplicity would not vanish. It would simply be more worrisome. As it seems, *staging* environments as under control suffices to sustain capitalism – so far.

In sum, the ways the capitalist apparatus to enact environments was configured and reconfigured was to enact environments more fluid, variable, floating, disembodied rather than less. This allows capitalism to more freely stage itself as knowing environments and, therefore, being able to respond to the detected problems. I have shown that this response has to fail. Capitalism organises itself such that it loses possibilities to engage closely with environments. Here is the production of a form of 'organised irresponsibility' (Beck 1988). The core of modern, capitalist, hegemonic organisation is not reconfigured to allow environments in but environments are reconfigured, disembodied, melted away, such that they do not disturb the core. Of course this does not necessarily work smoothless. Occasionally, some capitalist organising process may take environments more seriously into account. Being taken into account, however, is never neutral or innocent. Capitalism enacts its environments such that they work *for* capitalism – in the time-space-scapes capitalism configures. If these enactments cause breakdown outside of these scapes this does not concern capitalism. Environmental destruction is reenacted as overflows – externalised from what capitalism can deal with. The insertion of auditors or NGOs does not at all automatically provide corrective agencies. This is because their agencies are enacted as part of the apparatus. This study suggests that the effect of these assumed agencies of external control were not only acting as legitimising networks but also as co-structuring the apparatus such that capitalism is pushed to engage less with troubling environmental possibilities.

Simply assuming that environmental managers can help companies to engage with environments is naïve. Environmental managers know that well. Formally assigning these agents the status as change agents implies to disempower those agents who actually are not equipped with the decisive capitals they need to engender change (cf. Bourdieu 2001, 84). In the apparatuses observed, while ownership of capitals was

normally prescribed, actual distribution of possessions of decisive entities and abilities to enact certain relations were multiple, shifting and, foremost, a matter of practical concern. In these contradictory settings, agents of ecological modernisation are bound to make a key move – with consequences: agents are disposed to hope. In some future, capitalism will perform better. The problem is, of course that the past 'lives on so long as the contradictions that it left behind it are not truly surmounted' (Bourdieu and Sayad 2004, 470). In that respect we need to consider: if capitalism still is learning to responsibly engage with environments (or if it is still not doing this), then 'we' should prevent those capitalist enactments of realities that capitalism cannot be accountable for. Barad (2007, 235) sees an ethical obligation to the responsible participation in enacting realities. I second this.

Hegemonic discourses of the internalisation of environments into market realities or industrial ecology want us to believe that in- and outputs are treated equally within capitalism. This book shows that this is not the case. End-of-pipe environmental destruction does not intrinsically matter for a company – it only matters financially mediated via public perception.[5] Environmental destruction concerns are not at the core of capitalism (except for the small degree of organisations, like GGCA, who need destruction in order to have customers who buy GGCA's promises of a better world). At the core, staging environmental accountability is central and suffices. Staging environmental concern is more cost-effective than caring for environments. Capitalism does not care.

◊ ◊ ◊

In argumentative logics, this book argued for this *proposition*: that the enactment of environments is inherently constantly political and only appropriately interpretable and accountable for in situated contestation of that situated enactment. Here is a *premise*. Political situations ought to be democratically shaped by those affected by the situation.[6] If you do not share the premise, you may well stop reading here; if you share the premise, be invited to continue. The *conclusion* of this argument is, hence, that enacting environments ought to be democratically shaped by those affected by the situation. I use this conclusion as a *criterion* for the normative outlook of this book.

◊ ◊ ◊

Moving ahead from a critique of corporate enactments of environments I turn to proposed alternative instruments to govern carbon. These are premised upon hegemonic discourses suggesting that sustainable development requires sustaining current political-economical orders. We are urged to review whether such praised tools – like command and control, professionalisation, environmental management systems or market solutions – actually own the competencies required for such an instrumentality (Næss 2006; Blühdorn 2007;

[5] Obviously, publics can translate concern about corporate environmental destruction also different than translated via markets: publics can, for example, exercise forms of direct action to ensure that a company pollutes and, hence, emits less.

[6] This is a widespread political postulation – also recognised in sociological and political discourse (e. g. Habermas 1991a; Habermas 1991b; May 1994; Martin 1994; Beck 1996).

Blühdorn and Welsh 2007; Luke 2008; Sullivan 2010; Swyngedouw 2010b). The result of such a review is that all these tools are premised upon a model of scientific governance. They presuppose not only the possibility but also that they know reality adequately and can perform disinterested calculations. This deserves some detailing.

One instrument to govern environments is suspected to be the state. This approach is commonly referred to as command and control. Although it has been criticised for good reasons by neoliberalism's (including ecological modernisationist) critique it is still heralded by disciples of the presumed justices and orders of pre-neoliberal democracies. I presume this common thread in statist approaches: they propose trust in governments which would command corporations' practices, monitor these and intervene. Beyond the classic critique of the cost of such monitoring, this book challenges the ontological underpinnings of this approach, that is, of environments. This model of governing corporations would require the corporation to report about its environmentally relevant processes. To make these reports processable at large-scale – at nation-state scale – a command and control approach would result in employing an engagement with environments imagined as adequately calculable. In this respect the same critique would hold as laid out in this book: corporations' environments are enacted and not given. Corporations' environmental impacts are not simply known and, then, governable: the processes of enacting a company and its environment as governable by the state entail decisive onto-epistemic politics. Capitalism's environmental impacts are political projects prior to making them available for statist command and control. The state can merely add political layers but it cannot control totally and top-down the inner organisational onto-epistemic enactment of environments. Regulators may well define threshold values of what is defined as manipulation and what are acceptable data practices. Yet, how such entities would be positioned in members' enactment practices is out of state regulators' control. Environments are enacted in situations that are co-configured by material, legal and discursive infrastructures rather than determined by them.

At the other end of the spectrum, some actors may call for professionalisation of environmental management and environmental accounting. This call might go like this: following the recognition of the significance of environmental crises (Fineman 1997, 37), if only environmental managers' authority was boosted in terms of their ability to control, shape and influence the corporation, then they could turn the corporation to green itself effectively. They could, for example, redesign the data collection software to collect data about environmentally relevant consumption acts in more qualitative detail. The promise would be to prepare for the corporation's systems of communication (internally as well as externally) accounts about the situated and contingent character of environmental destruction. This promise could come into two versions. In the scientistic version professionals would claim that they could best judge their data and they were best positioned to offer neutral accounts. With Mol (2002, 170) we could say: 'this politics of who [...] grant professionals the facts. It requires of them that they give

information – as if, from the beginning, there were a neutral set of data out on the table. But there is not'. An alternative version would be the actuaries' and accountants' as described by Porter (1995, 112-113). Here we find agents of ecological modernisation who would not want to be evaluated in terms of precise measurements. That would imply public control through objective knowledge. Rather, they would want a profession which publics should trust. Publics should exercise confidence that agents account for environments as best as they can. In both versions, the professionalised agent of ecological modernisation would want to be equipped with more capitals. Ultimately, however, they are dependent not only on the corporation to continue employing them but also on the friendly cooperation of human and non-humans within the organisation. It is in the intra-action with these other humans and non-humans that environments are enacted. This means, this book showed, that agents of ecological modernisation will never be in control of enactment messes. There is no reason, thus, to trust that professionalisation has the ability to fundamentally reconfigure the apparatus and, hence, landscapes of environmental realities.

We can imagine, too, a critique suggesting this would book merely problematise a failed implementation of an EMS. Such critique would offer a strict and, therefore, 'better', enactment of an EMS as a resolution to tensions I have pointed to. To reiterate, an EMS promises to optimise business processes step-by-step, resulting in a greener corporation. This assumed mechanism is based upon evidence of the corporation's environmental impacts. Yet, the prior analysis questions which kind of evidence an EMS actually gathers. I established that whatever evidence of environmental impacts is enacted that evidence is inherently political. The problem is not that standards have not been correctly implemented. Any material citation of standards in the doing of environments is problematic. Of course an organisation learns to enact environments better. However, learning to enact environments better means that – within capitalism at least – the staging environments is moved to the core while engagement with the hinterlands and bodies of environmental realities is phased out, distanced. In the hegemonic take, a successful EMS would be an approach that troubles the capitalist core with environmental issues as least as possible.

Most political investments are now exercised in market relations. Neoliberalism promises that markets are instrumental in pareto-optimally allocating emissions. The idea of this promise is that demand and supply meet and prices are found at which every-one/thing is best off. The result is seen as best accumulation. The present study questions how useful this model is to optimise the allocation of environmental commodities (let alone questioning whether environments ought to be translated into commodities). A significant assumption is that markets are informed reliably. This requires that all relevant factors in an economic system are internalised, that is, included in the accounting frames. I established that this premise does not hold. Even though standards are employed to regulate and ensure internalisation, neither markets nor the state or NGOs can ensure that environmental accounting practices are thoroughly governed by standards. This is not a question of weak enforcement of standards but of

the ontology of situated action. The market cannot ensure more than an audit society which is spilled with empty certificates – signalling compliance (Power 1999). For the market to work, those doing the buying and selling are imagined as calculative agents. As if immediate prices would be everything they would take into account. Both individual consumers and investors may well be able to comprehend and assume the contingencies of the commodities they are economically relating with. Tactical, entangled relations to commodities and their prices are the norm rather than the exception. This book showed how even the production of abstract performances is fundamentally grounded in these rich, situated realities of apparatuses. Any producer of financial or other products knows the contingency of their products. When entertaining market relations – including labour relations, however, they may tactically perform these relations as-if economic theory could grasp them. As agents who invested in the existence of specific environments-as-commodities (whether as buyers or sellers) they cannot be expected to challenge a commodity's existence by pointing to its precariousness, contingency, fluidity or multiplicity. Therefore we may assume markets to be sustained as a performance along the lines of economic consensuses. However, whether or how market realities are coupled to 'out theres' is another question. While I see good reasons for agents to internalise those realities which they immediately depend on in their (re)production, my analysis suggests that environmental destruction is not of interest for economic performance as such. What is of interest within capitalism is to keep worried customers happy. That environmental destruction may threaten the foundations of capitalist economic reality may well be the case but it does not affect directly business practice. Any well-intentioned greening ideal enters the situated practice of environmental accounting only mediated by particular agents. It is them who can care for environments and reconfigure accounting systems to internalise environments as such. But to do so would counter-act economic optimisation trajectories. I showed that the corporation expels caring agents from the capitalist core. At the market level while environments-as-commodities are traded, how this relates to environments-'out there' is an empirical question deserving more research. This book shows that it may well be the case that the market has only weak grip on carbon realities 'out there'. And that may be better than otherwise.

This study indicated that enacting environments within an organisation is an inherently political project and that within a capitalist organisation we may expect environments being enacted to be rather loosely coupled to environments 'out there'. Any policy to improve enactments would have to deal with these situated practices taking place within onto-epistemic apparatuses. Despite this, the brief review of hegemonic policy instruments to improve environmental management or governance suggests that these instruments are premised upon centralised fact-making top-down, rather than bottom-up – authoritarian and non-participatory onto-epistemic practices. These normative scenarios all imply hierarchical structures. They fail the normative criterion drawn out above. This book shows, however, that these structures are not implementable and non-governable. This makes modern practices of evidence-based politics

impossible and undoable. Nevertheless, I recognise that in wider society a collective fiction is maintained that environmental management and governance is possible. And this fiction has real consequences – affecting humans (improving the income for some and destroying the livelihoods for others) and non-humans. I argued that corporations' participation in doing environments reproduces a discourse that naturalises corporate environments. It is not the case that actors cannot seriously care for environments. However, such care would conflict with capitalist societies. To stop corporations from deluding publics those few who participate would have to overcome modern capitalism. They would have to accept and make recognisable for societies that environments are not neat, stable, fixed; no more pipe dreams. Environments are not data but entangled practices of becoming.

As it is now, corporations blind themselves and others. This contributes to make the '"enemy" [...] always vague, ambiguous and ultimately vacant, empty and unnamed (CO_2, gene pools, desertification, etc.)' (Swyngedouw 2010b, 199). In these discourses politics is performed as a question of data. Recognising that things like carbon are inherently political opens them for political demands – *inter alia* about political and material participation. This line of argument implies a rather surprising finding. For this study set out striving to suspend judgements I did not expect to argue about projects of delusion. However, studying the interrelation of practices within the corporation I find, eventually, that the practices of performing carbon facts is – amongst other things – greenwashing. Purporting plain positivist facts prevents puzzled publics. Performing the company as knowledgable of its environmental impacts suggests that capitalism has carbon in control. No worries – corporations suggest. This study of environmental accounting reconstructs environmental management culture as doing significant articulation work to maintain capitalist ideology infrastructure: right now, capitalism needs carbon to perform itself as recognising its environmental relations. This requires environmental knowledge infrastructure. That capitalism turns environmental messes away from mattering is well hidden. Hidden hinterlands.

◇ ◇ ◇

Modern capitalist institutions are systemically organised to delude publics about their practices of silencing environmental realities. In fact, these institutions have never managed to meet their formal modern requirements (Latour 1993b). Delusion is achieved by acting *as-if* these institutions were managing to act towards modern ideals of sustainable development. Vis-à-vis these practices, this book closes by way of alluding to alternative engagements with the concerns I raised about capitalism's deluding effects. The question is what alternatives we can envision for agents of ecological modernisation to organise their ordering practices of environments such that they allow for democratic shaping by all those affected by the enactment's effects. What alternatives should these middle class professional workers (employed as instruments to sustain capitalism) think of? To explore these questions I play through a way of relating this analysis's central themes – onto-epistemology, relationality, practice – in circular movements

towards how agents of ecological modernisation might want to reinvent themselves as agents for grounded utopian democratic and environmental change – transcending the bourgeois utopia of sustainable development and calculable environments. This is not about *participation* (Cooke and Kothari 2001), but about waging into the *political conflicts* over how and which environments are enacted and democratically organising the engagement with these conflicts among all the affected.[7]

The real is not singular. Environments. Neither are environments neat nor clear nor ordered. If they are they are so because they are staged as such. Capitalist environmental facts are facts made of documents, databases, humans and their relations. Tangentially, these relations may extend into realities 'out there'. Primarily, however, capitalist environments are data enactments. That is, maybe except of cases where activist bring in the environment – storming an office – or in musing cases in which environments are exhibited to entertain capitalism – an Orang Utan on a calendar. Although, in both types of cases, actually, the environment brought in is transformed in that moment: environment is performed as data. Climate change 'out there' significantly differs from climate change within an multinational's HQ. Floods in the office consist of numbers; everything but water. Normally. Accidents, of course, take place. Capitalism tries to secure its HQs; environments from 'out there' are to stay out. Struggling for alternative human-nature relationships would better not presume that environments are neat, clear, cold, readily calculable in the office.

These environmental realities are opened up for us when we enter the back-office. Whereas glossy sustainable development publications promise fairy futures, in the back-office we find many more possibilities – and we find the fairy future to be an impossibility. More division of labour, keeping publics out of office by way of enacting simplifying front-offices (Bloomfield and Hayes 2009, 479), is reactionary – acting against knowing problematic realities located in the hinterland. Promised Sustainable Development Futures may not be safe. We require an ethics which allows to point to these security risks. Hacker ethics? Hacking environmental realities might show how presumably clear environmental realities are not clear at all. Versions of environments leak. A risk. This is unfortunately ambiguous: environmental realities are not in control and their overflows may spill over. The effects of such leaks can easily affect many who have not been positioned to control these leaks. The precautionary principle dictates to let such leaks leak: whisteblowing is just one option. Yet, this is not enough. Relations need to be enacted differently also within the apparatus: affected publics need to be provided with positions inside the back-office, in the midst of enacting environments.

An introductory move towards enacting environments more democratically would be to allow the recognition of agents of ecological modernisation's selves in enactment practices. With Mol (2002, 177) we can imagine what doing environments well implies. 'Doing good does not follow on finding out about it, but is a matter of, indeed, doing. Of trying, tinkering, struggling, failing, and trying again.' The messy entanglements that

[7]Of course, these considerations call for further research, writing grounded political utopias.

agents have to cope with in the processes of making sense of becoming environments not only deserve being recognised; also, their recognition is a first step to be able to support these agents in their *practical* work (cf. Suchman 1983, 327). This recognition may be supported by opening up the systems of classification to allow for multiple pasts, presents and futures (cf. Bowker and Star 2000, 326) or by allowing agents to stumble about their environments' ontic uncertainties and precariousnesses in general (Verran 2010). Unfortunately, these recognitions imply a restructuring of agents' positions. The latter are related to vulnerability (Haraway 1991c, 196). Capitalism does not want green collar workers to re-cognise environmental messes. I expect, therefore, that workers will want to protect themselves against being disabled to tell stories, to give caring accounts. An EMS does not help in this respect for it focuses on enacting the fiction of clear and neat environments. In response, workers have to enact these recognitions autonomously from the EMS, parallel to formal organisational structures, outside of official communication frameworks. Tactically, resources for recognition may well be mobilisable by way of alleged practices of constraining environmental contingencies. For good or bad, these contingencies cannot be deleted but only moved around while capitalism – momentarily – requires to silence them. Why not move indicators for environmental mess outside of the corporation and share them with affected publics?

Publics need to be aware. Capitalism's environmental agents can be configured into silence. Just like experts of pain, say patients, can be configured to not speak (general anaesthesia, Mol 2002, 17). Environmental discourse is complicated for it is about staging environments whilst not engaging with them. Whatever capitalist entities voice on environments needs to be assessed politically. Even more, we have to engage not only with organisations' spectacular voicing of environments – recall: pure natures! – but also with their silences and silencing.

If environments are to be democratically, i. e., collectively controlled and imagined this requires architectures within which this quality of greening can be enlived (Horton 2003, 75). Going beyond the performance of serious greening but actually allowing affected publics back into the apparatuses enacting environments has presuppositions. The material conditions to imagine fluid, multiple, troubling environments need to be spread: that means that points of contact to these problematic situations of enacting environments have to be generalised (cf. Bourdieu 1990c, 388). This has two significant implications. First, agents from within the apparatus need to weaken the apparatus's boundaries to allow affected publics in. Second, what is going on within these apparatuses needs to be no more complicated than what is imaginable and engageable with by these publics. In short: if affected cannot imagine and engage with the troubling and complicated realities of, say, a photovoltaic project, satellite production or a nuclear bomb, then societies ought to stop their enactment. Here is a role for believers of nation-states: state agents ought to follow the weakest of affected's voices about what is imaginable and controllable. State agents may help reconfigure e. g. legal or economic infrastructures to allow those in situated control, those enacting environments, to

subvert environmental management job into democratic control by affected parties.

Following this discussion would result in redirecting some of the assymmetric information flows which enact global environments in particularly unsustainable ways; and flows that are firmly integrated in capitalist production may better be disrupted (cf. Suchman 2002, 139). What we need is a caring engagement between affected publics, environmental agents and their companion environments. This may include reconfigurations of the authoring of environments – mixing cyber natures, pirating environmental versions (cf. Philip 2005). STS alongside anarchists can be read as proposing a subtle challenge to hegemonic techno-managerial enactments: playful experimental relations. 'Play is subversive to formal organisations', writes Ehrlich (1977, 24). Anarchist political theory suggests to move on, from revolutionary transgressions to experimentation. May (1994, 114) recognises that '[t]here is no blueprint for practice'. Rocker (1938, 16) suggests that the development of a better economy must be based on free experimentation and practical testing of new figurations, locally. Of course, the scale of these experiments need to be constrained. After all, what capitalism and nation-states do is also experimentation (real ones – Krohn and Weingart 1987) – resulting in nuclear catastrophes and climate change (Thorpe and Welsh 2008). The norm I proposed should still work: experimental apparatuses need to be accountable and their messiness imaginable by those affected. Doing accountability implies partial vision (Haraway 1991c), locatedness (Suchman 1994b), the messiness of order (Law 2004a) and the onto-epistemic becoming in apparatuses (Barad 2007) in which accountability is playing a part, then, as well. Responsible scientific support for enacting environments as actually in control by affected does not lead us to Bacon's (1626) model of benevolent authoritarian science but to feminist-anarchist proposals for organising.

By studying environmental management practices we have, thus arrived at a shared normative recognition of anarchist and practice theory: for apparatuses enact realities, *what is going on in these apparatuses ought to be accountable.* Reality is prefigured by material practice (Schatzki 2012) – and to enact better human-nature relations we have to reconfigure that what prefigures towards meeting the norm laid out above. This normative agenda, of course, is antithetical to sustaining hegemony for it requires extensive communication and scaling down of techno-managerial projects. The proposal would be to collectively enact environmental managers as activist workers who help to translate environmental realities and their troubles across communities, who would connect struggles of those affected to get the enactment of environments under the control of affected publics. The point is to render environmental struggles graspable for affected publics rather than to professionalise them. This will require reconfiguring those operations to which these environmental struggles are related.

The implications of this normative move deserves to be spelt out. For agents of ecological modernisation I like to signal: I do not assume that this book helps to get a *job* done – but I hope it provides reference points to develop *better* practices. These better practices would be grounded in taking managers' selves *seriously* – taking the messes

involved in enacting environments seriously and, hence, making them explicit, analysing them, allowing them to be politically and normatively mattering realities. It would include reconfiguring apparatuses to allow ideally all affected publics to democratically take part in shaping enactment practices.

There might also be a significant role for sciences. For ecological modernisation is deeply entrenched with techno-scientific-managerial knowledges, sustaining unsustainable trajectories, it would be meaningful if both STS and environmental sociology extend scrutinising practices of enacting environments. For the performativity of economics, this book suggests that not every thing that shines as economically rendered is indeed governed by economics. Environments, potentially, alongside other newly internalised realms – such as gender 'diversity' or 'care' – may well be staged *as* accountable for within capitalist economics. However, in contrast to processes, goods and services enacted to sustain the core of capitalist production, these political internalisation projects may fail to be actually engaging with how these realms matter for natures, people and societies.

Activists may find this book to suggest even more scepticism to being invited as legitimising agents. Activists better would not take seats as co-*governors* at meetings promising better rules and regulations for enacting environments. Actual intervention and participation is required in the midst of apparatuses.

Struggling over carbon may have a political potential: carbon may be a notion to engage with enactments of environments critically. Critique here implies to recognise the cyborg and companion characteristics of carbon. Environmental things are neither purely about 'what' or about 'who' but also about their relations. Enacting capitalist environments is a hegemonic project that configures what being human means in relation to the meanings of society and nature. This deserves the critical interference by all affected publics – and a range of studies scrutinising potential possibilities for productively inappropriate interferences in these hegemonic enactments. An opening move I hope to see is agents – of ecological modernisation, activists against ecological modernisation, critically reflecting academics studying enactments of environments and unsustainabilities – associating to share their concern: an association of concerned green workers – committed to take their selves, their conflicting identities and the politics of enacting environmental scapes seriously.

Appendices

APPENDIX A

Fieldwork and Methods

This part of the appendix provides references to the process by which I prepared fieldwork, analysed the data I enacted as part of this work and how this book has been written.

A.1 Into the Field

The relation between GFQ and me was formally governed by a contract as well as written and verbal subsidiary agreements. I received written consent by my boss and verbal agreements with the core research subjects allowing me to observe them, take notes and gather and analyse artefacts under the condition that their identities are not to be revealed.

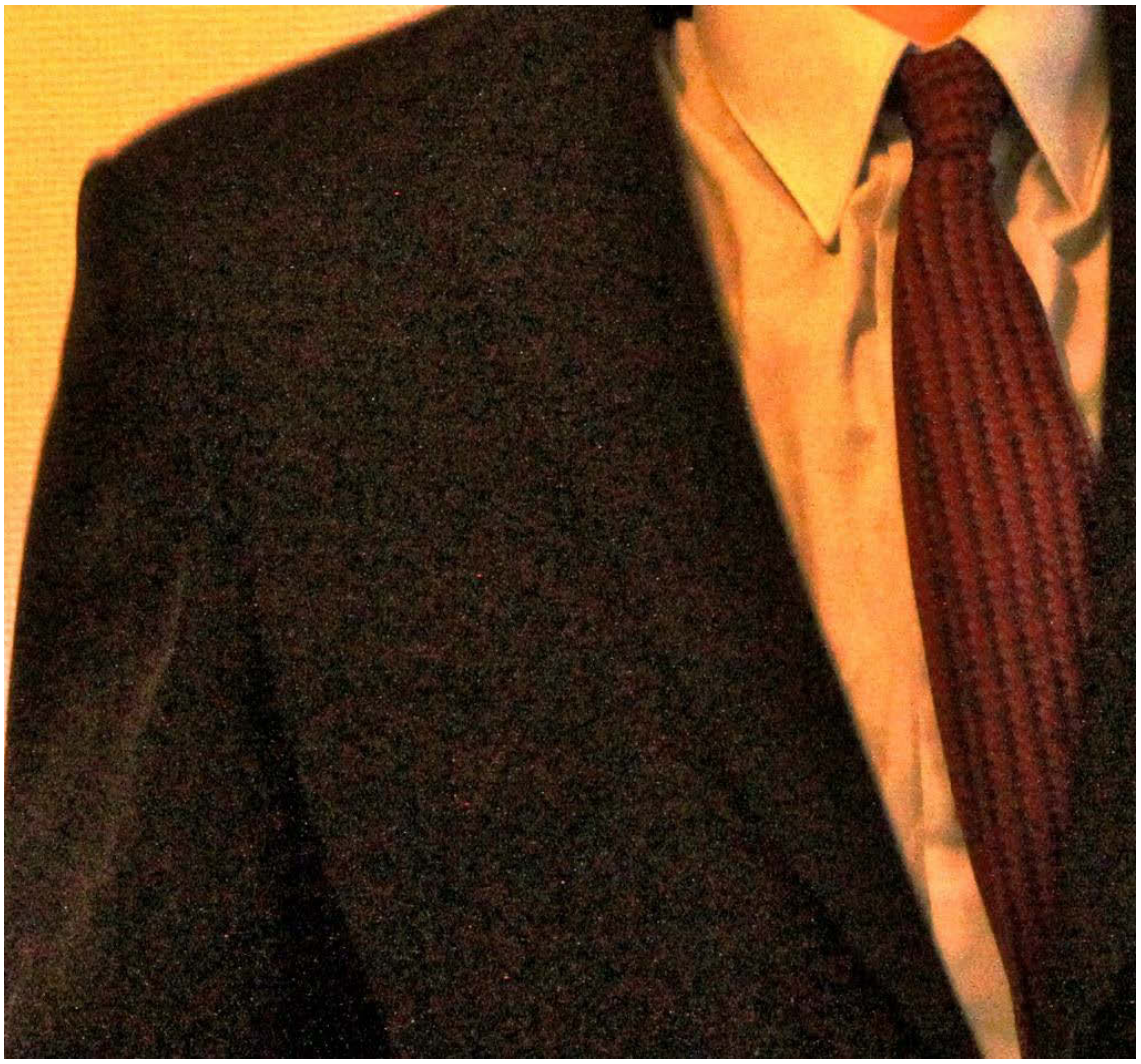
Artefact A.1.1 on the following page shows my appearance to fit into the field site 'HQ of GFQ'.

A.2 Material Edited

The corporate group's name as well as all data revealing its identity, as well as all the names of members central to the study have been anonymised. For simplicity, I converted currency data into USD and EUR.

It is relevant to note that I rendered materials depicted in this book anonymous. This means that artefacts shown have been cleared from explicit references to the multinational that I studied and revealing factors, including standards or regulations. In general, rendering artefacts anonymous implied editing out the corporation's designation, publicly accessible identifiers like names of partnering organisations, names of individuals.

In addition I edited some of the artefacts to exhibit all the features the signified things had in the field but that were lost in their translation into data artefacts. For example, I copied the top element of one ESDR task-form☞ screenshot to another screenshots of a task-form to provide a full view on the form in this book. A less edited version of the task-form can be found in Lippert (2012a).



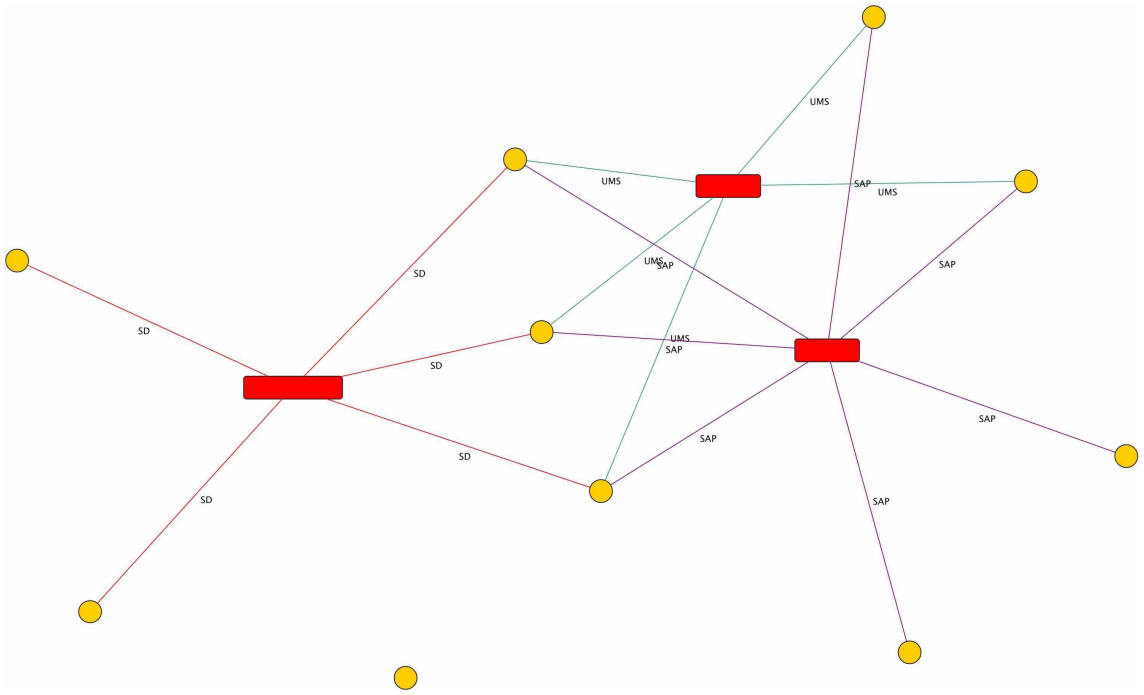
Artefact A.1.1: Fitting in

A.3 Analytic Data Selection Process Materials

In this part of the appendix I try to show materials which illustrate and document the process structure through which the account in this book took form. (To ensure anonymity, the material cannot be clearly identified to some degree.) This account is meant to be read in combination with the introduction to this book (especially my explanation of the method I exercised).

Making sense of members' formal and practical relations Figure A.1 is an artefact of my first approach to make sense of members' relations after one week within the field. This representation did not satisfy me for long.

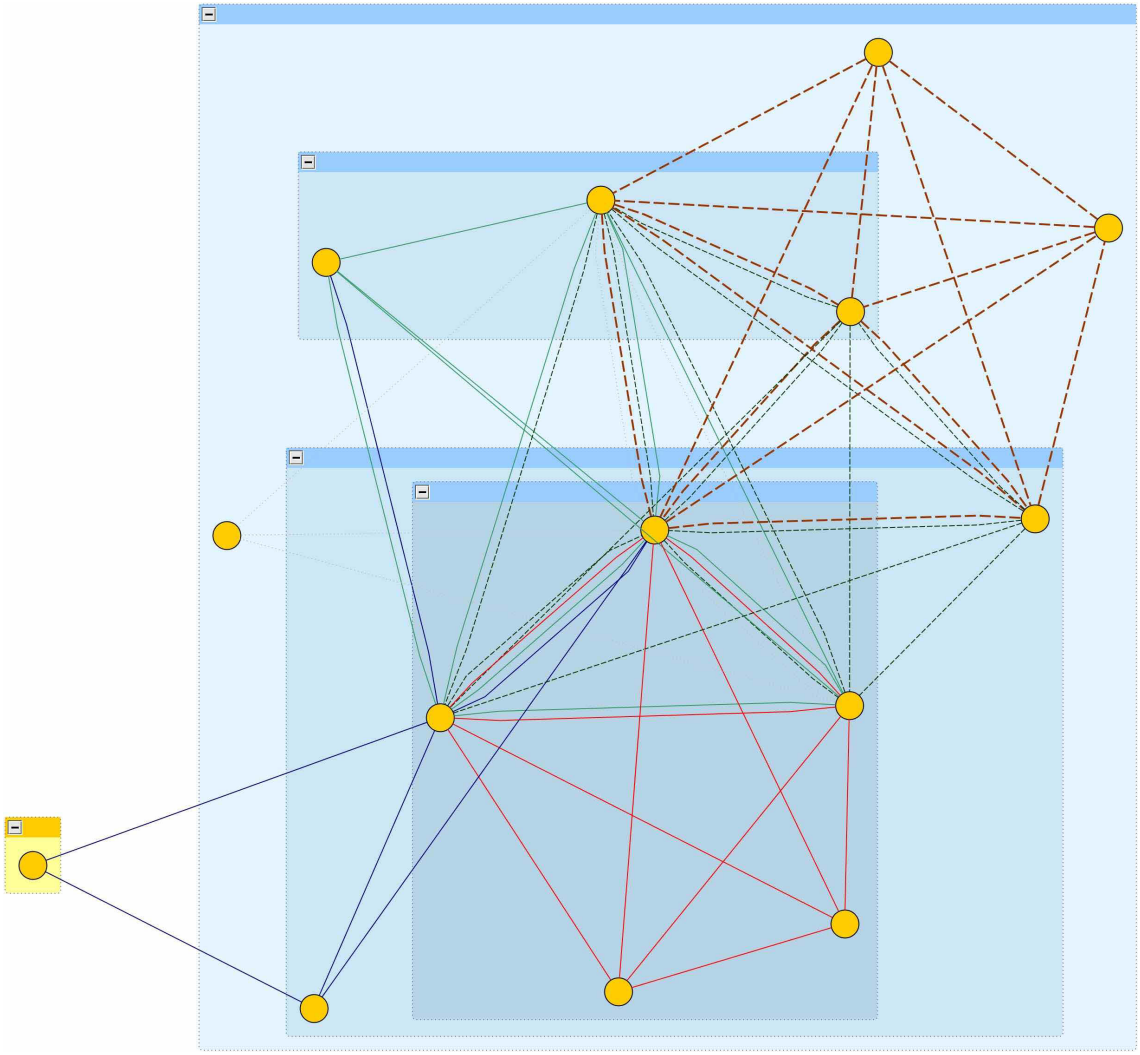
Figure A.1: Structure of first mapping of members' relations after about one week in field



In Figure A.2 (on page 558), the boxes represent the formal affiliations members had with well-bounded groups. These groups/boxes were hierarchically organised: the corporation encompassed all boxes. All? No, right from the start, an external agent from another company was part of the map.

Unfortuntately on the next day I experienced that I had a technical problem with the software (the graph editor *yEd*, cf. Footnote 2 (on page 72) for details of the editor) to show overlapping groups/boxes. This was a problem I encountered with quite a number of graph editing programmes.

Figure A.2: Structure of second mapping of members' relations after about one week in field; with boundary drawing around groups



Visualisation the organisation of codes Figure A.3 (on page 559) is explained in Footnote 42 (on page 53). I lost the digital version of the view. It is the direct output of TAMS (see Section 1.4 (on page 41)). In original size, the printed version extended 1 m times 75 cm.

Figure A.4 (on page 560) shows ten foci which I deducted *not* from Figure A.3, but from manually scanning the complete code list at that time for product-related practices by members. In this representation, data generation issues have already been central. In addition to the ten product-related entities, the representation shows actors, issues and prescriptive entities.

Figure A.3: First full coding: visualisation of groups of codes (relations indicate shared codes)



Figure A.4: Results of first round of systematic coding: hypothesis of relevant entities in the field

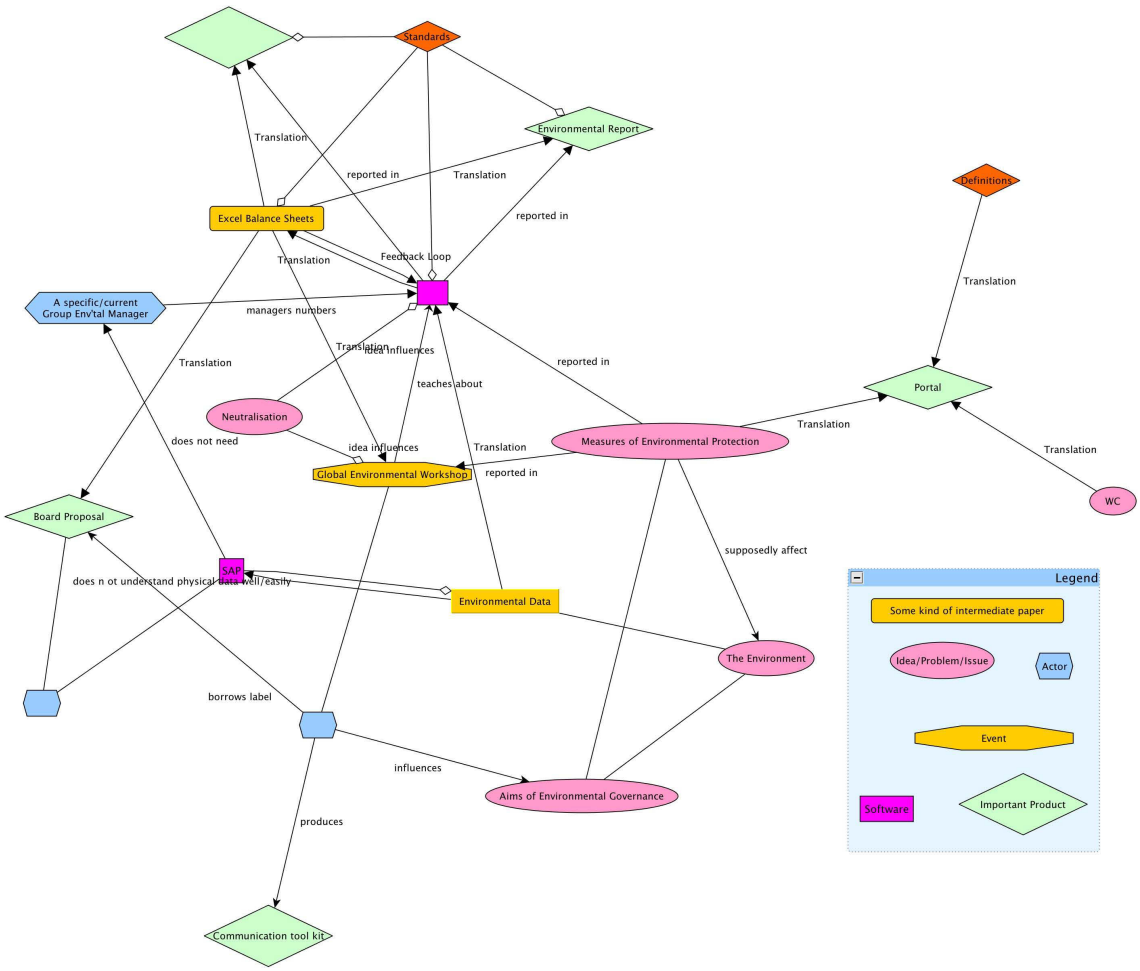
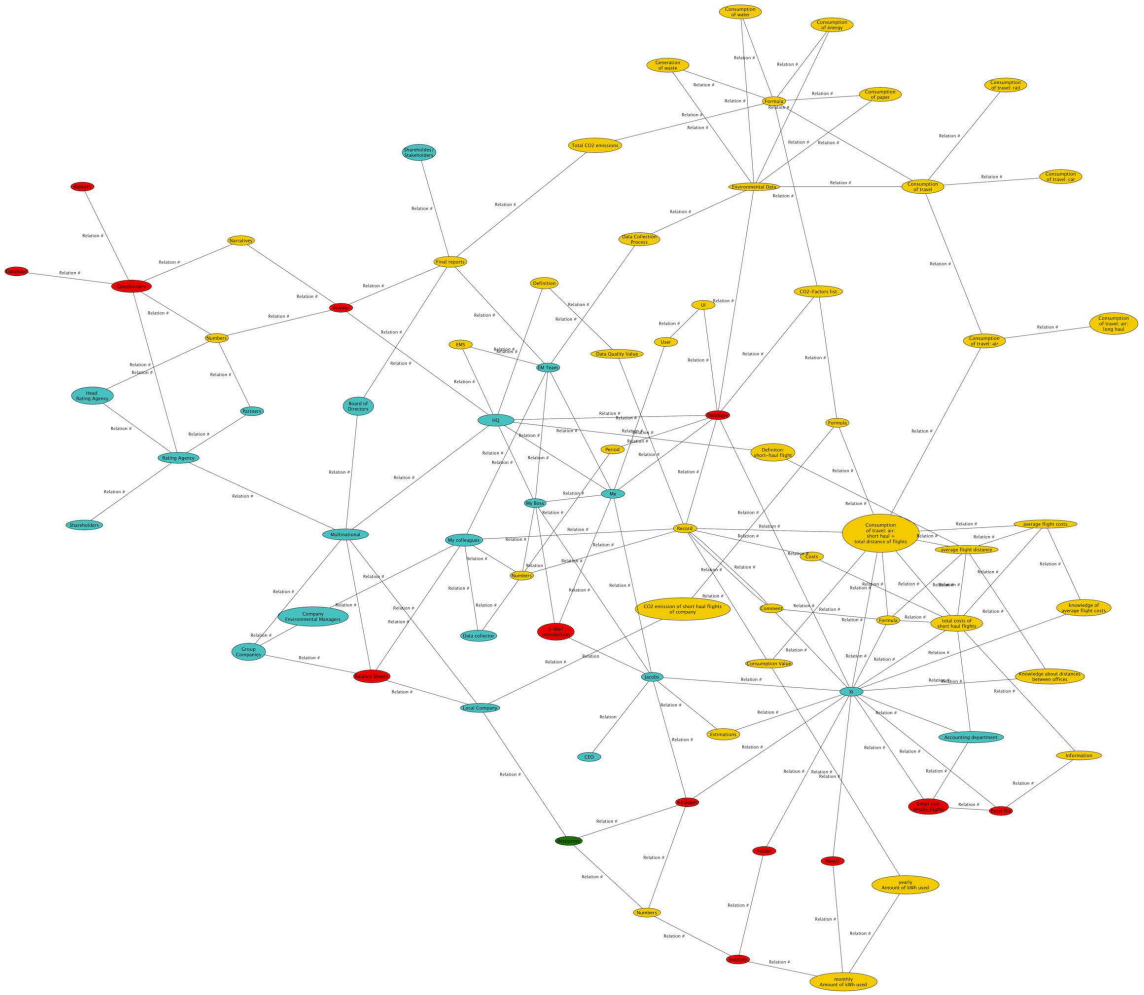


Figure A.5: Mapping data construction: a first experiment in visualising relations between actants



Experimenting with mapping actor-networks Figure A.5 is a trace of my work to map complete settings. This one revolves around data now shown in Chapter 2. The problem is, of course, that zooming in does not lead the researcher to any natural boundary of entities and their relations. And both, entities and relations dissolve into each other.

