Chapter 1

The Imaginative Fabrics of Urban Sustainability

From Metaphor to Matter and from Management to Culture in Eco(logical) City (Re-)Design

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"We have entered the urban millennium."[1] Kofi Annan's words, spoken in the year 2000, when he was Secretary-General of the United Nations, still sound like a self-fulfilling prophecy. The last decades have indeed witnessed a great increase in the urban population, as well as the growth of megacities and of far-reaching city regions with urban dwellers outnumbering rural dwellers for the first time in the history of humankind. And, as the latest UN report on the subject, issued in 2014, shows, we have not seen the end of it: by 2050, about 75% of the world's population is expected to live in cities.[2] This dramatic increase in city space and urban habitats will fundamentally alter our relationship to the planet, although nobody can predict what the exact consequences will be. Statistics and numbers have to be interpreted and are narratively framed, so that they always mirror the cultural place and context in which they are created by various means.[3] Annan, for instance, underlined the socioeconomic impacts connected to urbanization, their benefits, as well as their dangers. In his view, "cities are engines of growth and incubators of civilization," but can also turn into "places of exploitation, disease, violent crime, unemployment, and extreme poverty."[4] His comments echoed his concern for social topics of human rights and equality, issues whose relevance and immediacy he had witnessed firsthand due to his upbringing in a developing country. They also drew on a long tradition of thinking about cities in terms of their civilizational and cultural worth, especially with regard to the historical evolution of city-states, progress, and prosperity—a view that modernity has incorporated from antiquity. That the beneficial effects of cities are tied to public concern and policy is also implicit in this vision, and

Annan's call to "do more to make our cities safe and livable places for all" still rings true today.[5]

However, the parameters have shifted, and while the socioeconomic frameworks of urban lifestyles and quality of life continue to be pressing concerns, the environmental impacts of cities have been brought swiftly into focus in the wake of anthropogenic climate change and the depletion of resources on a global scale. Against this background, a different image seems to arise, which questions whether unbridled city growth can really be said to be limitless, and which suggests that large-scale urbanization could create more problems than it can actually solve. As Herbert Girardet notes in his 2008 book *Cities, People, Planet*, "the dependence of cities on the land beyond their periphery" and the impacts of urban living on those areas demand "new ways of looking at" urbanization.[6] His book is one example in a long line of contemporary publications and cultural media that study urban development in relation to climate change and that call for new ways of imagining the place of cities on a globalizing planet, as well as for innovative and interactive principles for situating cities in their respective environments. In this context, sustainability, resilience, and self-sufficiency have become key terms used by urban theorists, environmental activists, urban planners, and politicians alike. In the following, I want to trace the cultural roots and imaginations connected to these terms, and I want to sketch out the shift from metaphor to matter that co-occurs with the development of so-called eco-cities. While the general ideas behind eco-cities can be welcomed for their all-encompassing approach to what urban sustainability could entail, the socioeconomic fabrics and political ideologies are to be criticized for their top-down modeled management of urban environments. I will argue that culture has to be seen as an integral part of sustainability, because urban planning relies on narratives and is rooted in long cultural traditions. Moreover, our cities are (...). Only when the cultural dimension of sustainability is taken into account will the environmental impacts of cities be reconciled with the social topics of equality, justice, and prosperity that Annan evoked at the dawn of the millennium.

What will, in the following, be referred to as a "turn from metaphor to matter and from management to culture" is no totalizing or all-explanatory approach to the subject of urban sustainability, but rather an explorative perspective that tries to correlate two general patterns of development in recent years. There is no question that matter has come to the fore in environmental philosophy, as well as practice in shaping humanity's relationship to the nonhuman world. The "material turn" is both theory and practice, but in terms of urban planning and design it has its roots in cultural narratives and

projections that have long imagined cities as circuits or metabolisms and that have themselves transferred principles as observed in nature to human-built environments. In taking the metaphorical conceptualizations of the urban literally and in perceiving the city as a scene of material exchange processes that can be administered, managed, and imposed, some of the implications ingrained in the original cultural imaginations (like, for instance, aspects of communal engagement with urban space) are in danger of being superseded by mechanistic concepts of eco-city planning where the human element is often missing or marginalized. The "cultural turn," on the other hand, has paved the way for a revaluation of the role of symbolization, language, and representation in society, replacing—or at least modifying—scientistic, often positivistic, and economic explanations of the "social." This is not to say that the "material" and "cultural" turns as described in this essay are opposites, but rather that they need to complement one another in sustainable (eco-) city (re)design. Where a materialistic view of city space leads to top-down management, a cultural view needs to highlight the social, historical, and imaginative dimensions that engage with the urban from the bottom-up. Built-from-scratch cities are ideal for showing these perceived shifts in urban design, not only because they take their impetus from cultural projections and stories, but also because they give clear prevalence to material dimensions of economic growth and environmental management. Eco-cities themselves are cultural fictions that need to be seen against their sociocultural background; this cultural aspect is in need of revaluation. Conceiving built-from-scratch cities as cultural narratives-turned-reality enables us, as I aim to show, to uncover the different dimensions of sustainability now prevalent in urban design—and to explore where the story of the urban future is in need of retelling.

