Green and Grey: New Ideologies of Nature in Urban Sustainability Policy

Forthcoming in the Annals of the American Association of Geographers

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Abstract: *In the past two decades, "urban sustainability" has become a new policy common sense. This paper argues that contemporary urban sustainability thought and practice is co-constituted by two distinct representational forms, which we call green urban nature and grey urban nature. Green urban nature is the return of nature to the city in its most verdant form, signified by street trees, urban gardens, and the greening of post-industrial landscapes. Grey urban nature is the concept of social, technological urban space as already inherently sustainable, signified by dense urban cores, high-speed public transit, and energy-efficient buildings. We develop Lefebvre's ideas of the realistic and transparent illusions as the constitutive ideologies of the social production of space to offer a framework for interpreting contemporary urban sustainability thinking in these terms, and concretize this argument through case studies of post-industrial greening in the Ruhr Valley, Germany; municipal sustainability planning in Vancouver, Canada; and the Masdar smart city project in Abu Dhabi. We conclude by examining the implications of green and grey urban natures for the politics of urban sustainability.*

Keywords: *urban nature, green and grey, ideology, sustainability*

Green and grey sustainable cities

In the face of intensifying global environmental crisis, where do the world's hopeful eyes turn? To the city. "The environmental challenge we face," writes David Owen (2004: 112), "at the current stage of our assault on the world's non-renewable resources, is not how to make our teeming cities more like the pristine countryside. The true challenge is how to make other settled places more like Manhattan." According to economist Nicholas Stern (2015), cities "afford multiple opportunities to dramatically reduce carbon emissions while sustaining prosperous standards of living." One think tank recently declared that "climate-smart" cities could save the world $17 trillion (Global Commission on Economy and Climate 2015). And urban leadership pundit Benjamin Barber (2013: 131) made the case as follows: "Cities cannot wait for states to come to terms with climate change.… Political leadership by mayors and city councils…and voluntary intercity cooperation…are key in confronting both the urban consequences of climate change and the underlying causes."

What does the city as a solution to the world's environmental problems look like? It is not simply a return of nature to the city, but rather a distinctive pairing of "grey" high-tech environmental strategies with traditionally "green" interventions such as parks and gardens. New master-planned eco-city projects of the sort which may soon comprise half of new urban developments in China (Shepard 2015) promise sustainability through high technology, thanks to cutting-edge solar power, public transportation, thermal insulation, water filtration, and waste management systems. But optimistic renderings of these spaces inevitably surround shiny new skyscrapers with lakes, trees, and lush parks and plantings, and festoon residential buildings with verdant rooftops or hanging gardens (Figure 1). Planners in North America and Western Europe draw on the same tropes even when not planning new developments from scratch. Urban sustainability plans promote energy efficiency with LEED-certified buildings and smart infrastructure while promising new street trees, expanded park space, and support for urban agriculture and community gardening.

This pairing of high-tech "grey" with natural "green" aesthetics is urban sustainability in its paradigmatic contemporary form. And though it appears self-evident, this representational configuration is a thing to be explained. Why should urban sustainability take the form of green and grey? Why are high-tech environmental interventions dressed up in green garb? This paper offers a framework for interpreting contemporary urban sustainability thought and practice, based on a

Figure 1: A paradigmatic representation of urban sustainability as green and grey, in a render of the proposed Nanjing Green Towers (credit: Stefano Boeri Architetti).

distinction between *green urban nature* and *grey urban nature*. Green urban nature is the return of nature to the city in its most verdant form, while grey urban nature is the concept of social, technological urban space as already inherently sustainable.

This paper shares an agenda with urban political ecology (Angelo and Wachsmuth 2015; Gandy 2003; Heynen et al. 2006; Keil 2003; Swyngedouw 1996), critical analyses of contemporary urban sustainability (Anguelovski et al. 2016; Isenhour et al. 2015; Mössner and Miller forthcoming), and emerging scholarship on the urban political economy of climate change (Bulkeley et al. 2015; Cohen 2017; Rice 2014) in that we seek to disentangle the power-laden forms of contemporary urban sustainability practices. But, in contrast to these literatures, our project is to unpack the distinct aesthetic representations, green and grey, that urban nature takes. To do so, we develop Henri Lefebvre's ideas of the realistic and transparent illusions as the constitutive ideologies of the production of space to argue that urban sustainability planning today is constituted by twin ideologies of green and grey urban nature. We concretize this argument through three case studies of Germany's Ruhr Valley's green revitalization, Vancouver, Canada's Greenest City Action Plan, and the Masdar

smart city project in Abu Dhabi and conclude by unpacking the ideological work performed by these representations in contemporary urban sustainability planning and politics.

Urban sustainability thinking's common sense

Despite its present ubiquity in policy and academic circles, the concept of "urban sustainability" has come into common currency only in the past two decades. In 1996 Harvey placed scare quotes around "sustainable" when he noted that "some attention has begun to be paid...to the question of 'sustainable' cities and more environmentally friendly forms of urban growth and change" (427). Several years later Girardet (1999) was still explaining to a dubious public why "sustainable cities" were not a "contradiction in terms". Fast forward to the present, and green space (formerly relegated to city parks on the one hand or suburban developments on the other) is now a standard feature of urban development agendas. Environmental amenities from bike lanes to parks to farmers markets are leveraged for local economic development agendas. Urban agriculture is increasingly treated as a productive land use to be encouraged as opposed to a marginal one to be tolerated. Dense urban development is justified on environmental grounds in addition to the familiar economic grounds, while technologically sophisticated smart-city schemes promise to reduce urban environmental footprints. And, as international efforts to reduce greenhouse gas emissions through the Kyoto and Paris processes have stalled, city leaders are increasingly being hailed as the best hope for fighting global climate change.

As urban sustainability becomes a ubiquitous discourse in policy and planning circles around the world, local governments, supported by national and international policy initiatives, are increasingly likely to adopt formal sustainability plans or climate action plans. Even Phoenix, Arizona described by Ross (2011) as the "world's least sustainable city" in 2016 adopted a plan to be carbon neutral by 2050. And money is following these initiatives: philanthropic foundations and corporations now have ambitious grant-making programs oriented toward urban sustainability, while consultants and corporations secure governmental and non-governmental contracts and grants for urban-environmental developments. Finally, there has been a remarkable proliferation in recent years of global interlocal networks oriented towards urban sustainability challenges, with the C40 Cities Climate Leadership Group, ICLEI

- Local Governments for Sustainability, and the Rockefeller Foundation's 100 Resilient Cities the most prominent among a growing list of initiatives.