Focus switch to analysis Figure A.6 on the next page shows a prescriptive device. When designing it I aimed to reproduce much of the process structure laid out by Emerson, Fretz, and Shaw (1995). This prescriptive device was suggesting to imagine the subsequent research process in four larger blocks of work: first I would code openly all the material, aiming to come up with possible themes which I would 'generate' from the data. It entailed both, specific questions to ask of the data and a memo generation element to grasp all contextually relevant concerns. Themes were defined as consisting of a number of codes and memos. Second, I would aim to decide for a small number of core themes to analyse in-depth in interaction with relevant peers. The third step was to engage in focused coding, which meant to compare data instances and spell out how they vary, how they were important and could be theoretically integrated. Finally, I would come up with the core narrative of this book. However, it did not completely work out like this (compare with Figure A.22 (on page 581) which represents the last version I employed to guide my analysis).

More precisely, *open coding* consisted of asking these questions:

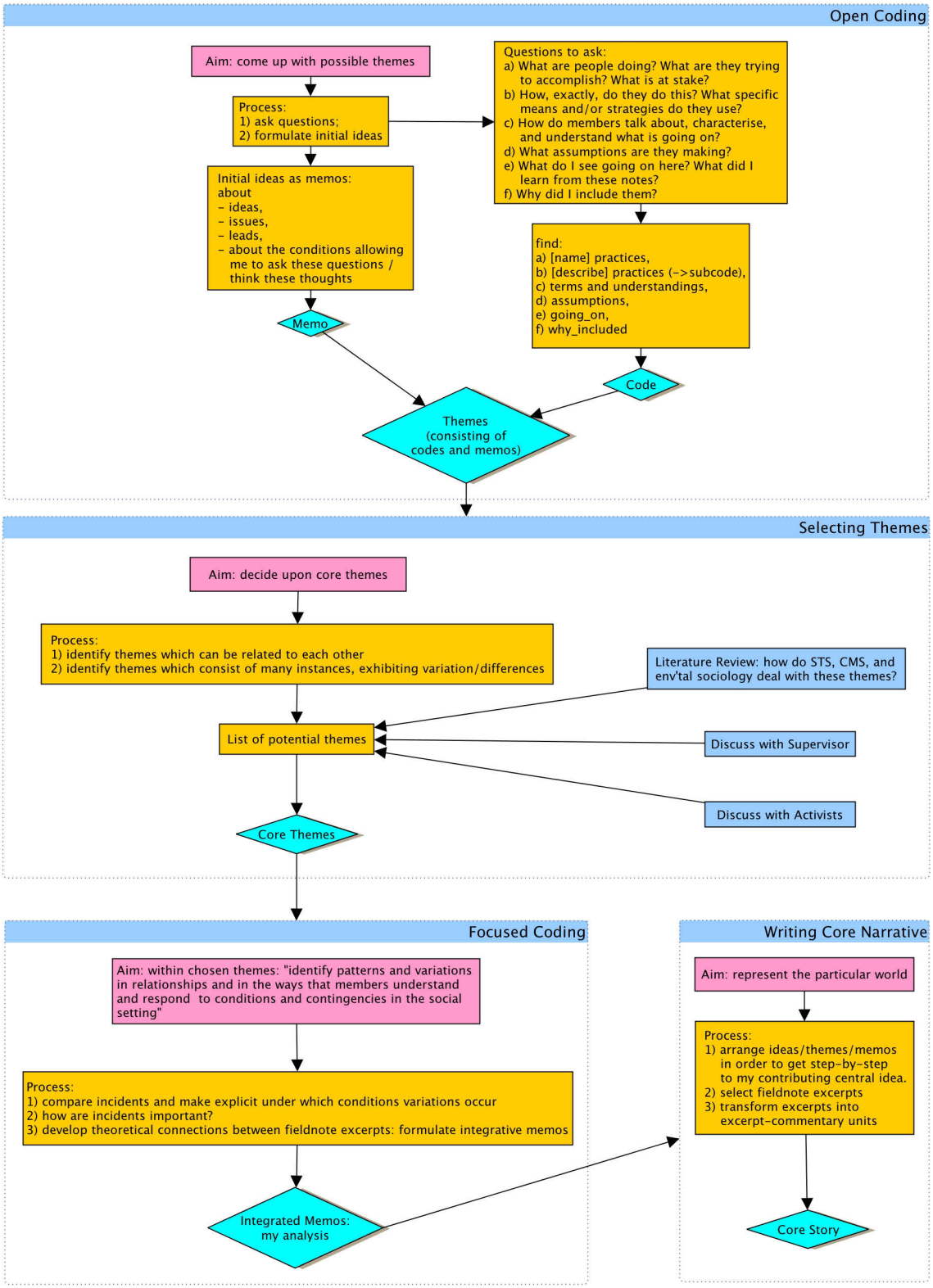
1. What are people doing? What are they trying to accomplish? What is at stake?
2. How, exactly, do they do this? What specific means and/or strategies do they use?
3. How do members talk about, characterise, and understand what is going on?
4. What assumptions are they making?
5. What do I see going on here? What did I learn from these field notes?
6. Why did I include them, i. e. these field notes?

Asking these questions generated over 1700 codes. I organised them into sets of codes by, again, asking questions. I called these questions *themes*. The result was the following list of themes.

List of Code Sets/Themes

1. List: Entities, organisations, things
2. Which roles does learning play?
3. How do members relate to paper?
4. How is the user constructed?
5. How do members relate to external actors (consultancy/consultants, external support, authorities, investors)?
6. How is GGCA relevant?
7. How do members imagine control?
8. How are member cautious?
9. How do I do research in the field?
10. Which roles of costs, finances and economies do I find?
11. Which roles do knowledges, (un)knowns, ignorance and forgetting play?
12. Which roles do rankings play?
13. How do members put the Environmental Management System (EMS) into practice?
14. Which roles do (un)certainties play?
15. Story: Sustainable Development trend screening
16. How is time relevant?
17. How do members relate to the political?

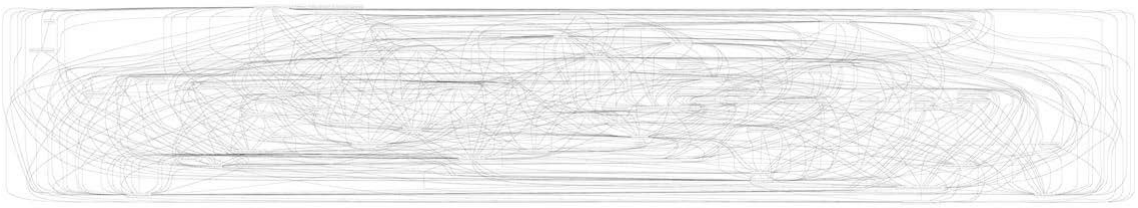
Figure A.6: Early version of outline of analysis process



18. How do members imagine the organisational configuration of GFQ?
19. How do members approach improving quality of data?
20. How are hierarchies relevant?
21. What causal effects and contitionalities do members perceive?
22. Which roles does the organisational context play?
23. How do members relate to my research?
24. How are members (not) exact?
25. What is significant to members, what do they feel strongly about?
26. How do members accomplish representations (texts, presentations, formulations, ...)?
27. Which epistemologies do I find?
28. Which ontologies do I find?
29. Story: Portal
30. List: Locations
31. How is ESDR relevant?
32. How do members deal with aims?
33. Which norms do I find?
34. What else do members do, what is their work context?
35. How do members deal with external control?
36. Story: CWC Ranking
37. How do members understand the EMS and the environment?
38. List: Ratings, consultants, standards
39. Which roles do standards play?
40. Story: EMS Transformation
41. How is being worker relevant?
42. How do members understand Sustainable Development?
43. How are members shaping society?
44. How do members present themselves?
45. How are members relevant as individuals?
46. How do members imagine CO2?
47. Which moralities do I find?
48. How do members (approach) work?
49. How are interventions and subversive acts possible?
50. How do members relate to GCE env'tal managers?
51. How do members decide?
52. How do members approach problems and conflicts?
53. What instances of control do members perceive?
54. How do members relate to data and numbers?
55. Which roles do locations and space play?
56. How do members relate to GFQ as a company?
57. How do members relate to body, health and gender?
58. Which roles do information technologies play?
59. How do members relate to futures?
60. How do members construct environmental reports?
61. How do members relate to business?
62. How do members calculate and construct numbers/counts?
63. Story: Financial Literacy and Corporate Volunterring
64. Which roles do narratives about the past and explanations play?

65. How do members imagine environmental measures, qualitative data?
66. What do members want to keep and safeguard, what do they want to get rid off?
67. How do members relate to standards and definitions?
68. What sources of knowledge do members perceive?
69. How do members understand each other?
70. Story: Global EMS Workshop
71. List: Members
72. How is the EMS being transformed?
73. How do members formalise sth?
74. How do members construct, alter, analyse, manipulate data?
75. How do members relate to meetings?
76. How do members deal with colleagues?
77. How do members think of communication?

Figure A.7: TAMS code set relations



These themes were densely interrelated because they shared common codes. Figure A.7 is the product of using TAMS to map the relations among the code sets. Using an UNIX script (an awk script) I transformed TAMS's graph output code (formatted for Graphviz) into a format readable by *yEd*. The effect was Figure A.8 on the next page. This figure made more visible to my eyes the relations among the sets' questions. In this figure I increased the size of nodes to indicate the relative amount of shared codes between groups. Figure A.9 (on page 567) renders the questions' spatial relations better visible by hiding the shared codes and not emphasising how many codes were shared. Yet, centrality in the graph indicates more shared codes.

Figure A.10 (on page 568) shows in addition the memos that I have written and to which question/code set they related. Here, grouping was facilitated by shared codes/closeness in space. Figure A.11 (on page 569) shows the code sets and their count of codes boxed into themes. Themes include code groups and memos. Figure A.12 (on page 570) makes the structure of the themes better visible by black-boxing the themes. They themes can be seen in addition to a few non-fitting code sets and memos. As a result of the selection process Figure A.13 (on page 571) shows the selected themes for the analysis underpinning this book.

Figure A.14 (on page 572) illustrates the hierarchical structure of data, coding, grouping and theming.

Figure A.8: After open coding: visualisation of groups of codes (relations indicate shared codes)

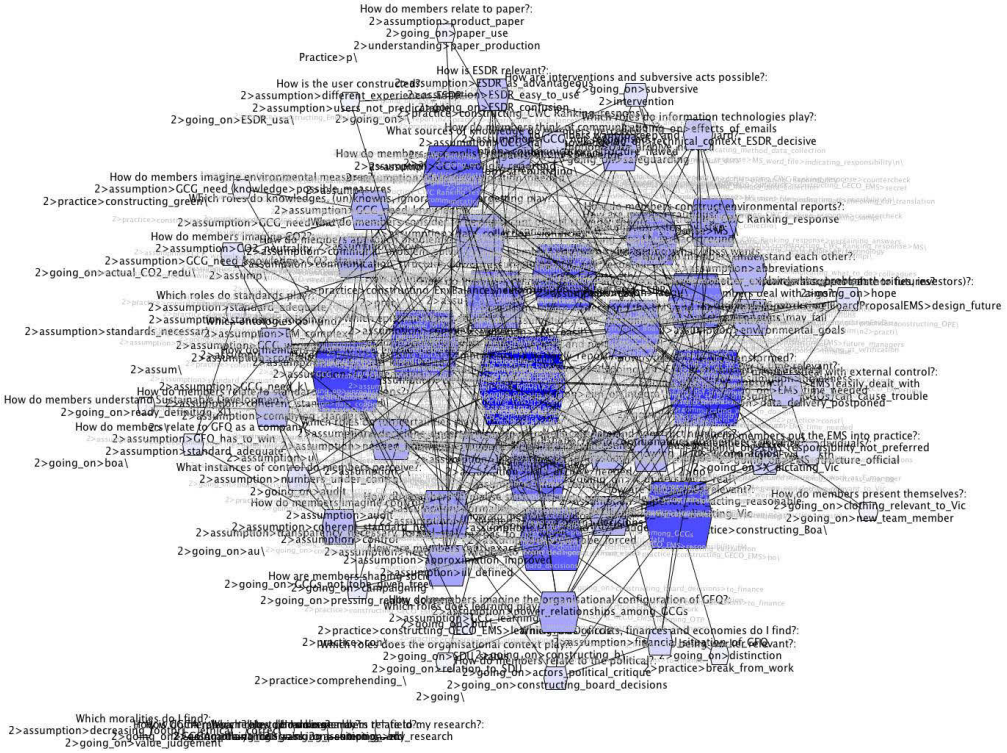


Figure A.9: After open coding: showing all code groups

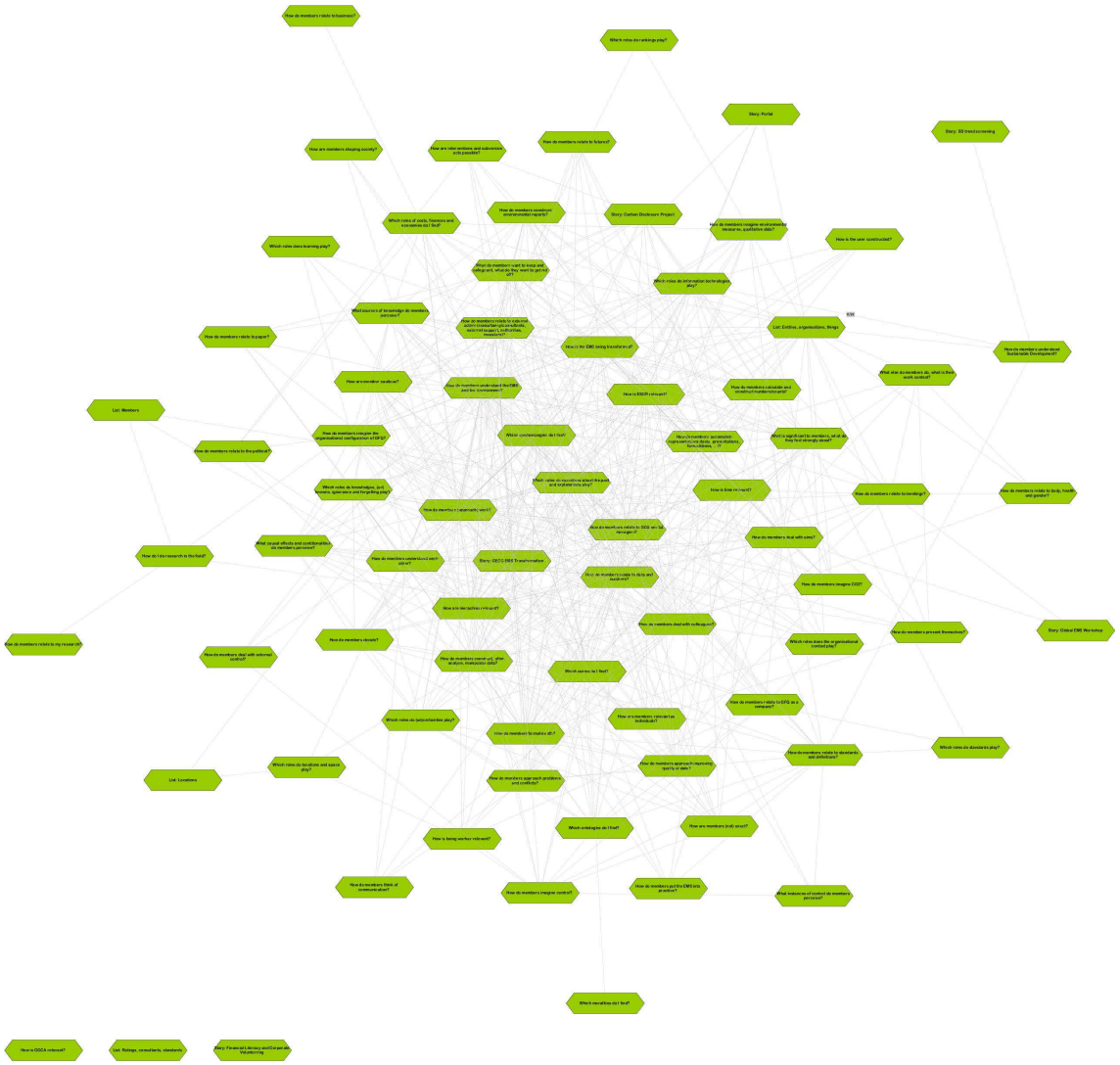


Figure A.10: Grouping code groups into themes and linking corresponding memos

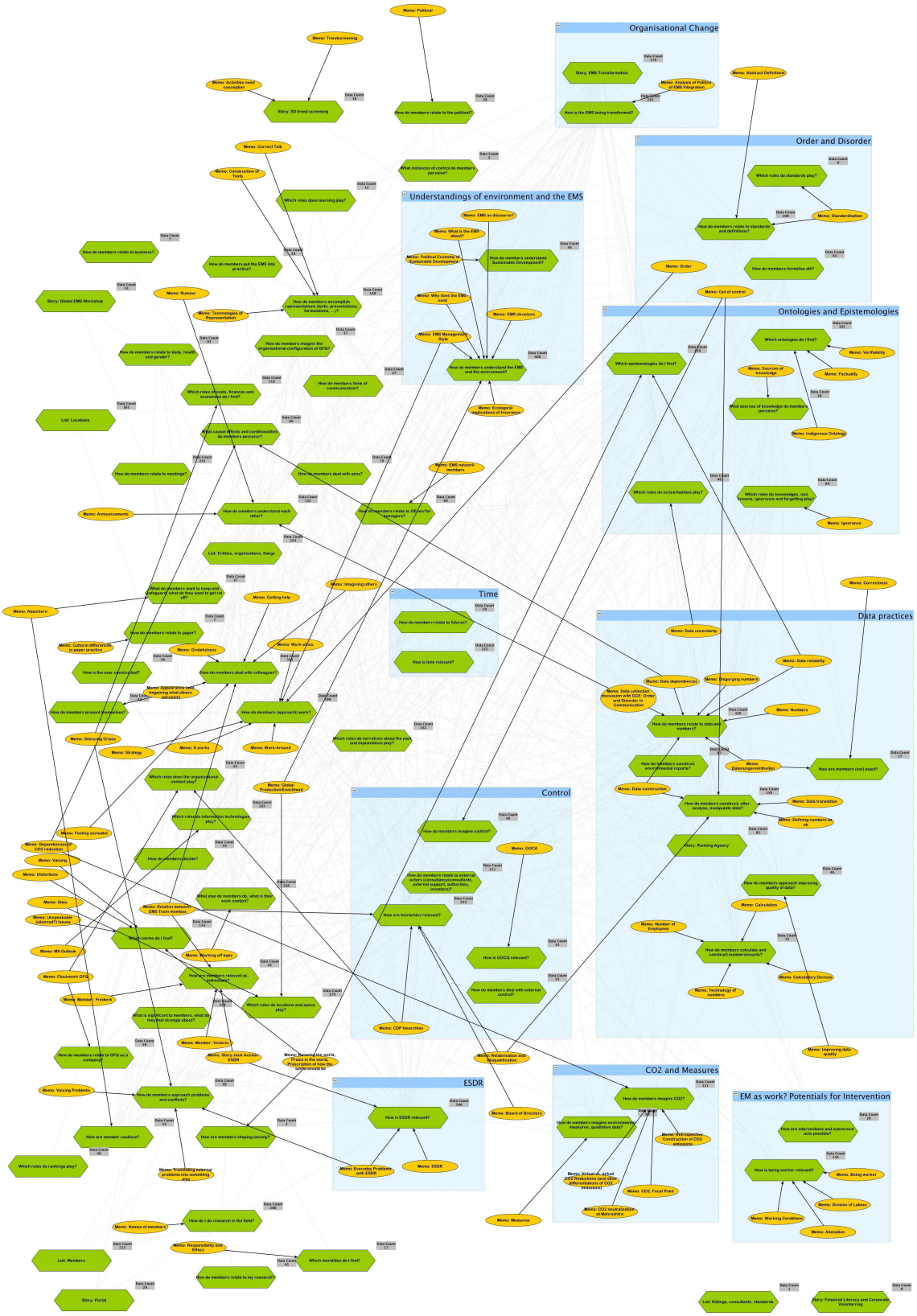


Figure A.11: Organising code sets into themes

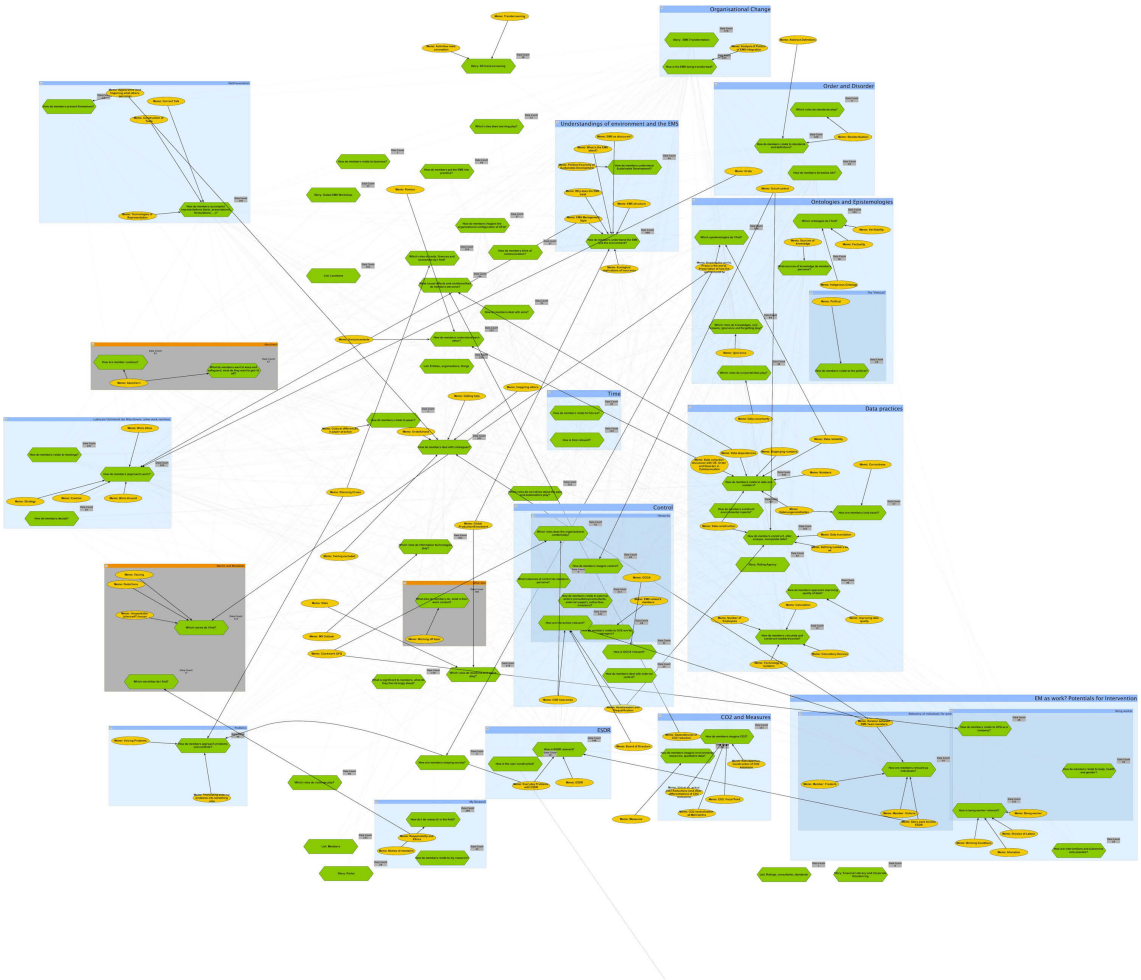


Figure A.12: Themes cleaned up with few non-fitting code sets and memos

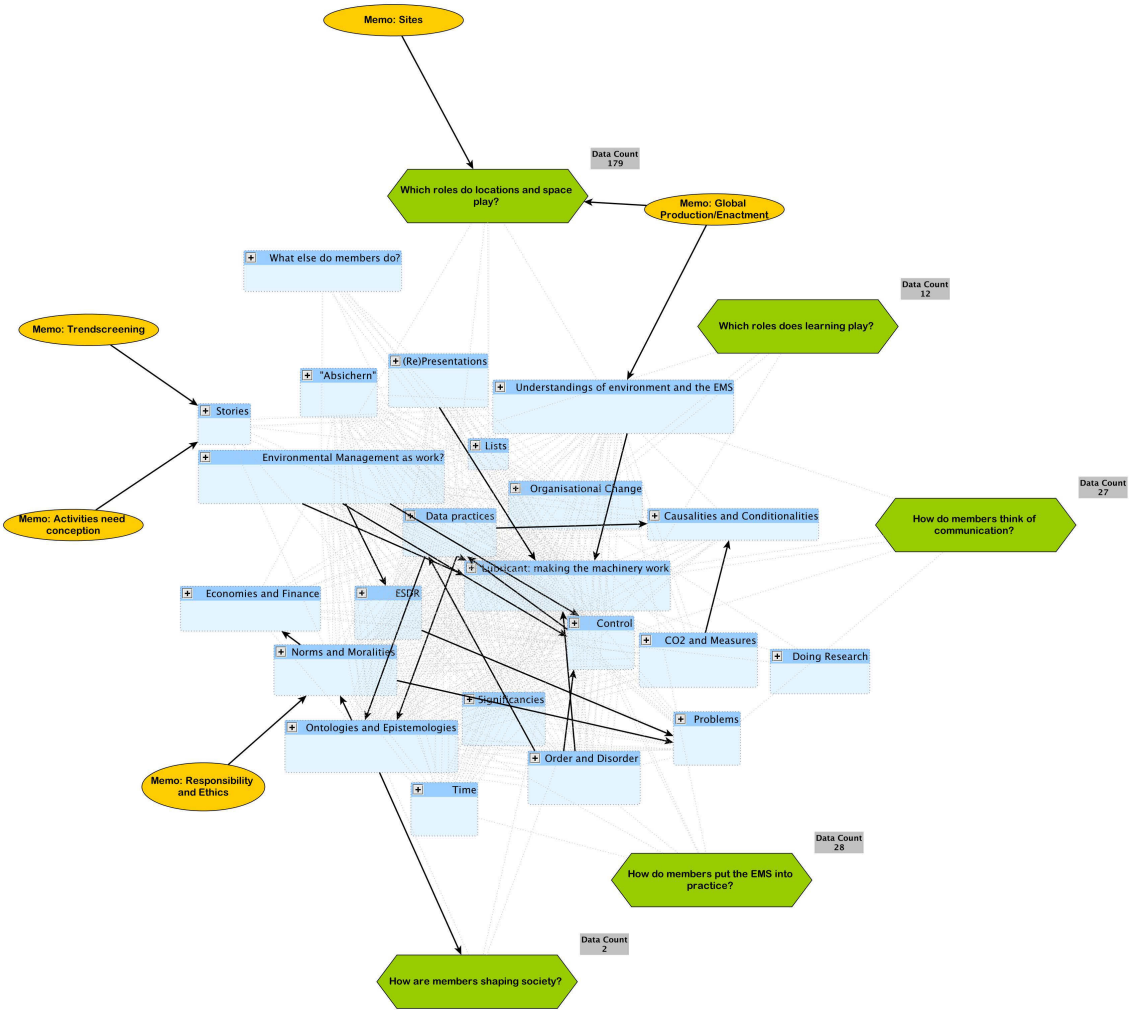


Figure A.13: Focus selection: Carbon

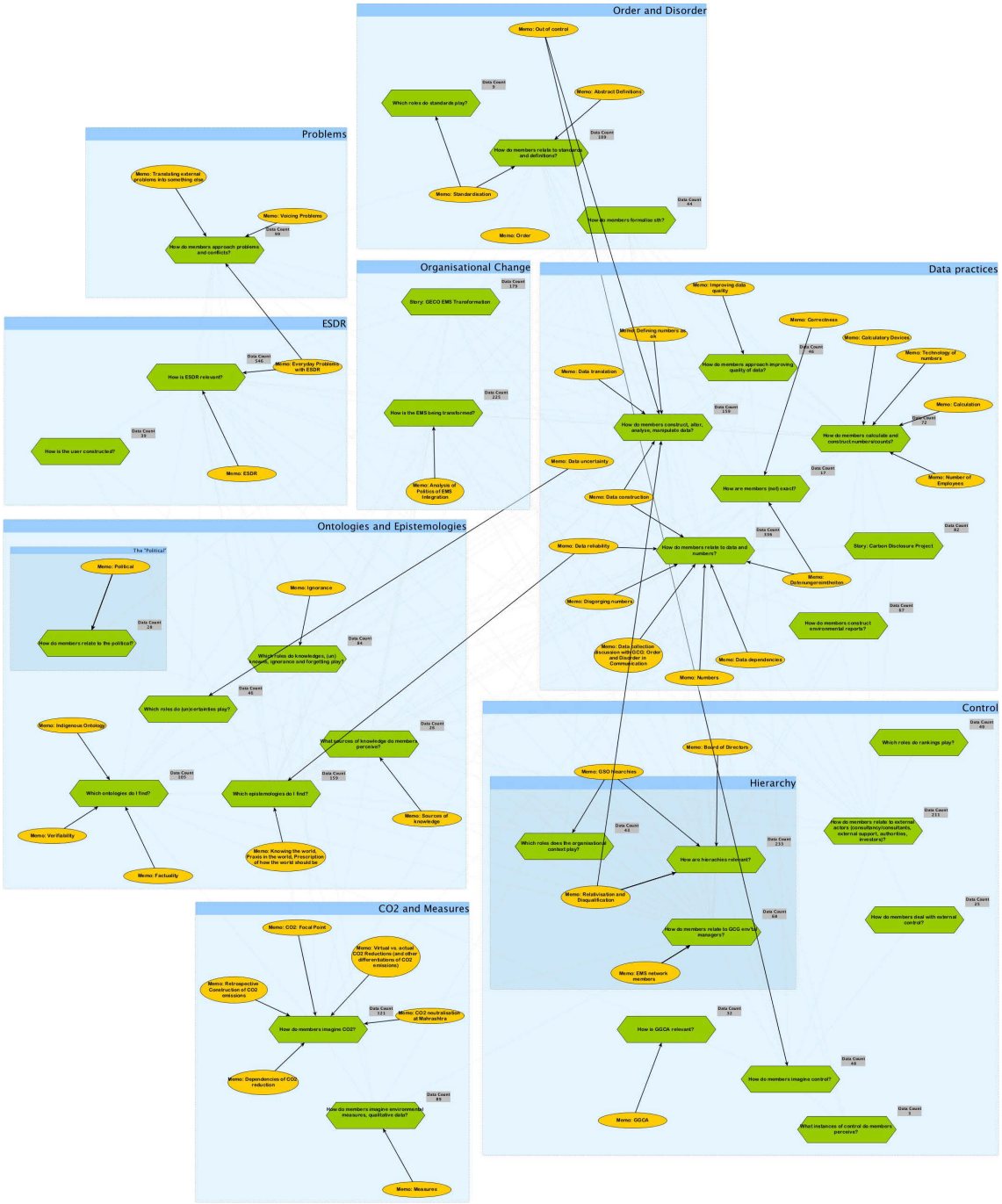


Figure A.14: Illustration of hierarchical representation structure in data processing

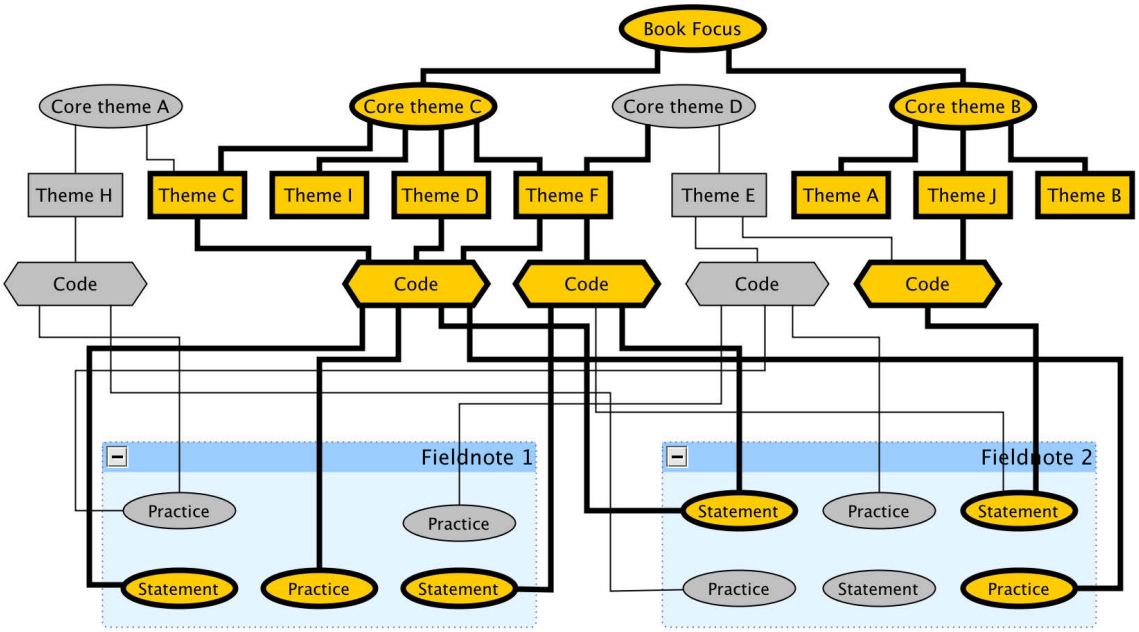
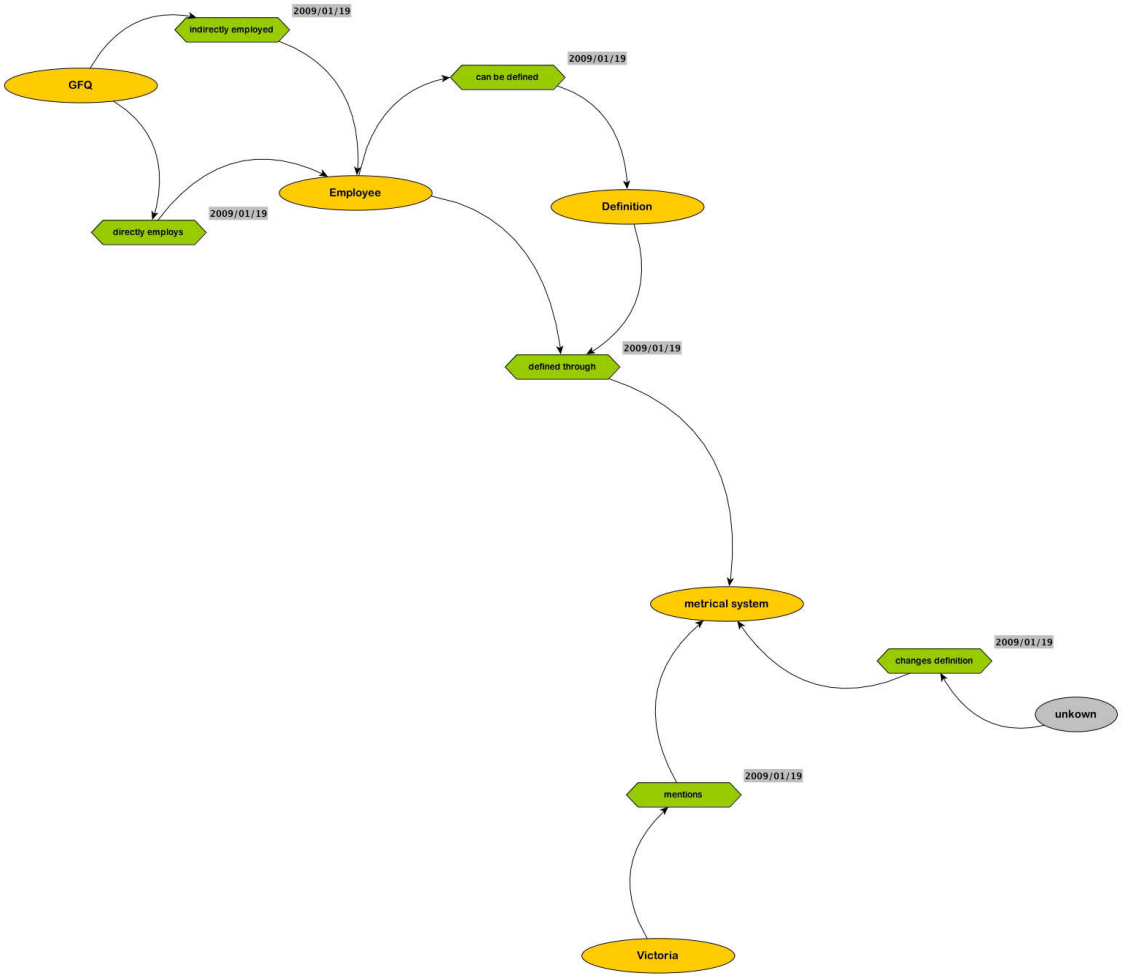


Figure A.15: Experimenting with mapping: a few relations



Experiment: analyse through deep mapping Figure A.15 shows nodes as representatives of both, actants and their relations. For actants I noted the date of the observation. Figure A.16 on the next page covers only a few observations of fieldnotes. Figure A.17 (on page 575) shows me, trying to work on this map.