FROM METAPHOR TO MATTER: URBAN SUSTAINABILITY DISCOURSE

Since the time of the Industrial Revolution, the decline of nature and the parallel ascendancy of an urbanized world have featured prominently in environmental and scientific debates. Because cities contribute massively to greenhouse gas emissions, demand huge amounts of energy, and produce heaps of waste, they are, it is claimed, places of pollution and hindrances on the path to a greener future. While I have dealt with these narrative templates elsewhere,[7] I have only marginally invoked the other side of the story, which sees cities as part of the solution to environmental degradation and as pioneers in progressive ecological policies and leadership. This could, for

instance, be seen after the failure of a number of international climate sum-
mits, which repeatedly dashed high expectations by their unwillingness (or
sheer incapability and ignorance) to reach binding emission-reduction targets
and to impose transnational green initiatives. In the Climate Communiqué of
the Large Cities Climate Leadership Group (C40) issued at Copenhagen, the
mayors of the biggest cities involved in extensive decarbonization programs
gave a wake-up call "that the future of our globe will be won or lost in the cit-
ies of the world."[8] "Aside from demonstrating that city governance was more
progressive than policy-making at the state level," as Andrew Ross comments
on their initiative, "the mayors' statement reflected a growing consensus
that only in dense urban environments could efficient, low-carbon living be
achieved on a mass scale."[9] This argument entails one of the key points that
urban commentators make in their endorsement of city life over other forms
of social organization, namely that population density and the compactness
of urban spaces save large areas of nonhuman nature from occupation and
create conditions enabling relatively short distances between people and
their institutions, public transportation, and so on. However, this does not,
of course, automatically engender sustainable urbanism per se, but rather
depends on the willingness of administration and policy makers to implement
programs that mitigate emission levels in urban spaces, reduce costs of—or
create other incentives for—using public transportation services, and involve
the most vulnerable and marginal groups in environmental justice initiatives.
There are thus many variables involved in urban sustainability discourses that
encompass social, material, and cultural dimensions.

The latter dimension has to do with how we imagine our cities and their
place and function within a globalized world. As Susanna Hagan puts it, "the
cultural context is one in which, over the last generation, a new metanarrative
has risen out of the ashes of postmodernist relativism—'ecologism.'"[10] Hagan
points to the increasing coalition between ecologist and urban thinking in her
concept of "Ecological Urbanism," which "foregrounds a view of the city as
literal and metaphorical ecosystem."[11] In architectural and planning terms,
this entails focusing on the "metabolic processes" and "creat[ing] some ver-
sion of 'artificial ecosystem': cities that achieve the same interdependent effi-
ciencies and life-preserving redundancies as natural ecosystems."[12] In fact,
much literature on urban development now stresses the ties between ecologi-
cal thinking and urban practice. According to Tai-Chee Wong and Belinda
Yuen, this also entails shifting from an "anthropogenic (human-centered)"
perspective to one that highlights "the interdependency of human and non-
human species and the 'rights' and 'intrinsic values' of non-human species in
our pursuit for a sustainable ecosystem."[13] In their view, "ecological planning
involves conceptual thinking in environmental urban sustainability, land use
allocations, spatially designed and distribution patterns that contribute and

lead to achieving such objectives of ecological balance."[14] Wong and Yuen's comment is interesting in so far as it merges the non-anthropocentric outlook of ecological justice advocates with a spatial focus on the city, which suggests that the achievement of environmental objectives depends on the human management and renegotiation of land use patterns and resources. As we will see, this is a paradox implicit in ecological models of urbanism in general, which stems from the aim of merging "ecology's characteristic scalar thinking" that "addresses the interrelationships between human culture and the biophysical environment [...] and the physical city and its bio-environment."[15]

The theoretical issue of scale, which is connected to many current environmental discussions about such concepts as deep time, the Anthropocene, or environmental footprints, has been incorporated into the scientific study of urban ecology since its beginning and concerns the identification of population-based spatial patterns and their relationships to ecological phenomena. More than a scientific collection of data on emission rates or population statistics, this also involves reflecting on how human meaning-making systems render their relationship to a more-than-human environment. While this is often done in a metaphorical way that conceptualizes anthropogenic city space as an ecosystem in its own right, it also means looking at the specific material conditions and physical, place-based contexts in which human-nature interactions take place. Metaphor and matter are mutually dependent on one another in concepts of urban ecology. As I want to show in the remainder of my essay, it is between these poles of metaphor and matter that urban sustainability arises as a concept at present, one in which the cultural imagination plays a key role for the formation and formulation of solutions to our environmental crisis.