Contemporary urban sustainability thinking contains a number of diverse and often contradictory elements. But current plans and debates generally emphasize some combination of the following key features, which together form a kind of emerging elite "common sense" (Gramsci 1971):

- *Density:* Even as suburban modes of urban growth have continued to expand and intensify across the globe in the last 20 years (Keil 2017), this period has also seen the emergence of something close to a policy consensus around the idea that urban density has environmental value (Jenks et al. 1996), particularly with respect to the necessity of reducing greenhouse gas emissions. As Glaeser (2009) argues: "Thoreau was wrong. Living in the country is not the right way to care for the Earth. The best thing that we can do for the planet is build more skyscrapers."
- *Smart technology:* The "smart city" is an increasingly diffuse label for a variety of urban development, governance, and branding policies being pursued by governments, corporations, and civil society organizations around the world (Hollands 2008; Söderström 2014; Vanolo 2014). In its early incarnations the smart city was strongly technological but only weakly sustainable. Efficiency, rapidity and ubiquity were its keywords, and the internationally recognizable smart-city projects such as Songdo, South Korea were marketed in these terms. But over the past 10 years, smart-city policies have increasingly been pitched on the basis of their environmental potential a fact which urban research has begun to document (Herrschel 2013; Neirotti et al. 2014; Viitanen and Kingston 2014). Today, smart cities such as Songdo and Masdar (discussed below) are upheld as new paragons of urban sustainability.
- *Resilience:* In the face of growing environmental threats, particularly linked to global climate change, urban policymakers have begun to understand sustainability in part as the need to proactively restructure cities' physical and social landscapes to protect them against these threats. This has been accompanied by the arrival of "resilience" as a new urban policy buzzword (Ahern 2011), which is arguably beginning to supplant "sustainability" itself as the master concept for urban environmental thinking (Wilkinson 2012).
- *Livability:* Parks and green spaces have been important elements of humane urban development since the 19th century, and environmental justice advocates have long

argued for more equitable access to these amenities. But today, entrepreneurial urban governance routinely leverages these amenities as as development strategy via "livability" a kind of tangible expression of sustainability at the local scale (Ruth and Franklin 2014). In terms which are analogous to the earlier marketing of cities for their "creative" arts and cultural amenities (Peck 2005), today the sustainable city (along with its desirable neighbourhoods) is promoted through bike lanes, walkability, farmers' markets and other green infrastructure. The rising property values and "green gentrification" more recently associated with proximity to environmental amenities (Gould and Lewis 2016) underscore their perceived centrality to contemporary sustainable urban life.

In any combination of these features, today sustainability planning is most often a market-oriented and pro-growth concept (Greenberg 2015). This is doubly true of *urban* sustainability, since it is precisely the productive power of cities which is supposed to meet global environmental challenges. But even as market- and growth-oriented sustainability planning has become dominant, counter-proposals led by community groups, nonprofits, and social movements draw on similar discourses of sustainability as they aim to decommodify urban environments and offer alternative visions of sustainable urban life (Agyeman 2005; Greenberg 2014; Heynen et al. 2006).

Scholars have likewise begun to critique mainstream urban sustainability thinking and policy along several lines. First, researchers have repeatedly identified the underlying conceptual muddiness of urban sustainability policy, from Campbell's (1996: 296) early characterization of its "vague idealism" to Gunder's (2006) depiction of sustainability as urban planning's key empty signifier. Similar lines of critique have been developed with respect to "resilience", the increasingly influential social-ecological policy discourse that conceives urban sustainability goals mostly in terms of risk management, adaptability, and disaster recovery (Evans 2011; McPhearson 2014; Meerow and Newell 2016; Wilkinson 2012). Human geographers and planners have argued that, for all its new discursive trappings, resilience thinking is in many respects an intensification of existing, politically conservative strands of sustainability discourse (Fainstein 2015; MacKinnon and Derickson 2013; White and O'Hare 2014).

Second, scholars have documented the equity deficits of actually-existing urban sustainability planning. The negative impacts of sustainability planning tend to fall disproportionately on the poor and marginalized, while benefits accrue to the wealthy and powerful (Anguelovski et al. 2016; Caprotti 2014). Following While et al.'s (2004) introduction of the "greening of the growth machine", researchers have explored how

urban development actors mobilize the environment as a means of capital accumulation (Evans and Karvonen 2014; Jonas and While 2007). Similarly, the growing literature on "green gentrification" illustrates how environmental amenities meant to "improve" neighbourhoods can be channeled into regressive neighbourhood change projects (Checker 2011; Gould and Lewis 2016).

A final emerging line of critique of contemporary urban sustainability discourse concerns its spatial limits and city-centrism (Angelo and Wachsmuth 2015). Prior to the 1990s, cities were almost always subject to environmental thought and political action with respect to limiting their negative impacts on the surrounding countryside, where nature and the environment were understood to "really" be located. Today, sustainability analysis and policy tends to focus on individual cities and city-regions to the exclusion of their wider contexts (Mössner and Miller forthcoming). Theoretically, this narrowness forecloses more holistic conceptions of urban nature and sustainability which seek to transcend city boundaries for example, through the implosion-explosion dialectic of planetary urbanization (Angelo and Wachsmuth forthcoming; Brenner and Schmid 2015) and also corresponds to a reductive understanding of the urban as "the city" (Angelo 2017; Millington 2016; Wachsmuth 2014). Practically, city-centric urban environmental interventions can undermine the very sustainability goals they are driving. When planned and evaluated within narrow spatial parameters, the sustainabilities they achieve within these boundaries are frequently predicated on unsustainabilities elsewhere (Ala-Mantilla et al. 2014; Mössner and Miller forthcoming; Wachsmuth et al. 2016).

Green urban nature and grey urban nature

To these important critical appraisals we suggest a new one: the aesthetic dimensions of contemporary urban sustainability thinking, and the common-sense ideology of nature that underlies them. For all of its diversity, we argue that urban sustainability policy is consistently characterized by two distinct strategies for achieving the sustainable city, corresponding to two very different aesthetic representations of urban nature.

We call these representations *green urban nature* and *grey urban nature*. Green urban nature is the return of nature to the city in its most verdant form. It is signified by street trees and urban gardens, local food and farmers markets, vertical farming and greened post-industrial landscapes. In policy it is mobilized in a range of different

urban sustainability strategies which leverage self-evidently natural nature, from green walls, bioswales, and urban agriculture up to large-scale landscaping initiatives such as soft coastlines and new parks. Grey urban nature, by contrast, is the concept of social, technological urban space as already inherently sustainable. It is signified by dense urban cores, high-speed public transit, and energy-efficient buildings. In policy terms we see it deployed in strategies which leverage that inherent sustainability of urban space through density and efficiency, ranging from transit and walkability promotion schemes to new smart city construction. We argue that these two sets of phenomenal forms offer two distinct concepts of urban sustainability with corresponding associative pairs: simple/complex; surface/depth; everyday/expert.

We describe these two concepts of urban nature as ideologies: partial representations of reality tied to hegemonic social practices and power relations. Following Henri Lefebvre (1982 [1966], 1991 [1974]), we particularly emphasize the dual *representational* and *historical* character of ideology. First, ideologies are representations in the sense that they express intuitions and common sense about social reality, given that society is too complex and multifaceted to be apprehended directly (Goonewardena 2005; Wachsmuth 2014). If common sense emphasizes some aspects of this complexity more than others, it does so in a context of unequal power relations reproducing those relations, contesting them, or some mixture of the two. And so the concept of ideology can be an important lens for identifying and challenging injustices and inequalities denaturalizing social relations to reveal that things could be otherwise.