Figure A.16: Experimenting with mapping: many relations

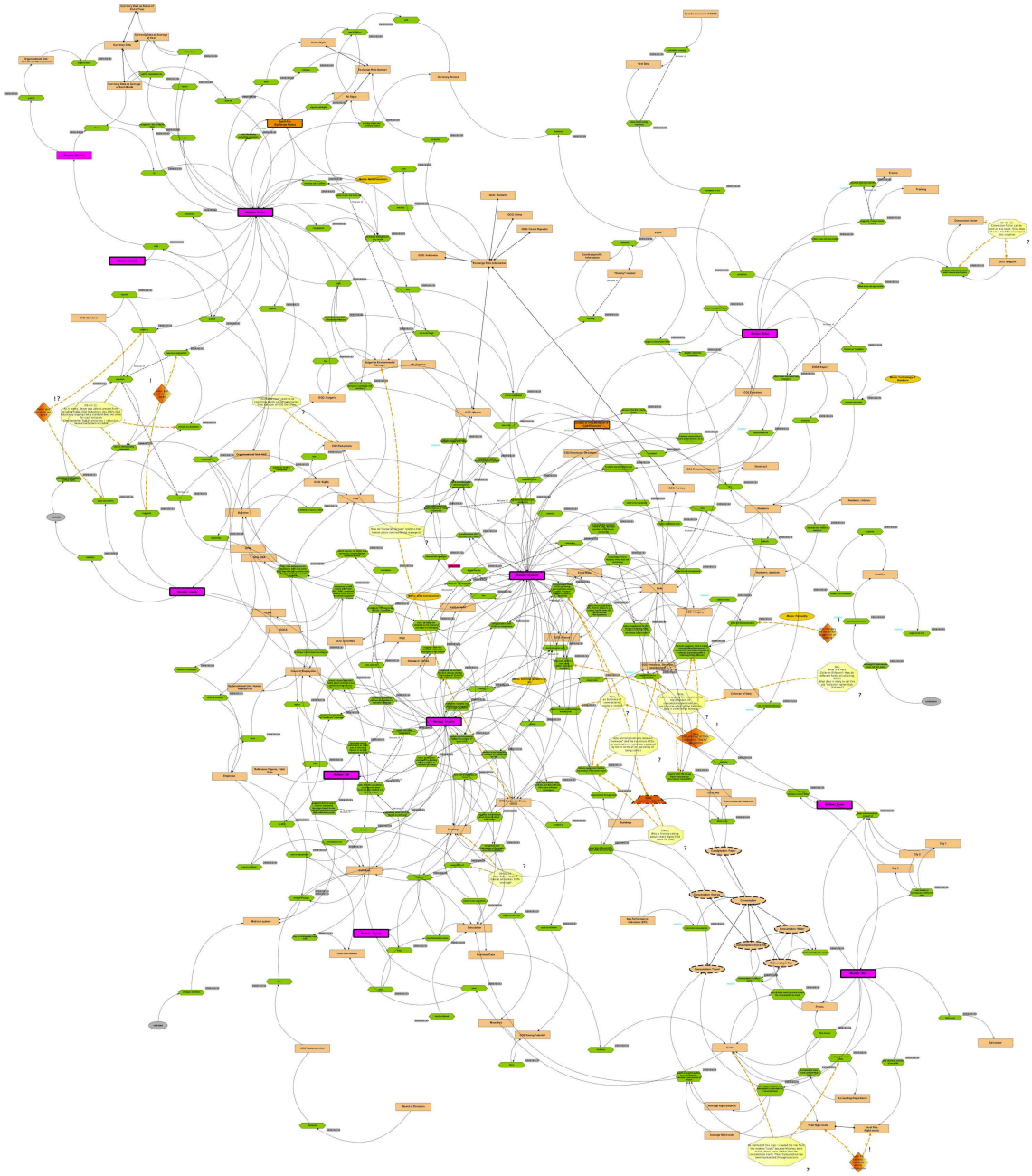


Figure A.17: Me: trying to analyse and make sense of map



Research Process Note *Analyse vs Writing*

28.3.2010: During the last couple of days and weeks I have been starting to work on the analysis. I started mapping the selected theme/focus (CO2 as focus, focussing on how CO2 is constructed in relation to 'external' actors). [This refers to Figure A.16 (on page 574).]

Before, I have had discussion with C. Lau [the supervisor], Niklas Hartmann [a peer advisor], XXX [an activist] and others about what theme to select. I finally settled with the one named above. It is introduced and visually represented in the file (attached [to this research process note; Figure A.13 (on page 571)]).

Today, I talked with [my brother] on the phone. I told him about the status of my work. He suggested that I should proceed iteratively: first write something, second problematise and analyse further data. C. Lau also suggested I should start writing.

I guess, I should start writing soon. However, the reason for the name of this note is simply this: I am afraid I will close my eyes to relevant and contradicting issues if I start writing too soon.

Pragmatically, of course, I have to make a compromise between analysis and getting things done ;)

I consider now to complete mapping the code family 'How do members calculate and construct numbers/counts?'. Afterwards, I should either map

another 1-2 code families/themes; or attend to some memos/themes using another method (maybe Werner Schneider's discourse analysis) or grounded theory (on 'Absichern' [a code set]).

4.4.2010: Yesterday I read quite a bit of John Law's 'After Method'. it was very inspiring and a number of ideas cropped up how to think of my data... I just mapped another instance of the field note of 13th of May 2009. It takes really a lot of time. I have mapped the first 50 instances of the data family by now. And, I am not sure that it is at all promising enough. I shall shift my energy now to start thinking and writing – trying to analyse the data as I write and look for similar instances, etc. Ok, let me briefly think through how I would imagine such an approach. First, I would start with some contingent entry point. This might be the 13th of May 2009. Then, I would explain how this situation became possible (as an effect of heterogeneous engineering). I will see certain things... and then I will have to go back to the data and compare instances, etc. However, now that I think of this, I feel, I am moving away from my 'coding-to-be-plan' ([Figure A.22 (on page 581)]) Basically, this emerging decision boils down to not systematically analysing. This, of course, is exactly what John Law refers to. Messy realities cannot easily be ordered. And, if we did so, what would we lose? I shall try to mix all this: write, analyse, order, show the messiness, order, write, ... To define how I will start, I will sit down and look at the map created during the last two weeks as well as the 'CO2-as-focus' map.

5.4.2010: ok, it is monday afternoon. Today in the morning I reconsidered how I should proceed. I was thinking more in line with my original plan of analysis, again (i. e. according to [Figure A.22 (on page 581)]).

Ok, the idea would be: I might write a simple paragraph or two on each code family [code set]. I would add key extracts of the data.

7.4.2010: ok, finally, I feel better about my data analysis process. basically, what I am doing now is this: I read through the instances of a code family and summarise/rephrase what is going on (insofar as it is relevant to the question posed by the code family). afterwards, I order/group the sentences/key words.

Getting the analysis process to move on Figure A.18 shows the ground of this book's analysis: the representation of all the data (signified through the codes that were part of the selected codes sets in the themes).

Figure A.18: The summarised representation of all the data concerning the research question – down to earth



Figure A.19 (on page 578) shows the data points selected and how they relate to each other. Green nodes are analytical points I have been engaging with, orange nodes have been issues raised by members. The blue nodes signify the data points that I turned into the field note extracts analysed and mostly presented in this book. By way of choosing these data points I made the move which allowed to make the theme legible. Figure A.20 (on page 579) indicates that throughout the process of inscribing this book's underlying files with the field notes, my theme's reading has been partially reorganised. The blue edges indicate that I included the relation between the field note extract and the analytical/members' issue in a respective book section.

Figure A.21 (on page 580) illustrates this relational mode of analysing data. The picture has been taken at a seminar I gave for environmental management students at Brandenburg University of Technology.

Finally, Figure A.22 (on page 581) presents the last version of the process scheme I was coordinating my analysis with (again, still using considerations from Emerson, Fretz, and Shaw (1995), but now as well relating to Keller (2011a) in the subprocess 'Coding of textual artefacts' presented in Figure A.23 (on page 582)).

Figure A.19: Categories of practices and selected cases

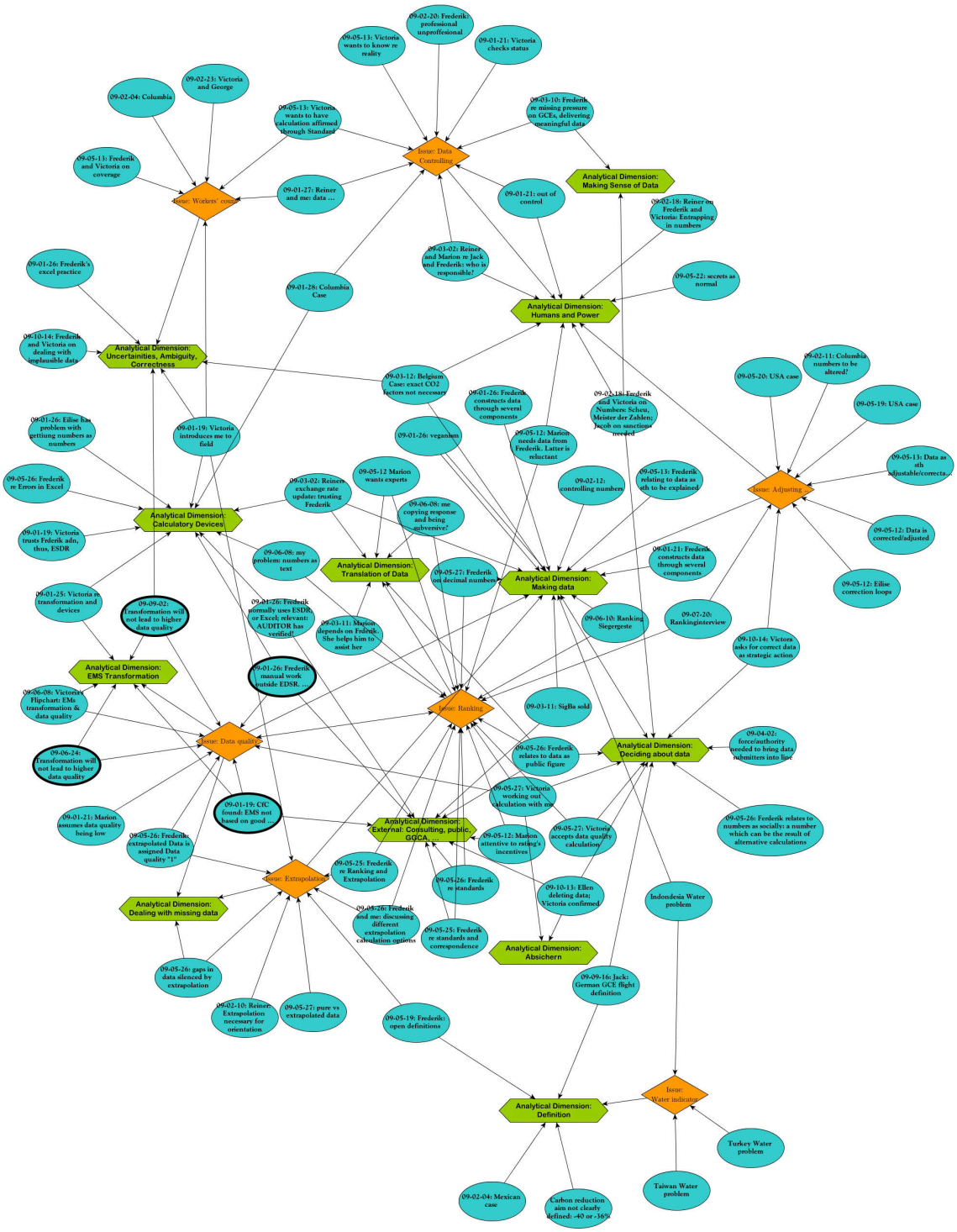


Figure A.20: Categories of practices and selected cases: further relations emerge

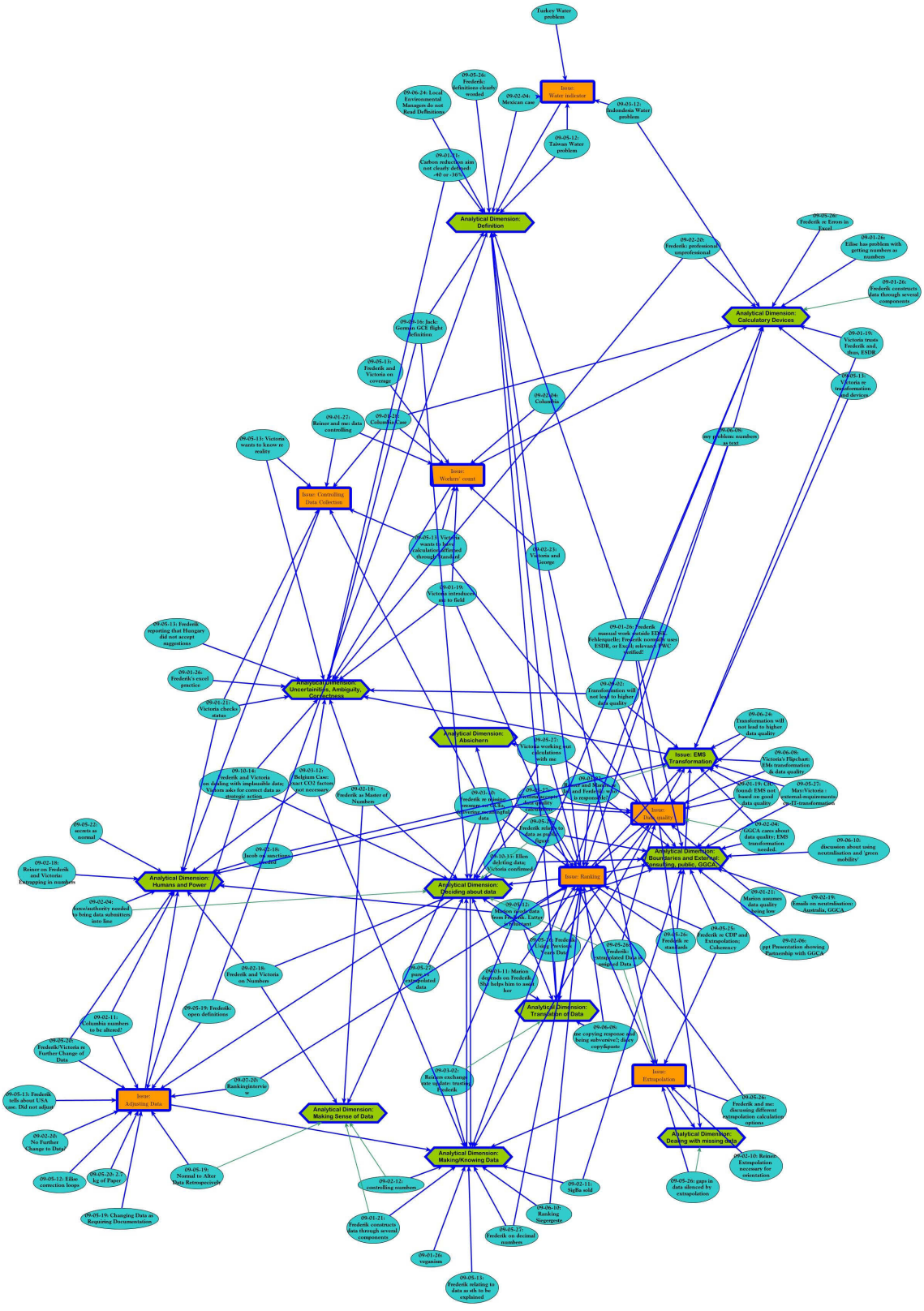


Figure A.21: Checking analysis with environmental management students

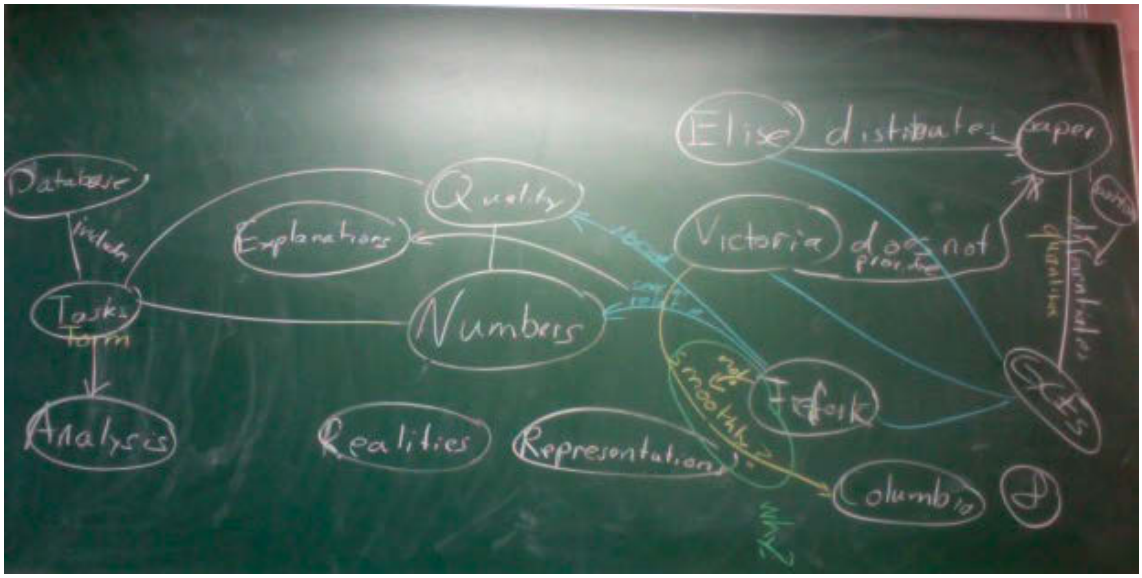


Figure A.22: Cleaned outline of analysis process

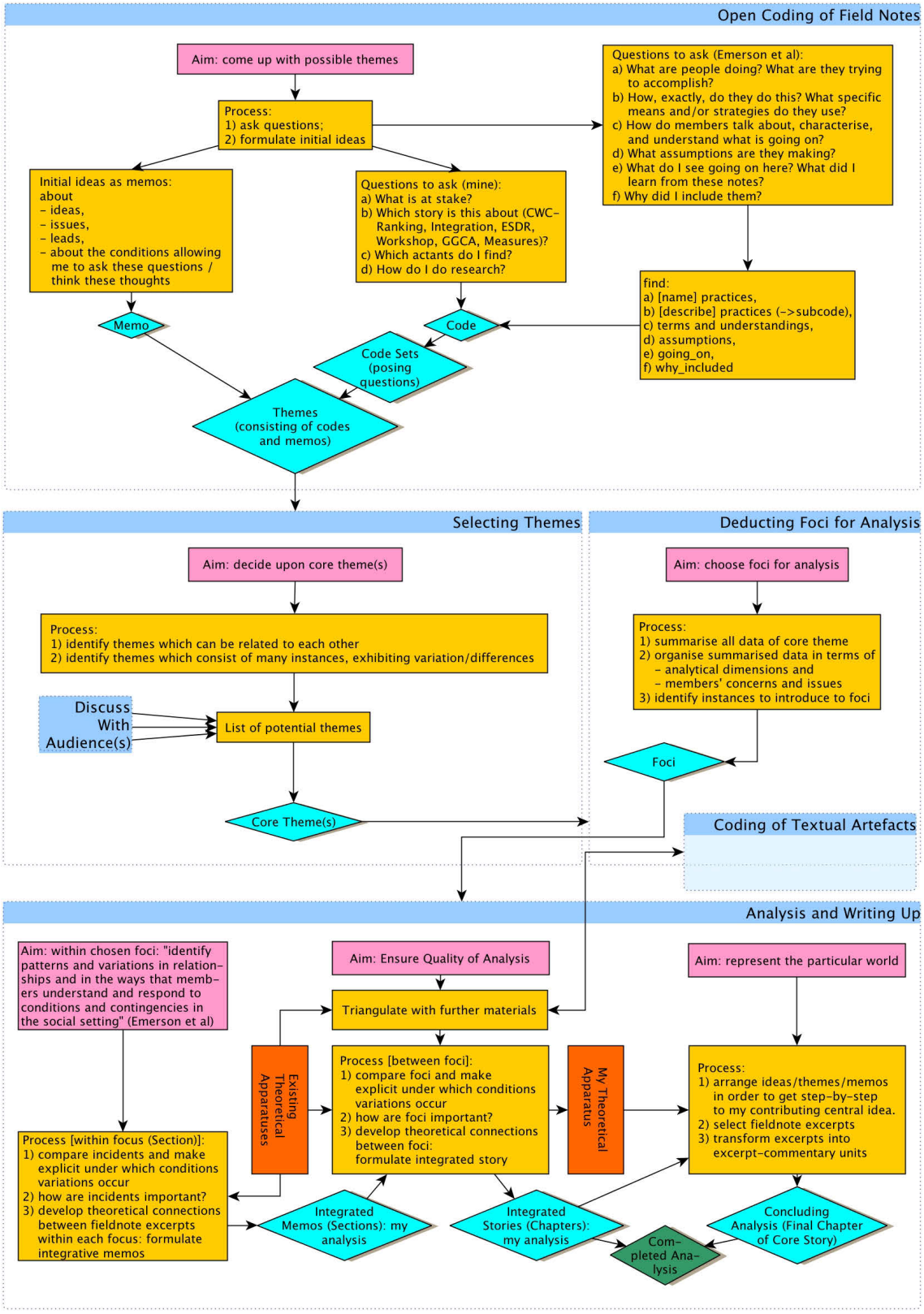
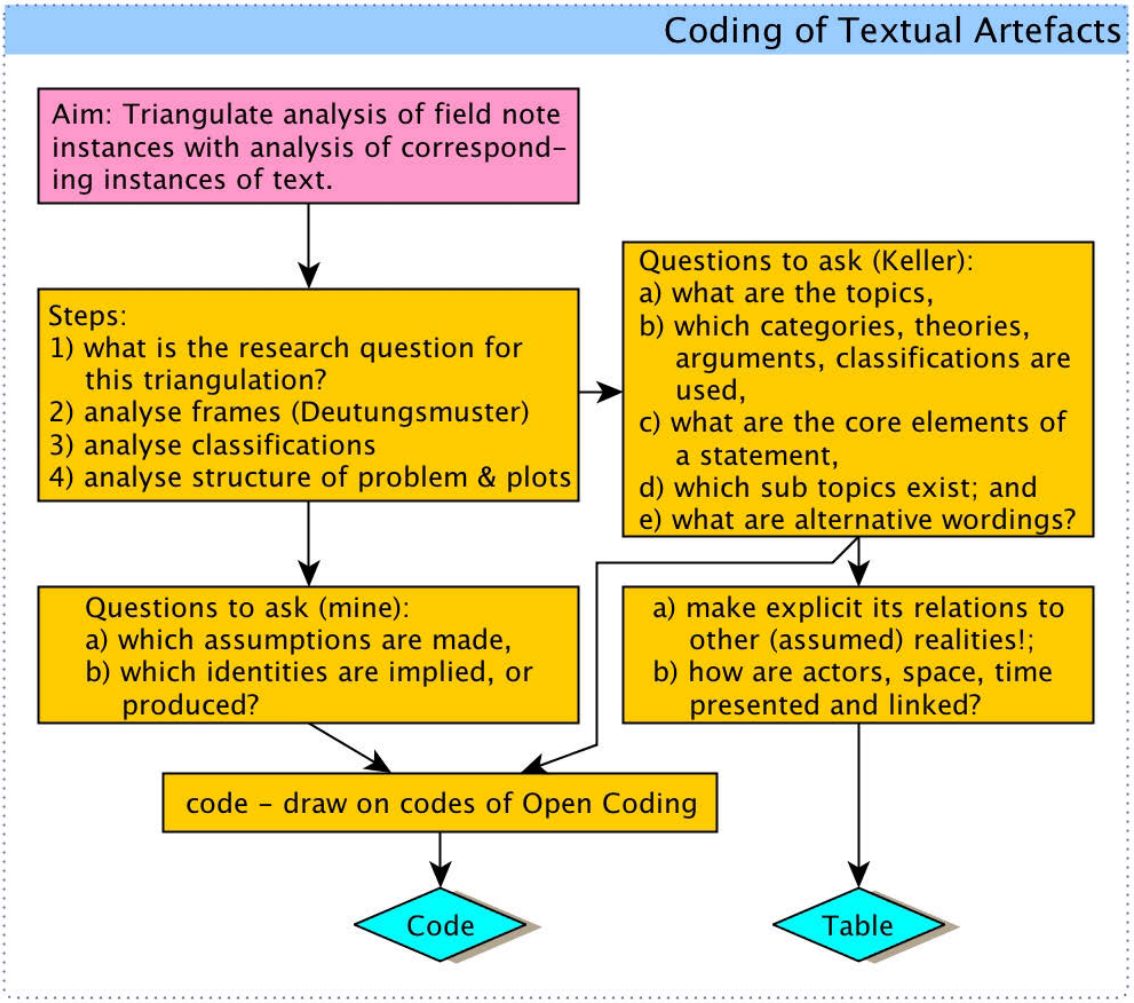


Figure A.23: Coding of textual artefacts



A.4 Software Employed

This project was made possible primarily with the following software packages:

yEd a graph editor programmed by *yWorks*.
R a statistical package, cf. R Development Core Team (2010).
Tinderbox a relational notepad programmed by *Eastgate*.
LaTeX an open source typesetting environment.
TAMS an open source qualitative data analysis package, cf. Weinstein (2006).

APPENDIX B

Analytic Materials

B.1 A Comment on Relating Bourdieu and Science and Technology Studies

While an actor-network theory (ANT) perspective provides appropriate sensibilities useful to follow members in the enactment of carbon emissions, for a reconstruction of the structure of settings, their decisive pasts and figurative effects on futures I add to our analytical apparatus some of the sensibilities introduced by Pierre Bourdieu to sociological thought. In the course of the analysis, the specific gains of the extension of the analytical approach will be explicated. My view is that ANT's and Bourdieu's sensibilities are complementary.[1] I do not offer a fully-fledged presentation of Bourdieu's œvre, but only stress those elements that should further the analytical apparatus of sensibilities. The motivation for this analytical move is significantly formed by the respective strengths of both approaches. While ANT is particularly sensitive to the multiplicity of actions resulting in the construction of carbon emissions, Bourdieu's conceptualisations are helpful to engage with the setting's structuring effects on actions and the production of social inertia. This is not implying a strict division of labour between both methodological-theoretical approaches. Rather, they provide distinct sensibilities which are generative, I argue, for a deeper treatment of the question of how carbon is mattering.

Towards a Sensibility with a Focus on Structured Power Relations – Drawing on Bourdieu[2] Why would members act at all? They do so because they follow certain aims. In principle such aims do not have to be grand objectives. Actors may simply, like the author in this moment of writing, want to produce a written account on thoughts, or may want to eat something. However, practices are not always directed

[1] ANT and Bourdieu's work are both fundamentally relying on a relationalist framework. The purpose of this book is, however, not to carry out a theoretical investigation of their reconcilability. Such work might draw on the work by Elder-Vass (2008), Elder-Vass (2007) and my emerging account of hybridising selected concepts provided by Bourdieu (Lippert 2010a, Part II).

[2] This presentation of Bourdieu's concepts enacts a heterodox portrait. Many texts by him and his scholars tend to be written and read in the order of how macro-structures shape members' practices. In contrast, I turn to Bourdieu's with an ethnographic perspective of observing situations and reconstructing the resulting and implied stability of socio-techno-natural environments.

towards aims. In the case discussed by this book, members had several aims; among them the aim of establishing the amount of carbon emitted by GFQ. Bourdieu (1977, 72) suggested to study the mode of how things are done, called *modus operandi*.[3] With Bourdieu, we can consider actors as structuring a situation when their aims require interaction. If their interests do not overlap (materially) then they can be considered as not influencing each other and, hence, acting isolated, relative to other members. In the case at hand, GFQ employees and managers constructing carbon emissions, however, they share at least one common aim – completing the construction. Then, the presence (which I aim to show in this chapter) of overlapping and interdependent interests suggests that members structure the settings in which they relate to each other. In their co- and interaction they must share at least some beliefs about the world they experience. Bourdieu (1990c, 381) refers to beliefs which people are not aware of as *doxa*. The subjective structure of a situation includes, for example, the categories through which people perceive the world. Such subjective structures include dichotomies like black/white or male/female (Bourdieu 1989, 20). People share also beliefs about what kind of aims they have and what kind of resources they need to achieve such ends. Both, taken-for-granted views in the organisation of their situation as well as formal or official ones (like rules) constitute the *nomos* (Bourdieu 1997, 124). Members who are acting within an environment (both, social and material) have to relate to the givens they perceive, i. e. the objective structures as they present themselves to members.

For members, the situations are structured through their perceptions of reality. Vis-à-vis their subjective reality they may act rationally. Thus, depending on the subjective reality reasons and, thus, rationalities may vary. For that, consciousness is not a prerequisite. Practices may be rationally ordered without presupposing intentionality or utility maximisation (Bourdieu and Wacquant 2006, 152). If members experience that their perceptions and interactions with other actors work out well, they will develop over time a *habitus*. Bourdieu (1988, 782) uses this notion as one of his key concepts to describe members' strategies of engaging with their social and material environment. He also called it 'feel for the game'. The conceptualisation 'game' provides a link to Bourdieu's reconstruction of environments within which members act. Analytically, he suggests to construct members' environments as so-called *fields*. Note, that fields are an epistemic device for sociologist, rather than an ontological fact *per se*[4](Bourdieu 1989; Bourdieu and Wacquant 2006, 14). He suggests to *conceptualise* fields with respect to the resource which allows actors to gain most. This is where his concept *capital* is meaningful. Resources are capital if they allow members to alter the field's situation in which they act. The *distribution* of capital is seen by him as part of (or representing partially) the objective structure of a field. If members recognise the types and distribution of capitals, this may allow them to emancipate from struggling for it. If they stop using the capitals to work towards realising the game's end, then they will not reach what is at stake. However, the opposite is to be expected when members take seriously the stake of a field, ? suggests. He refers to the latter stance as *illusio*.

The access of members to capitals provides them with power within that field. However, not all resources constitute capital with respect to every environment. For instance, while publishing articles in peer-reviewed scientific journals constitutes capital

[3]This question is of interest also to many other scholars in the social sciences. For example, Beunza and Stark (2003) explicated such interest as scholars of economic sociology and Li and Hersh (2002) investigated how capitalism works in terms of sustaining it politically and environmentally.

[4]But, see his discussion on theory effects (Bourdieu 1989, 17)

within the academic field, it does not so within the field of child care. Bourdieu and Wacquant (2006) define the *boundaries of a field* as the boundaries of the effectiveness of a set of capitals. Within the field, much access to capital provides an actor with a better *position* than if he had less capital at hand. Then, the distribution of capital among actors within a field constitutes the objective power relations among them to effect anything. A further analytical concept to study the configuration of fields is *class*. Bourdieu (1989, 17) uses the notion of class to group members who share similar positions in the field. *Domination* is possible if a group gathered enough capital to exercise power over actors positioned disadvantaged.

In social processes, some fields may exhibit quite a bit inertness. For example, in the field of education, some actors have better access to education institutions than others. In many countries, a clear pattern exists in which actors' access to education is handed down to next generation members. As a result, the education field structure may show little change over many generations. Consider that education is not simply passively consumed by actors. It is also being produced. Again, the distribution of access to shape the contents and forms of teaching structures a social space. Once actors' practices resulted in devices which have effects, these devices may be seen as *opus operatum*, i. e. that what has been done. If actors are objectively equipped over time with capitals such that their position with a field does not shift, they are likely to develop and embody schemes of perceptions and action which fit to the reality given at a position (Bourdieu and Wacquant 2006, 166-169). These schemes are generative; within a situation members apply these schemes to generate action in relation to the situation. Thus, the effect is not determined, but rather, prefigured by the relation between the particular generative schemes of perception and action as well as capital available to a member and the situation. Bourdieu (1998b) refers to the set of *tastes* developed at a position as habitus.

In this chapter, I reconstruct several sets of practices, settings and environments drawing on Bourdieu's sensibilities to how power relations are stabilised by means of distribution of capitals. However, in that respect, I am not about to scrutinise the particular fields Bourdieu has constructed and explored in his œvre. Much rather, the reconstructions below will shed light on the *specific* kinds of stakes which members strove for in order to reconstruct the types, forms and distributions of capitals.

To prepare this exploration, the following paragraphs show how Bourdieu's concepts can be used to engage with technologies and other materialised instances of the *opus operatum*.

Bourdieu and Technology Let us turn to possibilities of how we may conceptualise the relations between humans and technologies.[5] Actors' practices often sediment in material effects. This is the case for example, when members produce things and technologies. These artefacts can be considered as the objectified social and history. As such they may be decisive in co-configuring a field's relational structure. Albeit, entities do not necessarily occupy such powerful roles. Bourdieu (2001, 193) suggests that any thing can only act if it has been activated by an actor. While he was discussing the skilful use of benevolent instruments (like a letter) his approach can be easily extended to complex things, like a nuclear missile. Once activated, it may reconfigure

[5]This paragraph will not cover the discussion on how science may be studied drawing on Bourdieu. For his views on this, cf. Fowler (2006).

social spaces in actual reality. Similarly, Bourdieu (1998a) suggests that Information Technology (IT) takes a key role in the global mobility of capital within the finance sector.

Much of his work emphasises how the social is inscribed on bodies. Above, we also saw that social relations may be materialised within, e.g., education institutions. This, of course, extends to the physical. The architecture of buildings may reconfigure the available positions for members to act. The social relations inscribed into a building's construction are exercised when the building is part of members' practices (through its presence or absence). In his work on television, Bourdieu (1998d) pointed out that TVs can be used in a variety of ways. However, actual use practices may be structured by more than just the material technology. Clearly, *illusio* is a key to explain how interviewees engage with interview situations. His approach also allowed for recognising that technologies do not automatically and immediately reconfigure a field's relations at a given moment. For instance, Bourdieu and Bourdieu (2004) showed that photography was used such that it stabilises a social structure preferred by the peasants of Béarn – one of his famous locations of reserarch. And he showed how Algerian actors implemented agricultural technologies in a way which sustained their farming traditions rather than challenging or transforming it (2004, 466). Latour (1987, 129) discussed how a network in effect performing a corn economy may be based on an alliance of windmill, wind and corn. However, he also recognised that means of an alliance may include 'fashion or taste, anything that will *habituate* people to the mill and forget their pestles'. These three examples (photography, Algerian agriculture, windmill) suggest that technologies may be having more or less extending and strong effects on field relations. The ANT network or fluid may be viewed as well as a structure of relations between actors in the here-and-now and objectified history. Similarly, Pinch and Swedberg (2008a, 6) suggest that the notion of field may be useful for 'further developing the idea of materiality in dealing with technology and economy'. However, if a field is materially co-configured then we need to ask, how the habitus developed a certain positions has to be reconceptualised. This goes beyond asking how technologies are developed or used at a given position (Hård 1994), but rather invites to investigate how technologies become part of a habitus, i. e. the generative schemes of perception and actions. Sterne developed this line of argument when he studied how a turntable is constituted by the practices crystallising at such a technology. Its use changed from a playback device towards an instrument (which had specific class/race connotations). Thus, he suggested, 'practices [...] essentially *make* the technology in the first place' (2003, 374). The notion habitus, for him, includes technologies, which 'are just particularly visible sets of crystallised subsets of practices, positions and dispositions in the habitus. They are merely one sort of 'sedimented history' ' (ibid, 386). Also the work of Vitellone (2004, 31) offers the notion as such an interpretation. She studied how crack and heroine and associated techniques are part of actors' habitus. Bourdieu's concepts are, thus, opened to study how particular inscriptions co-configure field relations. With his perspective we do not need to restrict our focus onto bodies and material machineries, but may also study how the social is sedimented in the semiotic and natural (Lippert 2010a). Burri (2008b, 50) studies how radiologists used the emergence of the new imaging technologies to improve their positions within the social field of a clinic. In her study she paid close attention to how the field configurations and, thus, the generative schemes of perception and action, were put in crisis and, ultimately, reconfigured. Access and skill to put a new technology to use is something which is accumulated at the centres of power.

Latour (1987, 223) considers whether to designate such resource 'capital'. He argued that the concept is useful because it points to something which can be reinvested. At the same time, Latour appreciates that it that this notion is derived from the word '*caput*, the head, the master, the centre, the capital of a country', i. e. a place which is the beginning and end of a cycle. Nevertheless, he does not want to use the concept for two reasons: First, because it does not suggest more specifically what capital signifies, and, second, because it resembles the concept 'capitalism'.

B.2 A Bourdieusian Analysis of Data Reporting

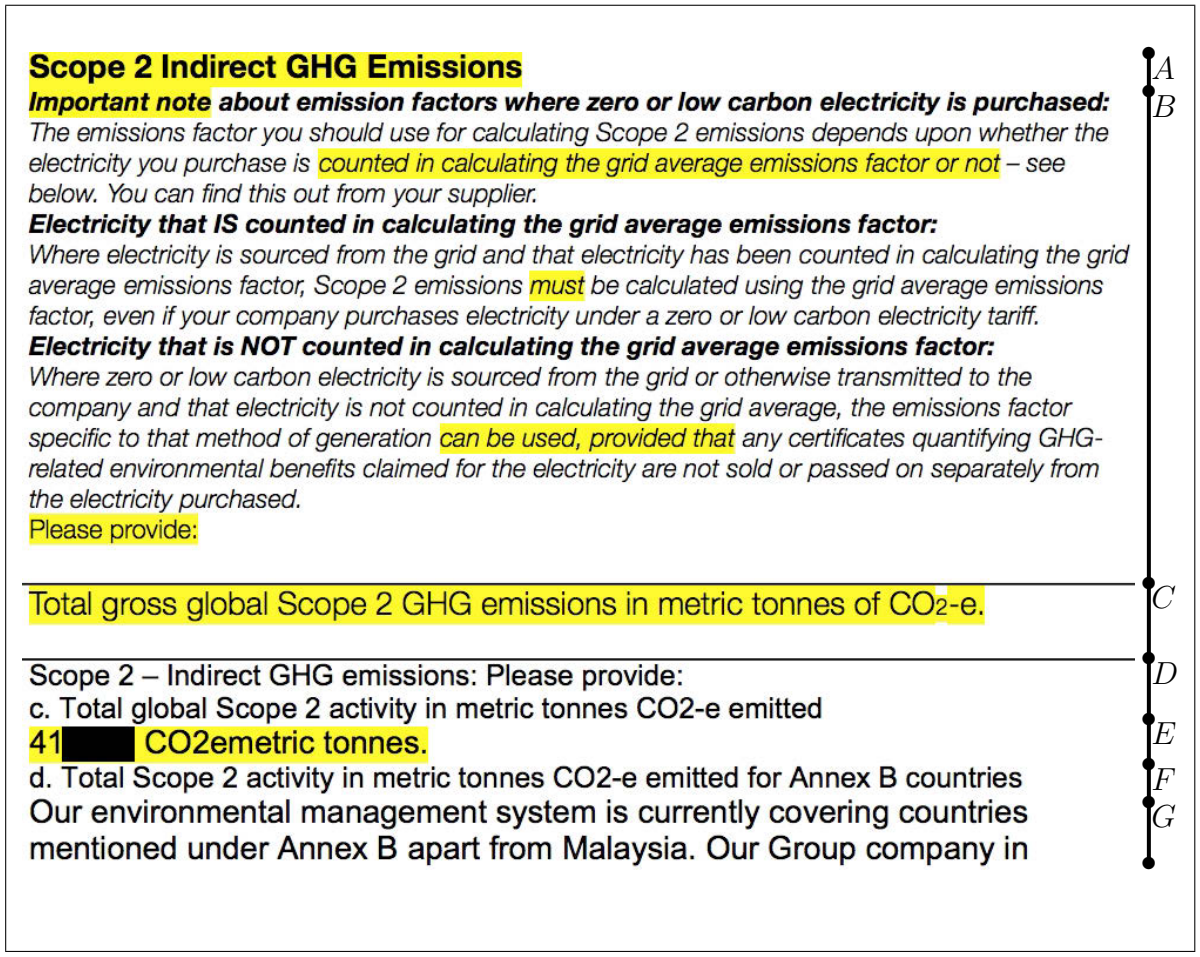
Analysis of Marion's MS Word File

Artefact B.2.1 on the next page shows an extract from a file Marion had produced to gather answers to compile GFQ's response to CWC Ranking. It provides much insight into how Marion formatted the response process. She had copied the formulations from the ranking's online platform into a Word document. As a result, the latter included headings (mark A) and the fine print (mark B). If you picture a document full of such text segments, you may imagine that this layout may have been surprised by many as not meeting demands for precision. Marion and me had tried to alleviate the ballast of the need that the text needed Frederik's interpretation by signalling what he should attend to. We suggested that this section was actually relevant (highlighting the section title) and we indicated him that an '[i]mportant note' existed. While providing this information we also shared responsibility with him. He had to accept the responsibility to comprehend and observe the fine print. Within the fine print we highlighted several 'technicalities', i. e. notions of counting and conditions for the calculation. Mark C indicates the first data segment requested by the ranking. It includes a qualifier ('Total gross global Scope 2 GHG emissions') and a unit (metric tonnes of CO_2e). Note this shine of precision. It is this shine of precision which is implied when the carbon disclosure movement suggests that emissions are commensurable because their data processing approach is precise. Below this data segment's heading we find two lines which seemingly repeat the specification of qualifier and unit (mark D). Marion and me highlighted the succeeding line (mark E). She had copied the quantifier, qualifier and unit from the prior year ('41[xxx CO_2e] metric tonnes'[6]) into this document. As argued above, this allowed the user to use the prior year's data as an indicator of what data would be acceptable now. Copying the qualifier and unit here underlines that, technically, a user could enter data in the field relating to a different qualifier and unit. Only restating these parts of the fact actually constituted the fact as compatible with the requested format. Finally, the document asked for emissions facts for specific countries (mark F). In response a narrative had been provided by GFQ in the prior year (mark G).