Let us begin with the metaphorical aspect. To render cities as ecosystems has a long tradition in cultural history, and while "this simile was, and still is, used to describe a cluster of economic or social relations [...], the environmental sciences have made [it] literal," perceiving the city as a spatial area with its own metabolism and feedback systems.[16] In cultural-historic terms, the metaphor goes back as far as antiquity, when philosophers of the Greek city-state referred to cities as organisms—an image that has been taken up repeatedly by modern city planners, visionaries, and artists.[17] Included in this vision is an understanding of the underlying complexity of urban life, including the interaction and interplay of the various parts that make up the whole. To imagine the city as a body rather than a system of any kind has the advantage that the city is seen as a living entity that depends on the functioning of all parts for its survival, whereas the image of an ecosystem has the benefit of bringing other-than-human entities into focus as an integral part of a living landscape. The widespread tendency to visualize cities as biological occurrences is, on the one hand, tied to the scientific impulse to outline

the biophysical foundation of cities; on the other hand, it may be seen as an attempt to discursively overcome a dualistic rhetoric that opposes cities and country, or culture and nature. Cities, these metaphors make clear, are also part of nature and of an interactive biosphere. Yet, as Richard Ingersoll reminds us in his critical overview, "the appearance of ecology within the discourse of architecture hinges on a historic paradox: every act of building betrays the environment, as it requires the displacement of 'natural' relationships."[18] Built environments are superimposed upon natural ones, feeding on natural resources and altering the landscape's morphology. Since cities merge "multi-layered biological and technical systems," Girardet has coined the term "eco-technical systems"[19] to underline the hybrid characteristic of cities. His term is useful because it avoids an anthropogenic perspective by describing the city as an *oikos* in which human and other-than-human entities are likewise involved without neglecting the controlled interventions in these relationships through technology and other means. Navigating these poles and realizing the paradox engrained in urban ecology are vital to any truly sustainable approaches to the city.

Urban ecology is, in this context, another way of framing the interrelatedness of human actions and the more-than-human environment within an urban space. Initially used in a metaphorical way by social scientists who studied the interaction between social groups (and their respective areas) in cities, urban ecology is now increasingly applied by urban planners, as well as natural scientists.[20] Common to their use of the term is an increasing tendency to render the material processes and metabolisms involved in urbanism. In Hagan's terms, urban ecology is a "way of seeing," especially the "material relationships between the built and the physical site," as well as their "socio-economic implications."[21] It is also a way of seeing what nature has to teach us with regard to adaption, construction, and resilience. Accordingly, natural processes are used as a model by many architects and planners who have begun to integrate concepts based on biomimicry.[22] While this model concerns the ways in which our built environments have to be reconstructed in order to withstand environmental impacts and mitigate emissions and energy consumption, it is based on the belief "that cities would be well advised to model themselves on the functioning of ecosystems to assure their long-term viability."[23] Inherent in this statement is a somewhat idealist image of ecosystems as beneficial (and balanced) for the continuity of the whole. While this does not hold in scientific terms because ecosystems are themselves marked by dominant or invasive species that lead to inconsistencies and periods of imbalance followed by regeneration,[24] it is still interesting to note the underlying impulse: Girardet argues that cities should create a metabolism in which every output is used as an input in order to minimize pollution and to maximize resource use.[25] Popular notions of ecosystems

are thus turned into foils upon which new interactive processes within cities can be modeled. This entails, for instance, a rethinking of how waste, garbage, and sewage are treated—rather than something to be disposed of, they become raw materials that could be used for energy production. It also means re-visioning the ways in which our cities interact as place-based entities with their hinterlands and the global flows of travel and trade. Most of the products sold in cities are imported from elsewhere, and, in a time when agriculture has been relegated to areas far removed from urban centers, loads of "food miles" are piled up that lead to high emission rates for transport alone.[26] In order to render the impact of our cities on a global scale, William Rees and Mathis Wackernagel came up with the concept of the "ecological footprint," which they define as "the areas required to supply cities with food and forest products to absorb their output of wastes, and particularly their output of carbon dioxide."[27] Like the metaphor of an urban ecosystem, the ecological footprint analysis is a "seeing" device (in the sense of Hagan's use of the term): it helps us to visualize the material impact of cities on the planet, as well as their mutual interrelationship.[28] And it is from the realization of the material imbalance inherent in this connection that debates about urban sustainability stem in our modern age.

There are myriad ways of defining sustainability. In urban terms, sustainability is a slogan that unveils as much as it covers up. Usually it combines aspects of social equity, the political management of resources, as well as a consideration of the long-term effects of urban design on humans (and sometimes nonhumans) in the framework of a circumscribed city area.[29] As Girardet defines the term, "a 'sustainable city' enables all its citizens to meet their own needs and to enhance their well-being, without degrading the natural world or the lives of other people, now or in the future."[30] Girardet's anthropocentric and socially centered perspective is central to definitions of sustainability formulated by policy makers and underlines the necessity of shifting the focus on how to maintain resources, rather than deplete them, to attend to their just distribution.[31] This socioeconomic outlook is often supplemented by a technological one that addresses the problem of how to use the material by-products of urban life in order to reduce environmental pollution and mitigate climate impacts. Since not all technological interventions are environmentally friendly, and because economic interests do not always coincide with environmental justice, there are tensions inherent in the term,[32] which can undermine the formulated aims and efforts from the beginning. One example is the problem of the new versus the renewed:[33] is it more ecological to renovate already existing buildings with regard to insulation and energy consumption or to erect new buildings instead? What will become of the people living there? And who benefits, economically speaking, from grand-scale construction projects? Another aspect to consider is