Second, ideologies are always tied to particular historical and geographical circumstances. While some power-laden social representations (e.g. of class relations or individual liberty) correspond to durable features of capitalist society and have therefore been present throughout its modern history, ideologies can also be embedded in more specific historical-geographical contexts. The neoliberal resurgence of faith in the market to solve social problems is just one of a number of possible examples of historically-specific ideologies that are widespread, familiar, and influential.

Green urban nature and grey urban nature are ideologies in this dual representational and historical sense. They express contrasting common senses about urban environments, and the way they do so reflects contemporary power relations about whose lifestyles and bodies count as environmental concerns and what kinds of environmental interventions they merit. While we propose a categorical distinction

that might look "just" aesthetic, we do so because the differences in aesthetics structure and reflect the strategies, priorities, and assumptions that follow. In other words, the aesthetic differences are important because they do ideological work.

We further argue that the ideological work of green and grey is interconnected: the two are materially and aesthetically opposed but imaginatively mutually supportive. To interpret their relationship we draw on Lefebvre's exploration of the ideologies of modern social space. Lefebvre (1991) posits that a new form of social space emerged in the West in the early 20th century, displacing a tradition stretching back through the Renaissance to Ancient Greece. This new homogenized, fragmented, hierarchized "abstract space" is the characteristic space of capitalist modernity, but, according to Lefebvre (1991: 27), its status as a social product is concealed by "a double illusion, each side of which refers back to the other, reinforces the other, and hides behind the other". He terms these double illusions the "illusion of transparency" and the "realistic illusion".

The illusion of transparency is the illusion of transcendentalism and idealism, which sees reality as encrypted but thought as pure and unimpeded: "Here space appears as luminous, as intelligible, as giving action free rein" (p. 27). The illusion of transparency privileges the ability of thought, language and design to transform society, by suggesting that social and mental space exist in a direct correspondence with each other. It is therefore a technocratic imaginary which informs planning and representations of space. To a planner or a designer, reality is a complicated ("encrypted") system, but thought can decrypt it, in order to intervene in it and solve its problems.

The realistic illusion "the illusion of substantiality, naturalness and spatial opacity" (p. 30) is the view of space which takes objects at face value, and hence suggests that social space is directly derived from physical space. It is the illusion of natural simplicity, and Lefebvre equates it with a naturalistic materialism, according to which the symbolic meaning of objects lies within the objects themselves. So in contrast to the illusion of transparency, where language and thought are imbued with interpretive and social power, according to the realistic illusion they simply convey reality itself. If the illusion of transparency is a technocratic ideology, the realistic illusion is the ideology of spatial practice and everyday life. It corresponds to the affective dimensions of social space to the phenomenological experiences through which the reality of "things" is confirmed.

These two illusions, for all that Lefebvre presents them as opposites, are not in competition with each other. Instead, they are mutually sustaining, masking each other's gaps, and shoring up each other's weaknesses. The "mental space" of the illusion of transparency and the "physical space" of the realistic illusion together draw our attention away from the social production of space Lefebvre is seeking to uncover. And, since the social production of space is a historical process, an implication of this analysis is that different sociohistorical contexts will host different concrete configurations of the transparent and realistic illusions masking social complexity through an apparent opposition of the physical and the mental, the evident and the obscure in each case. It is in precisely these terms that we understand green urban nature and grey urban nature. Green and grey are the twin ideological representations of contemporary urban sustainability, that oppose each other and prop each other up. The realistic illusion of green urban nature the appearance of simplicity, or the materialist distortion of the socionatural is the older and the more familiar of the two. But green urban nature now travels hand-in-hand with the newer transparent illusion of grey urban nature an idealist distortion of the socionatural through the appearance of complexity.

The realistic illusion of green urban nature

According to the realistic illusion of green urban nature, *if it looks green it is green*. The self-evidently natural is assumed to in fact be natural, and moreover to be sustainable. The conceptual breakthrough of green urban nature is that society and nature are linked in material terms, and that cities can be made more sustainable by bringing nature into them. The realistic illusion thus intertwines two related premises. The first is that nature is a real material thing to be discovered outside the city and imported into it as Lefebvre (1991: 30) describes it, a "hard dense reality delivered direct from mother nature". Once it arrives in the city, green urban nature is characteristically low tech, small-scale, and harmonious, which places it in contrast with the rest of the city.

The straightforward appearance of nature offered by green walls, bioswales, urban agriculture and the like causes us to overlook the technology and planning required to implement them, as the "rational is thus naturalized" (Lefebvre 1991: 30). Even where green urban nature interventions in fact rest on complex and large-scale engineering feats, they are represented as simple and direct. This ideology made it possible for New Yorkers to accept Olmsted and Vaux's Central Park as an escape from

the city in the 19th century (Rosenzweig and Blackmar 1992), and led the designers of New York City's High Line to plant wildflowers as replacements for the "real" wild growth that had accumulated on the rail line during the decades it was not in use – in spite of the long history and present diversity of meanings, both positive and negative, of nature (Fitzsimmons 1989; Nash 2014; Selin 2013).

The second premise of the realistic illusion of green urban nature is that nature is *per se* sustainable, and that the things that look like nature must be more sustainable than the things that do not. Green urban nature has the appearance of unspoiled "first nature": plants and vegetation are obviously sustainable because they are obviously synonymous with first nature itself. It is for this reason, we argue, that urban sustainability plans are literally green – that their imagery emphasizes trees, parks and waterways. And even planning that relies predominantly on technological means of achieving sustainability tends to include straightforwardly green components to make the case for its ecological benefits. Green walls, gardens and eco-roofs may not be central to the actual ecological impact of these projects (more likely determined by water and energy use, waste disposal systems, etc.), but they tend to feature heavily in promotional materials. The aesthetics of green urban nature are used to communicate sustainability to lay audiences.

The underlying conceptual foundation of green urban nature – that nature is "real" in a non-social or even pre-social sense, and thereby exists as a resource to improve the urban social – has been critiqued from both cultural (Williams 1973) and political-economic (Smith 2010 [1984]) perspectives. It was also the target of much of the first generation of urban political ecology scholarship (Heynen et al. 2006; Swyngedouw 1996), which introduced the socionature concept to dissolve society-nature binaries in urban contexts. Nevertheless, as this discussion of the realistic illusion illustrates, extra-social representations of urban nature persist. The realistic illusion of green urban nature is an ideology of spatial practice; whether or not planners truly believe greener things are actually more sustainable, they are reproducing this ideology when they cover their energy-efficient smart buildings in decorative plants.

The transparent illusion of grey urban nature

According to the transparent illusion of grey urban nature, sustainability is a thing lurking beneath the surface of the city, to be uncovered through science, technology and expertise. The conceptual breakthrough of grey urban nature is that

the environment is not separable from the social production of urban space, but exists to be revealed, shaped, or enhanced within cities as they actually are. While a version of this analysis is common among critical geographers (Braun and Castree 2005; Heynen et al. 2006; Swyngedouw 1996) who made their critique of green urban nature in order to render grey urban nature visible, its most eloquent public champions are economistic urban environmentalists such as Glaeser (2011), who have persuasively made the case that, in sustainability terms, "grey" is really greener than "green".