An analysis of translating GFQ's data into CWC Ranking's forms

We may say that the construction of the response was doing both, giving voice to some details, silencing others. Until now, I have primarily emphasised how members directed

[6]The latter four digits have been anonymised.



Artefact B.2.1: Extract from CWC Ranking Questionnaire File (Marion's translation; rendered anonymous)

the forms and contents included in the response. However, it was also the questionnaire itself which silenced realities. This is me, reflecting about how I copied the final response from the internal MS word document (for an extract of it see Artefact B.2.1) into the online questionnaire provided by CWC Ranking:

Field Note Extract B.2.a (Creating numbers from text)

> *I just copied the information from the final version of our response into the online questionnaire. Often it does not fit in! Staff of GFQ often provided qualitative information even though it was asked for a number.*

As a member I had to make choices of how to transform a reply consisting of many lines of text into a quantitative information consisting of a couple of digits. The stake was to identify that information which was asked for. How was my agency limited? On the one hand, the questionnaire acted as a form[7] constraining the agency of those who fill it. Within that technical infrastructure it was not possible[8] to enter certain information into fields designed to hold quantitative data. At the same time, my action was orientated at Frederik and Victoria as potential readers. My task was to translate

[7] For the agency of forms see e. g. Riles (2006a).

[8] Of course, I could have switched to an alternative technical infrastructure, like paper. However, such a strategy would have not promised a simple feedback into the online system provided by CWC Ranking.

the information such that they would approve of it. What happened here, thus, was the translation of text between two types of materials which were able to carry different kinds of semiotic content. The MS word file had acted as a writing device (Callon 2002) which was able to collect information by inscribing it into itself in multiple interactions between many members, their computers and the file.[9] The task for me was to produce a best fit between the file and the questionnaire. The nomos, thus, not only demanded that I tick the box of doing the job, but also of accomplishing the job in a specific way which was, however, not exactly prescribed, but, depended on my incorporated generative schemes for the identification and translation of information, i. e. the habitus of the agent.

However, even when numbers were asked for and the MS file included numbers, the result was uncertain. Imagine you have to manually copy many texts bits, number by number – none twice, don't skip one... Here you find, again, me using the by now very ordinary computer technique of copy-and-paste (Bowker and Star 2000, 300):

Field Note Extract B.2.b (Copy and paste as a dicey exercise)

> *It were specifically questions 10 and 11 which were risky: I had to check up a number of each balance sheet: copy name of GCE into the questionnaire form, back to the balance sheet, scroll down the screen, remember the right number, use alt-tab to switch to Internet Explorer, type the number in.*

The materials involved here were not only the questionnaire but also many environmental balance sheets☞, the operating system providing the infrastructure for copy-and-paste acts and my mind as a carrier of additional data. At stake was, as above, getting the job done as well as carrying out the job carefully. The regard for the latter can be read as part of a habitus. The configuration of these elements allowed for a translation of two types of information in parallel: names of GCEs and the respective numeric values associated with them. While the names were translated utilising the 'clipboard' of MS Windows, the numbers were copied mediated by a human memory. This dual work strategy constituted an economic engagement with the task and its multiple elements. It would have taken nearly twice as long to translate all data by means of computer only. This is, thus, an instance in which the distributed memory of GFQ (carrying its environmental information) was temporarily extended to a human memory.[10]

Overall analysis of how GFQ responded to CWC Ranking

Table B.1 (on page 596) lists findings from Section 4.2, entitled *Failing the Market* (page 256). The table helped to render visible the key stakes and resources needed to reach them. Using the table I drew together the following analysis.

With respect to the sociology of translations, then, the section concludes by taking note on the experts enrolled to participate in the fact-making exercise: Marion segmented the questionnaire and distributed the various segments to the experts pointing them to the information which were requested. The latter was necessary because actors are busy and do not necessarily spend the time to read through lots of pages of guidelines of how to reply to the questionnaire. For Marion – as the coordinator of the response – it

[9] The process was more complex in that respect: Marion had to work with several copies of the file, each filled in with information by some colleagues.

[10] For a more detailed discussion of extended and distributed minds, see Lippert (2011a).

was rational to direct these over-occupied actors to those data gaps which she deemed most significant. Thus, her view was incorporated in the construction of the response.

Individual agents enrolled as experts provided replies based on the data which they knew about, translating qualifiers and quantifiers into the response to the CWC Ranking questionnaire. As the instance of Frederik explaining how he calculated coverages indicated, the data submitted was contingent, and such was the choice of how to contextualise the data. We found how he treated words as self-evident concepts: conjuring coherency by using the same terms in several reports may easily silence the meanings of signifiers at other implied realities. The relations between signifiers and signified get obscured in the process of translating data from Nick's consumption data[11] via ESDR and the desks of members of the EMS-Team to the response to CWC Ranking. What water were we worrying with?

When members constructed the response, they had to make choices, which indicates their agency. Merely revisit me copying and pasting individual numbers – hopefully none got skipped! Practices like this were fundamental to create the carbon data reported. If we find Frederik asking 'how honest do we want to be here', we may emphasise the role of individual agents in shaping which and how realities are translated and which are ignored and silenced. This is especially true for the option to go for formulations of a previous year. Such formulations have shown they worked – they did not cause trouble to any of them. Thus, as this rationality suggests, one can easily apply them again.However, it remains to emphasise that this move is not a passive stance. Rather, it should be understood as a construction anew, bringing life to a specific representation (which had proofed its eagerness to survive amidst the scrutiny of investors and critical publics). The terms were inscribed to act out there on behalf of Frederik, Victoria, the EMS-Team, GFQ. Thus, members set up data such that it would act as carbon emission – the move from conceptualising the carbon emissions process as construction to enactment is affirmed.

To focus the reconstruction of the fifteen field note extracts and two artefacts undertaken above, the next pages reconsider their structure drawing especially on Bourdieu's concepts of stake, capital and nomos to propose how to think of the habitus and field structure in the work setting 'constructing a response to the CWC Ranking'.[12] This reconstruction is based on the findings, drawn together in Table B.1 (on page 596). To start with, I summarise the stakes in the field. This denotes what members struggled for. For Bourdieu, what is at stake is a kind of capital. Gaining the stake positions an actor better within the field. At the same time, to gain such capital, actors draw on other capital. Thus, capital exists in two modes – as resource as well as an end-in-itself. Accordingly, we will then engage with the capital-as resources. Subsequently, summarising the informal and formal rules and ways of seeing present in this work setting allows to circumscribe the agency of actors. These three steps provide the base to reconstruct the field and the positions from which members act. Understanding these positions allows to spell out some of the elements of habitus we can derive.

[11] encountered in Chapter 2 (entitled *Data Construction in a Basement*)

[12] I have not drawn on Bourdieu's concept doxa for the final analysis. The analysis suggested that members acted quite aware of many circumstances, which resulted in strategic communication and performances. This is not to claim, of course, that it would not be possible to construct the doxa involved in this setting. Within the scope of this book, this section does not approach such a reconstruction.

Stakes Within this setting, members related to three types of stakes: practical work matters (*data performance*), the governance of their work (*regulating work practices*) and GFQ (through *its imagined public carbon (inter)face*) itself. Members were interested in a smooth process of performing the data they enacted as required. This entailed, for example, simple guidelines of how to construct data or no barrier to get data from data suppliers. Sometimes the difficulty was to get hold of data; at other times it was hard to control the instruments which produced or altered data. At stake in these cases was control over data. The goal was to possess high quality data with characteristics like exactness, coherency and stability. To ensure these qualities, members accepted that access to and power over data was to be restricted. At the same time, this was perceived as a problem by some of them. Victoria, Frederik, Elise and me – we all wanted the data under our effective control. Data had to be brought into the organisational and social reality by members. Within these realities, how data existed was heavily contested. Data was, thus, not a natural representation, but, rather, a dynamic effect of the work of actors. Depending on how they performed data, it existed in different qualities and quantities.

Work practices have been governed in three ways. First, members have been formally organised hierarchically. They demanded from each other that their hierarchical and functional positions were to be accepted and properly executed. Second, their work practice, their tasks, and in effect also their hierarchical position, were governed by their official roles. Roles were more dynamic and complex than their hierarchical organisation. However, these roles were not arbitrarily constituted. Members enacted colleagues as having certain roles which enabled the former to claim from the latter role-according actions and behaviour. Third, members' work practices have been regulated at the dimension of responsibilities. Members had to ensure that their actions were perceived as responsible by their internal and external counter parts. This links to the last type of stake.

Finally and fundamentally at stake was GFQ's relation to its carbon emissions. Its carbon emissions existed only insofar as they were perceived by publics. Thus, the impression by publics about GFQ's emissions mattered and was to be steered. While GFQ was performed as needing to relate to its emissions publicly, the quality of their relationship was risky. Therefore, members had to protect GFQ from publics' potentially unfortunate perceptions. The perception was to be transparent. I.e., GFQ was performed as wanting to be perceived as a transparent player. A resource to that, and end-in-itself, was the CWC Ranking.

Resources or 'What is being used with what kinds of effects?' The analysis yields as well three types of resources which provided influence in gaining the stakes. Thus, they can be considered types of capital as well. Members worked with each other. *Aligning* members with time, roles and instruments was key to effectively configure their co-production of data. *Imagining* audiences was key for members to know how data should be performed. These resources needed to be interlocked effectively to *mobilise data* successfully.

Enacting and utilising these capitals required both, the ability and the authority to do so. However, the ability and authority were not static. They were not something substantial which members simply were able to collect. Rather, they needed to be continually reproduced and developed. All of their practices were fundamentally mediated by socio-technical systems. The latter were dynamic. Ensuring the ability

to produce any effect required members to engage with the fluid relations between instruments, humans, ideas, goals and various other devices.[13] Members needed to actively reproduce and adapt their abilities (including skills) vis-à-vis other actants. The same holds for authority. As shown above, authority was not static and binary. It needed to be actively performed. Frederik did not do so successfully. This undermined his authority. And, yet, it was not totally amiss. He was still able to lend his authority to other actants. The latter, reciprocally, stabilised his authority. If the data he produced was stable, his authority was stronger. Granting authority each other was also incorporating other human members. They both ascribed authority to and demanded it from actors.

All these three types of capitals were better performed and utilised with both, ability and authority. The elements to be aligned within that fluid included humans and non-humans such as ideas, identities and instruments. And the ability and authority to align humans with non-humans was non-equally distributed. Friction allowed and circumscribed how these elements could practically be configured (Tsing 2005). Formal hierarchies,[14] for example, provided both a medium through which configurations were enabled as well as threatened. The meeting which Marion had asked for was performed in friction to such hierarchies. Another instance for the capital of aligning was the communication between Frederik and me. While some members experienced communication with Frederik as difficult, I was able to engage with him in a rather smooth process. This allowed me better to align him with the response production process than it was possible for Victoria. She, however, controlled to a large degree the capital of the social network she had mobilised to contribute to the response. Also, she was able to align time resources to employees which was an effective capital because of the formal work relations co-governing the practices. Members did not participate in the production of the response purely for good will. They were promised wages in exchange for their labour time. A significant part of this type of capital was also the formal distribution and power over responsibilities, which translated directly into work assignments, i. e. tasks. These responsibilities were partially related to contractual relations and, overlapping with this, to members' roles and more or less corresponding identities. This kind of capital was also brought into existence through the unequally distributed agency to discipline and align data suppliers. Members as well as CWC Ranking's actors struggled for this capital.

A second type of capital was imagining successfully the audiences of data performances. However, imagining does not only refer to the straightforward internal process of humans who mentally form a picture of a situation. For the purposes at GFQ, imagining was also about enacting the imaginer as promisingly or powerfully suggesting an image. Furthermore, striving to imagine audiences' perceptions of data adequately is complex because the adequacy depends on both, successfully grasping the situation in which an audience perceives as well as on understanding the situation in which the imagination is performed. On the one hand, an imagined external reality may map more or less well onto the actual corresponding external reality. This question can be understood as the epistemological dimension of imagination. On the other hand, whether or not, or how, that representation-imagination is speakable in a certain situation *within* GFQ shapes its career. Thus, an imagination has to be skilfully performed. It has to be sensitive to the

[13] The fluid character of socio-technical entanglements was also described by Mol and Law (1994).

[14] Formal hierarchies, just like formal authorities, existed only in and through being performed.

external reality as well as to the internal social reality. For instance, Frederik's question 'how honest do we want to be here' was part of an imagination performed. He suggested that external reality might classify information about data uncertainty in an unfortunate way. To avoid such publics' perceptions, he implicitly proposed to not disclose some information. Whether or not his imagination of publics' perceptions was successful did not only depend on how adequately he knew these publics. It also depended on the communicative situation in which he performed this imagination. While it was perfectly acceptable to imagine publics as not well-digesting honest information in a conversation with me, in a meeting with his bosses, this imagination might have risked his position. The capital of imagining others was, thus, used to position the member within the organisation as well as to position GFQ to public audiences.

Third, data itself constituted a crystallisation anchor for capital in the construction of the response to CWC Ranking. While members were not accumulating data individually in this case, it constituted a significant resource to shape ones position with respect to other members and within the organisation if you were able, and authorised, to shape data – and through that the relation of publics to GFQ. Data was not a fixed entity. It was constructed and existed in a fluid state. How has data, then, been mobilised? Members' ability to mobilise data was influenced by their knowledge of the fabric and conditions of existence of the data they dealt with. Knowing how numbers had been constructed and could be constructed allowed members to shape or modify the modalities of numbers. Similarly, being accepted as knowing the conditions of data allowed members to interpret authoritatively what data meant. For instance, Frederik possessed the capital of interpreting the sources of data uncertainty and suggesting that GCEs' agents did not constitute a source of uncertainty to be reported. Most data, however, was perceived as quantitative. Numbers were to be reported. Constructing them as representing objects and adding units was, nevertheless, a very qualitative process. Again, Frederik had most power to bring numbers into relation to signified and modalising statements. However, also Victoria and CWC Ranking mobilised data in specific ways. They enacted data as complete, according-to-rule or -guideline or as accurate. Yet, Frederik was best positioned to strategically disclose uncertainties because he knew most about the qualitative relations among numbers and to standards. All these actors also directed resources to silence realities; for example by the way they shaped statements or forms. They controlled various memories of how data was stored. Who was left out? Publics had least possibilities to influence the data. Rather, the data was mobilised by GFQ members to shape their relations to publics in a favourable way. However, this did not mean that members forged data. Rather, the ways the capital of data mobilisation was utilised was highly shaped by the specific configuration of members and CWC Ranking.

Nomos Taken-for-granted or official views (within GFQ immediately significant in this setting) comprised three groups of terms of reference. The setting was regulated through a nomos covering *work* relations, the relations to *external audiences* and *data* itself.

Work relations were officially governed by contracts. This was, however not the taken-for-granted view. Members were aware that practically actors might not act according to their officially assigned tasks or do not necessarily perform their role and duties adequately. Thus, Marion clearly recognised that Frederik was not fitting to his role and hierarchical position. This had consequences for his authority (discussed

above). He recognised this deviation between official reality and members' views himself. The meeting for which Marion had not only invited him but also Jack reflected his changing position. Her calling-for-a-meeting took-for-granted that decisions are more stable if they are taken in – or by – a meeting. In a way, carrying out such a meeting was also more efficient. It saved time; and saving time was part of the official doctrine at GFQ. An interesting and problematic part of the nomos was that superiors had to trust their subordinated socio-technical apparatus. They needed to perform trust to the work of others – not only to save time but also in order to not enter others' territory of interpretation. For example, Victoria evaded scrutinising the algorithmic reality designed by Frederik. And, reciprocally, Frederik trusted her qualitative texts. He did not want to enter the territory of political-strategic formulations.

The setting aimed at the construction of the response to the CWC Ranking's questionnaire was, of course, structured by this very submission. The goal was to submit data to the ranking organisation. Relevant to note are, in this respect, three general points. First, the analysis has shown that 'submission' was merely a punctualisation. Actually, it was complex and an ongoing performance. Second, one decisive rule governing this distributed performance was that it was enacted by a single actor, Victoria/GFQ. They collapsed in each other at that moment. She had to take the responsible to act as GFQ's spokesperson and GFQ's carbon emissions-reality-located-at-the-CWC Ranking existed through her actions. Third, the setting was structured by the implicit view that publics should perceive GFQ and its carbon emissions in a rather idealised way. While, officially, GFQ wanted to disclose itself transparently, in practical reality, members aimed to shape its presentation as favourable.

The key to connect publics and the work realities of the EMS-Team was data. In order to engender the desired perception by publics, GFQ members had a detailed understanding of what data ought to be like. Fundamentally, quantitative data was seen as suitable to represent the carbon reality of GFQ. And, this data was to be provided to publics. However, publics were not to simply access GFQ's data. Rather, access to GFQ's environmental was and is heavily guarded and secured; just like CWC Ranking's connection to GFQ was also secured. The EMS apparatus was to construct data and check whether or how it should be disclosed. Accordingly, for both, Victoria and CWC Ranking it seemed self-evident that the performance of data transfer was to be authorised and multiply confirmed. At the end, the complex and heterogeneous set of data was taken-for-granted as to be punctualised as a single and uniform 'response' which could be either 'submitted' or not.However, before this performance found its vertex when Victoria underwent the triple confirmation process, data was moulded and formed. It needed to be exact, rule-following and the like. Above all, it needed to be acceptable – by both: within the EMS-Team as well as with respect to the dreaded critical public audience. Data was was not to invite any critique of GFQ. Towards part of the practice's preamble, data was shaped to please the demand for exactness, transparency as well as non-criticisability. Consequently, gradual changes constituted an end in themselves. The financial services sector prefers not to be associated with abrupt change, disruption. Do you want your bank to change its interest rates fortnightly by 50%? Thus, members were to translate data towards best fits or compromises among these conflicting normative orders.

If we construct the work practices which crystallised around the response to CWC Ranking as a multi-dimensional field, the analysis allows to recognise three different kinds of capitals which were distributed *among* members and structured this setting.

The field was structured along the lines of how the relation between GFQ and publics was imagined. All worked towards the goal of engendering a friendly relation of publics towards GFQ. Members were able to shape this relation through their unequally shared power over data moulding and mobilisation as well as over work elements' configuration and alignment. It was striking, however, that the members discussed in this section were highly interdependent and positioned within contradictory interests. Marion was dependent on data suppliers – and, yet, she directed them. Victoria had to control us – and, yet, she had to trust her socio-technical network. She was positioned to perform a GFQ of contradictory aims (transparency vs. protection from publics). This predisposed her to carry the loads of contradictions built into carbon work. She took it on. Frederik tried to focus his entanglements with data on numbers (performed as positivist data) – and, yet, he engaged willingly with strategic-political inscriptions into that data, and was even expected to be far more strategically acting. Positioned such that he was to perform positivist data while not being allowed to resulted in a disposition which was well-known: He tried to avoid the strategic-political. The division of labour suggested that Frederik was responsible for quantities and Victoria for qualitative texts – and, yet, both presupposed and implied each other. Finally, the CWC Ranking organisation wanted to understand carbon emissions and engender a low carbon economy – and, yet, their questionnaire suggested a neatly quantitatively manageable carbon dimension.

Who has been silenced in this picture? Bourdieu (1989) suggested that positions within a field depend on access to capital. While this setting was all about relating to publics, the latter have not been welcomed in an active position. Rather, members invested their resources to demobilise external audiences. The latter did not have access to data; neither did they realign the heterogeneous elements acting within this field.

At this moment, reader and author should ask themselves: Is this too neat a picture? Yes, it is! On the one hand, publics can reconfigure the setting by questioning the data façade and acting differently to corporations. On the other hand, to avoid the latter, GFQ tried to take various means – such as not being ultimately transparent and not opening its doors (which were not only protected by deep firewalls but also by security firms); or, they aimed to prevent publics from poisoning GFQ's business by playing parts of publics against each other.

Table B.1: Elements of Stakes, Capitals, Nomos, Habitus and Field Identified in Section 4.2

	Perspectives onto CWC Ranking		
	Organising the Response	**Constructing the Response**	**Emitting and Digesting Emissions**
Stake	Marion wanted a meeting; supposed to include all relevant actors	Keeping control over numbers	Responsibility for response
	Playing the game of hierarchy well	Which impressions do publics get?	Access to response
	Information was to be elicited from Frederik	Accomplish report to CWC Ranking	Confirmation that power over response may be handed over
	Marion needed Frederik to provide exactly the data which the questionnaire asked for	Conformity with standards; smooth engagement with standard (non-complexity within standard)	Submission or non-submission
	Who controls numbers?	Simple to translate data to DJSI	Control over data
	Frederik supposed to fit role expectations	Coherency between standards and response	*raison d'être* of the EMS: producing carbon data
		Relationship between GFQ and its carbon emissions	Performing carbon emissions externally
		Algorithmic face of GFQ should not suddenly change	Taking responsibility for carbon performance-out-of-control
		Transparency enacted	Contracts governing work tasks
		Perception of public audiences	CWC Ranking: Need companies to provide data
		Protection from publics	CWC Ranking: Companies want to be perceived as green

continued on next page

continued from previous page

	Organising the Response	**Constructing the Response**	**Emitting and Digesting Emissions**
		Appear being principally in control	CWC Ranking: Status of numbers: reliable, impartial? CWC Ranking: companies do not want risking perception of their statements as unreliable
Capital/Resources	Calling for a meeting	Ability/Authority to alter modality of numbers	Organisational apparatus headed by Victoria
	Imagining how Frederik would read the MS word file	Access to data reported for previous year	Technical infrastructure
	Polling information from Frederik by pointing to indicators and units	Ability to define whether data is similar/different	Complete and rule-according data provision
	Identifying as environmental manager	Imagining others well: how would GFQ be perceived by external audiences?	Victoria may perform GFQ
	Marion depended on internal experts	Access to standards; guidance/handbooks to interpret them; data	Online system performs user's agency for binary choice
	Ability and authority to control numbers; enacting an Obligatory Passage Point (OPP) as capital and viz. versa	Corpus of concepts of standard offer resource; ability to manœuvre this corpus	Marking the boundary over control over data
	Capacity of Frederik to engage with political statements?	Ability/authority to shape relations between response and standards	Producing carbon data

continued on next page

continued from previous page

	Organising the Response	**Constructing the Response**	**Emitting and Digesting Emissions**
	Aligning official position, performance and identity	Ability/authority to prescribe and inscribe algorithmic face of GFQ	Presenting carbon data to audiences
	Allocating worker's time to work assignments	Ability to shape the impressions of publics about accuracy of response	Contracts governing work tasks
		Knowledge of numbers, their perception by imagined others, ability to alter numbers	Victoria able to trust socio-technical network
		Authority	Ability to reflect about and relate to network's elements
		Artefacts suggest correctness	Effective and easy communication
		Make uncertainties available to publics	List of network elements, memory
		Reinterpreting the actual performance of local EMS agents	CWC Ranking: Companies provides data
		Power to discipline local agents	
		Questionnaire able to silence realities	
		Power over translating specific parts of information	
		Linking human and computer memories	
Nomos/Doxa	Formal hierarchies are to be recognised	Quantities represent realities adequately	Access to data secured
	Meetings are places for decision-making	Data can be similar or different	One person has access

continued on next page

continued from previous page

Organising the Response	**Constructing the Response**	**Emitting and Digesting Emissions**
Formal tasks are to be worked on	Data should not differ too much over time; gradual change ok	Data should be provided complete and according to rules/guidelines, correct units
Environmental manager of GFQ is supposed to take classificatory and political decisions	EMS-Team members had to produce statements which were not inviting critique.	Agreement for making data publicly available
Exact information is to be provided	Reporting as an end in itself	Victoria may perform GFQ
CWC Ranking's hierarchisation of questions is accepted	Transparency vs. protection from publics as conflicting normative orders	Submission or non-submission: Binary choice taken by Victoria
GFQ should be presented through 'key messages' and 'key challenges'	Present EMS idealised, rather than actual workings	Only acceptable data was to be sent
Frederik supposed to provide appropriate replies to Marion	Victoria was not to enter territory of defining algorithmic face of GFQ	Carbon data is to be presented to (external) audiences
Frederik was supposed to update information of preceding years	Victoria and Frederik should approve of my translations	Translate internal data into information-to-be-presented
	Create best fit between MS word file and online form	Load of 'data submission' to be carried by Victoria
	Complete tasks	Contracts governing work tasks
	Use time efficiently	Victoria had to trust socio-technical network
		CWC Ranking: Data should be reliable and impartial, normative free, objective knowledge possible

continued on next page

continued from previous page

	Organising the Response	**Constructing the Response**	**Emitting and Digesting Emissions**
Habitus	Frederik avoided the 'political' Frederik as not fitting role expectations	Frederik not wanting to submit non-ready numbers Identify and translate information such that it fits the game	Victoria may perform GFQ Victoria as marking data as under CWC Ranking's control Victoria able to carry load of 'submission'
Reflectivity	Dieter recognises how hierarchies are enacted	For Frederik formulations, algorithms and formats were not self-evident Frederik as recognising that accuracy is not an end in itself; end is about publics' perceptions Frederik recognised a dilemma of being honest	
Field		Some local agents positioned at boundary of reach of EMS Territory of defining algorithmic face of GFQ	Boundary of GFQ's control over 'its' data CWC Ranking: Companies provide data

B.3 Analysing the Relations between the Corporation and External Organisations

Another take on how CWC Ranking structured GFQ's internal practices

↪[15] In the prior section we learned about a way by which CWC Ranking was co-configuring GFQ's carbon practices: the ranking provided an incentive for organisations to split up emission data country-wise; the promise was a higher score. Marion translated this need for split up data to Frederik. For her, at stake was a preparation of the response to the ranking's questionnaire which would be likely to optimise the scores taken by GFQ. In this way, CWC Ranking was able to influence the formatting of data within GFQ. The corporation was dependent on CWC Ranking to receive high scores and, thus, be publicly construed as a transparent organisation. At the same time, the ranking organisation was dependent on GFQ to offer data. That supply, however was not only dependent on Marion but also on Frederik. CWC Ranking, however, was not able to directly access GFQ's environmental manager. Intermediaries of the CSR unit, like Marion, enacted external requirements locally and by that mobilised external information to play a role inside the organisation. In spite of that, this 'inside' of GFQ was structured in multiple ways. While members agreed that they should provide data to CWC Ranking, in what way exactly they would do that was related to many other issues. In the corresponding discussion above we learned that for Frederik the stakes were structured differently. He had connected the provision of data with his threatened identity as GFQ's environmental manager. For the response to the ranking organisation to be accepted as legitimate, Marion needed Frederik to provide and approve of the carbon accounting section of the response.

GGCA's Relation to GFQ

In the midst of my field work I met Frank who had been the communication strategist within the CSR unit, supporting the two organisations' communication early on. An informal interview provided some background to the floating discursive presence of GGCA in the unit.

Several years before my study took place, GFQ had engaged with various societal actors in a process he had called *stakeholder dialogue*. This concept refers to a fashionable notion emerging in the 1990s indicating a shifting emphasis of corporate attention from distributed owners (shareholders) to interested parties (stakeholders), frequently associated with Donaldson and Preston (1995). This idea of corporations engaging with stakeholders conceptualises all sides as open to breaking down their barriers in communication and move on from their entrenched positions (Burchell and Cook 2008, 36). One of the actors involved in GFQ's stakeholder dialogue was GGCA.

This NGO drew resources from a supporting base of several millions individual people. It was active in many countries – similarly many as the number of those countries GFQ was operating in. In internal documents they construed themselves as equally important players in their respective markets. While environmental NGOs have reason to be worried about being used for greenwashing purposes (ibid.), GGCA did not

[15] The following discussion is relating to Field note extract 4.2.c (on page 261).

seem reluctant to engage with for-profit firms. This organisation maintained publicised relations with a wide variety of firms. GGCA's aim was to support these companies in a transition towards a greener business conduct.

Thus, after GFQ's stakeholder dialogue closed, contact to GGCA had been continued. GFQ had been interested in developing a partnership through which they would establish an institutional access to knowledge and competencies to deal with climate change issues. I conceptualise that interest as having aimed to continue a focused dialogue with another actor to render their relationship more productive. They preferred GGCA over both, academic partners, which were perceived as not quite so flexible, and consultants, who were part of their economic territory anyway. In contrast, a partnership with GGCA promised access to a part of society which GFQ was less involved with, i.e. green clientele, Frank explained. At the same time, GGCA had been quite moderate a player among environmental NGOs: the organisation was well known for being embedded in the social realities of corporate leaders and aristocrats.

A series of meetings and exchange of files, including a lake-side conference of GGCA's COO with his GFQ counterpart Ivo, resulted in a formalised agreement in which GFQ's bill was more than three millions of USD for the possibility to publicise their new relationship as a *partnership*.

The stakes are high in such partnerships. On the tables are not only issues of greenwashing but the promises of stakeholder engagement, aiming to provide a model for public participation and legitimacy of corporate conduct as a way to reconfigure the battleground of workers and managers. Livesey (2002, 343) suggests that stakeholder dialogue might constitute 'a step toward more participatory and democratic practice'. In her understanding the dialogue's rules are decisive for whether this form of engagement lives up to the high expectations or whether we find 'yet another tool in the trend to delegate matters of environmental concern to a cadre of professional experts' (ibid.).

GGCA's visual presence in GFQ offices

Sceptical that the partnership's formal and explicit statements, textualised in manifold documents such as memorandums of understanding or emails, suffice to understand GFQ's relationship with GGCA, I turn to the enactment of GGCA's presence through EMS-Team members. Visually, for instance, the NGO was constantly around the workplace: GGCA's calendars were ornamenting white office walls. Calendars, of course, are quite an expected phenomenon in a Western administrative office. However, these particular time orientation devices were configured by GGCA in an interesting way: the majority of the visual display area was used to show some form of Nature – animals or plants. Many non-GGCA calendars differed. The latter would use the available space on the calendar to provide a regularly delimited array of boxes or lines to allow users of the calendar to translate activities into temporal coordinates. The GGCA calendar, however, was designed for a different use. While these calendars could be misused in principle, in the offices I have been around, these devices were not physically inscribed with anything. Maybe, then, they did not so much serve as calendars but as displays of GFQ's imagined entanglement with the NGO. In this reading, at stake was the performance of the partnership in front of the eyes of visitors and employees. The corresponding derogatory allegation of greenwashing would point to this kind of performance. The partnership was not only enacted within GFQ but also in the

corporation's Sustainable Development Report. GGCA allowed the corporation to picture their logo in GFQ's PR visualisations.

GGCA's presence in negotiating carbon offsetting

While Victoria had not been able to mobilise GGCA's presence as a capital in the fundamental discussion with George on carbon governance as decisive for GFQ's carbon conduct, investigating a more specific case decision situation is of interest. For that we turn towards a digitally mediated interaction between Victoria and a GCE. She enrolled the NGO partner in this case of advising a GCE about how they should utilise the option to buy VER carbon credits. The following artefact[16] provides elements of an email discussion between Ferdinand, the Australian subsidiary environmental manager, and Victoria on buying VER-credits:

[*Ferdinand:*] [GFQ] Australia currently has the opportunity to purchase some CDM VER certificates for a fairly good price compared to the offsets we are arranging to purchase for use in our green mobility facility, which we are developing to enable our customers to purchase carbon credits to offset their vehicle emissions. In considering the reputational risks of encouraging our customers to do this while not offsetting our fleet emissions, we are positively inclined to also offset our own vehicle emissions. However, the cost-benefit of such an approach depends in large part on whether any offsetting of our fleet emissions would be recognised in the [...] EMS.

[... some twenty days later he specified:]

Our plan is to purchase the offsets now but probably only use them to help close any gap in our target that we have left closer to [2015] once we have reduced as much as possible. We would only use them in the short term if we came under reputational pressure to offset our fleet because we were encouraging our customers to do it through our green mobility facility we are currently working on. The reason we need to make a decision now is because we are about to enter a contract with the supplier of green mobility credits that is exclusive, but the other credits we have identified are a good price at $US8 per tonne (they are CDM CERs). So we want to get them if possible and put them aside for the future, but if they could not be used to help reach our target in the future if we needed offsets to do that, it would not be worth buying them.

[... and another ten days later – after some back and forth]

[*Victoria:*] I had a first discussion with [AfC], our verifier. They said that neutralisation of car fleet – under the perspective that we offer such a product ourselves – would only make sense if you tie it into a thorough reduction concept and prove that you use this only in the case you cannot reduce [further]. I hope this helps you a bit for the moment?! I will talk to [GGCA] today and will carefully ask again.

Artefact B.3.1: Email exchange 'Fleet offsets'

This exchange relates the NGO to economic decision-making within the Australian GCE. The latter company was being offered a carbon deal and it considered venturing to make this deal. Ferdinand seemed to have had access to an unnamed source of carbon credits. The credits he got offered were cheap. However, he reasoned, buying these credits would only be meaningful, if they were actually recognised in the HQ's carbon accounting practices. Victoria and Ferdinand wrote several emails to each other, after a while including Frederik in the conversation. I came across this exchange at the moment when Frederik let Victoria know that the German GCE already had bought offsetting credits for the same reasons as the Australian GCE. Frederik wanted the database ESDR to be reconfigured such that accounting for emission-free consumption (which the EMS-Team called 'neutralised' consumption-related emissions) would be possible. Consequently, I drafted alternative solutions to numerically account for

[16]The artefact provides anonymised, verbatim extracts from three emails which I edited to include temporal and actor coordinates.

emission-free consumption activities within ESDR and environmental balance sheets. Eventually, GFQ was to be equipped with an adapted technology to be able to account for consumption which was defined as causing zero emissions because they had been offset.

For Ferdinand, in the exchange above, two issues were at stake. First and foremost he wanted to ensure the profitability of buying these credits. Second to this, he was relating to the emission reduction target which GFQ had. He only wanted to buy the credits if the HQ, i. e. Victoria, confirmed that the EMS would be able to integrate these credits as negative emissions into its calculations. We can imagine Ferdinand as part of this exchange: he envisioned the certainly occurring emissions produced by his GCE as encountering potential emission offset entities and figured how they would meet in some closer or not-so-close future. At the same time he had to juggle the possibility to buy these credits with considering that his GCE was about to close off its official access to this VER credit provider. He reasoned that he would not be able to source these cheap credits shortly afterwards because this subsidiary would enter an exclusive contract with another credits provider. Furthermore, Ferdinand detailed, they wanted to actually use these credits only in case the GCE would experience 'reputational pressure'. That risk would be actualised if environmental activists would attack the hypocrisy enacted by his GCE. The green mobility product which the Australian GCE offered was drawing on the presumably serious preferences of customers to offset their emissions in order to green their mobility practices. The GCE itself, however, was not considering to employ these credits to green its fleet's mobility but, rather, to counteract activists which would put pressure on the GCE. Thus, Ferdinand presented himself as determining his decision in terms of the HQ's prescription to reduce carbon emissions, the expected contractual constraint, the expected emissions, the development of credit prices, the potential reputational pressure his GCE might experience and in terms of whether the deal would pay off. He made the economic decision dependent on whether the HQ allowed his GCE to actually use these credits.

Victoria, however, was positioned very differently. She has been invited by Ferdinand into a conversation in which she represented the HQ and was supposed to confirm or decline the possibility that the EMS would allow including the negative emissions into the GCE's environmental balance sheet. In response to Ferdinand's inquiry, Victoria was circumscribing the situation in several dimensions. She tried establishing the amounts of emissions and consumption addressed. And she let Ferdinand know that, above all, emissions were to be reduced rather than offset. Further, she considered whether technically ESDR would be able to digest these credits. Finally, for her was at stake whether GGCA and their auditor AfC would accept the Australian practice of offsetting emissions.

To sum up the discussion of this email exchange, two issues were most of concern: would the deal pay off and would it be accepted by some legitimator. For Ferdinand, the legitimising actant was Victoria and for her it were the NGO and the auditor. Thus, in this interaction, the role of the NGO was to provide confirmation to carbon offsetting. For Victoria, GGCA constituted a legitimising resource. While the organisation was clearly present it was enacted by Victoria merely as a provider of certainty. Nevertheless, without naming the NGO influence, she reproduced the hierarchy of emission reduction measures prescribed by GFQ's carbon governance; and originally GGCA had been part in shaping this policy. Thus, implicitly, GGCA had been present. While I did not follow the Australian case, I can report that, after all, the German GCE was eventually

offsetting some of its fleet's emissions.[17] The discursive impact of the NGO on the enactment of carbon governance by Victoria was, therefore, practically limited. In a critical reading, of course, consumption reduction of car use is possible as long as cars exist. Such a critical perspective was not, however, attempted to be enacted by actants aligned to GFQ's carbon governance. The NGO did not prevent these offsetting practices to take place.

B.4 Analysing the Structure of the Workplace

In Chapter 4 (entitled *Situated Control Over Carbon*) I analysed members practices in terms of how they structured the workplace. As a result I mapped the network of resources, actors, stakes and their enactment. My observations circled around the EMS-Team's data practices. Figure B.1 on the next page presents the activities and relations (green nodes) through which human actors related to stakes and points to the key resources mobilised in that process. The figure was produced using yEd and was rendered as an organic graph with natural clustering. Natural clustering helped to emphasise visually the centres around which activities revolved. The analysis yielded three sets of resources which were accumulable and which members struggled for (i. e. capitals, in Bourdieu's sense). Figure B.2 on page 607 is a map of the same nodes and edges as in the prior figure, produced using *Gephi*. In it, I emphasised the capitals as biggest nodes. The core of my observations – and, thus, the figure, has been the EMS-Team and the data which they enacted. At the margins of the data practices have been two qualitatively relevant capitals: first, rewards which GFQ overall would struggle for, like profit. Albeit probably implicit present, it was rarely explicitly evoked. Second, symbolic recognition by the employer. Albeit members struggled for gathering this kind of symbolic capital, this did not qualitatively influence in many ways data practices. The three types of capital identified in the discussion above (doing data well, the promise of efficient data handling and legitimacy & approval) were much more central and showed up in various forms:

- Data
  - data as quantitative
  - trust
  - sources
  - data quality
  - standards
    - compliance with standards
    - concepts
- Hope and promise of the transformation project
- Approval and legitimacy

The EMS-Team and data enactment were positioned in the midst of relating to these accumulable entities.

[17] See Interlude IV for more details on GFQ's offsetting engagements.