that, although cities can manage resources in a certain way, "they can never become fully self-sufficient. Therefore, individual cities cannot be considered 'sustainable' without acknowledging and accounting for their dependence on resources and populations from other regions around the world."[34] To put it differently, sustainability is a concept that focuses on engendering stability and maintaining balance within an environment whose manifold actors and agents are anything but stable or balanced and include areas far removed from the narrow outskirts of an individual city.[35] Sustainability means negotiating the parameters upon which the far-reaching material interrelationships and socioecological interactions rest and involves a process of reflection about which standards—and what exactly—should be maintained. Unfortunately, current approaches to the term often fall short of advocating these issues so that it appears as an empty catchword without meaning. Negotiating meaning and interpreting concepts is exactly what the humanities do, and it is time to shift the focus to what sustainability means from a cultural perspective—an issue that is still undertheorized at the moment and that is addressed by the essays in this collection. In the following, I want to tackle this question by looking at ecological redesign, as well as the construction and planning of so-called eco-cities. As I will show, eco-cities are a prime example of the ways in which sustainability is used as a cultural foil for making implicit claims about issues of management, matter, and social processes of participation. I will argue that the cultural level is central to any approach that self-labels its intentions as "sustainable": while urban planners use storytelling and other cultural media to communicate their visions, they should also look to the culture of a city as a resource to be used and from which to learn.

FROM MANAGEMENT TO CULTURE: NEGOTIATING THE NARRATIVE FABRICS OF ECO-CITIES AND SUSTAINABILITY

Sustainability evolved into a key term of urban planning and architecture over the last decades of the twentieth century. However, it has been an increasing sensibility to the possible interrelations between human resource consumption and degrading environmental conditions, as well as the realization of the long-term consequences of consumption and economic growth ideologies in the wake of the 2008 collapse, that has given sustainability a new urgency in the twenty-first century.[36] What can be witnessed all over the world are extensive construction projects that aim for a new type of city, one that incorporates ecological ideals in both a metaphorical and a material way. Bringing about (...) of creating cities as self-reliant systems that do not

exclude natural forces but rather incorporate them in order to channel their energy and impact.[37] In Wong and Yuen's words, "this implies that cities should be conceptualized as ecosystems where there is an inherent circularity of physical processes of resources, [and] activities and residuals that must be managed effectively if the city's environmental quality is to be maintained."[38] This quotation incorporates all of the variables of ecological urbanism illustrated above and makes clear that the metaphor becomes a design principle in its own right, one that has to be "managed" and administered by officials and planners. As Hagan has shown, these principles are already ingrained in the UN Agenda 21, first formulated after the so-called Rio Earth Summit in 1992. Although very much centered on social justice in their formulation of "settlement objectives," the authors also proposed all-encompassing strategies for land use patterns and sustainable infrastructures.[39] In Hagan's analysis of this text, "it is a collection of ethically driven objectives, content without form or embodiment" with "objectives" that "don't lend themselves to imagery."[40] Thus the fabrics from which the eco-city concept sprung were vague, to say the least, and this still shows in contemporary design concepts, which have made clever use of the ethical objectives as labels for their far-reaching initiatives—initiatives that are, as we are about to see, neither always ecologically nor socially minded.

The trouble begins with the problem of how to accurately define the term eco-city. There is a plethora of definitions and characteristics attributed to it.[41] It can be seen as an "umbrella concept,"[42] which merges economic, social, and environmental aspects to reenvision human habitation in a globalized world. Richard Register first coined the term in his 1987 book *Ecocity Berkeley: Building Cities for a Healthy Future*, which put emphasis "on urban re-formation modelled on the circular consumption found in natural ecosystems, and achieved through environmental and social engineering."[43] Next to a focus on renewable energy production, this also includes aspects of social density and the avoidance of car traffic within the city area.[44] In order to guarantee and boost the development of eco-cities, the World Bank has incited the Eco2Cities program, which promotes financial support for cities and countries adopting green strategies in their city planning.[45] This has led developers to enter a race for financial support as more and more policy makers see the urgency of creating sustainable cities while also sensing the chance of participating in a new, profitable market at the same time. The latter aspect becomes apparent when one looks at the eco-city projects that have been implemented so far: Masdar City (Abu Dhabi), King Abdullah Economic City (KAEC, Saudi Arabia), and New Songdo (South Korea) are all designed as business hubs in a global network of travel trade. Either giant port cities (KAEC) or centers of air traffic (New Songdo), they are designed

to meet the demands of a globalized economy. Moreover, all of them are master-planned cities, built from scratch on blank slates, without already existing historical ties to the environment or social infrastructures. Let us look at the example of New Songdo.[46]

With the help of international star architects and architectural consortia, one of the first eco-cities of the world has been built on Incheon, near Seoul. Situated in the Incheon Free Trade Zone, New Songdo could easily become the template for a new urban design focused on both ecological and economic functionality as a breeding ground for a new, relatively homogeneous middle class. This mega project is expected to fulfill the vision of bringing in modern technology and diversifying the country's economy by focusing growth on energy, transportation, and knowledge-based industries. Moreover, a design based on compactness should ensure that all its citizens are in close contact to green spaces. Active high technology in buildings and on streets regulates the metabolic exchange and flow of substances and people within the city, while reducing emissions to a bare minimum and making use of renewable energy. The animations by architects and design groups involved in the planning of Songdo promise a bright future for the city—one in which the inhabitants can live healthily and prosperously.[47] However, in these animations, the city is the star, not the people themselves. The people resemble nice decorations for the city's shiny urban fronts, but the city seems eerily devoid of life. The animations invite the viewer to visit the city via long tracking shots and aerial views that provide a dynamic overview over the different parts of the city. But we never actually touch the ground; there is nothing of the messiness, the hectic and noisy everyday life that comes along with thousands of people living in a dense urban environment. To be sure, an animation could never adequately capture this aspect of the urban experience, but it is a common denominator of eco-city designs that they seem to highlight order and structure as opposed to other factors that actual engagement with urban space creates.