The ideology of grey urban nature rests on two premises. The first is that reality is complex and requires decoding to be properly understood, but that *knowledge* is transparent and able to accomplish this decoding. According to the illusion of transparency, planners and engineers are the experts with the knowledge and skills required to uncover the city's environmental content. In this sense, even though it is primarily concerned with the management of natural resources (above all energy, water, and carbon dioxide), grey urban nature rejects the romanticism of the realistic illusion's green "first nature" (Marx and Engels 1970 [1846]; Schmidt 2014 [1962]). Instead, it emphasizes a technologically mediated "second nature". If the realistic illusion of green urban nature is the ideology of spatial practice and everyday life, we might understand the transparent illusion as the technocratic imagination at work in planning and representations of space.

The second premise of grey urban nature is that sustainability is not a property of nature *per se*, but rather a characteristic which can be discovered or engineered in complex social systems. The current emphasis in sustainability-oriented urban planning on transit development and densification reflects this principle. And the rhetorical thrust of many of the most influential grey urban nature arguments (including Owen's [2009] *Green Metropolis* and Glaeser's [2011] *Triumph of the City*) has been a willful counterintuitiveness a celebration of the triumph of scientific and evidence-based reasoning in establishing the importance of grey urban density over merely aesthetic appeals to green nature. These arguments treat sustainability problems as complicated ones to which we must apply sophisticated technology and expertise. The transparent illusion of grey urban nature claims to have pierced the surface of complex urban reality and found the sustainability underneath. Grey urban nature aesthetics correspondingly look like electric car chargers, high-tech smart-city infrastructure, and green building design.

The transparent illusion implies a certain idealistic or even utopian belief in the promise of "smart" technology to solve sustainability problems by out-thinking and

out-planning bad outcomes and continuing to support economic growth. And indeed, the critique of grey urban nature has come most forcefully from skeptical appraisals of the smart city. As scholars such as Greenfield (2013), Holland (2008), and Söderström et al. (2014) have demonstrated, smart city proponents' claims to a comprehensive technocratic rationality have always been highly overstated. The knowledges underlying the smart city in general, and "grey" smart city sustainability strategies in particular, are always fragmented, partial and distorted. They model resource flows with sophistication but struggle to incorporate the cultural or political flows which may prove more consequential for how resources get deployed and appropriated. Grey urban nature is an is an ideological representation of sustainability that communicates it through the promise of high-tech engineering.

In sum, the imagery, discourse, and designs of contemporary urban sustainability planning are characterized by these two distinct ideologies. The realistic and transparent illusions of urban nature oppose each other and prop each other up to create the image of a sustainable city. Even the most technology-centric smart city plan is likely to deploy green imagery to emphasize its sustainability objectives, and images of urban agriculture likewise often emphasize its embeddedness within the grey city.

Green and grey in practice

We now turn to three case studies to illustrate green and grey representations of urban nature in different historical and geographical contexts, as and show how the two have developed, along with urban sustainability as a concept, over time. A snapshot of brownfield redevelopment in Germany's Ruhr Valley in the 1990s highlights the historical emergence of green and grey urban natures. Vancouver's Greenest City 2020 Action Plan provides a paradigmatic example of how green and grey represent two distinct planning and policy agendas that are nevertheless logically bundled under the rubric of sustainability. Finally, Abu Dhabi's Masdar City shows an important concrete configuration of green and grey urban natures (what we call "grey substrate, green surface") in the context of spectacular (and speculative) urban development. The analysis is based on an examination of public planning documents, promotional materials, and media discussions at all three sites, supplemented by fieldwork and interviews with sustainability policy actors in Vancouver and the Ruhr.

Green and grey emergent: The Ruhr region

Germany's Ruhr region is perhaps the largest early example of green and grey as twin representational forms of urban environmentalism. Defined by coal mining and steel production since the mid-19th century, after the collapse of the coal and steel economy at the end of the 1960s widespread consensus emerged that, in order to attract new residents and industry, the region required comprehensive structural change, rehabilitation of its denuded and polluted landscape, and a new reputation as a clean and pleasant place to live. In stark contrast to 19th and 20th century understandings of industrial technologies and the industrial city as contributors to pollution, Ruhr planners and policy makers came to view post-industrial technology and the post-industrial city as environmental solutions rather than problems in the wake of industrial decline (Angelo 2015).

In the 19th and 20th centuries, in the Ruhr as throughout Western Europe and North America, industrial cities were seen as non-natural or even anti-natural spaces, and planners prescribed green nature as a treatment for industrial pollution and other urban problems. Industrial barons and social reformers provided industrial workers garden city housing and green public recreation areas for recuperation on weekends and at the day's end. These urban green spaces were not designed to be "sustainable" in any modern sense of the term, but attempts to make cities more liveable by bringing nature back in. In this regard, green urban nature has been a consistent presence in urban design and thought throughout the last 150 years.

Yet as the industrial economy declined, understandings of cities as socionatural systems with inherently environmental properties grew. By the 1990s, planners and policymakers began to view post-industrial cities as spaces for greening rather than pollution. In the Ruhr, the vision for restoring "one of the most degraded landscapes in Europe" (LaBelle 2001: 222) was IBA Emscher Park, a 200-km region-wide park dotted with museums, heritage sites, and monuments connected by hundreds of kilometers of biking and walking trails. Envisioned and constructed between 1989-1999, its cornerstone was the "renaturalization" of the Emscher River, which runs through the heart of the project and the region. Considered biologically dead when the project began, it had deteriorated into a "poorly functioning, stinking sewer" for industry (Pehnt 1999 qtd. in Hemmings and Kagel 2010: 247). "Renaturalizing" the Emscher involved spending 4.4 billion Euros to create 400 kilometers of underground wastewater pipes and an artificial winding path for the water above since the original

Figure 2. Landschaftspark Duisburg Nord's Industrienatur, combining green and grey (credit: Mark Wohlrab)

riverbed was completely destroyed along with highly-engineered "lakes," floodplains, and catchment areas to manage its ebb and flow (Danish Architecture Center 2017).

IBA Emscher Park captures a transition moment between the end of an era when the city-nature relationship was nearly universally understood to be an antagonistic one, and the present era of urban sustainability thinking. In the 1990s, though neither the language of urban sustainability nor the representational forms of green and grey had fully crystallized, both were visibly in formation. Two decades before cities were being retrofitted for climate change, transforming deindustrialized cities into sites for new residential, commercial, and leisure uses required remediating industrial infrastructure, brownfields, and waterways and re-envisioning them as ecological spaces. IBA Emscher Park's urban-environmental consciousness was thus a precursor to seeing cities as sustainability solutions in two ways.