Figure B.1: A map of stakes, resources, actors in chapter 4 (clustering of activities emphasised)

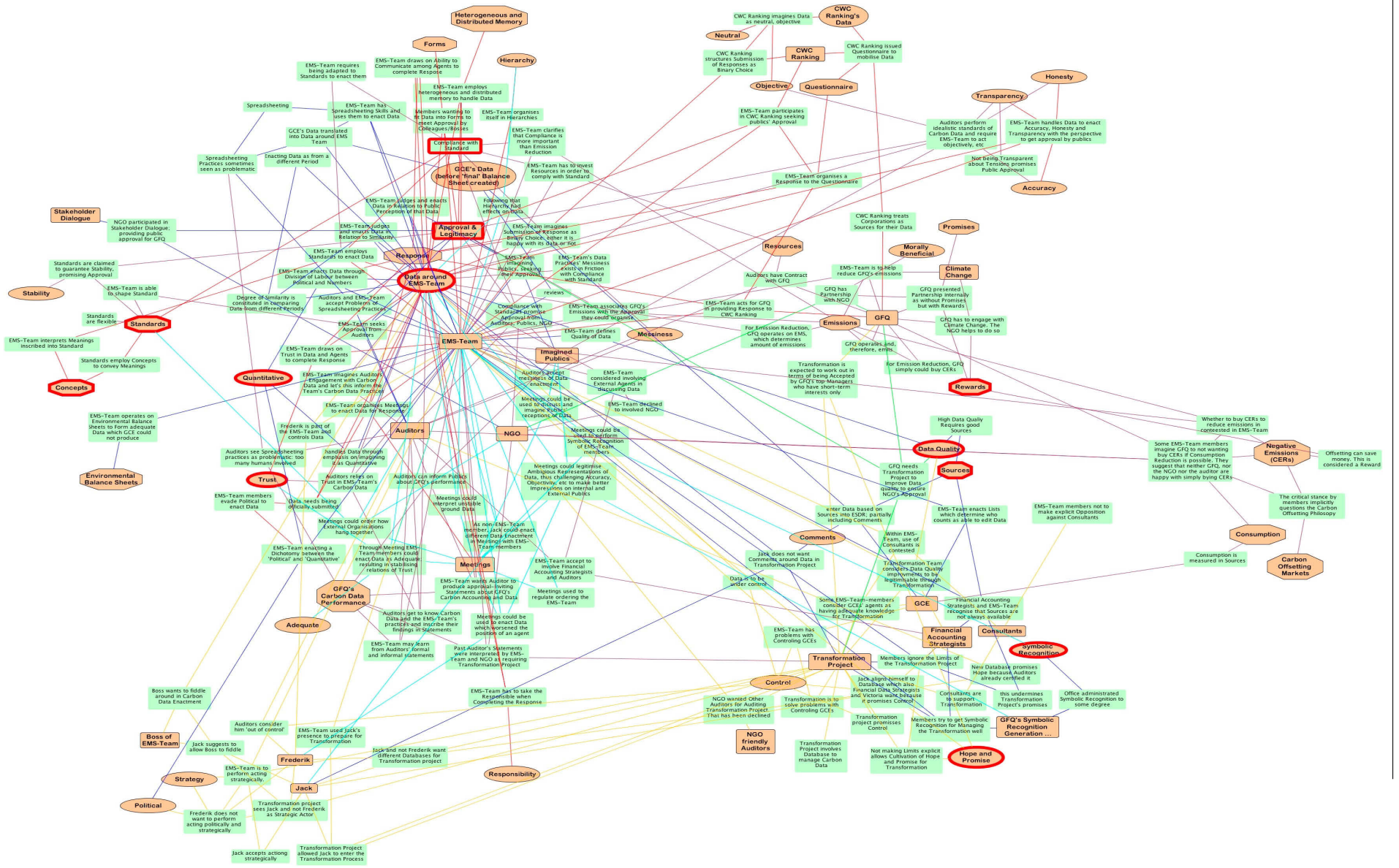
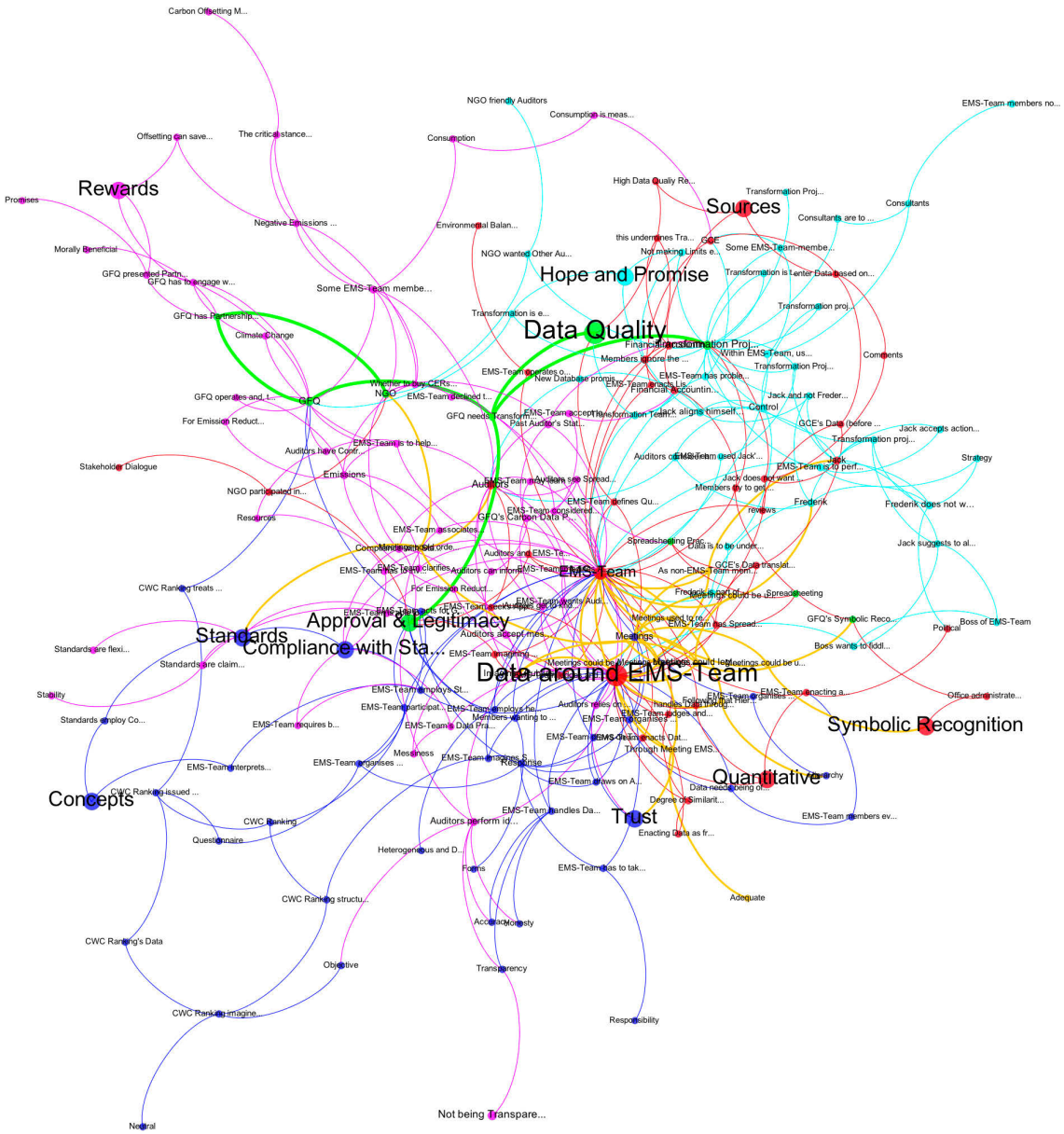


Figure B.2: A map of stakes, resources, actors in chapter 4 (closeness to data enactment by EMS-Team emphasised)



B.5 Auditor's Critique of GFQ's Carbon Accounting

During my field work I had access access to the printed and scanned version of the 30 page bullet pointed report provided by AfC to GFQ. Below (in Artefact B.5.1), I reproduce verbatim and anonymised some of these bullet points (and selections of their headings). In this authoritative artefact the EMS-Team found a formally independent evaluation of the network they managed. It contains several noteworthy elements.

Appraisal of data sources / Check of data samples

- Lacking proof / documentation of km driven by cars. This has been rectified
- Corrections necessary for waste

Recommendations for data sources (on site)

- Increase awareness for significance of the data with data collectors
- Ask data owners to document any calculations and assumptions
- Perform more checks on data before it is entered into [ESDR]

Appraisal of methods: Central data management

- Calculations and data origin not checked independently
- Logic and flow of calculation is very complicated and hard to verify
  → Calculation is prone to error
- Emission factors within [ESDR] are static, VfU data do not refer to newest data from greenhouse gases (GHG) protocol (2002)
- France does not use [VfU] data for road, but use[s] specific data
  Inconsistency[:] are factors checked and verified[?], danger of change in methodology in coming years
- Is VfU a suitable source of conversion factors?

Artefact B.5.1: Extracts from AfC's Report on GFQ's EMS

First, the artefact suggests, data can be proven right or wrong. Consequently, proofs can be provided which falsify the ontological claim of data. If AfC found that the reality which they had access to did not support certain knowledge claims, they asked for 'corrections'. Within the logic shown, the characteristic that some data were correctible necessitated the data's change.

Second, while 'wrong' data had to be adjusted, their data source 'recommendations' imply that the more systemic problems with data gathering did not determine specific solutions. Rather, AfC was simply able to point to mechanisms which they trusted to improve subsidiaries' performance of the EMS. They assumed that if GCE agents were aware of the relevancy of environmental data they would produce their product more reliably. To increase such reliability of data production they suggested that practitioners make explicit all of their quantitative practices and assumptions. This call performed the idea of complete data gathering and documentation being possible. Yet, how should data owners know where to draw the boundary of where to stop documenting? Practically, this recommendation could not work. The final recommendation pointed to the hope they had invested into the promise of checking data. In this rationality,

checking functions as a factor making correct data more likely. Interestingly, their qualifier 'before' points to the temporality in data construction. They would prefer to have data adjusted and changed before it entered the official database. At another part of their report they made explicit that data adjustments within ESDR should be clearly documented. The latter could easily be averted by performing such changes before data entered the surveilled data environment ESDR.

Third, AfC commented on the methods employed at the EMS's centre. They proposed that data and calculation should be independently checked. This possibility is, however, only imaginable if one does not question which reality the 'checking agent' would have to compare the 'to-be-checked' reality with. Just like AfC had to work with the materials provided by GFQ and their verification report was based upon these materials, also any other so-called independent checking agent would be dependent on GFQ's materials. Zooming into this issue only yields this problématique: how distant should data fragments originate to count as an independent source? The discussions in Chapter 2 show that for-all-practical-purposes, members depend on a material base taken-for-granted. Empirically, I found, an invoice is not questioned. Furthermore, AfC acknowledged that they simply did not grasp some of the calculatory apparatus enacted by Frederik. As a result, they propose, calculations will produce mistakes. Again, this implies the dichotomy of a calculatory apparatuses which are either likely to work correctly or not. Interestingly, however, their report also provides for realities which are not that easily compatible with the binary logic presented before. AfC made recognisable that they conceptualise data with the possibility of being out of date. That, however, would not render the data wrong. Rather, adjustments are called for (e. g. adjusting towards the newest GHG protocol). Their discussion of the French GCE which used specific emission factors is a perfect example for how AfC can accommodate multiple legitimate perspectives: the situation was deemed necessary to mention. However, it was not possible to condemn their specific data. Rather, AfC could call into question whether emission factors have been checked and verified. Within this report, both rationalities could co-exist peacefully in the same sentence. While checking implies a positivist stance, the factors might also be verified without reference to any truth. To conclude, they also simply asked whether the set of emission factors provided by the German standard VfU is suitable. Again, this question did not invite for a positivist reply. Rather, it lent itself to a constructivist stance. GFQ has been asked to reconsider how they like to translate environmental data into carbon data. VfU factors are acceptable just like any others.

B.6 Outsourcing Waste

In preparation of the EMS transformation, I participated in a meeting between Victoria, Jack and Lisbeth. They discussed the boundaries for the transformed EMS's data collection.

Field Note Extract B.6.a (Outsourcing waste)

> *Jack told his colleagues that in his GCE all of the IT is managed by Fujitsu. Therefore devices, such as PCs or printers, are not anymore listed as assets of GFQ. And, hence, his GCE also does not have to dispose unused computers. Consequentially, in 2008 there was nearly no electronic waste remaining and in 2009 electronic waste was down to zero. That's why electronic waste is now not anymore part of the balance of his GCE.*

Following his explanation, they discussed how to deal with situations when environmentally relevant entities could not be measured. They agreed that these entities were not to be accounted for if GFQ did not have primary responsibility for them. This situation is environmentally relevant because computers can be considered as associated with a large environmental footprint in not only production but also in best practice disposal. Thus, toxic waste – if not owned by GFQ – would not be accounted for by GFQ.

This case links us also to the hegemonic take on greening production chains. Theoretically, GFQ could demand from their services providers to prove their greenness. In the hypothetical case that customers demanded from GFQ that they ensure also the green status of the services that the corporation buys, the service providers would have to produce certifications, that they are green, e. g. 'ISO' 14.000 series statements. In such a reality, we would end up again with the issues this book unpacks: an accounting and management system, trying to establish greenness, including – nowadays – carbon emissions. In the hegemonic tale, all these services providers would be systemically forced to adapt to being green. This would be understood as a trickle-down *effect*. Based on the findings of this book, the materiality of these effects, however, would most probably be highly problematic in terms of their enactment as well as uncertain.

B.7 Materials on 3C Group's Carbon Offsetting Project

The following is the catalogue of questions that I submitted to a broker who sold GFQ CERs. The certificate is reproduced as Artefact IV.1 (on page 524). This is the catalogue, extracted from my letter asking for the history of the certificate:

> I would like to request further information on these projects.
>
> 1. Especially, I am interested in the
>   - local contact for,
>   - *location* of and
>   - *certification history* of,
>
>   the referenced wind power projects.
> 2. If applicable: I would like to know from
>   - which *broker*,
>   - at what *date*,
>   - which *volumes*
>
>   of CO_2 equivalent emissions reductions sourced from these projects 3C Consulting GmbH and First Climate (Germany) GmbH acquired.
> 3. Please, also provide me with information on
>   - the *methodology and standards* by which *additional investments* in the projects have been *calculated*/translated into emission reductions, including
>   – *who* developed this methodology, i.e. can you provide any references on this?
>   – *how* was the calculation designed?

- the *methodology and standards* by which 3C Consulting GmbH and First Climate (Germany) GmbH established the *amount of GHG emissions* caused by the customers' activities/objects (conference and cars).

4. If available, I would also greatly appreciate if you provide me with the *project design document forms (or equivalent)* of these wind power projects. If the information is not available, it would be most helpful if you let me know who might have the information available.

B.8 Additional Field Materials

The following artefact shows how VfU prescribes the calculation of 'data quality'☞.

For determining data quality on a corporate level covering a number of locations with different levels of data quality (e. g. some buildings have measured energy data, others have calculated data), follow this procedure:

- multiply the data quality of location A by the number of employees at A
- do the same for locations B and C, etc.
- add the totals from each location and divide by the overall number of employees within the system
- the resulting figure is the corporate average data quality for a certain indicator

Artefact B.8.1: VfU's Definition of 'Corporate Average Data Quality'

Lists

List of Field Note Extracts

I.a Climate change policy: trading off . . . 63
I.b Climate change: investment as solutions . . . 64
I.c How to accomplish carbon reductions? . . . 65
I.d Nature of offsetting . . . 65
I.e A technical problem? . . . 66
I.f A political problem? . . . 66
I.g Carbon managers . . . 66
2.1.a Measuring electricity consumption . . . 71
2.1.b Paper case . . . 75
2.1.c Water . . . 79
2.2.a Collecting data . . . 91
2.2.b Calculating travel . . . 94
2.2.c Problem with calculation . . . 99
2.3.a Excluding paper consumed . . . 107
2.3.b Approval by Simon . . . 109
3.a ‘Give me your data!’ . . . 121
3.2.a Reactions to a request for guidance . . . 143
3.2.b Recognising ‘weird’ data . . . 145
3.2.c Multiple orderings of data . . . 147
3.2.d Starting a phone conference . . . 149
3.2.e Framing subsidiary environmental managers . . . 150
3.2.f Checking the status . . . 151
3.2.g The phone conference . . . 152
3.2.h Comprehending data delivery statūs . . . 155
3.2.i ‘Is it real?’ . . . 160
3.2.j Acting upon data deliverers . . . 162
3.2.k Delivering numbers on time . . . 163
3.2.l Who is involved in control? . . . 165
3.4.a Astonishment about coverage . . . 181
3.4.b Coverage of 100 % . . . 183
3.4.c Assessment base . . . 184
3.4.d Are we workers? . . . 185
3.4.e Economy of employee counts . . . 187
3.4.f Recognising the contingency of coverages☞ . . . 189
3.4.g Strategically employing the contingency of coverages . . . 191
3.4.h Plenty of uncertainties . . . 193
3.4.i Retrospective extrapolation needed for orientation . . . 194
3.4.j Extrapolation necessary . . . 194

3.4.k Explaining options to extrapolate . . . 195
4.a Thread established by NGO . . . 232
4.1.a Establishing data quality as an issue . . . 238
4.1.b Poor data . . . 241
4.1.c Acknowledging misfit of realities . . . 243
4.1.d Data quality and lump sum contracts . . . 245
4.1.e Speadsheeting . . . 246
4.1.f Calculating with the boss . . . 247
4.1.g Contesting data qualities . . . 249
4.1.h Affirming average data quality . . . 250
4.1.i Flip-chart: improving data collection . . . 252
4.1.j Contesting data quality outlook . . . 252
4.2.a Who is responsible? . . . 258
4.2.b Setting up the response . . . 259
4.2.c Experts, dependencies and incentives . . . 261
4.2.d Standards . . . 264
4.2.e Drawing up coherencies . . . 265
4.2.f Decimal numbers . . . 266
4.2.g Certainties and public perception . . . 267
4.2.h Triumph . . . 269
4.2.i Interview with Rick Becks . . . 273
4.3.a IT to be accepted by external players . . . 286
4.3.b Deleting data . . . 298
4.3.c Reduction gap of SigBa . . . 311
4.4.a Trust in Frederik . . . 321
4.4.b This is another system . . . 325
4.4.c Jack gaining profile vis-à-vis Frederik . . . 333
4.4.d A promising hope? . . . 335
4.4.e Making prerequisites recognisable . . . 336
4.4.f Pure numbers, stripped off of comments . . . 338
4.4.g Offering something to cancel . . . 340
4.5.a Challenging Key Performance Indicators (KPI) . . . 345
4.5.b Coverage rephrased . . . 346
4.5.c Master of numbers . . . 348
4.5.d Plausible data . . . 351
4.b Aim of workshop: how to look at numbers . . . 362
5.1.a Wrong numbers . . . 365
5.1.b Significant difference? . . . 366
5.1.c No further change to data? . . . 369
5.1.d Changing data as requiring documentation . . . 369
5.1.e 2.7 kilogram (kg) of paper . . . 370
5.1.f Data needs being cleaned up . . . 372
5.1.g Comparing to base line . . . 374
5.1.h Normal to alter data retrospectively . . . 376
5.1.i Vague definitions . . . 376
5.2.a German definition . . . 385
5.2.b Subsidiary's environmental agents do not read definitions . . . 388
5.2.c Pumped water does not fit definitions . . . 390

5.2.d Facebook transfer of data . . . 390
5.2.e Mistiness, equivocality, vagueness, obscurity . . . 393
5.3.a Voluntariness and force . . . 396
5.3.b They should do it the right way . . . 398
5.3.c 'Entrapping in numbers' . . . 400
5.3.d Neutralisation and professionality . . . 402
5.4.a Depending on points of view . . . 411
5.4.b Suggesting interpretations . . . 414
III.a Cleaning . . . 423
III.b You will be labelled socialist... . . . 424
III.c Performing as GFQ's environmental manager . . . 427
III.d Skirt . . . 428
III.e White colour workers . . . 431
III.f Sleeping pills . . . 432
III.g Transparency and being progressive . . . 432
III.h Practicing not to think . . . 434
6.1.a Insuring evil things . . . 444
6.1.b Greening everything is not business . . . 445
6.1.c Imagining green products . . . 446
6.1.d Bean counting . . . 448
6.2.a Updating exchange rates . . . 461
6.2.b Not allowed to spread numbers . . . 468
6.3.a Ditching balance sheets . . . 480
6.3.b On real and offset emissions . . . 484
6.4.a Load balancer . . . 489
6.4.b Year will come to its end shortly . . . 493
6.4.c Saving more emissions than possible . . . 496
6.5.a EMS transformed: Elise's observations . . . 501
6.5.b Actual reductions . . . 508
IV.a Lo(o)sing qualities . . . 519
IV.b Fudging numbers . . . 521
IV.c Not 'system' . . . 521
IV.d Precautions against trading 'hot air' . . . 523
IV.e Money laundering . . . 527
IV.f Political mess . . . 527
IV.g Exploited . . . 528
B.2.aCreating numbers from text . . . 588
B.2.bCopy and paste as a dicey exercise . . . 589
B.6.aOutsourcing waste . . . 609

List of Artefacts

1.1 In a Nutshell: Making the Case for Carbon Foot-printing 24
2.1.1 Data Quality 72
2.1.2 Email at 15:01: Drinking Water defined 79
2.1.3 Task for Water Consumption 81
2.1.4 Fragment of the Ethics Statement on Fairness 82
3.1.1 Extract from '*Code of Conduct for Business Ethics and Compliance*' . 124
3.1.2 Intranet Definition of EMS 128
3.1.3 My Proposal for Defining 'EMS' for GFQ 131
3.1.4 Victoria's Reaction to my Definition of an EMS 131
3.1.5 The Improvement Cycle of an EMS 134
3.1.6 The 'Governance Structure' of GFQ's EMS 136
3.1.7 'Next Steps': 'collection of the environmental data 2007' 140
3.2.1 Email explaining 'reference figures☞' 146
3.2.2 Status List of Data Delivery Progress (illustrated and anonymised) . . 157
3.3.1 Input, Output and Sums 169
3.3.2 System Boundaries 170
3.3.3 Extract from 'Direct Footprint -25 % by 2015: Status and Next Steps' . 174
3.3.4 Extract from an ESDR Report 175
3.3.5 Environmental Balance Sheet: 'D - Balance sheet' 176
3.4.1 'EMS for GFQ' (*EMS4GFQ*)'s definition of who counts as employee . . 186
3.4.2 Extract from the Response to CWC Ranking 195
3.4.3 Response to the CWC Ranking questionnaire: Details of any assumptions made 197
3.5.1 Lakeside Mountains: GFQ as reconciling its global presence with Nature? 206
4.2.1 Final Confirmation 'Windows Internet Explorer' 271
4.3.1 'Strategic Partnerships: Thought and action leadership' (rendered anonymous; the word 'strategic' is cut off from the artefact's heading in this book) 284
4.3.2 'Higgins' Law of Sustainability Reporting' 294
4.3.3 Response to the CWC Ranking questionnaire: 'Select methodologies' . 305
4.4.1 'CO^2 Data Collection As-Is' [three extracts separated by vertical lines; extracts edited, rendered anonymous, marked] 330
5.1.1 List of task-forms 373
5.2.1 Financial Emission Intensity: Calculation Notes 382
5.2.2 Extract of definition from a task-form for drinking water 388
III.1 India Graphics 426
III.2 Jacob's drawing of EMS data flow and commitments 429
6.2.1 Average Exchange Rate Data 2008 (Extract) 460

6.3.1 Divided Meanings in Carbon Sums 483
IV.1 Certificate for 1.55 ktonne (t) of reduced CO_2e [sold to a German GCE] 524
IV.2 No 'Gold Standard wind project in state of Maharashtra in India' . . . 525
IV.3 Partial Transcript of Artefact IV.1 on page 524 526
A.1.1 Fitting in 556
B.2.1 Extract from CWC Ranking Questionnaire File (Marion's translation; rendered anonymous) 588
B.3.1 Email exchange 'Fleet offsets' 603
B.5.1 Extracts from AfC's Report on GFQ's EMS 608
B.8.1 VfU's Definition of 'Corporate Average Data Quality' 611

List of Figures

2.1 Using amount of electricity billed for to speak for environmental effects . . 73
2.2 Establishing the Class of a Package of Paper 76
2.3 Establishing the Right Choice of Accounts to File Water Consumption . . 83
2.4 Relations in a Simple Quantitative Statement 93
2.5 Relations in a Simple Qualculation 97
2.6 Calculating the Total Distance of Short-Haul Flights Travelled 105
2.7 Challenging the Exclusion of Paper Consumption from Counting 108
2.8 Relations of Control over Data at a GCE 113
2.9 Obligatory, Contingent and Automatic Affirmation Points of Passage . . . 115

3.1 *EMS4GFQ*'s Distribution of Contents 138
3.2 Illustration of Structure of ESDR's List of Task-forms 148
3.3 Comparing the elements used for extrapolation towards a GCE's total emissions 202
3.4 Elements used for calculating emission target indicators 203

II.1 Diverging Carbon Accounts 229
II.2 2006 Emissions of Subsidiaries in France and Brazil 230

4.1 Stake and capital relations around the enactment of control over carbon . . 233
4.2 Circular stake and capital relations around the Response to CWC Ranking 277
4.3 An idealised view on the multi-layered governance of the enactment of carbon emissions 282
4.4 Map of selected relations among environmental standards and standardisation organisation 308
4.5 Legitimising relations between assumed governing agents and the enactment of carbon emissions 315
4.6 The Stabilised Network of [Frederik-ESDR]–Victoria 323
4.7 An analytical differentiation of how meetings shape data 353

6.1 Indonesian GCE has to deliver data 454
6.2 Relations between GCE and HQ 456
6.3 Trustworthy Data 464
6.4 Schematic Data Flow of a Singular 'Fact' 486
6.5 Work Space of EMS-Team 504
6.6 Contesting the Use of an Offsetting Product 507

A.1 Structure of first mapping of members' relations after about one week in field 557
A.2 Structure of second mapping of members' relations after about one week in field; with boundary drawing around groups 558

A.3 First full coding: visualisation of groups of codes (relations indicate shared codes) . . . 559
A.4 Results of first round of systematic coding: hypothesis of relevant entities in the field . . . 560
A.5 Mapping data construction: a first experiment in visualising relations between actants . . . 561
A.6 Early version of outline of analysis process . . . 563
A.7 TAMS code set relations . . . 565
A.8 After open coding: visualisation of groups of codes (relations indicate shared codes) . . . 566
A.9 After open coding: showing all code groups . . . 567
A.10 Grouping code groups into themes and linking corresponding memos . . . 568
A.11 Organising code sets into themes . . . 569
A.12 Themes cleaned up with few non-fitting code sets and memos . . . 570
A.13 Focus selection: Carbon . . . 571
A.14 Illustration of hierarchical representation structure in data processing . . . 572
A.15 Experimenting with mapping: a few relations . . . 573
A.16 Experimenting with mapping: many relations . . . 574
A.17 Me: trying to analyse and make sense of map . . . 575
A.18 The summarised representation of all the data concerning the research question – down to earth . . . 577
A.19 Categories of practices and selected cases . . . 578
A.20 Categories of practices and selected cases: further relations emerge . . . 579
A.21 Checking analysis with environmental management students . . . 580
A.22 Cleaned outline of analysis process . . . 581
A.23 Coding of textual artefacts . . . 582

B.1 A map of stakes, resources, actors in chapter 4 (clustering of activities emphasised) . . . 606
B.2 A map of stakes, resources, actors in chapter 4 (closeness to data enactment by EMS-Team emphasised) . . . 607

List of Tables

1.1 An illustration of a balance sheet with subtracted emission reductions . . . 6

2.1 Organised Qualculative Statements 95
2.2 Carbon Conversion Factors for Flights 101
2.3 Accounting for Wrong Items? 102

5.1 A matrix of possible relations between reviewed comments and the deviation 389

B.1 Elements of Stakes, Capitals, Nomos, Habitus and Field Identified in Section 4.2 596

List of Members' Names Anonymised

Bill Bill Brown worked in the context of GFQ's unit FDSO and was part of the EMS transformation project team.

Bret Bret worked as a local environmental manager of an US GCE.

Chris Chris Kent was the formal superior of Frederik and Jack.

David David Parker worked for the central IT unit GFQ's HQ.

Denis Denis was working for GCE *GlobalCapital*.

Dieter Dieter Klar worked at the HQ as an assistant to Victoria; member of the EMS-Team.

Elise Elise Richards worked for the HQ as an assistant to Frederik and later to Jack; member of the EMS-Team.

Ellen Ellen Clark worked at the HQ and was responsible for Sustainable Development reporting.

Ferdinand Ferdinand Archer worked as the local environmental manager for the Australian GCE.

Frank Frank Jones worked at the HQ and had much experience with PR.

Frederik Frederik Steine worked for the HQ as the GFQ environmental manager; member of the EMS-Team.

George George Kruger worked at the HQ as an internal consultant for Victoria.

Han Han Liu worked as a software engineer in a little company, maintaining the code of ESDR.

Hector Hector Treviño worked for the Mexican GCE.

Henry Henry Stark worked at an American GCE.

Herbert Herbert McJames worked at the HQ as the head of the unit overseeing CSR issues, sponsoring activities as well as the EMS by way of the sustainable development office being part of the unit.

Ivo Ivo Hampson was part of the board of directors HQ.

Jack Jack Newman was head of the German GCE's EMS and during the late fieldwork period took the job as GFQ's environmental manager.

Jacob Jacob Scott worked at the HQ as the head of FDSO and was part of the EMS transformation project team.

Jacques Jacques Burk worked for a GCE.

Jason Jason Mert worked for the CSR unit at GFQ's HQ, being responsible for maintaining the unit's intranet presence.

Lisbeth Lisbeth Moore worked at the HQ at FDSO and was part of the EMS transformation project team.

Maggi Maggi Becker worked at the HQ.

Manuel Manuel Meier worked as a senior professional in a Latin American GCE, acting as a local environmental manager.

Marion Marion Skinner worked at the HQ's Sustainable Development Unit on external reporting projects.

Matt Matt Gustavson was researching GFQ.

Moses Moses Patricks worked for the Climate Business Unit of GFQ.

Nick Nick Xi worked at a GCE at the Near East.

Nora Nora King worked for HQ's Sustainable Development Unit and was responsible or external reporting projects.

Osvaldo Osvaldo Morales worked for the Mexican GCE.

Rick Rick Becks worked for the NGO which organised the CWC Ranking survey.

Simon Simon Jacobs worked at a GCE at the Near East.

Tom Tom Fis worked at a GCE in south eastern Asia.

Victoria Victoria Miller worked at the HQ as the head sustainable development manager; member of the EMS-Team.

List of Organisational Designations Anonymised

GCE *GlobalCapital* A special subsidiary that was dedicated to maximise profits through global investments.

AfC Auditing for Capitalists is a so-called Big Four auditing and consultancy company.

CWC Ranking Corporate World Carbon Ranking was an organisation that produced a ranking of how transparent organisations were reporting their carbon emissions.

EAN Environmental Auditor for NGOs, a firm perceived as friendly to GGCA.

ESDR Environmental and Social Data Reporting (ESDR) was a database which GFQ used to collect data relevant to sustainability reporting.

FDSO Financial Data Strategy Office was the unit of GFQ managing financial data flows.

GCE GFQ Corporate Entity is the designation for this organisation type within GFQ: a subsidiary corporation or corporate group as an entity owned by GFQ.

GFQ Global Finance Quality is the multinational in which the ethnography (reported in this book) took place. It has been a Fortune 50 company for several years.

GGCA Global Greening of Capitalism Association is one of the world biggest environmental conservation NGOs.

SigBa Simply Got-Rid-Off Bank got its name in this book because it has been sold in the early stages of the global financial crisis emerging towards the end of the first decade of the 21^{st} century.

List of Organisations

BP British Petroleum: `http://www.bp.com`.

FTSE FTSE Group calls itself 'The Index Company': `http://www.ftse.com`.

HSBC HSBC: `http://www.hsbc.com`.

IBM International Business Machines: `http://ibm.com`.

IPCC IPCC. International Panel of Climate Change: `http://www.ipcc.ch`.

ISO International Standardisation Organisation: `http://www.iso.org`.

IUCN The International Union for the Conservation of Nature was earlier also called the 'International Union for the Preservation of Nature' and 'International Union for the Conservation of Nature and Natural Resources': `http://www.iucn.org`.

MS Microsoft Corporation: `https://www.microsoft.com`.

OECD Organisation for Economic Co-operation and Development: `http://www.oecd.org`.

SAM SAM. Sustainability Investing: `http://www.sam-group.com`.

SAP Systems Applications and Products in Data Processing: `http://www.sap.com`.

UN United Nations: `http://www.un.org`.

UNEP United Nations Environment Programme: `http://www.unep.org`.

WBCSD World Business Council for Sustainable Development: `http://www.wbcsd.org`.

WWF World Wildlife Fund for Nature (WWF); later also called World Wide Fund For Nature: `http://www.wwf.org`.

List of Standards and Rankings

DJSI Dow Jones Sustainability Index: `http://www.sustainability-index.com`.

EMAS Environmental Management and Audit Scheme: `http://ec.europa.eu/environment/emas/index_en.htm`.

GHG Protocol Greenhouse Gas Protocol: `http://www.ghgprotocol.org`.

GRI Global Reporting Initiative: `http://www.globalreporting.org`.

html Hypertext Markup Language: `http://www.w3.org/MarkUp/`.

SI *Système International* is the international system of units of measurement: `http://www.bipm.org/en/home/`.

VfU Verein für Umweltmanagement in Banken, Sparkassen und Versicherungen e.V. (VfU) [Association for Environmental Management in Banks, Savings Banks, and Insurance Companies]; during the research process renamed to Verein für Umweltmanagement und Nachhaltigkeit in Finanzinstituten e.V. (VfU) [Association for Environmental Management in Financial Institutions]. See Schmid-Schönbein, Oetterli, and Furter (2005), VfU (2007): `http://www.vfu.de`.

Glossaries

Acronyms

CDM Clean Development Mechanism.

CEO Chief Executive Officer.

CER Certified Emission Reduction.

CFO Chief Financial Officer.

COO Chief Operations Officer.

CSR Corporate Social Responsibility.

EU European Union.

EUR Euro.

FTE Full-Time Equivalent.

HQ Head Quarters.

HR Human Resources.

NGO non-governmental organisation.

OS operating system.

PR Public Relations.

RAM Random-Access Memory.

SRI Socially Responsible Investment.

UK United Kingdom.

US United States of America.

USD United States Dollars.

VCM Voluntary Carbon Market.

VER Voluntary Emission Reduction.

Glossary

ANT Actor-network theory has been used as a key toolkit in the analysis underlying this book. ANT may well be understood along the move within Science and Technology Studies (STS) to study technological and scientific systems as socially constructed (see e. g. Bijker, Hughes, and Pinch 1987). Classic readings include Latour (1987), Callon (1999) and introductions to more recent developments should include engaging with Law and Hassard (1999) as well as Law (2004a).

CMS Critical Management Studies is a research field shaped by marxist engagement with the effects of 'management' on workers as well as the environment (see e. g. Alvesson and Willmot 1992).

coverage [*Members' term*] An indicator computed by dividing the reference figure relating to a coverage fact of a unit to its total head count. Discussed in depth in Section 3.4, entitled *Extension of Carbon Coverage* (page 179).

data quality [*Members' term*] The notion 'data quality' has been used by EMS-Team members and inscribed into task-forms and environmental balance sheets to denote how well a person who entered data knew its relation to an external source of the data. 'External' here refers to a source positioned outside of the knower's mind. Artefact 2.1.1 (on page 72) shows the available ordinal values inscribed into each task-form. See Section 4.1 (entitled *Performing Qualities of Data*) for a discussion of the indicator 'data quality' in relation to other qualities of data.

EMS An Environmental Management System (EMS) is an organisational scheme which can be used to deal with environmental implications of the organisation's industrial ecology.

EMT Ecological Modernisation Theory claims that capitalism is capable to and actually achieving to make ecological concerns central to capitalism. See especially Huber (2008), Jänicke (2004), Mol and Sonnenfeld (2000b) for the proponents, and Pepper (1998), Schnaiberg, Pellow, and Weinberg (2000) for opposing views; Christoff (1996), Buttel (2000), Hajer (1995) provide helpful studies to question ecological modernisation.

environmental balance sheet [*Members' term*] An environmental balance sheet is a multi-tabular spreadsheet, which GFQ used to translate consumption data into emission data. Artefact 3.3.5 (on page 176) shows one of the spreadsheet's tables.

EU ETS The EU's Emission Trading System has been set up to trade CO_2e emissions allowances.

GHG The notion greenhouse gas (GHG) refers to atmospheric substances which contribute to global warming.

KPI A Key Performance Indicator (KPI) refers to the label of an account at the top of a genealogy of accounts.

LCA Life Cycle Assessment (LCA) is a technique claimed to establish the environmental and resource implications 'attributable' to a product over its total life (Rebitzer, Ekvall, Frischknecht, Hunkeler, Norris, Rydberg, Schmidt, Suh, Weidema, and Pennington 2004).

monster I use the concept monster, as interpreted by Bowker and Star (2000, 304), analytically to point the automatised production of abnormal (othered) entities when applying some form of standard or law.

OPP Obligatory Passage Point is a concept used within ANT. See Latour (1987, 152).

overflow I use the concept overflow as coined by Callon (1998a) analytically to point to the *mass* of entities which are excluded or silenced in qualculations.

reference figure [*Members' term*] A reference figure was a number which was supposed to represent the count of workers which were covered (see Coverage) by a consumption (f)act. If all workers' consumption were represented by a consumption fact, the fact would be said to refer to the total head count (this was a special case of full coverage). Normally, one would expect that consumption facts could only be assembled for part of the workforce. The count of this part would establish the reference figure.

reporting period [*Members' term*] A reporting period is an abstract temporal accounting element. It denotes the boundaries for classifying activities into a time frame. At GFQ's EMS, a reporting period was a calendar year. Thus, data about consumption was to be assigned a calendar year in which the consumption had taken place.

STS Science and Technology Studies. For general introductions, see Bijker, Hughes, and Pinch (1987) and for recent debates Hackett, Amsterdamska, Lynch, and Wajcman (2008).

TAMS Text Analysis Mark-up System, a software developed by Weinstein (2006).

task-form [*Members' term*] An ESDR 'task' is a form for entering data into the database. A reproduction of such a task can be found at Artefact 2.1.3 (on page 81). It is called task, because users get the task to enter data for a specific indicator.

References

Abramsky, K. (2009). Energy transition: Towards degrowth and the democratization of key means of production and reproduction. *Soziale Technik 4*, 6–8.

Acker, J. (1990). Hierarchies, jobs, bodies. *Gender & Society 4*(2), 139.

Adam, B. (2000, Jan). The temporal gaze: the challenge for social theory in the context of GM food. *The British Journal of Sociology 51*(1), 125—142.

Adam, B. (2004, Aug). *Of Metaphors, Morals and Memories: Reflections on Socio-environmental Action from a Temporal Perspective*. Number 68 in Working Paper Series. Cardiff University School of Social Sciences.

Adams, W. (2003). *Decolonizing Nature: Strategies for Conservation in a Post-colonial Era*, Chapter 2: Nature and the colonial mind, pp. 16–50. London, Sterling (VA): Earthscan.

Agamben, G. (2009). *What is an Apparatus? and other essays*. Meridian. Stanford: Stanford University Press.

Alcott, B. (2005). Jevons' paradox. *Ecological Economics 54*(1), 9–21.

Allespach, M. and M. Bartmann (2011, Dec.). Dimensionen eines gesellschaftspolitischen Kurswechsels: Überlegungen zu gewerkchaftlichen Zielen und ihren Durchsetzungsstrategien. *WSI Mitteilungen 64*, 619–628.

Almklov, P. (2008, Dec). Standardized data and singular situations. *Social Studies of Science 38*(6), 873—897.

Alvesson, M. and H. Willmot (Eds.) (1992). *Critical Management Studies*. London: Sage Publications.

Amster, R., A. DeLeon, L. A. Fernandez, A. Nocella, II, and D. Shannon (Eds.) (2009). *Contemporary anarchist studies: an introductory anthology of anarchy in the academy*. London, New York: Taylor & Francis.

Amsterdamska, O. (2008). Practices, people, and places. See Hackett, Amsterdamska, Lynch, and Wajcman (2008), pp. 205–209.

Anonymous (2012, Apr 29). *Samuel Beckett*. online retrieved 2012, 31/3 from `http://www.poetryfoundation.org/bio/samuel-beckett`.

Appadurai, A. (1986a). Introduction: commodities and the politics of value. See Appadurai (1986b), pp. 3–63.

Appadurai, A. (Ed.) (1986b). *The social life of things: Commodities in Cultural Perspective*. Cambridge: Cambridge UP.

Appadurai, A. (1996). *Modernity at large: Cultural dimensions of globalization*, Volume 1 of *Public Worlds*. Minneapolis, London: University of Minnesota Press.

Arendt, H. (1963). *Eichmann in Jerusalem: A Report on the Banality of Evil*. New York: Viking.

Åsberg, C. (2010). Enter cyborg: tracing the historiography and ontological turn of feminist technoscience studies. *International Journal of Feminist Technoscience*, version 1.1.

Asdal, K. (2008). Enacting things through numbers: Taking nature into account/ing. *Geoforum 39*(1), 123–132.

Asdal, K. (2011, Jan). The office: The weakness of numbers and the production of non-authority. *Accounting, Organizations and Society 36*(1), 1–9.

Asplen, L. (2008). Going with the flow: Living the mangle through environmental management practice. In A. Pickering and K. Guzik (Eds.), *The mangle in practice: science, society, and becoming*, Science and Cultural Theory, pp. 163–184. Durham and London: Duke University Press Books.

Austin, J. (1962). *How to do things with words*. London: Oxford University Press.

Bachram, H. (2004, Dec). Climate fraud and carbon colonialism: the new trade in greenhouse gases. *Capitalism Nature Socialism 15*(4), 5–20.

Bacon, F. (1901, 1626). *New Atlantis*. online retrieved 2012, 1/4 from `http://oregonstate.edu/instruct/phl302/texts/bacon/atlantis.html`: The Colonial Press.

Bailey, I., A. Gouldson, and P. Newell (2011). Ecological modernisation and the governance of carbon: A critical analysis. *Antipode 43*(3), 682–703.

Bakunin, M. (1916). *God and the State*. New York: Mother Earth Publishing Association.

Baldvinsdottir, G., J. Burns, H. Nørreklit, and R. Scapens (2009). The image of accountants: from bean counters to extreme accountants. *Accounting, Auditing & Accountability Journal 22*(6), 858–882.