It is interesting to note the utopian vision and political determinacy included in the planning of this large-scale urban project—while it holds great promise for a future based on mutual prosperity and well-being, there have been setbacks, as well. Initially planned for 70,000 inhabitants, the city now holds about half that number of people. The implementation of the project has been more costly than initially calculated, and the city primarily hosts a population whose mobility is constrained by various factors: I do not mean this in the literal, spatial sense of the word, but in both social and cultural terms. Whereas the public transportation system is excellent, and walking distances have been reduced to a bare minimum within the city space, Songdo is planned *for*, not *by* the inhabitants. Career paths and job opportunities are predetermined, and there is not much room for the inhabitants' own initiatives; moreover, it has been made up of set pieces of already existing cities,

including a central park, a convention center modeled on Sydney's opera house, and vast shopping malls resembling Dubai's sumptuous duty-free areas. People move *in* Songdo, but are they really moved *by* their city? A retort city like Songdo has the problem that it lacks a history, a sense of place based on a long interaction with the environment; its structures have not grown in laborious processes, but were imposed on a blank slate. This is the primary reason why critics of eco-city projects predict a somber future for these cities as their top-down modeled design misses the cultural aspects of urban ecology and communal identity.[48] In an environmental sense, they also dodge the difficult question of what to do with already existing cities which may not be as sustainable or self-sufficient. What is needed is not so much a look ahead to shiny urban projects, but rather a look back to the environmental history of our cities: where do they come from and how have they negotiated the shifting landscapes of their surroundings? How can they work with their natural environments to reach an ecological equilibrium and a sound base for biophilic well-being? That South Korea's leading politicians are not blind to this issue can be seen in Seoul, where government-led green initiatives have seen the implementation of natural reserves along the shores of the once polluted Cheonggyecheon River. The river and its biosphere have recovered and have turned into a popular recreational area with beneficial effects on Seoul's urban climate and its (non)human inhabitants.[49] When it comes to urban planning, the simplest measures sometimes have the greatest effects. This can, in fact, be seen as an integral part of what constitutes ecological knowledge within our cities: a sensitivity to natural landscape features and an experience in dealing with them based on a long history of nature-culture interaction. There is an inherent danger of romanticizing cities with histories, of course. And it is clear that a place-based urban history can have negative effects as well, for instance by spurring closed community fervor when newcomers (or refugees) are prohibited from settling down in a specific part of the city—as Claudia Mantovan relates in her essay in this collection—or by presenting a hindrance to innovation when laws prohibit the renovation or reuse of abandoned or rundown factory buildings. Nevertheless, it is my belief that history can make a difference, especially where the communities and people come to the fore as the protagonists of city life and as integral parts of the multilayered levels of everyday complexity (and sometimes chaos).[50]

This is also where storytelling comes in as the framework for, and basis of, sustainable urbanism: in eco-cities built from scratch "no pre-existing population and social groups are invited to influence the planning process, advocate, or bargain for their interests."[51] Rather, eco-cities "are designed and marketed as smart cities and intelligent places offering all the related economic and environmental advantages, in terms of competitiveness, environment, quality of life, and safety."[52] In their analysis of the advertisement plans,

design graphics, and architectural visions for Dongtan, the Chinese showcase eco-city which was supposed to be built near Shanghai but was stopped due to financial and infrastructural problems, Julie Sze and Yi Zhou uncover the narratives connected to ecological cities.[53] As they make clear, this Chinese eco-city (and, in this respect, it does not differ from other projects around the world) can be "understood as a projection of global fantasies of what an ecological life and experience would look like"[54] while neglecting the specific local conditions and environments on which it is built. The specific "top-down character of the project [...] does not put the local community at the center," and its "language of ecology is a very specific index of economic development"; as Sze and Zhou put it, "material prosperity is not only the precondition for building the eco-city; it is also the goal."[55] In the same vein, Mark Jarzombek argues that most eco-city projects use popular notions of ecology as a mere label, "pretending that masterplans are cities." He sees their danger: they can turn into "corporate enclave[s]" with little or no benefit to the majority of the population.[56] What can indeed be witnessed with regard to eco-development on a global basis is that the wealthy classes benefit most from green initiatives. Moreover, the construction of eco-cities is not only a costly enterprise but also a tremendous logistical task, and it remains to be seen whether the transportation of raw materials, the construction of high-technological buildings, and the import of nourishment will really justify the effort, especially in an environmental sense. Rather, it seems as if eco-cities and their visions of urban metabolisms managed by machines reinforce myths of technology as a means of resolving ecological problems when it is, in fact, reproducing processes of capitalist modernization.[57] It is important to stress that these critical voices do not question the necessity of reformulating strategies of urban living and design but challenge contemporary notions of ecological urbanism that use sustainability as a mere label without content.[58]