First, the growing thinkability of urban sustainability corresponded with the emergence of a new representational form, that of grey urban nature. In the post-

industrial era, technology became a fix for environmental problems instead of a cause of them. This was a first step towards "grey" as a representational form coming to connote positive ecological outcomes, and towards the idea that sustainability could be engineered through technology: the transparent illusion of grey urban nature. For most of the 20th century, in the Ruhr as throughout Europe and North America, "grey" stood for polluting technologies of coal extraction and the steel industry and the destruction of nature while the region itself was antithetical to nature in the public imagination. Industrial pollution made local foliage "grey, not green" in the 1920s (Rossmann 2009: 149); in the 1960s poor air quality turned laundry grey within minutes of being hung on the line (Der Spiegel 1961). IBA Emscher Park gave the Ruhr a new green identity through grey technology, arguing that a green urban-industrial region was neither impossible nor an oxymoron.

While there are certain aesthetic continuities between modernist 20th-century urban infrastructure projects and contemporary grey urban nature projects, those continuities should not be allowed to overshadow a vital difference. Technological solutions to urban problems in the 20th century were seen as just that: technological. They were human technologies solving human problems, or demonstrating mastery over nature. By contrast, for contemporary, high-tech sustainability practitioners who see their charge as designing with nature rather than dominating it, solar grids, green building codes and the like are not technologies antithetical to nature, but hybrids of the technological and the ecological.

Second, IBA projects also put these two distinct representational dimensions of environmentalism the realistic and transparent illusions of green and grey urban nature in relationship. Neither the Emscher River renaturalization nor IBA Emscher Park were understood as efforts to return to first nature after a century of destruction by industry. Instead, IBA conceived a second "industrial-nature" (*Industrienatur*), which it deliberately showcased at ecological and cultural heritage sites. The IBA-produced Landscape Park Duisburg Nord, for example, turned green and grey into a design principle. Duisburg Nord was created on the site of a former steel mill. Visitors now stroll through gardens in its remains, repel off its outer walls and scuba dive in its gas tanks (Figure 2).

While flowers and plantings invite visitors to enjoy the realistic illusion of green urban nature, the park's designer also intended to "[debunk] the fantasy of taking refuge in pristine nature" by designing a park that was "unmistakably man-made" (Lubow 2004: 49). Throughout Emscher Park, at sites where *Industrienatur* might

look "natural," IBA takes special care to denature that representation by revealing how the landscape is a product of the region's industrial history or technology's contributions to sustainability. Along the renaturalized Emscher, for instance, signage, promotional materials, and commissioned public art projects all showcase the grey urban nature that makes the natural-*looking* river possible (Huning and Frank 2011).

Sustainability as (green and grey) livability: Vancouver, BC

The Ruhr Valley shows green and grey representations of urban sustainability before the latter stabilized into a recognizable paradigm, and in a historical moment in which urban environmental concerns centred on industrial remediation rather than climate change. To view these representations in a contemporary urban context, we turn now to Vancouver, which for the last decade has been the site of an ambitious municipal sustainability plan the Greenest City 2020 Action Plan (GCAP). Vancouver's plan demonstrates how green and grey can be logically paired as a single policy bundle in a context of urban retrofitting and intensification. Importantly, while GCAP contains robust density- and technology-focused "grey" interventions aimed at reducing GHG emissions alongside robust livability-focused "green" interventions aimed at creating a pleasant urban environment, there is very little substantive connection between the two. They simply coexist as the two self-evident pillars of urban sustainability. While the empirical details are unique to Vancouver, the bundling of green and grey policies form a globally recognizable set of "best practices" whose co-development can also be observed in other self-consciously green, affluent, post-industrial cities such as San Francisco and New York.

Vancouver is the third largest city in Canada, and is generally considered one of the most livable cities on the planet (e.g. Economist Intelligence Unit 2016). An important part of this reputation is the city's relationship with the natural environment; Vancouver occupies a piece of temperate rainforest tucked between the Pacific Ocean coast and the North Shore mountain range, and has a long, self-conscious history of environmentalism. The city's official environmental mythology reinforces this idea:

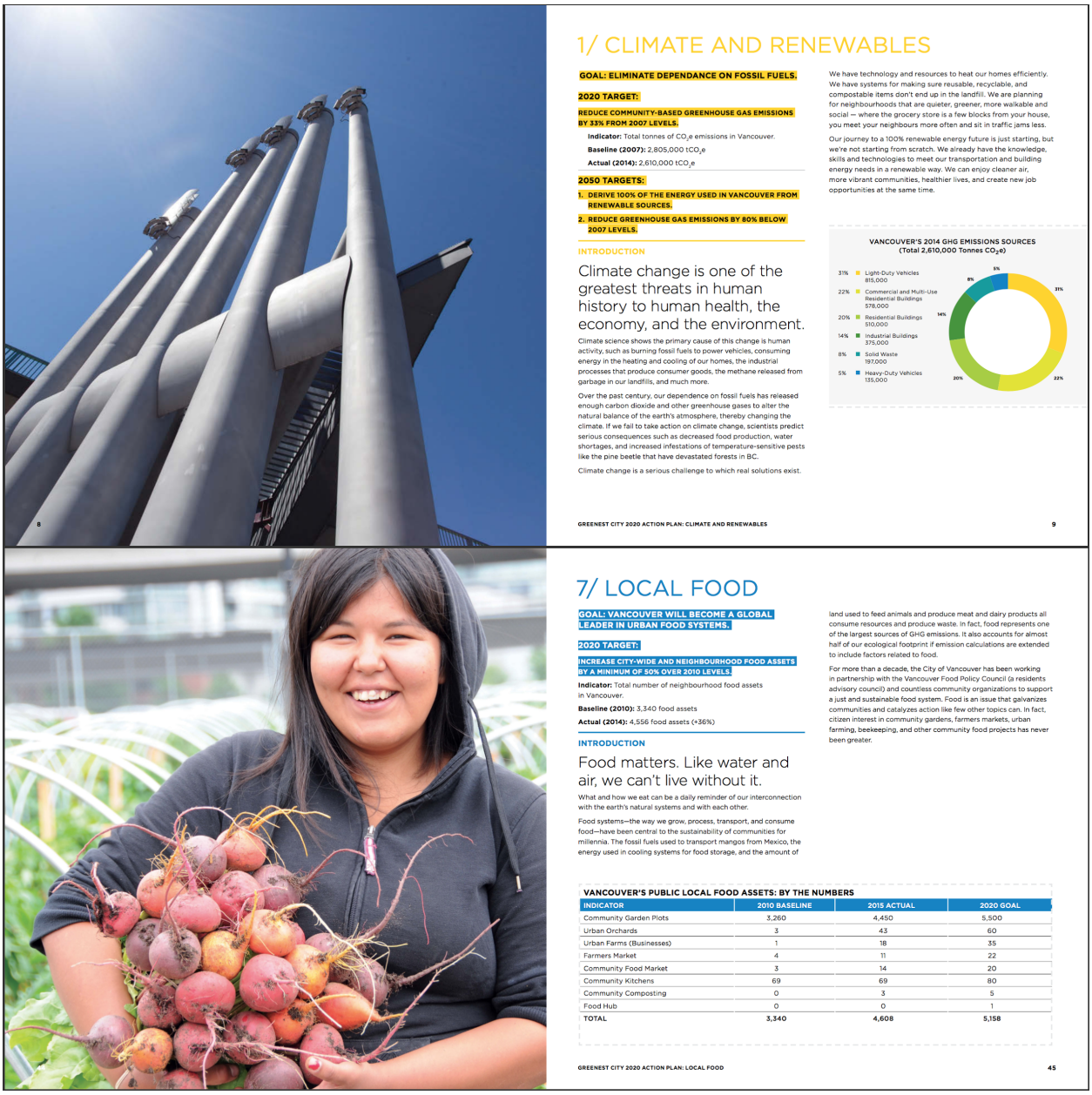
> Decades ago, Vancouver residents decided that the way of the past was not for us. We chose a different path…. We are the birthplace of Greenpeace, the home of David Suzuki [Canada's most influential environmentalist], and one of the first cities in the world to recognize the significance of climate change. (City of Vancouver 2015: 4)