Bansal, P. and K. Roth (2000). Why companies go green: a model of ecological responsiveness. *Academy of management Journal*, 717–736.

Barad, K. (1998). Getting real: technoscientific practices and the materialization of reality. *differences 10*(2), 87–128.

Barad, K. (2003, Spring). Posthumanist performativity: Toward an understanding of how matter comes to matter. *Signs: Journal of Women in Culture and Society 28*(3), 801–831.

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Durham and London: Duke University Press Books.

Barad, K. (2008). Queer causation and the ethics of mattering. See Giffney and Hird (2008), Chapter 14, pp. 311–338.

Barad, K. (2011). Erasers and erasures: Pinch's unfortunate 'uncertainty principle'. *Social Studies of Science 41*(3), 443–454.

Barany, M. J. and D. MacKenzie (under revision, as of: 2011). Chalk: Materials and concepts in mathematics research. In C. Coopmans, M. Lynch, J. Vertesi, and S. Woolgar (Eds.), *New Representation in Scientific Practice*. MIT Press.

Barry, A. and D. Slater (2002). Introduction: the technological economy. *Economy and Society 31*(2), 175–193.

Bath, C. (2009). *De-Gendering informatischer Artefakte. Grundlagen einer kritisch-feministischen Technikgestaltung*. Ph. D. thesis, Universität Bremen.

Baumast, A. (2003). *Environmental Management Systems and Cultural Differences: An Explorative Study of Germany, Great Britain, and Sweden*. Aachen: Shaker-Verlag.

Beck, U. (1988). *Gegengifte: die organisierte Unverantwortlichkeit*, Volume 468. Suhrkamp.

Beck, U. (1992). *Risk society: towards a new modernity*. New Delhi: Sage Publications Ltd.

Beck, U. (1996). Risk society and the provident state. In S. Lash, B. Szerszynski, and B. Wynne (Eds.), *Risk, Environment & Modernity*, Theory, Culture & Society, Chapter 1, pp. 27–43. London, Thousand Oaks, New Dehli: Sage Publications.

Beck, U. and C. Lau (Eds.) (2004). *Entgrenzung und Entscheidung: was ist neu an der Theorie reflexiver Modernisierung?* Suhrkamp.

Beckett, S. (2009). *Watt*. Grove Press.

Benton, T. (Ed.) (1996). *The Greening of Marxism*. Democracy and Ecology. New York, London: The Guilford Press.

Berg, M. and S. Timmermans (2000). Orders and their others: on the constitution of universalities in medical work. *Configurations 8*(1), 31–61.

Bergstedt, J. (2005). *Nachhaltig, modern, staatstreu?: Staats-und Marktorientierung aktueller Konzepte von Agenda 21 bis Tobin Tax*, Volume 2. IKO-Verlag für Interkulturelle Kommunikation.

Bernstein, S., M. Betsill, M. Hoffmann, and M. Paterson (2010, July). A Tale of Two Copenhagens: Carbon Markets and Climate Governance. *Millennium - Journal of International Studies 39*(1), 161–173.

Beunza, D. and D. Stark (2003). The organization of responsiveness: innovation and recovery in the trading rooms of Lower Manhattan. *Socio-economic review 1*(2), 135–164.

Beunza, D. and D. Stark (2008). Tools of the trade: The socio-technology of arbitrage in a wall street trading room. See Pinch and Swedberg (2008b), Chapter 8, pp. 253–290.

Bewernitz, T. (2005). Klassen[n] von Gewicht. See Mümken (2005), pp. 63–95.

Biagioli, M. (Ed.) (1999). *The Science Studies Reader*. New York, London: Routledge.

Bijker, W. (1990). *The social construction of technology*. Ph. D. thesis, Enschede.

Bijker, W., T. P. Hughes, and T. J. Pinch (Eds.) (1987). *The social construction of technological systems: New Directions in the Sociology and History of Technology*. Cambridge: MIT Press.

Bijker, W. and J. Law (1992). General introduction. In W. Bijker and J. Law (Eds.), *Shaping Technology/Building Society*, Studies in Sociotechnical Change, pp. 1–14. Cambridge (Massachusetts), London: The MIT Press.

Birke, M., C. Burschel, and M. Schwarz (Eds.) (1997). *Handbuch Umweltschutz und Organisation: Ökologisierung, Organisationswandel, Mikropolitik*. Lehr- und Handbücher zur Ökologischen Unternehmensführung und Umweltökonomie. München, Wien: Oldenbourg.

Birke, M. and M. Schwarz (1994). *Umweltschutz im Betriebsalltag: Praxis und Perspektiven ökologischer Arbeitspolitik*. Number 150 in Studien zur Sozialwissenschaft. Opladen: Westdeutscher Verlag.

Birke, M. and M. Schwarz (1997). Ökologisierung der Mikropolitik. See Birke, Burschel, and Schwarz (1997), pp. 189–225.

Blackless, M., A. Charuvastra, A. Derryck, A. Fausto-Sterling, K. Lauzanne, and E. Lee (2000). How sexually dimorphic are we? review and synthesis. *American Journal of Human Biology 12*(2), 151–166.

Bloch, E. (1923). *Geist der Utopie*. Paul Cassirer.

Blok, A. (2010). Topologies of climate change: actor-network theory, relational-scalar analytics, and carbon-market overflows. *Environment and Planning D: Society and Space 28*, 896–912.

Bloomfield, B. P. and N. Hayes (2009). Power and organizational transformation through technology: Hybrids of electronic government. *Organization Studies*.

Blühdorn, I. (2007, Apr). Sustaining the unsustainable: Symbolic politics and the politics of simulation. *Environmental Politics 16*(2), 251–275.

Blühdorn, I. and I. Welsh (2007, Apr.). Eco-politics beyond the paradigm of sustainability: A conceptual framework and research agenda. *Environmental Politics 16*(2), 185–205.

Böhle, F., A. Bolte, W. Dunkel, S. Pfeiffer, S. Porschen, and N. Sevsay-Tegethoff (2004). Der gesellschaftliche Umgang mit Erfahrungswissen: Von der Ausgrenzung zu neuen Grenzziehungen. See Beck and Lau (2004).

Böhm, S. and S. Dabhi (Eds.) (2009). *Upsetting the Offset: The Political Economy of Carbon Markets*. London: MayFly.

Boiral, O. (2002). Tacit knowledge and environmental management. *Long Range Planning 35*(3), 291–317.

Boiral, O. (2007). Corporate Greening Through ISO 14001: A Rational Myth? *Organization Science 18*(1), 127–146.

Bookchin, M. (1962). *Our synthetic environment*. New York: Knopf (published under the pseudonymn 'Lewis Herber').

Bookchin, M. (1993). What is social ecology? In M. E. Zimmerman, J. B. Callicott, G. Sessions, K. J. Warren, and J. Clark (Eds.), *Environmental Philosophy: From Animal Rights to Radical Ecology*, Chapter 354–373. Upper Saddle River: Prentice Hall.

Borrelli, P., L. Lees, M. Easterling, G. Pauker, B. Klein, and R. Poppe (1971). People, power and pollution: environmental and public interest aspects of electric power plant siting. Technical Report 1, California Institute of Technology, Environmental Quality Laboratory.

Botto, S. (2009). Tap Water vs. Bottled Water in a Footprint Integrated Approach. *Nature Precedings*.

Botzen, W., J. van den Bergh, and L. Bouwer (2010). Climate change and increased risk for the insurance sector: a global perspective and an assessment for the netherlands. *Natural hazards 52*(3), 577–598.

Bourdieu, P. (1977). *Outline of a Theory of Practice*. Number 16 in Cambridge Studies in Social Anthropology. Cambridge: Cambridge University Press.

Bourdieu, P. (1985). The social space and the genesis of groups. *Social Science Information 24*(2), 195–220.

Bourdieu, P. (1988, Sept.). Vive la crise!: For heterodoxy in social science. *Theory and Society 17*(5), 773–787.

Bourdieu, P. (1989, Spring). Social space and symbolic power. *Sociological Theory 7*(1), 14–25.

Bourdieu, P. (1990a). *In other words: Essays towards a reflexive sociology*. Stanford: Stanford University Press.

Bourdieu, P. (1990b). *The Logic of Practice*. Stanford: Stanford University Press.

Bourdieu, P. (1990c, Nov.). The scholastic point of view. *Cultural Anthropology 5*(4), 380–391.

Bourdieu, P. (1997). *Pierre Bourdieu: Der Tote packt den Lebenden*, Chapter Wie eine soziale Klasse entsteht, pp. 102–129. Number 2 in Schriften zur Politik & Kultur. Hamburg: VSA.

Bourdieu, P. (1998a, Dec.). The essence of neoliberalism. *Le Monde diplomatique*.

Bourdieu, P. (1998b). *Practical Reason*. Cambridge: Polity Press.

Bourdieu, P. (1998c, Jan.-Feb.). A reasoned utopia and economic fatalism. *New Left Review I*(227).

Bourdieu, P. (1998d). *Über das Fernsehen*. Number 2054 in edition suhrkamp. Frankfurt am Main: Suhrkamp.

Bourdieu, P. (2000). *Pascalian meditations*. Stanford: Stanford University Press.

Bourdieu, P. (2001). *Meditationen: Zur Kritik der scholastischen Vernunft*. Frankfurt am Main: Suhrkamp.

Bourdieu, P. (2003, Feb.). Participant objectivation: The huxley medal lecture. *Journal of the Royal Anthropological Institute 9*(2), 281–294.

Bourdieu, P. and M.-C. Bourdieu (2004). The peasant and photography. *Ethnography 5*(4), 601–616.

Bourdieu, P. and A. Sayad (2004). Colonial rule and cultural sabir. *Ethnography 5*(4), 445–486.

Bourdieu, P. and L. Wacquant (1992). *An Invitation to Reflexive Sociology*. Cambridge: Polity Press.

Bourdieu, P. and L. Wacquant (2004). Symbolic violence. In N. Scheper-Hughes and P. Bourgouis (Eds.), *Violence in war and peace*, Malden, Oxford, Carlton, pp. 272–274. Wiley-Blackwell.

Bourdieu, P. and L. Wacquant (2006). *Reflexive Anthropologie*. Number 1793 in suhrkamp taschenbuch wissenschaft. Frankfurt am Main: Suhrkamp.

Bowker, G. (2000a). Mapping biodiversity. *International Journal of Geographical Information Science 14*(8), 739–754.

Bowker, G. (2005). *Memory practices in the sciences*. Cambridge, MA: MIT Press.

Bowker, G. C. (2000b, Oct). Biodiversity datadiversity. *Social Studies of Science 30*(5), 643–683.

Bowker, G. C. and S. L. Star (1996). How things (actor-net) work: Classification, magic and the ubiquity of standards. *Philosophia 25*(3-4), 195–220.

Bowker, G. C. and S. L. Star (2000). *Sorting things out: classification and consequences*. Cambridge Massachusetts: MIT Press.

Brand, K.-W. (2004). Strohhalme bieten keinen Halt. Kommentar 1 zu Jörg Tremmels Beitrag 'Nachhaltigkeit – definiert nach einem kriteriengebundenen Verfahren'. *GAIA 13*(1), 35–37.

Brand, U. (2012). Green economy the next oxymoron? no lessons learned from failures of implementing sustainable development. *GAIA-Ecological Perspectives for Science and Society 21*(1), 28–32.

Branzei, O., I. Vertinsky, T. Takahashi, and W. Zhang (2001). Corporate environmentalism across cultures: A comparative field study of chinese and japanese executives. *International Journal of Cross Cultural Management 1*(3), 287–312.

Breitbarth, T., P. Harris, and A. Insch (2010, Nov). Pictures at an exhibition revisited: reflections on a typology of images used in the construction of corporate social responsibility and sustainability in non-financial corporate reporting. *Journal of Public Affairs 10*(4), 238–257.

Brewis, J. and E. Wray-Bliss (2008). Re-searching ethics: Towards a more reflexive critical management studies. *Organization Studies 29*(12), 1521—1540.

Briers, M. and W. Chua (2001). The role of actor-networks and boundary objects in management accounting change: a field study of an implementation of activity-based costing. *Accounting, Organizations and Society 26*(3), 237–269.

Brown, N. and A. Kraft (2006). Blood ties: Banking the stem cell promise. *Technology Analysis Strategic Management 18*(3/4), 313–327.

Brundtland, G., S. Agnelli, S. Al-Athel, P. G. Casanova, B. T. G. Chidzero, L. M. Padika, V. Hauff, I. Lang, M. Shijun, M. M. do Botero, N. Singh, P. Nogueira-Neto, S. Okita, S. S. Ramphal, W. D. Ruckelshaus, M. Sahnoun, E. Salim, B. Shaib, V. Sokolov, J. Stanovnik, M. Strong, and J. MacNeill (1987). *Our Common Future/World Commission on Environment and Development*. Oxford: Oxford University Press.

Burawoy, M. (2012). The roots of domination: Beyond Bourdieu and Gramsci. *Sociology 46*(2), 187—206.

Burchell, G., C. Gordon, and P. Miller (Eds.) (1991). *The Foucault Effect: Studies in governmentality*. Chicago: The University of Chicago Press.

Burchell, J. and J. Cook (2008). Stakeholder dialogue and organisational learning: changing relationships between companies and ngos. *Business Ethics: A European Review 17*(1), 35–46.

Bureau d'études (2002, 2006, Dec. 01). *autonomous knowledge and power in a society without affects*. `http://utangente.free.fr/anewpages/holmes.html`: online retrieved.

Burri, R. V. (2008a). Bourdieu und die New Sociology of Science: Anmerkungen zu einer schwierigen Beziehung. *Swiss Journal of Sociology 34*(3), 555–573.

Burri, R. V. (2008b, Feb). Doing distinctions: Boundary work and symbolic capital in radiology. *Social Studies of Science 38*(1), 35–62.

Burri, R. V. and J. Dumit (2008). Social studies of scientific imaging and visualization. See Hackett, Amsterdamska, Lynch, and Wajcman (2008), Chapter 13, pp. 297–317.

Burritt, R. (2012). Environmental performance accountability: planet, people, profits. *Accounting, Auditing & Accountability Journal 25*(2), 370–405.

Burritt, R., T. Hahn, and S. Schaltegger (2002). Towards a comprehensive framework for environmental management accounting—links between business actors and environmental management accounting tools. *Australian Accounting Review 12*(27), 39–50.

Burritt, R., S. Schaltegger, and D. Zvezdov (2011). Carbon management accounting: Explaining practice in leading German companies. *Australian Accounting Review 21*(1), 80–98.

Burschel, C. (1997). Abschied aus der Organisationsstruktur? Ökologisches Innovationsmanagement und mikropolitische Mitarbeiterkalküle. See Birke, Burschel, and Schwarz (1997), pp. 274–315.

Burston, J., N. Dyer-Witheford, and A. Hearn (2010). Digital labour: Workers, authors, citizens. *Special issue, ephemera: theory and politics in organization 10*(3/4), 214–221.

Busch, L. (2000). The moral economy of grades and standards. *Journal of Rural Studies 16*(3), 273–283.

Busch, L. (2010). Standards, law, and governance. *Journal of Rural Social Sciences 25*(3), 56–78.

Busch, L. (2011, February, 21). Larry Busch retirement presentation. standards: Recipes for reality. Presentation at Sociology Department of Lancaster University.

Butler, J. (1986). Sex and gender in Simone de Beauvoir's *Second Sex*. *Yale French Studies* (72), 35–49.

Butler, J. (1990). *Gender trouble: Feminism and the subversion of identity*. New York: Routledge.

Butler, J. (1993). *Bodies that matter: on the discursive limits of 'sex'*. New York: Routledge.

Buttel, F. (2000). Ecological modernization as social theory. *Geoforum 31*, 57–65.

Button, G. and W. Sharrock (1998, Feb.). The organizational accountability of technological work. *Social Studies of Science 28*(1), 73–102.

Cajori, F. (1909). *A history of mathematics*. London: Macmillan.

Çalışkan, K. and M. Callon (2010). Economization, part 2: a research programme for the study of markets. *Economy and Society 39*(1), 1–32.

Callon, M. (1991). Techno-economic networks and irreversability. See Law (1991), pp. 132–161.

Callon, M. (1995). Four models for the dynamics of science. In S. Jasanoff, G. Markle, J. Petersen, and T. Pinch (Eds.), *Handbook of Science and Technology Studies*, pp. 29–63. Thousand Oaks, London, New Delhi: Sage Publications in Cooperation with the Society for Social Studies of Science.

Callon, M. (1998a). An essay on framing and overflowing: economic externalities revisited by sociology. See Callon (1998c), pp. 244–269.

Callon, M. (1998b). Introduction: the embeddedness of economic markets in economics. See Callon (1998c), pp. 1–57.

Callon, M. (Ed.) (1998c). *The Laws of the Markets*. Oxford, Malden: Blackwell Publishers/The Sociological Review.

Callon, M. (1999). Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St Brieuc Bay. See Biagioli (1999), pp. 67–83.

Callon, M. (2002). Writing and (re)writing devices as tools for managing complexity. In J. Law and A. Mol (Eds.), *Complexities: social studies of knowledge practices*, pp. 191–217. Duke University Press.

Callon, M. (2007). What does it mean to say that economics is performative? See MacKenzie, Muniesa, and Siu (2007), Chapter 11, pp. 311–357.

Callon, M. (2009, April). Civilizing markets: Carbon trading between in vitro and in vivo experiments. *Accounting, Organizations and Society 34*(3-4), 535–548.

Callon, M. and K. Çalışkan (2005, Apr). Economization: New directions in the social studies of the market. *Presented at the 'New Directions in the Anthropology of Markets Conference' at the Wenner-Gren Foundation in New York*.

Callon, M. and B. Latour (1981). Unscrewing the big leviathan: how actors macrostructure reality and how sociologists help them to do so. In K. Knorr-Cetina and A. Cicourel (Eds.), *Advances in Social Theory and Methodology: Toward an Integration of Micro- and Macro-Sociologies*, Chapter 10, pp. 277–303. Boston: Routledge & Kegan Paul.

Callon, M. and J. Law (2005, Jan). On qualculation, agency, and otherness. *Environment and Planning D 23*(5), 717–733.

Callon, M. and F. Muniesa (2002). Economic markets as calculative and calculated collective devices. In *Columbia University Conference on Social Studies of Finance, New York*.

Callon, M. and F. Muniesa (2005). Peripheral vision: Economic markets as calculative collective devices. *Organization Studies 26*(8), 1229.

Carson, R. (1962). *Silent Spring*. Boston (MA): Houghton Mifflin.

Castel, P. (2009, September). What's behind a guideline?: Authority, competition and collaboration in the french oncology sector. *Social Studies of Science 39*(5), 743–764.

Cattaneo, C. and M. Gavaldà (2010). The experience of rurban squats in collserola, barcelona: what kind of degrowth? *Journal of Cleaner Production 18*(6), 581–589.

Chan, M. (2009). Subprime Carbon? Re-thinking the world's largest new derivatives market. Technical report, Friends of the Earth.

Christoff, P. (1996, Autumn). Ecological modernisation, ecological modernities. *Environmental Politics 5*(3), 476–500.

Clark, B. and J. Foster (2001). William Stanley Jevons and *The Coal Question*: An introduction to Jevons's 'Of the Economy of Fuel'. *Organization & Environment 14*(1), 93–98.

Clark, B. and R. York (2005). Carbon metabolism: Global capitalism, climate change, and the biospheric rift. *Theory and Society 34*, 391–428.

Clark, G. and T. Hebb (2005). Why should they care? The role of institutional investors in the market for corporate global responsibility. *Environment and Planning A 37*(11), 2015–.

Clark, N. (2010). Volatile worlds, vulnerable bodies: Confronting abrupt climate change. *Theory, Culture & Society 27*(2-3), 31.

Clarke, A. (2003). Situational analyses: Grounded theory mapping after the postmodern turn. *Symbolic Interaction 26*(4), 553–576.

Clarke, A. E. and S. L. Star (2008, Feb). The social worlds framework: A theory/methods package. See Hackett, Amsterdamska, Lynch, and Wajcman (2008), pp. 113–137.

Clegg, S., D. Courpasson, and N. Phillips (2006). *Power and organizations*. Foundations for Organizational Science. Los Angeles: SAGE Publications.

Coase, R. (1960). The problem of social cost. *Journal of law and economics 3*, 1–44.

Cochoy, F. (2008). Calculation, qualculation, calqulation: shopping cart arithmetic, equipped cognition and the clustered consumer. *Marketing Theory 8*(1), 15.

Coelho, R. (2009). Rent seeking and corporate lobbying in climate negotiations. See Böhm and Dabhi (2009), Chapter 19, pp. 203–213.

Collins, H. (1974). The TEA set: Tacit knowledge and scientific networks. *Science Studies 4*(2), 165–185.

Connors, P. and P. McDonald (2011). Transitioning communities: community, participation and the transition town movement. *Community Development Journal 46*(4), 558–572.

Cooke, B. and U. Kothari (Eds.) (2001). *Participation: The new tyranny?* London and New York: Zed Books.

Coopmans, C. (2011). 'Face Value': New medical imaging software in commercial view. *Social Studies of Science 41*(2), 155–176.

Corporate Watch (2004). Corporate law and structure: Exposing the roots of the problem. online retrieved (13/6/2011), `http://www.corporatewatch.org.uk/download.php?id=43`.

Crabtree, A. (2004). Taking technomethodology seriously: hybrid change in the ethnomethodology–design relationship. *European Journal of Information Systems 13*, 195–209.

Crehan, K. (2002). *Gramsci, Culture and Anthropology*. London: Pluto Press.

Cronon, W. J. (1996). Introduction. In W. Cronon (Ed.), *Uncommon ground: Rethinking the human place in nature*, pp. 23–66. New York: WW Norton & Company.

Crozier, M. and E. Friedberg (1979). *Die Zwänge kollektiven Handelns: Über Macht und Organisation*. Athenäum.

Cruikshank, J. (2001). Glaciers and climate change: Perspectives from oral tradition. *Arctic 54*(4), 377–393.

Czarniawska, B. (2001, June). Is it possible to be a constructionist consultant? *Management Learning 32*(2), 253–266.

Czarniawska, B. (2004, Jan). On time, space, and action nets. *Organization 11*(6), 773–791.

Davison, J. (2008). Rhetoric, repetition, reporting and the 'dot. com' era: words, pictures, intangibles. *Accounting, Auditing & Accountability Journal 21*(6), 791–826.

Davison, J. and S. Warren (2009). Imag[in]ing accounting and accountability. *Accounting, Auditing & Accountability Journal 22*(6), 845–857.

De Beauvoir, S. (1953). *The second sex*. London: Jonathan Cape.

de Certeau, M. (1984). *The Practice of Everyday Life*. Berkeley: University of California Press.

Deleuze, G. and F. Guattari (1987). *A Thousand Plateaus*. Minneapolis: University of Minnesota Press.

Demirović, A. (2005). Zur Dialektik von Utopie und bestimmter Negation. In C. Kaindl (Ed.), *Kritische Wissenschaften im Neoliberalismus*, Number 49 in Forum Wissenschaft Studien, pp. 143–147. Marburg: BdWi-Verlag.

Denning, P. and R. Medina-Mora (1995). Completing the loops. *Interfaces 25*(3), 42–57.

Descheneau, P. (2012). The currencies of carbon: carbon money and its social meaning. *Environmental Politics 21*(4), 604–620.

Diemberger, H., K. Hastrup, S. Schaffer, C. F. Kennel, D. Sneath, M. Bravo, H.-F. Graf, J. Hobbs, J. Davis, M. L. Nodari, G. Vassena, R. Irvine, C. Evans, M. Strathern, M. Hulme, G. Kaser, and B. Bodenhorn (2012). Communicating climate knowledge: Proxies, processes, politics. *Curr Anthropol 53*(2), 226–244.

Dingler, J. (2003). *Postmoderne und Nachhaltigkeit. Eine diskurstheoretische Analyse der sozialen Konstruktion von nachhaltiger Entwicklung*, Volume 7 of *Hochschulschriften zur Nachhaltigkeit*. München: ökom.

Ditz, D., J. Ranganathan, and R. Banks (Eds.) (1995). *Green Ledgers: Case studies in corporate environmental accounting*. Baltimore: World Resources Institute.

Doing, P. (2008). Give me a laboratory and I will raise a discipline: The past, present, and future politics of laboratory studies in STS. See Hackett, Amsterdamska, Lynch, and Wajcman (2008), Chapter 12, pp. 279–296.

Donaldson, T. and L. Preston (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of management Review*, 65–91.

Dorsey, M. (2011). Tracing the oligonomy of the sky: Critical ethnographic analyses meets actor- network data visualizations of the carbon market industrial complex. In *Paper presented at '6th International Conference in Interpretive Policy Analysis: Discursive Spaces. Politics, Practices and Power' (Cardiff)*.

Douglas, M. (1991). *Wie Institutionen denken*. Frankfurt am Main: Suhrkamp.

Down To Earth (2008, Aug). Fanning an alternative. *Down To Earth: Science and Environment Online 17*(6).

Drake, F., M. Purvis, J. Hunt, and D. Millard (2003). European business, national priorities: Pioneers and laggards of ecological modernization. *European Environment 13*, 164–182.

Driver, T. (1961). Beckett by the Madeleine. In *Columbia University Forum*, Volume 4, pp. 21–25.

Dugdale, A. (1999). Materiality: juggling sameness and difference. See Law and Hassard (1999), pp. 113–135.

Eberhart, T. and C. Wächter (Eds.) (1994, Jul. 05–09). *2nd European Feminist Research Conference: Feminist Perspectives on Technology, Work and Ecology*, Graz. IFF/IFZ.

Eblinghaus, H. and A. Stickler (1996). *Nachhaltigkeit und Macht, Zur Kritik von Sustainable Development*. Frankfurt/Main: IKO – Verlag für Interkulturelle Kommunikation.

Edwards, P. (1994, Jan). Hyper text and hypertension: Post-structuralist critical theory, social studies of science and software. *Soc. Stud. Sci. 24*(2), 229–278.

Ehrlich, H. (1977). *Anarchism and Formal Organizations. Some Notes on the Sociological Study of Organizations from an Anarchist Perspective*. Number 23 in Research Group One Report. Baltimore: Vacant Lots Press.

Elder-Vass, D. (2007). Reconciling Archer and Bourdieu in an emergentist theory of action. *Sociological Theory 25*(4), 325–346.

Elder-Vass, D. (2008, Jan). Searching for realism, structure and agency in actor network theory. *The British Journal of Sociology 59*(3), 455–473.

Emerson, R., R. Fretz, and L. Shaw (1995). *Writing Ethnographic Fieldnotes*. Chicago Guides to Writing, Editing, and Publishing. Chicago, London: The University of Chicago Press.

Engels, F. (1969). *The condition of the working class in England*. Moscow: Institute of Marxism-Leninism.

Enzensberger, H. (1996). A critique of political ecology. See Benton (1996), Chapter 1, pp. 17–49.

Espeland, W. and M. Stevens (1998). Commensuration as a social process. *Annual Review of Sociology 24*(1), 313–343.

Evans, R. and H. Collins (2008). Expertise: From attribute to attribution and back again? See Hackett, Amsterdamska, Lynch, and Wajcman (2008), Chapter 25, pp. 609–630.

Feldon, J. (2007). The black hole in the Kyoto Protocol: Was the exclusion of black carbon regulation a 'Fatal Flaw'? *Sustainable Development Law & Policy 7*(2), 24.

Fernandez, L. A. (2009). Being there: thoughts on anarchism and participatory observation. See Amster, DeLeon, Fernandez, Nocella, II, and Shannon (2009), Chapter 9, pp. 93–102.

Feyerabend, P. (1975). *Against Method: Outline of an anarchistic* theory of knowledge*. Brooklyn and London: Verso.

Feyerabend, P. (2009). *Naturphilosophie*. Frankfurt am Main: Suhrkamp.

Fineman, S. (1997). Constructing the green manager. *British Journal of Management 8*, 31–38.

Fineman, S. (2000). The business of greening: an introduction. In S. Fineman (Ed.), *The Business of Greening*, Number 8 in Routledge Research in Global Environmental Change Series, Chapter 1, pp. 1–10. London, New York: Routledge.

Fineman, S. (2001). Fashioning the Environment. *Organization 8*(1), 17.

Flick, U. (2007a). *Designing Qualitative Research*. The Sage Qualitative Research Kit. Sage.

Flick, U. (2007b). *Managing Quality in Qualitative Research*. Los Angeles: Sage Publications.

Forsythe, D. (1999). Ethics and politics of studying up in technoscience. *Anthropology of Work Review 20*(1), 6–11.

Foucault, M. (1979). *Discipline and Punish, translated by Alan Sheridan*, Volume 263. New York: Vintage Books.

Foucault, M. (1981). The order of discourse. In R. Young (Ed.), *Untying the text: A post-structuralist reader*, pp. 48–78. New York: Routledge.

Foucault, M. (1989). *The order of things*. London and New York: Routledge.

Foucault, M. (1991). Governmentality. See Burchell, Gordon, and Miller (1991), Chapter 4, pp. 87–104.

Fowler, B. (2006). Autonomy, reciprocity and science in the thought of Pierre Bourdieu. *Theory, Culture & Society 23*(6), 99–117.

Fraenkel, A., Y. Bar-Hillel, and A. Levy (1973). *Foundations of set theory*, Volume 67. North Holland.

Frame, B. and J. Brown (2008, Apr). Developing post-normal technologies for sustainability. *Ecological Economics 65*(2), 225–241.

Franks, B. (2006). *rebel Alliances: The means and ends of contemporary British anarchisms*. Edinburgh: AK Press and Dark Star.

Franks, B. (2007, Jun). Postanarchism: A critical assessment. *Journal of Political Ideologies 12*(2), 127–145.

Garfinkel, H. (1964). Studies of the routine grounds of everyday activities. *Social problems 11*(3), 225–250.

Garfinkel, H. (1967). *Studies in Ethnomethodology*. Malden: Blackwell.

Georgakopoulos, D., M. Hornick, and A. Sheth (1995). An overview of workflow management: From process modeling to workflow automation infrastructure. *Distributed and parallel Databases 3*(2), 119–153.

Ghosh, S. and H. Yasmin (2008, Jul.-Sept.). India's clean development! *Mausam*, 19–26.

Giaglis, G. (2001). A taxonomy of business process modeling and information systems modeling techniques. *International Journal of Flexible Manufacturing Systems 13*(2), 209–228.

Gibbs, D. (2000, Jan). Ecological modernisation, regional economic development and regional development agencies. *Geoforum 31*, 9–19.

Gibson-Graham, J. (2006). *The end of capitalism (as we knew it): A feminist critique of political economy*. Minneapolis, London: Univ Of Minnesota Press.

Giddens, A. (1986). *The constitution of society: outline of the theory of structuration*. Berkeley: University of California Press.

Giddens, A. (2008). The politics of climate change: National responses to the challenge of global warming. *Polity Network, London*.

Gieryn, T. (1983). Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists. *American sociological review 48*(6), 781–795.

Giffney, N. and M. Hird (Eds.) (2008). *Queering the Non/human*. Aldershot: Ashgate.

Gilbert, G. and M. Mulkay (1984). *Opening Pandora's box: A sociological analysis of scientists' discourse*. Cambridge: Cambridge University Press.

Gilbertson, T. and O. Reyes (2009). Carbon trading: How it works and why it fails. *Critical Currents* (7).

Glacken, C. (1967). *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century*. Berkeley, Los Angeles, London: University of California Press.

Glaser, B. (2002, Jan). Constructivist grounded theory? *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research 3*(3).

Gleick, P. and H. Cooley (2009). Energy implications of bottled water. *Environmental Research Letters 4*, 014009.

Goffman, E. (1959). *The Presentation of Self in Everyday Life*. Harmondsworth: Penguin Books.

Goffman, E. (1975). *Frame Analysis: An Essay on the Organization of Experience*. Harmondsworth: Penguin.

Goldman, E. (1910). *Anarchism and Other Essays*. online retrieved 2012, 1/4 from `http://files.uniteddiversity.com/More_Books_and_Reports/The_Anarchist_Library/Emma_Goldman__Anarchism_and_Other_Essays_a4.pdf`: The Anarchist Library.

Goodman, N. (1978). *Ways of Worldmaking*. Indianapolis: Hackett Publishing.

Goodwin, C. (1994). Professional vision. *American Anthropologist 96*(3), 606–633.

Gordon, C. (1991). Governmental rationality: An introduction. See Burchell, Gordon, and Miller (1991), Chapter 1, pp. 1–52.

Gordon, U. (2008). *Anarchy alive!: anti-authoritarian politics from practice to theory*. London: Pluto Press.

Graeber, D. (2004). *Fragments of an Anarchist Anthropology*. Chicago: Prickly Paradigm Press.

Gramsci, A. (1971). Selections from the prison notebooks. *Lawrence and Wishart, London*.

Gray, R. (2010). Is accounting for sustainability actually accounting for sustainability... and how would we know? an exploration of narratives of organisations and the planet. *Accounting, Organizations and Society 35*(1), 47–62.

Gray, R. and R. Laughlin (2012). It was 20 years ago today: Sgt Pepper, *Accounting, Auditing & Accountability Journal,* green accounting and the blue meanies. *Accounting, Auditing & Accountability Journal 25*(2), 228–255.

Gregory, J. (2000). *Sorcerer's Apprentice: Creating the Electronic Health Record, Reinventing Medical Records and Patient Care*. Phd dissertation in communication, University of California, San Diego.

Grint, K. and S. Woolgar (1997). *The machine at work: Technology, work, and organization*. Cambridge: Polity Press.

Grove, R. (1996). *Green imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860*. Studies in Environment and History. Cambridge: Cambridge University Press.

Guattari, F. (1995). *Chaosmosis an ethico-aesthetic paradigm*. Bloomington and Indianapolis: Indiana University Press.

Gunningham, N., R. Kagan, and D. Thornton (2003). *Shades of green: business, regulation, and environment*. Stanford: Stanford University Press.

Guyer, J., N. Khan, J. Obarrio, C. Bledsoe, J. Chu, S. Bachir Diagne, K. Hart, P. Kockelman, J. Lave, C. McLoughlin, B. Maurer, F. Neiburg, D. Nelson, C. Stafford, and H. Verran (2010). Introduction: Number as inventive frontier. *Anthropological Theory 10*(1-2), 36–61.

Habermas, J. (1976). *Legitimation Crisis*. London: Heinemann.

Habermas, J. (1991a). *Erläuterungen zur Diskursethik* (1 ed.). Number 975 in Suhrkamp-Taschenbuch Wissenschaft. Frankfurt/Main: Suhrkamp.

Habermas, J. (1991b). *Moralbewusstsein und kommunikatives Handeln* (4 ed.). Number 422 in Suhrkamp-Taschenbuch Wissenschaft. Frankfurt/Main: Suhrkamp.

Hackett, E. J., O. Amsterdamska, M. Lynch, and J. Wajcman (Eds.) (2008). *The Handbook of Science and Technology Studies* (3 ed.). Cambridge (Massachusetts), London: MIT.

Hacking, I. (1990). *The Taming of Chance*. Ideas in Context. Cambridge, New York, Melbourne, Madrid: Cambridge University Press.

Hacking, I. (1999). *The social construction of what?* Cambridge (Massachusetts), London: Harvard University Press.

Hajer, M. (1995). *The Politics of Environmental Discourse. Ecological Modernization and the Policy Process*. Oxford: Clarendon Press.

Hammersley, M. (1992). Some reflections on ethnography and validity. *Qualitative studies in education 5*(3), 195–203.

Haraway, D. (1991a). A cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century. See Haraway (1991b), Chapter 8, pp. 149–181.

Haraway, D. (1991b). *Simians, Cyborgs, and Women*. London: Free Association Books.

Haraway, D. (1991c). Situated knowledges: the science question in feminism and the privilege of partial perspective. See Haraway (1991b), Chapter 9, pp. 193–201.

Haraway, D. (1992). The promises of monsters: A regenerative politics for inappropriate/d others. In L. Grossberg, C. Nelson, and P. A. Treichler (Eds.), *Cultural Studies*, pp. 295–337. New York: Routledge.

Haraway, D. (1994). A game of cat's cradle: Science studies, feminist theory, cultural studies. *Configurations 2*(1), 59–71.

Haraway, D. (2003). *The companion species manifesto: Dogs, people, and significant otherness*. Chicago: Prickly Paradigm Press Chicago, IL.

Haraway, D. (2006). *Modest_Witness@Second_Millenium*. New York, London: Routledge.

Haraway, D. (2008). Companion species, mis-recognition, and queer worlding. See Giffney and Hird (2008), Chapter Forword, pp. xxiiv–xxvi.

Hargreaves, T. (2008). *Making pro-environmental behaviour work: An ethnographic case study of practice, process and power in the workplace*. Ph. D. thesis, University of East Anglia, Norwich.

Harmes, A. (2011). The limits of carbon disclosure: Theorizing the business case for investor environmentalism. *Global Environmental Politics 11*(2), 98–119.

Harper, R. (1998). *Inside the IMF: an ethnography of documents, technology and organisational action*. Academic Pr.

Hayles, N. (1999). *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics*. University of Chicago Press.

Heath, C., H. Knoblauch, and P. Luff (2000, Jan). Technology and social interaction: the emergence of 'workplace studies'. *Br. J. Sociol. 51*(2), 299—320.

Heintz, B. (2000). *Die Innenwelt der Mathematik: Zur Kultur und Praxis einer beweisenden Disziplin*. Springer Verlag.

Hetherington, K. (2012). Promising information: democracy, development, and the remapping of latin america. *Economy and Society 41*(2).

Higgins, W. and K. T. Hallström (2007, Sep). Standardization, globalization and rationalities of government. *Organization 14*(5), 685–704.

Hoffman, A. J. (2001, Jun). Linking organizational and field-level analyses: The diffusion of corporate environmental practice. *Organization & Environment 14*(2), 133–156.

Hoffman, A. J. (2003, Mar). Linking social systems analysis to the industrial ecology framework. *Organization & Environment 16*(1), 66–86.

Hoffman, A. J. (2005). Climate change strategy: The business logic behind voluntary greenhouse gas reductions. *California Management Review 47*(3), 21–46.

Hoffman, A. J. (2007). *Carbon strategies: How leading companies are reducing their climate change footprint*. Ann Arbor: University of Michigan Press.

Hoffman, A. J. (2010). Climate change as a cultural and behavioral issue. *Organizational Dynamics 39*(4), 295–305.

Hoffman, A. J. and M. H. Bazerman (2005). Changing environmental practice: understanding and overcoming the organizational and psychological barriers (version 1.7). *Ross School of Business Working Paper Series* (923).

Holmes, B. (2010). Is it written in the stars? global finance, precarious destinies. *ephemera 10*(3/4), 222–233.

Horton, D. (2003). Green distinctions: the performance of identity among environmental activists. See Szerszynski, Heim, and Waterton (2003), pp. 63–77.

Hosking, D. M. (2007). Sound constructs: a constructionist discourse of sound processes and listening (final draft). *Revue Sciences de Gestion (retrieved 9/7/2011 from* `http://www.relational-constructionism.org/media/sound%20constructs.pdf` *) 55*, 55–75.

Howard-Grenville, J. (2006, Mar.). Inside the "black box": How organizational culture and subcultures inform interpretations and actions on environmental issues. *Organization & Environment 19*(1), 46–73.

Howard-Grenville, J., J. Nash, and C. Coglianese (2008, Jan.). Constructing the license to operate: Internal factors and their influence on corporate environmental decisions. *Law & Policy 30*(1), 73–107.

Hård, M. (1994). Technology as practice: Local and global closure processes in diesel-engine design. *Social Studies of Science 24*, 549–585.

Huber, J. (1988). *Die Regenbogen-Gesellschaft*. Frankfurt am Main: Fischer-Taschenbuch-Verlag.

Huber, J. (2000, Dec). Towards industrial ecology: sustainable development as a concept of ecological modernization. *Journal of Environmental Policy & Planning 2*(4), 269–285.

Huber, J. (2008, Aug). Pioneer countries and the global diffusion of environmental innovations: Theses from the viewpoint of ecological modernisation theory. *Global Environmental Change 18*(3), 360–367.

Hulme, M. (2008). The conquering of climate: discourses of fear and their dissolution. *Geographical Journal 174*(1), 5–16.

Hutchins, E. (2008). The role of cultural practices in the emergence of modern human intelligence. *Philosophical Transactions of the Royal Society 363*, 2011–2019.

IG-BCE (2009, Aug). Positionen für eine nachhaltige Industrie-, Energie- und Klimapolitik. Technical report, Industriegewerkschaft Bergbau, Chemie, Energie, Hannover.

Ihlen, Ø. and J. Roper (2011). Corporate reports on sustainability and sustainable development: 'We Have Arrived'. *Sustainable Development*.