Storytelling is used to sell and advertise eco-cities, but how can it be used to create what I would like to call "sustainable thinking" with regard to contemporary urbanism? I suggest that there are two possibilities: one is storytelling as a mode of critique, and the other is storytelling as a mode of showing alternatives and integrating already existing urban models. Both have been used in contemporary debates and books that deal with sustainability discourses in cities and that try to confront planners' intentions with the voices of local residents. Andrew Ross, in his 2011 monograph *Bird on Fire: Lessons from the World's Least Sustainable City*, looks at the example of Phoenix, Arizona, and how this desert city navigates the tightrope of being a crowded city with only a small number of natural resources and climatic conditions demanding innovative design methods. He traces how ideas of technological fixes and urban development plans often clash with dwellers' own experiences in dealing with the land. While the city administration and politicians formulated

bold plans for their city, the many citizens whom Ross interviewed presented him with another image entirely, namely one in which environmental justice and ecological balance were unraveled by misguided top-down initiatives and economic interests. The stories presented by Ross function as a counter-discourse against "the vested power of the growth machine"[59] that uses ecology as a label for obscuring strategies of gentrification, as well as show that "the greening of cities is a grand act of improvisation,"[60] in which community action and bottom-up processes of urban gardening, recycling strategies, and resource protection can make a big difference. By interviewing community leaders as well as marginalized groups, Ross uncovers the social roots of urban sustainability, along with "the conviction that a community's resilience depends on its capacity to adopt the conditions of its most vulnerable populations as a baseline for green policymaking."[61] Instead of the discursive greenwashing involved in ecological (re)design, he thus argues for involvement of local residents in discussions concerning urban environmental conditions, since a city's sustainability relies on the contribution of every urban dweller and does not solely depend on technological management. In a time when advertising and images have a strong impact and are dispersed easily via social networks, it becomes crucial to question the underlying messages of techno-materialist modernization initiatives and to ask for the (economic and social) costs of these enterprises. Listening to and telling the stories of people immediately affected by these issues can be one way of challenging any great narratives that appease the conscience of consumers with the promise of their actions having minimal to zero environmental impact. As Hagan puts it, "people power must supplement if not replace new-fangled technologies: reduce, recycle, re-use. Citizens must *choose* not to drive a car, must *choose* to insulate their roof, must *choose* to have solar panels."[62] In this context, narratives and communal interaction have to make an appearance, not in the form of didactic measures, but as modes of democratic involvement and debate. "Sustainability," as Ross points out, is then "a social challenge as much as it is a biophysical goal."[63] Alone, "a set of metrics"—data that measures urban metabolisms—"reflects a purely physical understanding of how societies strive to be ecologically resilient. By contrast, there are no indexes for measuring environmental justice, no indicators for judging equity of access to the green life, and no technical quantum for assessing the social sustainability of a population."[64] I would claim that cultural stories told by residents can function in exactly this way, and it is time to incorporate them into our frameworks of what constitutes sustainability in a city.

This may be harder to do with regard to eco-cities built on a blank slate or parcel of land that has no long history of human settlement. But, as Julie Sze has shown in her book *Fantasy Islands: Chinese Dreams and Ecological Fears in an Age of Climate Crisis*, this is still possible when one looks at

the specific sociocultural contexts in which eco-cities are built. To Sze, these "ecological fantasy islands" are part of a "utopian branding of the future" and "reflect the values and ideologies of their creators."[65] Sze takes their pursuit of eco-development and change as a metaphor that encapsulates the contradictions of our ecological crisis. Like Ross, she warns "against simple designs or [a] technological fix,"[66] while also claiming that the design dreams of eco-cities fail both at taking "their own ecotopianism seriously"[67] and at imagining true alternatives to our current predicaments. In her view, it is necessary to get rid of static concepts of the "environment" and "to see 'environments' through multiple lenses," thus creating "multiple environmentalisms."[68] This includes a historical, deep perspective, an analysis of present conditions, and an imaginative framework that enables us to seek alternatives.[69] I propose using "eco-cities" in exactly this way: as a mode of cultural ecological narrative that helps us to think about urban sustainability from various angles and in new ways. Our cities will not benefit from big design projects built on a blank slate, but they could profit from applying and adapting some of the goals and measures of eco-cities to their own environments, including renewable energy strategies, a sensitivity to material metabolisms, and issues of public transportation. Some of the urban forerunners of sustainability, including Copenhagen, Curitiba, Freiburg, and others, have long integrated these ideas into the management of their infrastructures and surroundings. They prove that "strong grassroots involvement and participation" are vital to sustainability and "are manifestations of a *culture* of sustainability."[70] This cultural aspect includes "an understanding of site and context" on the one hand,[71] but also the question of how "the tremendous creativity of urban people can be applied to the imperative of sustainable development" on the other.[72] This makes clear why eco-cities drawn up on masterplans are doomed to fail, because they lack a "cultural context"[73]—or rather, they do not take their own cultural place and background seriously enough. As long as eco-cities continue to be sold as pragmatic and manageable forms of terraforming, they will fall short of their initial aims of creating truly livable and sustainable cities. Built-from-scratch cities are often laboratories of technological innovation and economic models of boosting growth, when they could be so much more: laboratories of thought where new modes of urban community, (bio)diversity, and renewable design could be tested. Sustainability is not only about maintaining balance, but, in cultural terms, it is also a dynamic process of the activation of creative energies for imagining alternative lifestyles. In consequence, the stories that we tell about our cities could make all the difference. Are they places beyond redemption, ugly stains on the beautiful carpet of our planet? Or are they places of hope, where pathways to more environmentally just and friendly ways of living can be sought? In the history of humankind, cities have always functioned as nodal points in a network

of mobility and trade, but they have also been hubs of creative energy and cultural imagination. To see creativity as a resource in its own right might be key to unlocking the great ecological challenges of the future. The "environmental humanities" should join the debate. The time is now.