Building on this legacy, in the last decade Vancouver's city government launched an ambitious urban sustainability agenda. In 2011 the city released the Greenest City 2020 Action Plan (GCAP). The plan has three high-level goals zero carbon, zero waste, and healthy ecosystems which are addressed through a combination of livability-focused "green" interventions and carbon-and-waste-focused "grey" ones.

The centerpiece of GCAP's carbon-reduction plan is a building efficiency and retrofitting scheme a characteristically technology-driven grey urban nature effort. All new buildings in the city will need to be carbon neutral by 2030, and the entire building stock of the city is planned to produce 20% fewer emissions by 2020. The plan also includes a number of strategies to decrease emissions from private car usage. The aspects of GCAP which use green urban nature to advance urban sustainability are focused on improving quality of life in the city. Hundreds of thousands of new trees are being planted, standards for local green space access have been improved, and there has been significant investment in expanding access to local "food assets" such as community gardens and farmers markets.

In some respects the plan reads as two separate initiatives, one focused on large-scale engineering efforts to reduce waste and greenhouse gas emissions, and one focused on improving residents' access to environmental amenities. Both initiatives are ambitious and embody cutting-edge planning ideas, but very little about either of them would change if the other were removed from the plan. The only thing that unites them is that they are both self-evidently "sustainable". In this regard the aesthetics of the document are revealing (Figure 3). Chapters presenting "grey" sustainability goals (e.g. "Climate and Renewables", "Green Buildings", "Green Transportation") are headed with photographs of dazzling technological infrastructure, with few humans to be found. The solutions to sustainability challenges are presented here with the illusion of transparency's appeal to complexity. Chapters presenting "green" sustainability (e.g. "Access to Nature", "Clean Air", "Local Food"), by contrast, are headed with photographs of city residents engaged in small-scale acts of green living the natural simplicity of the realistic illusion.

For all of its successes so far, GCAP also illustrates some characteristic tensions with respect to the equity and ecological impacts of contemporary urban sustainability policy: the political and spatial narrowness of green and grey urban natures. The first tension is the region's deepening crisis of housing affordability. Vancouver, in addition to being one of the world's most livable cities, holds the dubious distinction of being



1/ CLIMATE AND RENEWABLES

GOAL: ELIMINATE DEPENDANCE ON FOSSIL FUELS.

2020 TARGET:

REDUCE COMMUNITY-BASED GREENHOUSE GAS EMISSIONS BY 33% FROM 2007 LEVELS.

Indicator: Total tonnes of CO_2e emissions in Vancouver.

Baseline (2007): 2,805,000 tCO_2e

Actual (2014): 2,610,000 tCO_2e

2050 TARGETS:

1. DERIVE 100% OF THE ENERGY USED IN VANCOUVER FROM RENEWABLE SOURCES.
2. REDUCE GREENHOUSE GAS EMISSIONS BY 80% BELOW 2007 LEVELS.

INTRODUCTION

Climate change is one of the greatest threats in human history to human health, the economy, and the environment.

Climate science shows the primary cause of this change is human activity, such as burning fossil fuels to power vehicles, consuming energy in the heating and cooling of our homes, the industrial processes that produce consumer goods, the methane released from garbage in our landfills, and much more.

Over the past century, our dependence on fossil fuels has released enough carbon dioxide and other greenhouse gases to alter the natural balance of the earth's atmosphere, thereby changing the climate. If we fail to take action on climate change, scientists predict serious consequences such as decreased food production, water shortages, and increased infestations of temperature-sensitive pests like the pine beetle that have devastated forests in BC.

Climate change is a serious challenge to which real solutions exist.

We have technology and resources to heat our homes efficiently. We have systems for making sure reusable, recyclable, and compostable items don't end up in the landfill. We are planning for neighbourhoods that are quieter, greener, more walkable and social — where the grocery store is a few blocks from your house, you meet your neighbours more often and sit in traffic jams less.

Our journey to a 100% renewable energy future is just starting, but we're not starting from scratch. We already have the knowledge, skills and technologies to meet our transportation and building energy needs in a renewable way. We can enjoy cleaner air, more vibrant communities, healthier lives, and create new job opportunities at the same time.

VANCOUVER'S 2014 GHG EMISSIONS SOURCES (Total 2,610,000 Tonnes CO_2e)

GREENEST CITY 2020 ACTION PLAN: CLIMATE AND RENEWABLES 9

7/ LOCAL FOOD

GOAL: VANCOUVER WILL BECOME A GLOBAL LEADER IN URBAN FOOD SYSTEMS.

2020 TARGET:

INCREASE CITY-WIDE AND NEIGHBOURHOOD FOOD ASSETS BY A MINIMUM OF 50% OVER 2010 LEVELS.

Indicator: Total number of neighbourhood food assets in Vancouver.

Baseline (2010): 3,340 food assets

Actual (2014): 4,556 food assets (+36%)

INTRODUCTION

Food matters. Like water and air, we can't live without it.

What and how we eat can be a daily reminder of our interconnection with the earth's natural systems and with each other.

Food systems—the way we grow, process, transport, and consume food—have been central to the sustainability of communities for millennia. The fossil fuels used to transport mangos from Mexico, the energy used in cooling systems for food storage, and the amount of land used to feed animals and produce meat and dairy products all consume resources and produce waste. In fact, food represents one of the largest sources of GHG emissions. It also accounts for almost half of our ecological footprint if emission calculations are extended to include factors related to food.

For more than a decade, the City of Vancouver has been working in partnership with the Vancouver Food Policy Council (a residents advisory council) and countless community organizations to support a just and sustainable food system. Food is an issue that galvanizes communities and catalyzes action like few other topics can. In fact, citizen interest in community gardens, farmers markets, urban farming, beekeeping, and other community food projects has never been greater.