Ingold, T. (1993, Jan). The temporality of the landscape. *WA 25*(2), 152–174.

Ingold, T. (2000). *The Perception of the Environment: Essays on livelihood, dwelling and skill*. London, New York: Routledge.

Ingold, T. (2008). Anthropology is not ethnography. In *Proceedings of the British Academy*, Volume 154, pp. 69–92.

Ingold, T. (2010). The textility of making. *Cambridge Journal of Economics 34*(1), 91–102.

IPCC (2007). Summary for policymakers. In S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. Averyt, M. Tignor, and H. Miller (Eds.), *Climate change 2007: the physical science basis: contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*. Cambridge and New York: Cambridge University Press.

ISA Executive Committee (2001). Code of ethics of the international sociological association. Technical report, International Sociological Association.

Jackson, S., P. Edwards, G. Bowker, and C. Knobel (2007). Understanding infrastructure: history, heuristics, and cyberinfrastructure policy. *First Monday 12*(6).

Jacob, M. (1997, Mar). Critical theory in political practice: Sustainable development and development theory. *Science Technology & Society 2*(1), 99–129.

Jacques, P., R. Dunlap, and M. Freeman (2008). The organisation of denial: Conservative think tanks and environmental scepticism. *Environmental Politics 17*(3), 349–385.

Jaeger, C., O. Renn, E. Rosa, and T. Webler (2001). *Risk, Uncertainty, and Rational Action*. London, Sterling (VA): Earthscan.

Jänicke, M. (2004). Industrial transformation between ecological modernisation and structural change. In K. Jacob, M. Binder, and A. Wieczorek (Eds.), *Governance for Industrial Transformation. Proceedings of the 2003 Berlin Conference on the Human Dimensions of Global Environmental Change*, Berlin, pp. 201–207. Environmental Policy Research Centre.

Jänicke, M. (2008). Ecological modernisation: new perspectives. *Journal of Cleaner Production 16*(5), 557–565.

Jänicke, M., P. Kunig, and M. Stitzel (1999). *Lern- und Arbeitsbuch Umweltpolitik. Umweltpolitik, Politik, Recht und Management des Umweltschutzes in Staat und Unternehmen*. Bonn: Dietz.

Jasanoff, S. (1994). *The fifth branch: Science advisers as policymakers*. Cambridge (Massachusetts), London: Harvard University Press.

Jaworski, G. D. (1993). Pitirim A. Sorokin's sociological anarchism. *History of the Human Sciences 6*(3), 61–77.

Jevons, W. (1866 [2011]). *The coal question: an inquiry concerning the progress of the nation, and the probable exhaustion of our coal-mines*. London: The Macmillan Company (online retrieved 28 July 2011 from `http://pdrap.org/The_Coal_Question/The_Coal_Question.pdf`).

Kahlenborn, W., H. Dierks, D. Wendler, and M. Keitel (2010). Klimaschutz durch Kapitalanlagen Wirkung von Klima- und Nachhaltigkeitsfonds auf deutsche Aktienunternehmen. Technical report, adelphi consult GmbH; Auftraggeber: Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit.

Kalthoff, H. (2002). Figures, writing and calculation thoughts on the representation of economic practices. *Economic Sociology 3*(3), 28–39.

Kalthoff, H. (2005, Apr). Practices of calculation: Economic representations and risk management. *Theory, Culture & Society 22*(2), 69–97.

Katz, J. (2004, Sept.). On the rhetoric and politics of ethnographic methodology. *AAAPSS 595*, 280–308.

Keller, R. (1998). *Müll, die gesellschaftliche Konstruktion des wertvollen: Die öffentliche Diskussion über Abfall in Deutschland und Frankreich*. Opladen: Westdeutscher Verlag.

Keller, R. (2005, Jan). Analysing discourse. an approach from the sociology of knowledge. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*.

Keller, R. (2011a). *Diskursforschung: Eine Einführung für SozialwissenschaftlerInnen* (4 ed.). Wiesbaden: VS Verlag für Sozialwissenschaften.

Keller, R. (2011b). The sociology of knowledge approach to discourse (SKAD). *Human Studies 34*, 43–65.

Kember, S. (2003). *Cyberfeminism and artificial life*. Routledge.

Kim, B. and R. Neff (2009). Measurement and communication of greenhouse gas emissions from US food consumption via carbon calculators. *Ecological Economics 69*(1), 186–196.

Knorr Cetina, K. and U. Bruegger (2002). Global microstructures: the virtual societies of financial markets. *American Journal of Sociology 107*(4), 905–950.

Koch, A. (1993). Poststructuralism and the epistemological basis of anarchism. *Philosophy of the Social Sciences 23*(3), 327–351.

Köhler, B. (2010). Macht der Zahlen, Herrschaft der Statistik – Eine machttheoretische Skizze. In C. Lau and W. Bonß (Eds.), *Macht und Herrschaft in der reflexiven Moderne*. Weilerswist: Velbrück.

Kolk, A., D. Levy, and J. Pinkse (2008, December). Corporate Responses in an Emerging Climate Regime: The Institutionalization and Commensuration of Carbon Disclosure. *European Accounting Review 17*(4), 719–745.

Kollman, K. and A. Prakash (2002). EMS-based Environmental Regimes as Club Goods: Examining Variations in Firm-level Adoption of ISO 14001 and EMAS in U.K., U.S. and Germany. *Policy Sciences 35*, 43–67.

Kritt, D. and L. Winegar (Eds.) (2010). *Education and technology: Critical perspectives, possible futures*. Lexington Books.

Krohn, W. and P. Weingart (1987). Nuclear power as a social experiment: European political 'Fall Out' from the chernobyl meltdown. *Science, Technology & Human Values 12*(2), 52–58.

Kropotkin, P. (1902). *Mutual Aid: A Factor of Evolution*. History of Economic Thought Books. online retrieved 2012, 1/4 from `http://ideas.repec.org/b/hay/hetboo/kropotkin1902.html`: McMaster University Archive for the History of Economic Thought.

Kuhn, G. (2009). Anarchism, postmodernity, and poststructuralism. See Amster, DeLeon, Fernandez, Nocella, II, and Shannon (2009), Chapter 2, pp. 18–25.

Kuhn, T. (2008). A communicative theory of the firm: Developing an alternative perspective on intra-organizational power and stakeholder relationships. *Organization studies 29*(8-9), 1227.

Kunda, G. (2006). *Engineering culture: Control and commitment in a high-tech corporation*. Philadelphia: Temple University Press.

Kunen, K. (1980). *Set theory: An introduction to independence proofs*, Volume 102. Elsevier Science.

Lacey, A. (2005, Aug). Networked communities: Social centers and activist spaces in contemporary britain. *Space and Culture 8*(3), 286–301.

Lampland, M. (2010, April). False numbers as formalizing practices. *Social Studies of Science 40*(3), 377–404.

Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge, Massachusetts: Harvard University Press.

Latour, B. (1988). Mixing humans and nonhumans together: the sociology of a door-closer. *Social Problems 35*(3), 298–310.

Latour, B. (1990). Drawing things together. In M. Lynch and S. Woolgar (Eds.), *Representation in scientific practice*, pp. 19–68. Cambridge (Massachusetts), London: MIT Press.

Latour, B. (1991). Technology is society made durable. See Law (1991), pp. 103–131.

Latour, B. (1993a). *The pasteurization of France*. Cambridge (Massachusetts), London: Harvard University Press.

Latour, B. (1993b). *We Have Never Been Modern*. New York, London: Harvester Wheatsheaf.

Latour, B. (1997). Trains of thought: Piaget, formalism, and the fifth dimension. *Common Knowledge 6*, 170–191.

Latour, B. (1999a). Circulating reference: Sampling the soil in the amazon forest. See Latour (1999b), Chapter 2, pp. 24–79.

Latour, B. (Ed.) (1999b). *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge Massachusetts: Harvard University Press.

Latour, B. (2002). What is iconoclash? or is there a world beyond the image wars? In B. Latour and P. Weibel (Eds.), *Iconoclash: Beyond the Image Wars in Science, Religion and Art*, pp. 16–40. Cambridge, MA: MIT Press.

Latour, B. (2004a). *Politics of Nature: How to Bring the Sciences into Democracy*. Cambridge (Massachusetts), London: Harvard University Press.

Latour, B. (2004b, Winter). Why has critique run out of steam? from matters of fact to matters of concern. *Critical Inquiry 30*, 225–249.

Latour, B. (2005). *Reassembling the social: An introduction to actor-network-theory*. Oxford: Oxford University Press.

Latour, B. (2009). *The making of law: an ethnography of the Conseil d'État*. Cambridge: Polity.

Latour, B. (2011a). Networks, societies, spheres: Reflections of an actor-network theorist. *International Journal of Communication 5*, 796–810.

Latour, B. (2011b). Politics of nature: East and west perspectives. *Ethics & Global Politics 4*(1).

Latour, B. and S. Woolgar (1986). *Laboratory life: The construction of scientific facts*. Princeton, New Jersey: Princeton University Press.

Lave, J. (1988). *Cognition in practice: Mind, mathematics and culture in everyday life*. Cambridge: Cambridge University Press.

Law, J. (Ed.) (1991). *A Sociology of Monsters: Essays on Power, Technology and Domination*. Number 38 in Sociology Review Monograph. London, New York: Routledge.

Law, J. (1992). *Notes on the Theory of the Actor Network: Ordering, Strategy and Heterogeneity*. `http://www.lancaster.ac.uk/fss/sociology/papers/law-notes-on-ant.pdf`: online retrieved 2006, Nov. 02.

Law, J. (1994). *Organizing modernity*. Blackwell Oxford, UK.

Law, J. (1997). *The Manager and His Powers*. Lancaster University, Department of Sociology at `http://www.lancs.ac.uk/fass/sociology/papers/law-manager-and-his-powers.pdf`.

Law, J. (2002, Dec). Objects and spaces. *Theory, Culture & Society 19*(5-6), 91–105.

Law, J. (2004a). *After Method: Mess in Social Science Research*. London: Routledge.

Law, J. (2004b, Feb). *Enacting Naturecultures: a Note from STS*. Centre for Science Studies, Lancaster University; online retrieved from `http://www.lancs.ac.uk/fass/sociology/papers/law-enacting-naturecultures.pdf`.

Law, J. (2007). *Actor Network Theory and Material Semiotics. Version of 25th April 2007*. `http://www.heterogeneities.net/publications/Law-ANTandMaterialSemiotics.pdf`: online retrieved 2008, Apr. 10.

Law, J. (2008). *The Materials of STS*. `http://www.heterogeneities.net/publications/Law2008MaterialsofSTS.pdf`: online retrieved 2010, Feb. 01.

Law, J. (2009). Actor network theory and material semiotics. See Turner (2009), Chapter 7, pp. 141–158.

Law, J. (2010). Pinboards and books: Learning, materiality and juxtaposition. See Kritt and Winegar (2010), Chapter 7, pp. 125–149.

Law, J. and J. Hassard (Eds.) (1999). *Actor Network Theory and after*. The Sociological Review. Oxford, Malden: Blackwell.

Law, J. and M. Lynch (1988). Lists, field guides, and the descriptive organization of seeing: Birdwatching as an exemplary observational activity. *Human Studies 11*(2), 271–303.

Law, J. and V. Singleton (2005, 05). Object lessons. *Organization 12*(3), 331–355.

Le Guin, U. (1974). *The Dispossessed*. New York: Avon Books.

Lederer, M. (2012). Market making via regulation: The role of the state in carbon markets. *Regulation & Governance*, 1–21.

Lee, N. and J. Hassard (1999, Aug). Organization unbound: Actor-network theory, research strategy and institutional flexibility. *Organization 6*(3), 391–404.

Lemke, T. (2001). 'The birth of bio-politics': Michel Foucault's lecture at the Collège de France on neo-liberal governmentality. *Economy and Society 30*(2), 190–207.

Lépinay, V.-A. (2007). Decoding finance: Articulation and liquidity around a trading room. See MacKenzie, Muniesa, and Siu (2007), Chapter 4, pp. 87–127.

Levy, D. L. (1997). Environmental Management as Political Sustainability. *Organization & Environment 10*(2), 126–147.

Levy, D. L. (2011). Strategic power in complex governance systems: The carbon disclosure case. In *Critical Management Studies Conference 7*, Naples.

Levy, D. L. and R. Kaplan (2008). Corporate social responsibility and theories of global governance: strategic contestation in global issue arenas. In *The Oxford Handbook of Corporate Social Responsibility*, Chapter 19, pp. 432–451. Oxford: Oxford University Press.

Li, X. and J. Hersh (2002). Understanding capitalism: Crises and passive revolutions. *Competition & Change 6*(2), 193–212.

Lippert, I. (2007). Zur Rolle von Wissen für Konzepte und in Konzepten antihierarchischer Bildung. Technical report, Arbeitskreis 'Emanzipatorische Bildungspolitik im Postfordismus' des Bund der demokratischen Wissenschaftlerinnen und Wissenschaftler, online retrieved 2012, 1/4 from `http://www.bb-goettingen.de/download/antihierarchiewissen2.pdf`.

Lippert, I. (2010a). *Agents of Ecological Modernisation*. Tönning, Lübeck, Marburg: Der Andere Verlag.

Lippert, I. (2010b). *Fragments of Environmental Management Studies*. Tönning, Lübeck, Marburg: Der Andere Verlag.

Lippert, I. (2010c). Voluntary standards. In N. Cohen and D. P. Philipsen (Eds.), *Green Business: An A-to-Z Guide*, The SAGE Reference Series on Green Society: Toward a Sustainable Future-Series. Sage Publications.

Lippert, I. (2011a). Extended carbon cognition as a machine. *Computational Culture 1*(1).

Lippert, I. (2011b). Greenwashing. In P. Robbins, K. Wehr, and J. G. Golson (Eds.), *Encyclopedia of Green Culture*. Sage Publications.

Lippert, I. (2011c). Limits to managing the environment. See Schmidt, Onyango, and Palekhov (2011), Part III, pp. 209.

Lippert, I. (2012a). Carbon classified? Unpacking heterogeneous relations inscribed into corporate carbon emissions. *Ephemera 12*(1/2), 138–161.

Lippert, I. (2012b, Mar). Carbon dioxide. In C. A. Zimring (Ed.), *Encyclopedia of Consumption and Waste: The Social Science of Garbage*. Sage Publications.

Livesey, S. (2002). The discourse of the middle ground: Citizen shell commits to sustainable development. *Manag. Commun. Q. 15*(3), 313–349.

Livesey, S. and K. Kearins (2002). Transparent and caring corporations? A study of sustainability reports by the Body Shop and Royal Dutch/Shell. *Organization & Environment 15*(3), 233–258.

Loconto, A. and L. Busch (2010). Standards, techno-economic networks, and playing fields: performing the global market economy. *Review of International Political Economy 17*(3), 507–536.

Lohmann, L. (2005, Sep). Marketing and making carbon dumps: Commodification, calculation and counterfactuals in climate change mitigation. *Science as Culture 14*(3), 203–235.

Lohmann, L. (2006, Sept). Carbon trading: A critical conversation on climate change, privatisation and power. *development dialogue* (48).

Lohmann, L. (2009a). Neoliberalism and the calculable world: The rise of carbon trading. See Böhm and Dabhi (2009), Chapter 2, pp. 25–37.

Lohmann, L. (2009b, Apr). Toward a different debate in environmental accounting: The cases of carbon and cost–benefit. *Accounting, Organizations and Society 34*, 499–534.

Lovell, H. and D. MacKenzie (2011). Accounting for carbon: The role of accounting professional organisations in governing climate change. *Antipode 43*(3), 704–730.

Luke, T. W. (2008). The politics of true convenience or inconvenient truth: struggles over how to sustain capitalism, democracy, and ecology in the 21st century. *Environment and Planning A 40*, 1811–1825.

Lynch, M. (1991). Pictures of nothing? visual construals in social theory. *Sociological Theory 9*(1), 1–21.

Lynch, M. (1995). Collaboration and scandal: A comment on Laibinger. *Social Studies of Science 25*(2), 324–329.

Lynch, M. (1999). Silence in context: Ethnomethodology and social theory. *Human Studies 22*, 211–233.

Macintosh, N., T. Shearer, D. Thornton, and M. Welker (2000). Accounting as simulacrum and hyperreality: perspectives on income and capital. *Accounting, Organizations and Society 25*(1), 13–50.

MacKenzie, D. (1990). *Inventing accuracy: A historical sociology of nuclear missile guidance systems*. Cambridge, MA: MIT Press.

MacKenzie, D. (2007). The Political Economy of Carbon Trading. *London Review of Books 29*(7), 29–31.

MacKenzie, D. (2009a, Apr). Making things the same: Gases, emission rights and the politics of carbon markets. *Accounting, Organizations and Society 34*(3-4), 440–455.

MacKenzie, D. (2009b). *Material Markets: How Economic Agents are Constructed*. Oxford University Press.

MacKenzie, D., F. Muniesa, and L. Siu (Eds.) (2007). *Do economists make markets?: On the performativity of economics*. Princeton University Press.

MacKenzie, D. and G. Spinardi (1995, Jul.). Tacit knowledge, weapons design, and the uninvention of nuclear weapons. *Am. J. Sociol. 101*(1), 44–99.

Maltby, J. (2008, Jan). There is no such thing as audit society. *ephemera 8*(4), 388–398.

Mannheim, K. (1952). *Essays on the sociology of knowledge.* Routledge & Kegan Paul.

Mannheim, K. (1954). *Ideology and utopia: An introduction to the sociology of knowledge*. New York: Hartcourt, Brace Co.

Marcon, T. and A. Gopal (2003). Irony, critique and ethnomethodology in the study of computer work: Fundamental tensions. In *Critique and Inclusivity: Opening the Agenda*, `http://www.mngt.waikato.ac.nz/ejrot/cmsconference/2003/proceedings/exploringthemeaning/Marcon.pdf`. Critical Management Studies Conference: online retrieved.

Marcus, G. (1995). Ethnography in/of the world system: The emergence of multi-sited ethnography. *Annual Review of Anthropology 24*, 95–117.

Martin, B. (1994). Anarchist Science Policy. *The Raven 7*(2), 136–153.

Marx, K. (1887). *Capital: A Critique of Political Economy: Volume I.* Moscow, USSR: Progress Publishers at `http://www.marxists.org/archive/marx/works/download/pdf/Capital-Volume-I.pdf`, online accessed 18/3/2011.

May, T. (1994). *The Political Philosophy of Poststructuralist Anarchism*. Pennsylvania: The Pennsylvania State University Press.

M'charek, A. (2010). Fragile differences, relational effects: Stories about the materiality of race and sex. *European Journal of Women's Studies 17*(4), 307–322.

McNeill, J. (2000). *Something New Under the Sun. An Environmental History of the Twentieth Century*. London: Penguin Books.

Meadows, D., D. Meadows, J. Randers, and W. Behrens III (1972). *The Limits to Growth*. New York: Universe Books.

Mebratu, D. (1998). Sustainability and sustainable development: Historical and conceptual review. *Environmental Impact Assessment Review 18*(6), 493–520.

Mennicken, A. (2002). Bringing calculation back in: Sociological studies in accounting. *Economic Sociology 3*(3), 17–27.

Meyer, J. and B. Rowan (1991). Institutionalized organizations: Formal structure as myth and ceremony. In W. Powell and P. DiMaggio (Eds.), *The New Institutionalism in Organizational Analysis*, Chapter 2, pp. 41–62. Chicago, London: The University of Chicago Press.

Mialet, H. (2003, Aug). Book review: The 'Righteous Wrath' of pierre bourdieu. *Social Studies of Science 33*(4), 613–621.

Michael, M. (1994, Spring). The power-persuasion-identity nexus: Anarchism and actor-networks. *Anarchist Studies 2*(1), 25–42.

Miller, D. (2002). Turning Callon the right way up. *Economy and Society 31*(2), 218–233.

Miller, P. (1998). The margins of accounting. See Callon (1998c), pp. 174–193.

Mills, E. (2005). Insurance in a climate of change. *Science 309*(5737), 1040–1044.

Mitchell, W. (2002). Showing seeing: a critique of visual culture. *Journal of Visual Culture 1*(2), 165–181.

Mol, A. (2001). *Globalization and Environmental Reform. The Ecological Modernization of the Global Economy*. Cambridge, Massachusetts: The MIT Press.

Mol, A. (2002). *The Body Multiple: Ontology in Medical Practice*. Durham, N. Ca., and London: Duke University Press.

Mol, A. (2010). Social theories of environmental reform: Towards a third generation. In M. Gross and H. Heinrichs (Eds.), *Environmental Sociology: European Perspectives and Interdisciplinary Challenges*, pp. 19–38. Dordrecht, Heidelberg, London, New York: Springer Verlag.

Mol, A. (2012). Carbon flows, financial markets and climate change mitigation. *Environmental Development 1*(1), 10–24.

Mol, A. and J. Law (1994, Dec). Regions, networks and fluids: Anaemia and social topology. *Social Studies of Science 24*(4), 641–671.

Mol, A. and D. Sonnenfeld (Eds.) (2000a). *Ecological Modernisation Around the World: Perspectives and Critical Debates*. London, Portland: Frank Cass.

Mol, A. and D. Sonnenfeld (2000b, 2007, Mar. 30). Ecological modernization around the world: An introduction. See Mol and Sonnenfeld (2000a), pp. 3–16; online retrieved from `http://www.tricity.wsu.edu/sonn/ecomod_intro.htm`.

Molloy, E. (2000). *Management Technologies: Ideas, Practices and Processes*. Ph. D. thesis, Lancaster University, Lancaster.

Morris, B. (2005). Anthropology and anarchism: their elective affinity. *Goldsmiths Anthropology Research Papers* (11).

Moser, I. and J. Law (2006). Fluids or flows? information and qualculation in medical practice. *Information Technology & People 19*(1), 55–73.

Mümken, J. (Ed.) (2005). *Anarchismus in der Postmoderne: Beiträge zur anarchistischen Theorie und Praxis*. Frankfurt am Main: Verlag Edition AV.

Munro, R. (1999). The Cultural Performance of Control. *Organization Studies 20*(4), 619–640.

Nader, L. (1972). *Up the anthropologist: Perspectives gained from studying up*. online retrieved 2012, 31/3 from `http://eric.ed.gov/PDFS/ED065375.pdf`.

Næss, P. (2006, Jan). Unsustainable growth, unsustainable capitalism. *Journal of Critical Realism 5*(2), 197–227.

Newman, S. (1998). Here, there, and nowhere at all: Distribution, negotiation, and virtuality in postmodern ethnography and engineering. *Knowledge and Society 11*, 235–267.

Newton, T. and G. Harte (1997, Jan). Green business: Technicist kitsch? *Journal of Management Studies 34*(1), 75–98.

Ngwakwe, C. C. (2012, Apr). Rethinking the accounting stance on sustainable development. *Sustainable Development 20*(1), 28–41.

Ninan, A. S. (2011). Outsourcing pollution: Clean development mechanism (CDM) as ecological modernisation. See Schmidt, Onyango, and Palekhov (2011), Chapter 21, pp. 263–282.

Nygren, A. (1999, Jan). Local knowledge in the environment-development discourse: From dichotomies to situated knowledges. *Crit. of Anthropol. 19*(3), 267–288.

Oels, A. (2005, Nov). Rendering climate change governable: From biopower to advanced liberal government? *J Environ Pol Plann 7*(3), 185–207.

Olwig, K. (2005). Representation and alienation in the political land-*scape*. *Cultural Geographies 12*(1), 19–40.

Ortmann, G. (1997). Das Kleist-Theorem. Über Ökologie, Organisation und Rekursivität. See Birke, Burschel, and Schwarz (1997), pp. 23–91.

Oxford Dictionary (2011a). keyword entry 'benefit'.

Oxford Dictionary (2011b). keyword entry 'integrity'.

Oxford Dictionary (2011c). keyword entry 'precise'.

Oxford Dictionary (2011d). keyword entry 'spring water'.

Oxford Dictionary (2012). keyword entry 'invent'.

Parkes, A. (1926). The physiological factors governing the proportions of the sexes in man. *The Eugenics Review 17*(4), 275–298.

Pellizzoni, L. (2011). Governing through disorder: Neoliberal environmental governance and social theory. *Global Environmental Change 21*, 795–803.

Pellow, D., A. Schnaiberg, and A. Weinberg (2000, 2004, Jun. 22; 2007, Jan. 25). Putting the ecological modernization thesis to the test: The promises and performance of urban recycling. See Mol and Sonnenfeld (2000a), pp. 109–137, online retrieved from `http://www.northwestern.edu/ipr/publications/papers/2004/schnaiberg/13_TestEcolMod.pdf`.

Pels, D. (1996). Karl mannheim and the sociology of scientific knowledge: Toward a new agenda. *Sociological Theory 14*(1), 30–48.

Pentland, B. (1993). Getting comfortable with the numbers: auditing and the micro-production of macro-order. *Accounting, Organizations and Society 18*(7-8), 605–620.

Pentzold, C. (2011). Imagining the wikipedia community: What do wikipedia authors mean when they write about their 'community'? *New Media & Society 13*(5), 704–721.

Pepper, D. (1984). *The Roots of Modern Environmentalism*. The Croom Helm Natural Environment – Problems and Management Series. London, Sydney, Dover (New Hampshire): Croom Helm.

Pepper, D. (1998). Sustainable development and ecological modernization: A radical homocentric perspective. *Sustainable Development 6*, 1–7.

Pepper, D. (2005, Feb.). Utopianism and environmentalism. *Environmental Politics 14*(1), 3–22.

Perrow, C. (2010). Organisations and global warming. In C. Lever-Tracy (Ed.), *Routledge Handbook of Climate Change and Society*, pp. 59–77. Londen, New York: Routledge.

Philip, K. (2005). What is a technological author? the pirate function and intellectual property. *Postcolonial Studies 8*(2), 199–218.

Pickerill, J. and P. Chatterton (2006, Dec). Notes towards autonomous geographies: creation, resistance and self-management as survival tactics. *Progress in Human Geography 30*(6), 730–746.

Pigou, A. (1920). *The Economics Of Welfare*. London: Macmillan and Co.

Pinch, T. (2011). Review essay: Karen Barad, quantum mechanics, and the paradox of mutual exclusivity. *Social Studies of Science 41*(3), 431–441.

Pinch, T. J. and R. Swedberg (2008a). Introduction. See Pinch and Swedberg (2008b).

Pinch, T. J. and R. Swedberg (Eds.) (2008b). *Living in a material world*. Cambridge (Massachusetts), London: MIT Press.

Platform (2010). Desk killer.

Plepys, A. (2002). The grey side of ICT. *Environmental Impact Assessment Review 22*(5), 509–523.

Pojasek, R. B. (2010). Environmental management system. In N. Cohen and P. Robbins (Eds.), *Green Business: An A-to-Z Guide:*, pp. 226–229. Thousand Oaks, California: SAGE Publications.

Polanyi, K. (2001, 1944). *The Great Transformation: The Political and Economic Origins of Our Time*. Boston: Beacon Press.

Pollock, N. and R. Williams (2010, May). The business of expectations: How promissory organizations shape technology and innovation. *Social Studies of Science 40*(4), 525–548.

Porter, T. (1992). Quantification and the accounting ideal in science. *Social studies of science 22*(4), 633–651.

Porter, T. (1995). *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life*. Princeton, New Jersey: Princeton University Press.

Powell, F. W. (1921). *The railroads of Mexico*. Boston: The Stratford Co.

Power, M. (1996). Making things auditable. *Accounting, organizations and society 21*(2-3), 289–315.

Power, M. (1997). Expertise and the construction of relevance: accountants and environmental audit. *Accounting, Organizations and Society 22*(2), 123–146.

Power, M. (1999). *The audit society: rituals of verification*. Oxford: Oxford University Press.

Power, M. (2008, Jan). In defence of the audit society: A reply to maltby. *ephemera 8*(4), 399–402.

Prasad, P. and M. Elmes (2005). In the name of the practical: Unearthing the hegemony of pragmatics in the discourse of environmental management. *Journal of Management Studies 42*(4), 845–867.

Prebisch, R. (1964). *Towards a New Trade Policy for Development: Report by the Report by the Secretary General of UNCTAD*. New York: United Nations Conference on Trade and Development.

Preston, A., C. Wright, and J. Young (1996). Imag[in]ing annual reports. *Accounting, Organizations and Society 21*(1), 113–137.

Preston, A. and J. Young (2000). Constructing the global corporation and corporate constructions of the global: a picture essay. *Accounting, Organizations and Society 25*(4-5), 427–449.

Prior, N. (2008). Putting a Glitch in the Field: Bourdieu, Actor Network Theory and Contemporary Music. *Sociology The Journal Of The British Sociological Association 2*(3), 301–319.

Purkis, J. (2004). Towards an anarchist sociology. In J. Bowen and J. Purkis (Eds.), *Changing Anarchism: Anarchist Theory and Practice in a Global Age*, Chapter 2, pp. 39–54. Manchester, New York: Manchester University Press.

R Development Core Team (2010). *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing.

Rämö, H. (1999, Jan). An aristotelian human time-space manifold: from chronochora to kairotopos. *Time & Society*.

Rämö, H. (2011). Visualizing the phronetic organization: The case of photographs in CSR reports. *Journal of Business Ethics*, 371–387.

Rebitzer, G., T. Ekvall, R. Frischknecht, D. Hunkeler, G. Norris, T. Rydberg, W. Schmidt, S. Suh, B. Weidema, and D. Pennington (2004). Life cycle assessment: Part 1: Framework, goal and scope definition, inventory analysis, and applications. *Environment international 30*(5), 701–720.

Rees, B. and E. Garnsey (2003). Analysing competence: gender and identity at work. *Gender, Work & Organization 10*(5), 551–578.

Rees, W. (1992). Ecological footprints and appropriated carrying capacity: what urban economics leaves out. *Environment and urbanization 4*(2), 121–130.

Restivo, S. (1993). The social life of mathematics. In S. Restivo, J. P. Van Bendegem, and R. Fischer (Eds.), *Math worlds: philosophical and social studies of mathematics and mathematics education*, pp. 247–278. New York: State University of New York Press.

Rheinberger, H.-J. (2001). *Experimentalsysteme und epistemische Dinge: Eine Geschichte der Proteinsynthese im Reagenzglas*. Wissenschaftsgeschichte. Göttingen: Wallstein.

Ribes, D. and G. Bowker (2009). Between meaning and machine: Learning to represent the knowledge of communities. *Information and Organization 19*(4), 199–217.

Richardson, B. J. (2009). Climate finance and its governance: Moving to a low carbon economy through socially responsible financing? *International & Comparative Law Quarterly 58*, 1–36.

Richardson, I. (1994, Jul. 05–09). Green computing: The application of computers in environmental management. See Eberhart and Wächter (1994), pp. 268–275.

Rikhardson, P. and R. Welford (1997). Clouding the crisis: the construction of corporate environmental management. In R. Welford (Ed.), *Hijacking Environmentalism: Corporate Responses to Sustainable Development*, Chapter 3. London: Earthscan.

Riles, A. (2000). *The Network Inside Out*. Ann Arbor: The University of Michigan Press.

Riles, A. (Ed.) (2006a). *Documents: Artifacts of Modern Knowledge*. Ann Arbor: The University of Michigan Press.

Riles, A. (2006b). Introduction: In response. See Riles (2006a).

Riles, A. (2010, Dec). Collateral expertise: Legal knowledge in the global financial markets. *Current Anthropology 51*(6), 795–818.

Risku-Norja, H., S. Kurppa, and J. Helenius (2009). Dietary choices and greenhouse gas emissions–assessment of impact of vegetarian and organic options at national scale. *Progress in Industrial Ecology, an International Journal 6*(4), 340–354.

Robson, K. (1992). Accounting numbers as 'inscription': Action at a distance and the development of accounting. *Accounting, Organizations and Society 17*(7), 685–708.

Rocker, R. (1938). *Anarcho-Syndicalism*. London: Phoenix Press.

Røpke, I. (2012). The unsustainable directionality of innovation – the example of the broadband transition. *Research Policy*.

Rose, D. (2000). To dance with time: a victoria river aboriginal study. *The Australian journal of anthropology 11*(2), 287–296.

Rowland, N. J. and T. Gieryn (2008). Transfer troubles: Outsourcing information technology in higher education. See Pinch and Swedberg (2008b), Chapter 12, pp. 375–391.

Saïd, E. W. (1979). *Orientalism*. New York: Vintage Books.

Salter, C. (2011). Activism as terrorism: The green scare, radical environmentalism and governmentality. *Anarchist Developments in Cultural Studies* (1), 211–238.

Savage, M. (2009). Contemporary Sociology and the Challenge of Descriptive Assemblage. *European Journal of Social Theory 12*(1), 155–174.

Sayer, A. (2000). *Realism and Social Science*. London, Thousand Oaks, New Dehli: Sage Publications.

Schaltegger, S., D. Gibassier, and D. Zvezdov (2011). Environmental management accounting: A bibliometric literature review. Technical report, Centre for Sustainability Management.

Schaltegger, S. and T. Synnestvedt (2002). The link between 'green' and economic success: environmental management as the crucial trigger between environmental and economic performance. *Journal of environmental management 65*(4), 339–346.

Schatzki, T. R. (2001). Introduction: practice theory. In T. R. Schatzki, K. Knorr Cetina, and E. von Savigny (Eds.), *The Practice Turn in Contemporary Theory*, pp. 1–14. Routledge.

Schatzki, T. R. (2012). A primer on practices. In J. Higgs, M. Smith, E. Duffy, and T. Gerzina (Eds.), *Practice-Based Education: Perspectives and Strategies*, Chapter 4. Rotterdam: Sense Publishers.

Schmid-Schönbein, O., G. Oetterli, and S. Furter (2005). VfU indicators 2005: Internal environmental performance indicators for the financial industry (report of an international project undertaken by financial institutions). Technical report, Verein für Umweltmanagement in Banken, Sparkassen und Versicherungen e.V. (VfU).

Schmidt, M., V. Onyango, and D. Palekhov (Eds.) (2011). *Implementing Environmental and Resource Management*. Heidelberg: Springer.

Schnaiberg, A., D. Pellow, and A. Weinberg (2000, Apr. 4; 2007, Feb. 16). *The Treadmill of Production and the Environmental State*. `http://www.northwestern.edu/ipr/publications/papers/2004/schnaiberg/17_TreadmillEnvirState.pdf`: online retrieved.

Schuler, R. and S. Jackson (1987). Linking competitive strategies with human resource management practices. *The Academy of Management Executive 1*(3), 207–219.

Schull, N. D. (2005). Digital gambling: The coincidence of desire and design. *The Annals of the American Academy of Political and Social Science 597*(1), 65–81.

Schwartz, B. and K. Tilling (2005, 18th-20th August). Standardizing sustainable development – the case of environmental and social responsibility management and reporting standards. *Paper to be presented at the Scandinavian Academy of Management (NFF) meeting, Aarhus School of Business, Denmark*.

Scott, J. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. The Yale ISPS Series. New Haven: Yale University Press.

Shackley, S. and B. Wynne (1995, August). Mutual construction: Global climate change: the mutual construction of an emergent science-policy domain. *Science and Public Policy 22*(4), 218–230.

Shackley, S., P. Young, S. Parkinson, and B. Wynne (1998, Jan). Uncertainty, complexity and concepts of good science in climate change modelling: Are GCMs the best tools? *Climatic Change 38*, 159—205.

Shapin, S. and S. Schaffer (1989). *Leviathan and the air-pump: Hobbes, Boyle, and the experimental life*. New Jersey: Princeton University Press.

Sharrock, W. and G. Button (1991). Epistemology: professional scepticism. In G. Button (Ed.), *Ethnomethodology and the Human Sciences*, pp. 51–76. Cambridge, New York, Poert Chester, Melbourne, Sydney: Cambridge University Press.

Shayler, M., R. Welford, and G. Shayler (1994). Bs7750: Panacea or palliative? *Eco-Management and Auditing 1*(2), 26–30.

Shields, R. (2006, Dec). Flânerie for cyborgs. *Theor. Cult. Soc. 23*(7-8), 209–220.

Shove, E. (2003). Converging conventions of comfort, cleanliness and convenience. *Journal of Consumer Policy 26*(4), 395–418.

Shulman, B. (1996). What if we change our axioms? a feminist inquiry into the foundations of mathematics. *Configurations 4*(3), 427–451.

Skirbekk, G. (1996). Marxism and ecology. See Benton (1996), Chapter 6, pp. 129–136.

Skogen, K., I. Mauz, and O. Krange (2008). Cry wolf! Narratives of wolf recovery in France and Norway. *Rural Sociology 73*(1), 105–133.

Spaargaren, G. (2011). Theories of practices: Agency, technology, and culture: Exploring the relevance of practice theories for the governance of sustainable consumption practices in the new world-order. *Global Environmental Change 21*, 813–822.

Spooner, B. (1986). Weavers and dealers: the authenticity of an oriental carpet. See Appadurai (1986b), pp. 195–235.

Stanton, P. and J. Stanton (2002). Corporate annual reports: research perspectives used. *Accounting, Auditing & Accountability Journal 15*(4), 478–500.

Star, S. (1991). The sociology of the invisible: The primacy of work in the writings of anselm strauss. In D. R. Maines (Ed.), *Social organization and social process: Essays in honor of Anselm Strauss*, pp. 265–283. Aldine de Gruyter Hawthorne, NY.

Star, S. L. (1999, Nov). The ethnography of infrastructure. *American Behavioral Scientist 43*(3), 377–391.

Star, S. L. and J. R. Griesemer (1989, Aug). Institutional ecology, 'Translations' and boundary objects: Amateurs and professionals in berkeley's museum of vertebrate zoology, 1907-39. *Social Studies of Science 19*(3), 387–420.

Stark, D. and V. Paravel (2008). Powerpoint in public: Digital technologies and the new morphology of demonstration. *Theory, Culture & Society 25*(5), 30–55.

Stechemesser, K. and E. Guenther (2012). Carbon accounting: a systematic literature review. *Journal of Cleaner Production*.

Stern, N. (2008). The economics of climate change. *Am. Econ. Rev. 98*(2), 1–37.

Sterne, J. (2003). Bourdieu, technique and technology. *Cultural Studies 17*(3/4), 367–389.

Sterne, J. (2006, Oct). The mp3 as cultural artifact. *New Media & Society 8*(5), 825–842.

Strathern, M. (1996, Sept.). Cutting the network. *The Journal of the Royal Anthropological Institute 2*(3), 517–535.

Strathern, M. (2004). *Partial connections*. Walnut Creek: Altamira Press.

Strauss, A. (1988). The articulation of project work: An organizational process. *The Sociological Quarterly 29*(2), 163–178.

Strauss, H. (2011). Visualising nuclear landscapes: Visual simulation in the licensing for Finnish nuclear facilities. See Schmidt, Onyango, and Palekhov (2011), Chapter 20, pp. 249–262.

Strum, S. and B. Latour (1987). Redefining the social link: from baboons to humans. *Social Science Information 26*(4), 783–802.

Suchman, L. (1983). Office procedure as practical action: models of work and system design. *ACM Transactions on Information Systems (TOIS) 1*(4), 320–328.

Suchman, L. (1994a). Do categories have politics?: The language/action perspective reconsidered. *Computer Supported Cooperative Work (CSCW) 2*(3), 177–190.

Suchman, L. (1994b, Jul. 05–09). Located accountability: Aspects of a feminist practice of technology production. See Eberhart and Wächter (1994), pp. 124–131.

Suchman, L. (1994c). Working relations of technology production and use. *Computer Supported Cooperative Work (CSCW) 2*(1), 21–39.

Suchman, L. (2000). Organizing Alignment: A Case of Bridge-building. *Organization 7*(2), 311–327.

Suchman, L. (2002). Practice-based design of information systems: Notes from the hyperdeveloped world. *The Information Society 18*(2), 139–144.

Suchman, L. (2005, Jan). Affiliative objects. *Organization 12*(3), 379–399.

Suchman, L. (2007). *Human-machine Reconfigurations: Plans and Situated Action* (2 ed.). New York: Cambridge University Press.

Suchman, L. and L. Bishop (2000). Problematizing 'Innovation' as a critical project. *Technology Analysis & Strategic Management 12*(3), 327–333.

Suchman, L., J. Blomberg, J. E. Orr, and R. Trigg (1999, Nov). Reconstructing technologies as social practice. *American Behavioral Scientist 43*(3), 392–408.

Sullivan, S. (2010). Ecosystem Service Commodities – A New Imperial Ecology? Implications for Animist Immanent Ecologies, with Deleuze and Guattari. *New Formations 69*(1), 111–128.

Swyngedouw, E. (2010a, Mar). Apocalypse forever?: Post-political populism and the spectre of climate change. *Theory, Culture & Society 27*(2-3), 213–232.