NOTES

1. United Nations, "Secretary-General Calls for Practical Achievable Programme to Make Globalization a Positive Force for All World's People," news release, July 5, 2000, http://www.un.org/press/en/2000/20000705.sgsm7479.doc.html.

2. United Nations Department of Economic and Social Affairs, Population Division, *World Urbanization Prospects: The 2014 Revision* (New York: United Nations, 2015), http://esa.un.org/unpd/wup/Publications/Files/WUP2014-Report.pdf.

3. There is now a vast variety of literature on urbanization and how to interpret these staggering figures; see Herbert Girardet, *Cities, People, Planet: Urban Development and Climate Change* (Chichester, England: Wiley, 2008), 254–56.

4. United Nations, "Secretary-General Calls for Practical Achievable Programme."

5. Ibid.

6. Girardet, *Cities, People, Planet*, 1.

7. See Christopher Schliephake, *Urban Ecologies: City Space, Material Agency, and Environmental Politics in Contemporary Culture*, Ecocritical Theory and Practice Series (Lanham, MD: Lexington Books, 2015).

8. C 40 Cities, "The Copenhagen Climate Communiqué," *C40Cities.org*, accessed November 30, 2015, http://www.c40cities.org/news/news/-20091215.jsp.

9. Andrew Ross, *Bird on Fire: Lessons from the World's Least Sustainable City* (New York: Oxford University Press, 2011), 7.

10. Susannah Hagan, *Ecological Urbanism: The Nature of the City* (London: Routledge, 2015), 4.

11. Ibid., 4.

12. Ibid., 4.

13. Tai-Chee Wong and Belinda Yuen, "Understanding the Origins and Evolution of Eco-City Development: An Introduction," in *Eco-City Planning: Policies, Practice and Design*, ed. Tai-Chee Wong and Belinda Yuen (Heidelberg: Springer, 2011), 2–3.

14. Ibid., 2.

15. Hagan, *Ecological Urbanism*, 9.

16. Ibid., 11.

17. See Girardet, *Cities, People, Planet*, 108–9.

18. Richard Ingersoll, "The Ecology Question and Architecture," in *The SAGE Handbook of Architectural Theory*, eds. C. Greig Crysler, Stephen Cairns, and Hilde Heynen (Los Angeles: SAGE, 2013), 574.

19. Girardet, *Cities, People, Planet*, 108.

20. For an overview, see Hagan, *Ecological Urbanism*, 20–31.

21. Ibid., 16.

22. See Ingersoll, "Ecology Question and Architecture," 574.

23. Girardet, *Cities, People, Planet*, 123.

24. For a concise discussion of current debates among ecologists and biologists, see Matt Ridley, "Nature Has No 'Balance' for Us to Keep," *Wall Street Journal*, March 23, 2012.

25. Girardet, *Cities, People, Planet*, 123–30.

26. That is why Girardet speaks of "Mobilisation" (10) in order to render the way in which cities have turned into nodal points for the mobility of products and people; see also ibid., 75, 93, and 111; on agriculture and food imports, see ibid., 236–53.

27. Ibid., 113–14.

28. Peter Head and Debra Lam, "How Cities Can Enter the Ecological Age," in *Eco-City Planning: Policies, Practice and Design*, ed. Tai-Chee Wong and Belinda Yuen (Heidelberg: Springer, 2011), 19.

29. See Thomas Elmqvist, Guy Barnett, and Cathy Wilkinson, "Exploring Urban Sustainability and Resilience," in *Resilient Sustainable Cities: A Future*, eds. Leonie J. Pearson, Peter W. Newton, and Peter Roberts (New York: Routledge, 2014), 19–21.

30. Girardet, *Cities, People, Planet*, 6.

31. See Hagan, *Ecological Urbanism*, 94–95.

32. See Steffen Lehmann, *The Principles of Green Urbanism: Transforming the City for Sustainability* (London: Earthscan, 2010), 139–41.

33. See Hagan, *Ecological Urbanism*, 87.

34. Elmqvist, Barnett, and Wilkinson, "Urban Sustainability and Resilience," 19.

35. Because anthropogenic climate change and the different variables included in urban systems are dynamic phenomena, recent approaches replace "sustainability" with "resilience." Resilience, some commentators claim, is better suited for thinking about issues of "recovery, adaptive and transformative capacities of interlinked social and ecological systems and subsystems" as well as "the ability of an urban system either to adjust or adapt in the face of change." Elmqvist, Barnett, and Wilkinson, "Urban Sustainability and Resilience," 20.