VANCOUVER'S PUBLIC LOCAL FOOD ASSETS: BY THE NUMBERS

INDICATOR	2010 BASELINE	2015 ACTUAL	2020 GOAL
Community Garden Plots	3,260	4,450	5,500
Urban Orchards	3	43	60
Urban Farms (Businesses)	1	18	35
Farmers Market	4	11	22
Community Food Market	3	14	20
Community Kitchens	69	69	80
Community Composting	0	3	5
Food Hub	0	0	1
TOTAL	**3,340**	**4,608**	**5,158**

GREENEST CITY 2020 ACTION PLAN: LOCAL FOOD 45

Figure 3. Green and grey representations of urban nature in GCAP (source: City of Vancouver 2015: 8-9, 44-45)

one of the most expensive cities in the world, and the skyrocketing increase in cost of living over the last decade has led to escalating social tensions (Wachsmuth forthcoming). GCAP is arguably exacerbating the housing crisis in the city. On the demand side, the visible green markers of sustainability parks, bike trails, farmer's markets, street trees and the like are an increasingly desirable amenity for urban residents, so housing in green areas of the city tends to be expensive. And on the

supply side, many cutting-edge technological forms of urban sustainability policy – the grey urban nature energy efficiency schemes, low-carbon building techniques, and LEED certifications – increase the cost of housing production. Even mandates to build more density can be costly when combined with strict environmental building codes, because they shift the development economics in favour of condominiums instead of rental housing on the land that is zoned for multi-family. One Vancouver senior housing staffer put the issue as follows in an interview:

> The issues with LEED certified building just drove up the cost of that [development] and because we build housing and the rents are affordable rents, all that means is that fewer units can get built if the capital cost of the individual units go up. In the private market...all those costs will simply be passed onto the purchaser, because you're able to do it in a market like Vancouver.

The second tension is the limited territorial scope of the action plan. GCAP is a sustainability plan for the City of Vancouver, which is a municipality accounting for just a quarter of the metropolitan region's population. The plan acknowledges that sustainability issues cross municipal boundaries, but there has been no actual attempt to act on that acknowledgment in the context of the plan (e.g. through engagement with the regional government – Metro Vancouver Regional District – of which it is the most important local member, or through the provincial government which has encompassing authority over municipal affairs). So even as the City of Vancouver attempts to build more dense rental housing near mass transit stations, the neighbouring suburb of Burnaby is tearing down rental apartments around its transit stations to build higher-ecological-footprint condominiums – a dynamic Mössner and Miller (forthcoming) describe as "sustainability in one place".

In summary GCAP demonstrates a municipal aspiration to both (green) livability and a (grey) low ecological footprint, and despite there being little substantive connection between the two visions of urban sustainability, Vancouver's planning interweaves them. Furthermore, even as green and grey urban natures represent two complementary strategies for sustainable urbanism, in Vancouver's affluent, post-industrial context both of these strategies have intensified pre-existing socio-economic tensions. The same configuration of discrete-yet-complementary green and grey strategies (along with similar tensions related to social equity and spatial scale) is visible in New York's PlaNYC and OneNYC sustainability plans and in San Francisco's

Plan Bay Area 2040, and represents in our analysis a common post-industrial pattern of urban sustainability thinking and practice.

Grey substrate, green surface: Abu Dhabi's Masdar City

The Vancouver case shows green and grey ideologies of urban nature bundled together in a simple side-by-side configuration. However, another important configuration is "grey substrate, green surface," where a veneer of green urban nature helps communicate the ecological content of grey sustainability interventions. We now explore in the case of Masdar City, one of the world's most ambitious urban sustainability schemes. Although Masdar is an archetypally grey sustainability project, leveraging smart-city technology towards environmental ends, it relies heavily on the aesthetics of green urban nature to make this environmentalism legible, with the affective dimensions of the latter and the techno-rational dimensions of the former mutually supporting each other.

Initiated in 2006 by the Abu Dhabi government, Masdar City was an environmental, high tech smart city, created with the dual ambitions of being the world's first zero-carbon city and a means of reorienting the national economy away from fossil fuels. Though the project has so far failed to reach its ambitious environmental goals (Goldenberg 2016), Masdar City arguably remains the world's leader in the emerging policy terrain of "sustainable smart cities",. Masdar City is substantively a grey urban nature project. Its major infrastructural systems all use renewable and alternative energy technologies, including energy (solar), transit (electric) and water and waste treatment systems. The orientation and surfaces of the buildings, and the narrow, pedestrian-friendly streets were designed to counter energy-intensive forms of contemporary urbanism, creating cooler interiors and exteriors to reduce dependence on cars and air conditioning. And the city itself has been leveraged for larger state development goals. From the beginning, the project was meant to help transform Abu Dhabi's economy for a post-oil future by providing a new national template for sustainable economic growth. And so, in addition to using solar and renewables in the city's design, Abu Dhabi planned for the city to house a "community of academics, researchers, start-up companies and financiers all focused on developing renewable energy and sustainability technologies" (Nader 2009: 3952).

Yet Masdar City's attempts to achieve sustainability through grey forms of design, building materials, and transportation and energy systems have, since the project's inception, been promoted through signifiers of green urban nature. In

Figure 4: Masdar City's green veneer "reminds" us that grey interventions are sustainable (credit: BSQ Solar).

renderings, promotional photographs, and the city's master plan, residential areas, schools, and the visitor center are surrounded by plants, trees, and green lawns (Figure 4). Photographs of many of the development's office and research buildings are foregrounded with foliage, signalling the LEED certifications of the buildings and the alternative energy research occurring inside (Masdar 2015). The city's plans also include "biodiversity protection areas" and green corridors that are to provide habitat for native species and serve as recreational areas (Masdar 2015: 56). In each of these designs and representations the green veneer of palm trees and gently waving grasses "remind" us in everyday, phenomenal terms that Masdar City is designed to promote more sustainable ways of living and working.

Masdar City may be utopian, but it is not naive. The city's engineers do not offer foliage and fox habitats as the actual means through which Masdar City will meet its low-carbon goals. Instead, plans use these signifiers of apparently straightforward reality (green urban nature) to communicate a complex reality (grey urban nature) in intuitive terms. The green veneer is the realistic illusion; the grey substance the illusion of transparency. While the project's sustainability goals will really be achieved (to the extent they are achieved at all) through often-invisible, highly engineered

materials and systems, Masdar City's superficial greenness *represents* the city as sustainable.

This pairing of green surface and grey substrate is also readily apparent in the way third parties have interpreted and digested Masdar City's sustainability plans. On the green side, an article in the United Arab Emirates' leading English-language newspaper called "Sowing the seeds of gardening-based change at Masdar City" quotes Masdar City's project directors describing the intention of the city's landscaping to "imbue a new mindset that promotes the concept of living in harmony with our culture and environment" (Hunt 2015). The designers are working with local nurseries to supply Masdar City with native plants large enough to create a "landscape regime" that promotes the "experience of engaging with nature." On the grey side, a story in *Renewable Energy Focus* prepared on Masdar City for the 2010 World Future Energy Summit describes Masdar City's sustainability entirely in terms of a "brave new world" of futuristic, high-tech research, that requires solar investments, innovations in electricity and engineering technology, wind power, and biotech (Hopwood 2010). For this professional audience, the environment to be saved and promoted is a complex, technological system in which industry leaders "[forge] our energy future by developing a renewable fuel supply [and] developing and commercializing…low-carbon energy sources" (Hopwood 2010: 23). The green urban nature perspective offers sustainability on the surface of reality, while the grey urban nature perspective looks for it underneath.