Swyngedouw, E. (2010b). Impossible sustainability and the post-political condition. pp. 185–205. Dordrecht, Heidelberg, London, New York: Springer Verlag.

Szerszynski, B. (2010, Mar). Reading and writing the weather: Climate technics and the moment of responsibility. *Theory, Culture & Society 27*(2-3), 9–30.

Szerszynski, B., W. Heim, and C. Waterton (Eds.) (2003). *Nature performed: environment, culture and performance*. Oxford: Blackwell Publishing.

Szerszynski, B. and J. Urry (2010, Mar). Changing climates: Introduction. *Theory, Culture & Society 27*(2-3), 1–8.

Taylor, F. (1911). *The Principles of Scientific Management*. Harper and Bros.

Taylor-Batty, J. (2007). Imperfect mastery: the failure of grammar in beckett's l'innommable. *Journal of Modern Literature*, 163–179.

The Climate Group (2008). The climate principles: A framework for the finance sector. online retrieved (26/03/2012) from `http://www.theclimategroup.org/_assets/files/The-Climate-Principles-English.pdf`.

The International Labour Foundation for Sustainable Development (2008). Climate Change, its Consequences on Employment and Trade Union Action. Technical report, Sustainlabour.

Thévenot, L. (2009, September). Postscript to the special issue: Governing life by standards: A view from engagements. *Social Studies of Science 39*(5), 793–813.

Thomas, K. (1983). *Man and the Natural World. Changing Attitudes in England 1500-1800*. London: Penguin Books.

Thorpe, C. and I. Welsh (2008). Beyond primitivism: Towards a twenty-first century anarchist theory and praxis of science and technology. *Anarchist Studies 16*(1), 48–75.

Timmermans, S. and M. Berg (1997, Apr). Standardization in action: achieving local universality through medical protocols. *Social Studies of Science 27*(2), 273–305.

Trittin, J. (2002, Mar-Apr). Environmental management in the financial sector. *ISO Management Systems*, 18–20.

Trompette, P. and D. Vinck (2009). Revisiting the notion of boundary object. *Revue d'anthropologie des connaissances 3*(1), 3–25.

Tsing, A. L. (2005). *Friction: An Ethnography of Global Connection*. Princeton University Press.

Tufte, E. (2003). *The cognitive style of PowerPoint*. Cheshire, CT: Graphics Press.

Turkle, S. (2003). From powerful ideas to powerpoint. *Convergence: The International Journal of Research into New Media Technologies 9*(2), 19–25.

Turnbull, D. (2002, Dec). Performance and narrative, bodies and movement in the construction of places and objects, spaces and knowledges: The case of the maltese megaliths. *Theory, Culture & Society 19*(5-6), 125–143.

Turnbull, N. and N. Antalffy (2009). Bourdieu's distinction between philosophical and sociological approaches to Science Studies. *Soc. Rev. 57*(4), 547–566.

Turner, B. S. (Ed.) (2009). *The New Blackwell Companion to Social Theory*. Chichester: Blackwell.

UNEP (2011). *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*.

United Nations (1992, Jun. 2.-14.; 2004, Nov. 9). *Agenda 21*. `www.un.org/esa/sustdev/documents/agenda21/english/Agenda21.pdf`: online retrieved.

US Environmental Protection Agency (2012, Mar). Environmental Management Systems (EMS). online retrieved (25/03/2012) from `http://www.epa.gov/ems/`.

Van Der Veen, M. (2003). When is food a luxury? *World Archaeology 34*(3), 405–427.

van Huijstee, M., L. Pollock, P. Glasbergen, and P. Leroy (2011). Challenges for NGOs partnering with corporations: WWF Netherlands and the Environmental Defense Fund. *Environmental Values 20*(1), 43–74.

Van Leeuwen, T. (2001). Semiotics and iconography. In T. Van Leeuwen and C. Jewitt (Eds.), *Handbook of visual analysis*, pp. 1–9. London: Sage Publications.

Van Maanen, J. (1988). *Tales of the Field: On Writing Ethnography*. Chicago, London: The University of Chicago Press.

Vanelslander, B. (2007). Long live temporariness: Two queer examples of autonomous spaces. *Affinities: A Journal of Radical Theory, Culture, and Action 1*(1).

Vereecken, W., W. Van Heddeghem, D. Colle, M. Pickavet, and P. Demeester (2010). Overall ict footprint and green communication technologies. In *Communications, Control and Signal Processing (ISCCSP), 2010 4th International Symposium on*, pp. 1–6. Ieee.

Verran, H. (1999). Staying true to the laughter in nigerian classrooms. See Law and Hassard (1999), pp. 136–155.

Verran, H. (2001). *Science and an African logic*. Chicago and London: University of Chicago Press.

Verran, H. (2002, Oct.-Dec.). A postcolonial moment in science studies: Alternative firing regimes of environmental scientists and aboriginal landowners. *Social Studies of Science 32*(5–6), 729–762.

Verran, H. (2010). The educational value of explicit non-coherence. See Kritt and Winegar (2010), Chapter 6, pp. 101–124.

Verran, H. and M. Christie (2007). Using/designing digital technologies of representation in aboriginal australian knowledge practices. *Human Technology 3*(2), 214–227.

VfU (2007). VfU indicators 2005: Internal environmental performance indicators for the financial industry: Indicator calculation file version february 2007. Technical report, E2 Management Consulting Inc. and the VfU 2003 project group (for details see report), Zürich.

Vidgen, R. (2005, Mar). Commentary: Action-oriented development of information systems: A language-mapping approach. In P. J. Ågerfalk, L. Bannon, and B. Fitzgerald (Eds.), *Action in Language, Organisations and Information Systems*, pp. 251–254. University of Limerick.

Vitellone, N. (2004). Habitus and social suffering: Culture, addiction and the syringe. In L. Adkins and B. Skeggs (Eds.), *Feminism after Bourdieu*, The Sociological Review, pp. 129–147. Oxford, Malden: Blackwell.

von Weizsäcker, E., A. Lovins, and L. Lovins (1997). *Faktor Vier: Doppelter Wohlstand – halbierter Naturverbrauch. Der neue Bericht an den Club of Rome*. München: Knaur.

Wajcman, J. (1998). *Managing like a man: Women and men in corporate management*. Pennsylvania State Univ Pr.

Wakeford, N. (2006). Power point and the crafting of social data. In *Ethnographic Praxis in Industry Conference Proceedings*, Volume 2006, pp. 94–108. Wiley Online Library.

Waterton, C. (2002, Apr). From field to fantasy: Classifying nature, constructing Europe. *Social Studies of Science 32*(2), 177–204.

Waterton, C. (2003). Performing the classification of nature. See Szerszynski, Heim, and Waterton (2003), pp. 111–129.

Waterton, C. (2010). Experimenting with the Archive: STS-ers as Analysts and Co-constructors of Databases and Other Archival Forms. *Science, Technology & Human Values 35*(5), 645–676.

Weber, F. (2001). Settings, interactions and things: A plea for multi-integrative ethnography. *Ethnography 2*(4), 475–499.

Wehling, P. (2006). *Im Schatten des Wissens?* UVK.

Weinstein, M. (2006). TAMS Analyzer: Anthropology as cultural critique in a digital age. *Social Science Computer Review 24*(1), 68–77.

Wenger, E. (2000). Communities of practice and social learning systems. *Organization 7*(2), 225.

West, C. and D. Zimmerman (1987). Doing gender. *Gender & Society 1*(2), 125–151.

White, D. (2006, Feb.). A political sociology of socionatures: Revisionist manoeuvres in environmental sociology. *Environmental Politics 15*(1), 59–77.

Wieser, B. (2002). If the public only knew! In A. Bammé, G. Getzinger, and B. Wieser (Eds.), *Yearbook 2002 of the Institute for Advanced Studies on Science, Technology and Society*, pp. 295–311. Regensburg: Profil.

Williams, D. (2011, Aug). Anarchism and the sociological imagination: An interview with Dana Williams by Jamie Heckert. online retrieved (05/09/2011) from `http://sociologicalimagination.org/archives/5911`.

Winner, L. (1978). *Autonomous technology: Technics-out-of-control as a theme in political thought*. The MIT Press.

Winner, L. (1980). Do artifacts have politics? *Daedalus 109*(1), 121–136.

Woodhouse, E., D. Hess, S. Breyman, and B. Martin (2002). Science studies and activism: Possibilities and problems for reconstructivist agendas. *Social Studies of Science 32*(2), 297–319.

World Bank (2011, Jun). State and Trends of the Carbon Market 2011. Technical Report 63270, World Bank, Environment Department.

World Bank (2012, May). State and Trends of the Carbon Market 2012. Technical report, World Bank, Environment Department.

Wynne, B. (1991, Winter). Knowledges in context. *Science, Technology & Human Values 16*(1), 111–121.

Wynne, B. (1992). Misunderstood misunderstanding: Social identities and public uptake of science. *Public Understanding of Science 1*(3), 281–304.

Wynne, B. (2002, 05). Risk and environment as legitimatory discourses of technology: Reflexivity inside out? *Current Sociology 50*(3), 459–477.

Wynne, B. (2010). *Rationality and Ritual: Participation and Exclusion in Nuclear Decision-making*. Science in Society Series. London, Washington D.C. Earthscan.

Zermelo, E. (1908). Untersuchungen über die grundlagen der mengenlehre. i. *Mathematische Annalen 65*(2), 261–281.

Zimmerman, A. S. (2008, Sep). New knowledge from old data: The role of standards in the sharing and reuse of ecological data. *Science, Technology & Human Values 33*(5), 631–652.

Index

Accountability, 225, 256, 264, 279, 320, 334, 343, 364, 367, 368, 370, 372, 373, 417, 420, 427, 440, 499, 516, 544, 551
Accuracy, 190, 221, 266, 267, 295, 302, 464
Action, 36
  individual, 325
Alignment, 366
Anarchism, 42–46, 57
  and environmental sociology, 9
  and Science and Technology Studies, 43, 551
  movement, anarchist inspired, 233, 477
Anonymity, 303
Apparatus, 450, 471, 515, 529, 536–540
Appresentation, 99
Archive, 40, 152, 214, 513, 522
Articulation work, 40, 85, 118, 356
Auditing, 109, 122, 291–302, 355, 373, 427
  Big Four, 48, 166, 293, 296, 317, 532
  comfort, as serving to, 292
  internal audits, 302, 325, 522
Authenticity, 217
Authority, 73, 77, 84, 110, 114, 119, 349, 591
Automatisation, 400, 406

Baseline year, 24, 124, 180, 194, 211, 229, 375, 499
Black-box, 96
Board of directors, 205, 393
Body, 85, 134, 162, 247, 256, 360
  blindness, 210
  clothing, 291, 424, 427, 428
  corporeality, 347
  health, 431, 432
  resource, as, 395–405
Boundary, 84, 100, 101, 137, 165, 168–179, 221, 271, 378, 441
  boundary work, 348
  documenting, of, 408, 608
  permeable, 166
  responsibility, of, 404
  system boundaries (EMS), 168–172
  temporal, *see also* Time
Boundary object, 171–173, 192, 212, 239, 340, 443, 476, 521
  boundary infrastructure, 281
  ideal type, 171, 173
  practice, 412
  process, 172–178
  project, 447–455
  repository, 173, 177, 321, 356
  standardised entity, 173
  translation, as a means of, 173
  visionary, 321, 337, 359
Bourdieu, 236
  and Science and Technology Studies, 583–587
  and technology, 244
Breakdown, 163, 391
Buildings, 242–244
Business process modelling, 327–332, 430
Business relations, 445
  fossil fuels, *see also* Coal
  military exports, 445

Calculation, 88–107, 247
  addition, 75, 89
  as situated, 90
  calculative analyses, 132
  calculative space, 95, 103, 349
  centre of calculation, 92, 133, 188
  including judgements, 90
  mean versus median, 249

sum, 94, 476
Capital, 234, 236–237
as performance, 242, 265
capitalisation, 247
capitals as ends-in-themselves, 265
fractal logic, 265
multiple distributions, 245–246
symbolic, 252
transforming one capital into another form of capital, 247
Capitalism, 22
Carbon, 16–21, 438, 476
as commodity, 313
carbon conversion factor, 80–82, 85, 86, 98, 101, 118, 119, 147, 197, 198, 201, 304, 307–309, 312, 399, 407, 475, 483–484, 491, 500, 511, 534, 608, 609
carbon offsetting, 17, 18, 64–66, 177, 287–289, 393, 402–403, 478, 484, 498, 506–509, 522–527, 603–605
carbonscape, 164, 215–217, 437–516, 536
emissions, 78
relative, 180
survival vs. luxury, 430, 448
infrastructure, 166
markets, 7, *see also* Market, 635
members' conceptualisation, 170
molecular, 20, 220, 440, 441, 458, 473, 515
neutral, 26, 497, 498
Care, 103, 358, 388, 434
Categorisation, 345
categorial work, 87
Centre and periphery, 386
Certainty, 326
Change, 175, 182, 321, 339, 370, 499
discursive, 326
organisational change management, 252
social change
low carbon society, 285
Class, 358
Classification, 71–75, 100–103, 107–110, 168
class, 73, 76–78
classificatory devision, 260
of humans, 150
politics of, 78–86
prescription, 72
Climate change, 121, 216, 257, 283–285, 497, 498, 532, 602
GFQ's relation to climate change, 127–128
2° C aim, 5, 8, 129, 283, 291, 293, 301, 359
and GFQ's micro-economics, 63–64
as requiring global instruments, 283
as risk, 208
discursive link to sustainable development, 4, 127
Kyoto protocol, 5, 20, 47, 63, 127, 172, 532
mitigation, 26
Closure, 47, 84, 250, 270, 332, 394, 511
Code of Conduct, 27, 123–126, 128, 130, 141, 619
Cognitive deficit model, 146
Coherency, 265, 482, 541
Colonialism, 125, 150, 151
postcolonialism, 284, 513
Commensurability, 20, 92, 95–96, 248, 476, 477
Commodity, 360
exchange, 339
Communication
email, 79, 91, 99, 103, 131, 143–162, 269–270, 273, 461–463, 603–605
ordered, 154
phone, 95, 144–155, 185, 187, 267–268, 385–387, 402, 500
Community, 494
Community of practice, 168, 169, 171, 172, 178, 234–235, 281, 316, 355, 361
Competence, 77
Configuration, 149, *see* Figuration
Conflict, 259
Consensus, 337
Constructivism
members', 181, 193, 376
Context, 481
con-text, 85, 347, 481
Contingency, 37
Continuous improvement, 134

Control, 175, 234
democratic, 550–552
force, 396–398
imaginary of, 164
out of control, 467
situated, 238, 251, 277, 343, 346, 354, 356, 535
Cooperation, 337
Corporate
CSR, 23, 29–31, 37, 52, 57, 63, 127, 128, 131, 137, 183, 205, 207, 208, 211, 215, 218, 219, 222, 246, 283, 289, 293, 309, 325, 328, 330, 334, 335, 339, 341, 359, 364, 424–427, 431–433, 441, 492, 523, 527, 528, 601, 625, 626, 635, 675
citizen, 210
Country
Australia, 288, 402, 603–605
Belgium, 351, 373, 398–399, 410
Columbia, 143–149, 155, 156, 185, 366
France, 160
Germany, 238, 289, 345, 385–388, 402, 415–416, 603
Hungary, 414–415
India, 186, 442, 509
Indonesia, 149–155, 399, 451–455, 465
Korea, 496–498
Malaysia, 245, 391
Mexico, 160, 385–387
Poland, 162
Russia, 158
Taiwan, 390
Turkey, 171
UK, 509
USA, 158, 161, 162, 187, 245, 336, 351–352, 391
Coverage, 147, 165, 166, 174, 179–195, 200, 201, 204, 209, 217, 222, 239, 279, 321, 334, 335, 341, 345–346, 356, 386, 396, 413, 417, 615, 637
as capital adequacy ratio, 334–335
full, 183, 184, 279, 417, 447
multiple, 279
target, 396
Credibility, 128, 174, 374, 446
Data, 31–41, 118, 152, 164, 219, 254
adequate, 399
adjustment, 364–377
affirmed, 344–345
amount of data, 335
as done, 276
as not yet ready, 109, 111
as number, 71
as representation, 148, 219
automatisation, 450
cognitive model, 147
collection, 69–120, 143–168
as phase, 152
multiple orderings, 148
prescriptions, 150
relevancy, 133–134
comparison, 146
contested, 348–352
correct, 146, 148, 149, 252
correctness, 90, 336
data as partial, 222
data quality, 72, 74, 89, 98, 106, 111, 232, 237–239, 241, 244, 245, 249–256, 267, 268, 286, 290, 312, 320, 321, 328, 336, 344, 346, 347, 354–356, 378, 391, 410, 431, 452, 475, 480, 611, 616, 637, 679
as object of EMS transformation, 286
average, 249–251, 346–347, 475
formal definition, 239
delivery, 152
digital, 459–466, 469, 485
disclosure, 257, 269
discrepancy, 146
distributed storage, 177
environmental, 12
estimated, 109
format, 144
formulated, 345–347
handling
manual, 479
having, 240–245
local, 454
manual data, 307
ordering, 148
plausible, 247–248, 351, 352
production, 147

proper, 221
purified, 339
qualifying, 398–400
raw, 240, 243
regulated, 347–348
relative, 374
reliable, 252, 253, 274, 275, 300, 376, 597, 599
source, 106, 117, *see also* Invoice, 244
strategic, 406, 419, 420
strategic orientation, 371, 374
structure, 147, 148
tricked, 161, 411
uncertain, *see* Uncertainty
update, 259
weird, 145, 146
Decision-making, 107–116, 344–354
rational, as, 218
Definition, 168, 378–395
negotiated, 199
open, 388
sharpness, 379
Deviation, 372, 374
Difference, 190, 248
Diffraction, 451
Discontinuity, 505
Discourse, 38, 122, 220, 318, 319, 437, 508, 515, 544
sustainable development, 320, 328
water, 326, *see also* KPI, 521, 541
Domination, 262

Ecological modernisation, 7, 121, 129–130, 380, 531
as discourse, 9, 132
theory (Ecological Modernisation Theory (EMT)), 9, 10, 15–17, 19, 21, 39, 46, 57, 59, 130, 637, 676
Economics, 8, 541
consumer, 91
demand and supply, 17
efficiency, *see* Efficiency
externality, 8, 99, 102–103, *see also* Overflow, 126
internalisation, 2, 8, 111, 499
low carbon economy, 279
markets, *see* Market
pareto-efficiency, 127, 256
Economy
informal, 154
low carbon economy, 256, 274, 278, 595
moral, 394
political economy
micro, 368
responsibilities, of, 369
Efficiency, 129, 132, 146, 178, 187, 224, 327, 340, 409, 491, 529
Jevon's paradox, 224
Emancipation, 236
Emissions, 229–230, 269–275
GHG, 2, 5, 18–20, 23, 47, 124, 127, 169, 170, 172, 175, 196, 197, 289, 291, 403, 430, 526, 608, 609, 611, 638, 676
average, 147
emission trading, 5–7, 129, 288
intensity, 381–384
negative, 6, 7, 16, 17, 497
past, 310–311
reduction, 285, 287–289, 603–605
certificate, 7, 11, 17, 65, 127, 216, 287, 288, 297, 506, 508, 511, 523, 525–527, 541, 603, 604, 610, 635
measures, *see* Measures
policy, 65, 288
strategy, 238, 239, 301
target, 288
trading, 288, *see also* Carbon offsetting
zero, 154, 199, 217, 604
Enactment, 38–39, 118, 377
introduction, 37, 159
Energy, 147
coal, 198, 213, 434–435, 444, 446
hydropower, 147
market energy mix, 147
nuclear energy, 147
photovoltaic, 213
Enlistment, 73
Environmental balance sheet, 18, 31, 36, 140, 168, 173, 175, 177, 178, 180, 188–190, 198, 205, 209, 211, 212, 214, 218–221, 225, 228–230, 232, 234, 242, 243, 246, 247, 249, 269,

272, 279, 288, 289, 298, 307, 308, 324, 340, 350, 351, 367, 368, 385, 402, 403, 413, 427, 435, 438, 467, 468, 472, 476, 478–481, 483, 484, 490, 491, 493, 499, 501–505, 509, 515, 540, 589, 604, 637
file, as a, 175–178
Environmental management, 280
global, 129
studies, 12–15, 18–19, 552
Environmental management system, vii, 2, 10–15, 23, 31, 53, 61, 62, 65, 69, 70, 74, 79, 84, 89, 94, 99, 101, 102, 110, 111, 115, 117, 118, 121–125, 128, 130–142, 144–146, 150–152, 162–164, 166–174, 179–184, 187, 189–195, 198, 200, 201, 204, 207–211, 214, 216, 217, 219–223, 225, 226, 230–233, 237, 241, 242, 244, 245, 251, 252, 254–256, 259, 267, 268, 270–272, 274, 279–281, 286, 287, 290–293, 298, 300–302, 304–305, 310, 312, 320–328, 331–335, 338, 340, 341, 343–346, 348–352, 354, 355, 358, 359, 361, 362, 364–367, 369, 372–374, 376, 378–380, 385, 386, 388, 390–398, 400, 401, 403, 404, 406, 407, 409, 412, 413, 415, 416, 419, 428–430, 437, 438, 442–445, 447, 449–452, 454–457, 466, 467, 476, 485–488, 493, 495, 496, 501, 505, 508, 509, 513, 517–522, 527–529, 534, 544, 546, 550, 562, 564, 565, 594, 596, 598–600, 603, 604, 608, 609, 617, 619, 620, 625, 626, 637, 638, 675, 678
as standardised, 11, 304
cycle, as, 133
definition, 131–133
expansion, 396
history, 324
policy, 133
process, as, 521
promise, 12, 128–130, 179
transformation, 192, 320–343, 355–356, 409–410, 501–505, 513, 519–522
data quality, 251–253
Environmental manager, 67, 310, 427, 543
as data practitioner, 320
disposition, 241–242
employment, 150
role, 259–262
Epistemology
realism, 376
strategic, 417, 420
strategical, 375
Error, 190
ESDR, 31
assemblage, as an, 322
history, 322, 324
introduced, 75
problems, 246, 251
reporting possibilities, 174
Ethnomethodology, 363
Expectation, 145, 146
Expert, 129, 246, 259, 367, 506, 507
Extrapolation, 90, 177, 180–181, 193–200, 412–414
by GCE, 90, 182–183

Facebook, 399
Facts, 33, 34, 38, 73
construction of, 155
fact-making, 167
factum, 118
freezing, 505
social, through interaction, 116, 154
Field, 234–237
stability, 360
Figuration
configuring, 85, 111, 149
prefiguring, 43, 58, 59, 526, 551
reconfiguring, 103
Financial
capital adequacy ratio, 334
data collection, 321, 322, 324
exchange rate, 247, 383, 463
financial crisis, 133, 311, 350, 508, 523
financial emission intensity, 247
investment, 22, 26, 285, 487
SRI, 16, 26, 215, 217, 257, 635, 677
consequences, 213

ethical, 213
products
micro finance, 186, 205, 224
services sector, 22, 128, 207
Finitism, 77, 84
Fluidity, 414, 480
flowing, 220
Food, 100, 448
Football, 152, 153
Footprinting, 24
Forgery, 230
Form, 465
Format, 211
formulating, 345
Foucault, 2, 14, 175, 361, 419
Friction, 25, 36, 151, 301, 327, 358, 418, 478

Gender, 149, 428–432
and sex, 32–33
GFQ, 21
EMS, 130–135
formal carbon accounting, 23, 30–31, 122–126, 130, 133, 135, 137–139, 141, 143, 144, 147, 164, 168, 174, 182, 186, 220, 221, 226, 305, 378, 380, 390, 399, 452, 619, 621
formal relation to carbon, 23–28
hierarchical organisation, 136
structure, 153
subsidiaries (GCE), 26, 122
Governance, 135, 283, 286, 398, 516, 544–552
mandates, 244, 246, 247, 251, 254, 302
Greenwashing, 10, 211, 213, 282, 318, 531, 548, 601, 602

Habitus, 237, 241–242, 276, 310, 361–362
hybrid, 342
Hegemony, 360
Hierarchy, 79, 109, 114, 119, 136, 259, 325, 327, 350
among informational entities, 72
Hinterland, 78, 117, 118, 162, 492, 515, 535, 540, 546, 548, 549
Honesty, 267
Hope, 213, 216, 256, 335, 404, 409–410
Human resource, 340
Human rights, 426
Humour, 370–371, 387
Hybridity, 74, 106, 115

Ignorance, 168, 172, 359
Impression management, 111
Individuals, 369, 449
Information
system
ecological, 12
Infrastructure, 508
breakdown, 490
temporal, *see also* Time
Innovation, 333, 334, 519–522
Inscription device, 74–75, 478–480
Integrity, 124
Interest, 255
Interests, 142, 339
Interference, 153, 187–188, 201, 429
non-interference, 418
Interpretation, 13, 246
Intransitivity, 80
Investors, 27, 275, 446
community, 275
Invisible work, 85
Invoice, 71–75, 85, 89, 91, 117, 292, 321, 453
flat rate, 245, 410
for consumed service, 71
lump sum, 253, 391
needing payment, 71

Knowledge, 34–36, 178, 501–506
as constructed, 155
authority, 152
contingent, 155
expert, 129, 326
expertise, 325
forgetting, 470
ignorance, 10
lack, 521
limits, 204, 222, 302
local, 153
orderly, 455
personal, 151
proper, 110
rational, 146

recognising phenomena, 154
shared understanding, 148, 153
situated, 153, 155
suitable, 110
tacit, 15, 191, 204, 215, 295
tactical, 204
unknown unknowns, 171
visual, 218
KPI, 31, 70, 75, 94, 109, 112, 133, 137, 138, 141, 142, 145–147, 154, 158, 165, 167–170, 172, 177, 180, 188, 189, 192, 199–201, 208, 209, 221, 222, 228, 331, 340, 345, 354, 378, 386, 390, 392, 447, 449, 450, 616, 638
data quality, *see* Data
Energy, 147, *see also* Energy, 188
electricity, 71–75, 89, 196–198, 245, 264, 336, 351, 410, 446
heating, 197, 199, 245
natural gas, 175, 336
Food (no official KPI), 447–450
Paper, 75–78, 107–110, 160, 370
recycling, 173
subindicators, 141, 172–174
Total energy use, 169
Travel, 94, 165, 171, 392
boat (excluded from KPIs), 100
car, 100, 603–605, 608
flight, 94–106, 110–111, 345, 392, 415–416, 483–484
train, 385–387
Waste, 107, 109–110, 153, 169, 326
Water, 78–85, 89–91, 197, 199, 245, 326, 336, 384–391, 451–455, 541, 590
drinking, 182–183, 265, 387–388
tap water, 310, 388

Labour, 144, 303, 340, 360, 421–435, 465, 527–529
child labour, 426
commitment
competing, 145
defining employees, 186–188, 409
division of labour, 152, 400–404, 432, 463, 495
employment, 137, 150
help, 145
holiday, 150
human resources, 145
idendity card, 153
outsourced, 425–426
slave, 262
wage, 339, 537, 592
work-to-rule, 368, 403
worker, 7, 28, 29, 43, 50, 56, 86, 123, 135, 143, 179, 185–188, 251, 259, 262, 368, 401, 421, 477, 492, 548, 602
working hours, 144, 145, 155
Language, 153, 388
Learning, 132
Legitimacy, 124, 165, 276, 279–320, 324, 345
tripartite legitimising network, 318–320
Leviathan, 271
License to operate, 280
Location, 214
office, 427

Manipulation, 224
Market, 2, 4, 7, 16, 120, 127, 130, 257, 355, 541, 546
critique, 7
failure, 2, 16, 103, 256–279
financial market, 107
governable by markets, 314
prices, 352
rankings, 26, 27, 194, 195, 197, 199, 215, 246, 247, 249, 256–279, 298, 303–305, 307–310, 312, 347, 348, 360, 366, 373, 374, 378, 381, 383, 384, 409, 431, 432, 446, 476, 480, 487, 494, 504, 505, 508, 521, 564, 587–601, 619–621, 626, 627, 631
trade, *see* Emissions
Materiality, 99–104, 108, 211–212, 342, 359, 360, 424, 441, 457–473
conflicting, 466–468
Mathematics, 37, 88, 96, 97, 226, 249, 352, 383, 540
axioms, 96
equation, 96–97
theory versus practice, 249

McKinsey, 424–426
Meanings, 483–485
Measurement, 12, 17, 254, 285, 324
  unit, 519
Measures, 6, 8, 11–13, 132, 138, 210, 217, 311, 322, 346, 400, 477, 485, 496–497, 508
Meeting, 311
  actant, as, 258
  solution, as, 191
Messiness, 49, 51, 295, 405–418, 527, 541, 542
Mobility, 427
Modality, 74, 89, 109, 111–112, 263, 271, 347, 353, 519, 593
  alter-modalising, 345
  alter-modality, 347
Model, 169
Monster, 82, 86, 87, 98, 99, 106, 118, 245, 303, 361, 388, 517, 529, 638
Moral, 124, 284
Multiplicity, 104, 148, 189, 244–245, 254, 279, 303, 377, 393, 441–442, 474–488, 502
  copy, 103, 276
  of standards, 304–310
  parallelity, 152, 211, 222, 384, 408
  perspectivalism, 161, 281, 476
  plurality, 346
  singularity, 299, 304, 305, 331, 394
  versions, 228, 276, 349, 477, 481
  winning versions, 189
Myth
  rational, 14–15, 232, 343
  staged, 232

Nation-state, 156, 197–199, 224, 318
Naturalisation, 34, 173, 268, 281, 338, 360, 476, 506, 542
Nature, 216, 602
  as concept, 213
Neo-institutionalism, 316
Neutralisation, 603, *see* Carbon offsetting
Nomos, 240, 301
Normality, 227
  average, as, 199
  norm, 151
Numbers, 215, 521
  change, subject to, 182
  comments, 338
  counts, 180–185
  false, 90, 349
  stability, 184

Objectivity, 5, 14, 22, 34, 35, 39, 42, 44, 50, 96, 162, 165, 190, 317, 321, 322, 378
  feminist, 33, 161
  mechanical, 247, 281, 299
Ontic, 95, 100, 248
  politics, 82
Ontology, 21, 39, 50
  ontological difference, 151
  politics, 84
  poststructuralist, 46, 48
  situated, 181
  turn, ontological, 439
Organisational structure
  as digital representation, 153
Other, 35, 111, 151, 308, 509, 638
Overflow, 97–99, 101, 102, 104, 106, 111, 118, 121, 171, 239, 257, 277, 278, 308–310, 320, 355, 361, 420, 445, 455, 499, 503, 509, 514, 517, 535, 538, 543, 549, 638
Ownership, 254, 357, 449, 610

Parallelity, 115
Participation, 218
  stakeholder dialogue, 282, 601, 602
Path, 125, 126, 218, 333
  bifurcation point, 306
  path dependency, 303
Performativity, 36–38, 49
  enactment, *see* Enactment
  introduction to, 158
  stage, *see also* Stage, 358–359
  stages, 159
Perspectivalism, 440
Place, 93
Placeholder, 494–495
Plan, 132, 496
  implementation, 132
  interferences in plans, 153
  requirements for planning, 194

Point, 356–357
automatic point of affirmation, 114, 251, 255, 277, 344, 357, 538
contingent point of passage, 114–115, 311, 323, 341, 357
obligatory point of passage, 86, 92, 110, 112, 115, 119, 277, 311, 323, 341, 357, 366, 538, 638
source point, 92
Policy, 4, 8, 9, 11, 63–66, 132, 133
Political, 552
action, 82
economy, 425
the political, versus non-political, 260, 278, 347–348, 352, 397, *see also* Strategy, 400–404
Position, 235–237
vulnerable, 111
Powerpoint, 426
Pragmatism, 253
Precision, 267, 394
Presence-absence, 26, 41, 97, 99, 210, 346, 412–417, 471
Product ecology, 22, 172, 446
Products, 285
green, 288, 506
Profession, 303, 309
Professional vs. expert, 209
Profit, 124, 285, 445
pay off, 283, 288
Promise, 179, 210, 322, 336, 360, 405, 533
Publics, 27, 28, 61, 248–250, 254, 267, 268, 270, 276, 278–280, 292, 300, 310, 314, 316–318, 346, 358, 446, 488, 498, 511, 542
Punctualisation, 84, 269
Purification, 74, 101–103, 325
purity as premise, 100

Qualculation, 94–99, 103, 248
account of an qualculation, 304
investment into, 248
Quantification, 172, 178

Race, 151
Rational actor paradigm, 36, 37, 57, 237
Reality, 36
diverging, 390–392
misfit, 243
Reference figure, 146, 181, 182, 187–189, 200, 201, 637, 638
Reflexive modernisation, 363
Reflexivity, 74, 151, 181, 215, 273
author's presence, 151
blind-spots, 284
intervention, 181, 250
members reflecting, 446
members', 377
political responsibility, 131
research
commitment, 233
conditions, 145
ethics, 131
labour, 493
trusting members' information, 196
uncertainty, 187
Relationality, 49
Relative vs. absolute, 211, 213
Research, 41–57
field site, 21–31
access, 28–30
fieldnotes, 52, 493
generalisability, 46–48, 532
methodology, 48–56, 152, 555–582
Responsibility, 112, 210, 240, 267, 272, 280, 325, 350, 390, *see also* Corporate, 587
division, 250–251
Reversibility, 214, 338, 540, 541
Revolution, 43, 551
passive, 257
Risk, 179, 180, 352
reputational, 283, 288, 426, 603
safe-guarding against risk, 306

Scale, 41, 179, 219, 249, 324, 326, 340, 413, 442–444, 454, 499–511
extension, 182
local-global, 34, 138, 387, 390, 455
ordinal, 239
ownership, *see* Ownership
transport, 449
universality, 138, 303, 380, 387, 388, 394, 395
Schooling device, 139, 362, 455
Script, 77, 117, 147, 159, 162

Self-referential, 374
Silence, 172
Similarity, 190, 255, 263–264, 371–374
  difference, versus, 248
  equivalent prior data, 248, 259
  previous year, 371–374, 381, 475
Simulation, 130, 426, 515
Singularity, 116, 222, 346, 486
Situatedness, 90, 114
Situation, 234
Smell, 424
Social, 538, 539
  as human everyday relations, 386
Social constructivism, 33
Sociology
  promise, of, 336
  verbs, of, 247
Sound, 149, 150, 155, 187, 223
  listening technology, 150
  making audible, 152
  non-audibility, 151
  voice, 149
Space, 160
  global, 154, 324
  local, 154, 485
  travel, 144
Speech-act, 112, 158
Spreadsheets, 246–247, 340
Stage, 38, 59, 231, 232, 238, 261, 281, 290, 296, 313, 314, 341, 347, 354, 355, 358
  backstage, 37, 295, 297, 341
Standards, 101, 264–266, 279–281, 302–314, 327, 350, 475–476, 484, 508, 638
  GHG Protocol, 48, 101, 307–311, 319, 350, 631, 682
  ad-hoc, 166
  as legitimising, 280
  communication, 501
  EMAS, 11, 304, 631
  environmental, 130
  Gold Standard, 17, 65, 508, 523–527
  interpretational clarity, 264
  ISO 14.001ff, 11, 14, 133, 208, 317, 610
  ratings, 264, 303
  standardisation, 168, 173, 221, 378
    implicit, 362, 446
  standardised methods, 174
  tripartite standards regime, 318
  VfU, 48, 80, 85, 101, 165, 169, 170, 177, 197, 198, 249, 265, 266, 279–282, 300, 304–308, 310, 312, 314, 316–319, 360, 372, 407, 413, 417, 483, 608, 609, 611, 620, 631
    history, 306
  voluntary, 14, 303
Statistics, 348
Strategy, 192, 193, 351, 393, 400, *see also* Political, 418, 542
Structure, 234
Subjectivity, 82, 87, 281, 477, 491–493, 498, 584
Sustainable development, v, 2, 4, 9, 15, 21–24, 27–29, 31, 42, 52, 55, 57, 60, 61, 121–123, 125–130, 132, 133, 137, 141–143, 166, 168, 169, 174, 178, 179, 182, 183, 204, 205, 207, 209–225, 227, 234, 241, 250, 267, 283, 286, 289, 298, 303, 304, 314, 316, 318–320, *see* Discourse, 328, 359, 380, 383, 426, 432, 437, 515, 517, 518, 522, 529, 531, 535, 539, 540, 542, 544, 548, 549, 562, 603, 625, 626, 674
  and financial services, 303
  and terrorism, 130
  as salvation, 141
  history of concept, 125
  passive, 446
  premises, 128
  simulation, as, 130
  strategies, 128–129

Task (ESDR), 84, 92, 94, 97, 98, 103, 107, 111, 115, 117, 118, 139, 140, 142, 147, 148, 152–156, 158, 159, 164, 171–173, 178, 182, 197, 228, 239–242, 244, 245, 254, 263, 339, 370–373, 387–390, 394, 443, 452, 455, 456, 512, 521, 555, 619, 621, 637, 638
Technology implementation, 337
Temporality, 108, 309, 609
  temporal translation, 86

temporal view, 78
Test, 166, 311, 334, 336–337
indicator, 311
proxy, 255, 298, 311, 322
Thing (Latour), 349, 354, 443, 451
Threshold, *see also* Deviation
Time, 75–78, 93, 143, 144, 150, 153, 160, 175, 191, 192, 262, 340, 370, 371, 442, 445, 483, 488–499, 592, 594
and efficiency, *see* Efficiency
calendar, 602
deadline, 31, 143, 144, 228
duration, 155, 491
future, 77, 195, 225, 272, 322, 347, 355, 405, 515, 535, 604
far, 496, 498
near, 495
promissory, 211, 212
past, 77, 78, 85, 86, 108, 117, 119, 194, 211, 311, 329, 344, 347, 394
period, 147, 148, 492, 493
minutes, 150
reporting, 143, 144, 177, 194, 209, 211, 228, 249, 305, 362, 371–375, 411, 493–495, 497, 539, 638
precious, 145
resource, as, 254
synchrony, 489–492
tempo, 497
temporal frame, 492–496
temporal stability, 509
time zone, 149, 442, 495
timeline, 138, 144, 145, 336, 427
timing, 496–498
working hours, *see also* Labour
Topology, 234, 318, 509
fire, 505, 510
fluid, 510
network, 509
regional, 150, 156, *see also* Nation-state, 509
country, 587
Translation, 39, 74, 268–269
betrayal, 74, 84
Transparency, 27, 41, 57, 218, 301, 359, 370, 433, 518, 540, 541
Travel, 470
Trial of strength, 263
Trust, 64, 124, 128, 152, 158, 160, 174, 209, 217, 296, 321, 336, 341, 344, 349, 350, 409–410, 463, 473, 498, 515, 546
capital, as, 272–273
centre of, 466
trustworthiness, 160
Truth, 38, 45, 410, 411, 529

Uncertainty, 145, 158, 161, 168, 194, 267, 268, 312
User, 147
misuse, 602
Utopia, 28, 232–233
restricted, 497

Values, 133, 516
Violence,symbolic, 361
Visibility, 168, 170, 175, 190, 204, 469, 482
invisibility, 171
Vision, 155, 165, 253
calibrated, 148
gaze, 149, 154
reflexive, 165
global, 155
god-trick, 160, 161, 163
invisible, 147
looking away, 409–410
magical, 164
of the EMS-Team, 160
partial, 33
shaping, 148
surveillance, 387
visibility, 152
visualisation technology, 150
Visionary entity, 211, *see also* Boundary object, 336
Visualisation, 204–219, 283
Vorreiter, 290

Wikipedia, 247, 384
Witness, 281, 287

Curriculum Vitæ – Ingmar Lippert

Date of Birth	17 October 1980
Degrees	B. Sc. in *Environmental and Resource Management* Brandenburg University of Technology Faculty of Environmental Sciences and Process Engineering 2005
	M. A. in *Environment, Culture and Society* Lancaster University Institute for Environment, Philosophy and Public Policy (IEPPP) and Sociology Department Centre for the Study of Environmental Change (CSEC) 2007
Positions	*Research Fellow* Inter-University Research Centre for Technology, Work and Culture Institute for Advanced Studies on Science, Technology and Society (IAS-STS) 2007 – 2008
	Research Fellow National University of Singapore Tembusu College 2012 – ongoing
Scholarships	*German National Academic Foundation* 2004 – 2011 (not 2007 – 2008)
	Hans-Böckler-Foundation 2008 – 2012
Community	*Central Evaluation and Accreditation Agency* Member of the Standing Accreditation Commission 2006 – 2009
	Environment, Management and Society Research Group Founding Member 2009 – ongoing
	European Association for the Study of Science and Technology Council Member 2010 – 2012