36. Ecological (re)design of cities is not merely a present concern, but as a very long history that includes forebears as Ebenezer Howard, Patrick Geddes, or Paolo Soleri. Although I cannot get into details at this stage, it is interesting to note the utopian potential of their respective visions, itself part of a long cultural-historic process of thinking about humanity's relation to its environment. See especially Ruth Eaton, "Architecture and Urbanism: The Faces of Utopia," in *Utopia: The Search for the Ideal Society in the Western World*, eds. Roland Schaer, Gregory Claeys, and Lyman Tower Sargent (New York/Oxford: The New York Public Library/Oxford University Press, 2000), 298–315.

37. See Girardet, *Cities, People, Planet*, 264–67.

38. Wong and Yuen, "Eco-City Development," 3.

39. See Hagan, *Ecological Urbanism*, 95.

40. Ibid., 95.

41. For a concise overview, see Meine Pieter van Dijk, "Three Ecological Cities, Examples of Different Approaches in Asia and Europe," in *Eco-City Planning: Policies, Practice and Design*, eds. Tai-Chee Wong and Belinda Yuen (Heidelberg: Springer, 2011), 31–33. Hambleton summarizes some of the basic principles of

eco-city design. It "supports an economy that works with the environment not against it; questions the primacy of economic interests over other considerations; is alert to the environmental impact of decisions relating to urban infrastructure (particularly transport, energy, water, waste and buildings in general); and is committed to the principles of sustainable planning and urban development." Robin Hambleton, *Leading the Inclusive City: Place-based Innovations for a Bounded Planet* (Bristol: Policy Press, 2015), 208.

42. Scott Dunn and Walter Jamieson. "The Relationship of Sustainable Tourism and the Eco-City Concept," in *Eco-City Planning: Policies, Practice, and Design*, eds. Tai-Chee Wong and Belinda Yuen (Heidelberg: Springer, 2011), 97.

43. Hagan, *Ecological Urbanism*, 95.

44. See Wong and Yuen, "Eco-City Development," 3.

45. See Ibid., 9.

46. New Songdo is featured prominently in Frédéric Castaignède's documentary series *Cities of the Future* (2014), produced by the European TV channel ARTE. For other examples like Dongtan, Masdar City, or King Abdullah Economic City, see Girardet, *Cities, People, Planet*, 289–94; Lehmann, *Principles of Green Urbanism*, 116-18; Hagan, *Ecological Urbanism*, 97–105.

47. As an example, see Gale International, "Songdo Vision," *YouTube*, April 17, 2008, https://youtu.be/cVtvlQ4Jzbw.

48. See Nicolai Ouroussoff, "In Arabian Desert, a Sustainable City Rises," *New York Times*, September 25, 2010.

49. See Dunn and Jamieson, "Sustainable Tourism," 101.

50. At this point, my essay also touches on the topic of place-making and the question of "non-place." While it would be worthwhile to delve deeper into these issues I cannot do this due to the initial topic and the length of the essay. I have extensively discussed these issues and the literature elsewhere: Schliephake, *Urban Ecologies*, xxiii–xxviii.

51. Nikos Komninos, *The Age of Intelligent Cities: Smart Environments and Innovation-for-All Strategies* (London: Routledge, 2015), 124.

52. Ibid., 125.

53. See Julie Sze and Yi Zhou, "Imagining a Chinese Eco-City," in *Environmental Criticism for the Twenty-First Century*, eds. Stephanie LeMenager, Teresa Shewry, and Ken Hiltner (New York: Routledge, 2012), 218–19.

54. Ibid., 220.

55. Ibid., 226.

56. Mark Jarzombek, "Post-Sustainability," in *Smartcities and Eco-Warriors*, eds. C. J. Lim and Ed Liu (London: Routledge, 2010), 248–49.

57. See Shiloh Krupar and Stefan Al, "Notes on the Society of the Brand," in *The SAGE Handbook of Architectural Theory*, eds. C. Greig Crysler, Stephen Cairns, and Hilde Heynen (Los Angeles: SAGE, 2013).

58. On the heterogeneity of contemporary approaches to sustainable architecture, see Simon Guy, "Introduction: Whither 'Earthly' Architectures: Constructing Sustainability," in *The SAGE Handbook of Architectural Theory*, eds. C. Greig Crysler, Stephen Cairns, and Hilde Heynen (Los Angeles: SAGE, 2013).

59. Andrew Ross, *Bird on Fire: Lessons from the World's Least Sustainable City* (New York: Oxford University Press, 2011), 20.
60. Ibid., 20.
61. Ibid., 17.
62. Hagan, *Ecological Urbanism*, 96 (original emphasis).
63. Ross, *Bird on Fire*, 199.
64. Ibid., 245.
65. Julie Sze, *Fantasy Islands: Chinese Dreams and Ecological Fears in an Age of Climate Change* (Oakland: University of California Press, 2015), 14–15.
66. Ibid., 163.
67. Ibid., 101.
68. Ibid., 159.
69. Cf. ibid., 101.
70. Girardet, *Cities, People, Planet*, 18–19 (original emphasis).
71. Lehmann, *Principles of Green Urbanism*, 118.
72. Girardet, *Cities, People, Planet*, 257.
73. Ibid., 273.

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