Most tellingly, an Al Jazeera video segment about Masdar City's master plan presents the city's environmental ambitions as a mixture of immediate and straightforward green urban nature and hidden and complex grey urban nature (Earthrise 2011). The video begins by noting that the city is free of cars and skyscrapers. Then, after a quick closeup of a flowering plant, the city's director Alan Frost describes how its orientation, building design, and narrow streets all designs once common in traditional Arab cities keep Masdar about 15 degrees celsius cooler than downtown Abu Dhabi. Standing in a shady plaza planted with trees and grasses, Frost calls the breezes which the streets are designed to draw "green fingers," while the narrator says they're "going back to traditional ways of doing things." Whether these "traditional ways" are a sincere attempt by the British planning firm in charge of the development to leverage local knowledge, or simply a branding exercise, tradition and simplicity are key signifiers of green urban nature. The plants and "green fingers"

conjure an image of nature as a straightforward and simple reality, and an understanding of sustainable living as low-tech, back-to-nature the realistic illusion.

But, the film goes on to add, "some new developments will be based on new ways of doing things." Now the film moves from green to grey urban nature, as it travels from the city's core living and working areas to a solar plant on a dry, hot desert plain. In this portion of the film, technology, ecology, and reality are all presented as too complex for direct comprehension, and instead in need of decoding. The narrator describes the solar "beam-down project" as a "crazy-looking contraption." And unlike the close-ups of residential areas, which prominently feature plants and grasses, this grey urban nature scene is shot wide and low, to emphasize the gadget's (and the city's) technological and otherworldly quality. Once the film leaves the beam-down project, electronic music, industrial sounds, and hard reflective surfaces accompany Frost's discussion of his hopes for the city. The picture of sustainability presented by these scenes and technologies of grey urban nature is one that is strange, alien, and in need of interpretation by experts the transparent illusion.

Conclusions: The ideological work of urban sustainability

"Sustainability" is frequently criticized for being an amorphous concept or an empty signifier. In spite of the truth in this, we have argued that in the domain of urban policy sustainability is nevertheless consistently characterized by two distinct ideas: green urban nature and grey urban nature. These are pervasive but unacknowledged commonsensical frames for understanding what counts as sustainable and what should be prioritized in urban-environmental policy. The purpose of this paper has been to offer a framework for decoding contemporary urban sustainability thinking in these terms. To do so, we have drawn on Lefebvre's distinction between the realistic illusion and the illusion of transparency, and have used case studies of Germany's Ruhr Valley, Vancouver, Canada, and Masdar City, Abu Dhabi to showcase these two representations in practice. We now conclude by returning to the question of the ideological work these representations perform.

To say that green urban nature and grey urban nature are ideologies is to say that they are commonsensical simplifications of social reality which are not neutral to power. Their animating ideological tension is that the aesthetic simplicity of green urban nature encourages it to be taken at face value as inherently sustainable (the realistic illusion) while the aesthetic complexity of grey urban nature leads it to be

considered a problem for technological optimization (the illusion of transparency). This tension has two immediate implications. First, it threatens to render green urban nature the presumptive realm of popular participation in urban environmental politics, and grey urban nature the presumptive realm of technocratic expertise (see, e.g., Finewood 2016). Consider competing efforts to envision future modes of sustainable living in response to the threat of climate change. On one side, we have a grey vision of a high-tech future of geoengineering, electric cars, solar grids, and a Mars colony; on the other, a green vision in which people live smaller, slower lives in harmony with nature in small-scale communities that have gone back to the land.

Second, the ideological tension between green and grey urban nature obscures the fact that there are no necessary differences between these two ideas of sustainability with respect to their environmental content or their objective sustainability outcomes. Both are "socionatures": hybrid assemblages of the social and natural (Swyngedouw 1996). Green strategies are not somehow more natural because they rely on visible deployments of non-human nature, nor are grey strategies somehow more social or more technological. Both rely on complex and cutting-edge metabolisms of nature, capital, society, and technology. In practice, both take concrete form in small- and large-scale, top-down and bottom-up ways; for every community garden there is a massive coastal re-engineering effort, and for every transnational corporate smart city there is a neighbourhood infill scheme. Likewise, the relationship between either of these forms of appearance of sustainability and actual sustainable outcomes is also a contingent one. Even as the low-carbon benefits of high-tech post-industrial cities have arguably been oversold (Wachsmuth et al. 2016), grey urban nature strategies can be effective at reducing greenhouse gas emissions where they take appropriate account of spatial and temporal scale (Ramesh et al. 2010). Conversely, while more trees do not guarantee urban sustainability (Escobedo et al. 2011), retrofitting city streets and buildings with more vegetation really does reduce rainwater runoff and urban heat island effects (Susca et al. 2011). And perhaps most importantly, both confirm an underlying intuition that urban environments are not antithetical to nature, but key places for envisioning and creating sustainable futures.

These dynamics open up a number of questions for future research and political action. First, though a current common configuration of green and grey urban natures is "grey substrate, green surface", our analysis implies that this relationship could change. As discussed in the context of the Ruhr region, in contrast with the long history of green nature as a resource for improving cities, grey urban nature is a

relatively new representational form. A "green surface" helps communicate the ecological content of grey urban nature by appealing to a more familiar environmental referent. As grey urban nature becomes a more intuitive signifier of sustainability, will green urban environmental policies someday need to wrap themselves in grey aesthetics to signal their sustainability content to policymakers and experts?

Second, green and grey are not inherently city-centric, despite their deployment in practice. Comparison to ecological critiques of urbanism in the 1960s and 1970s highlights the spatial tunnel vision of contemporary urban sustainability. Although postwar ecological thinking rigorously used the boundary of the city to separate the human and non-human environments, it treated the two as interconnected components of a common social field (e.g. Wolman 1965). 1960s US policy, for instance, saw the proliferation of regional councils meant to address sustainability challenges by integrating the governance of urban areas and their "environmental" peripheries (Atkins and Wilson-Gentry 1992). Nowadays urban sustainability thinking of the sort represented by Masdar City or the High Line does not need to leave the city to find nature, and maybe for this reason, it tends not to. How can the now-robust appreciation of city-environment interconnections be better integrated with the growing awareness of the planetary dimensions of contemporary urbanization processes?

Third, we have outlined green and grey urban nature as the dominant representations of human-environment relations in contemporary urban policy. But are they also categories through which people understanding human-environment relations in everyday life? To the extent that these ideological notions are repertoires for social action, they are not equally available to all social actors in all contexts. Until the 1990s, North American and European environmental movements and organizations were predominantly anti-urban and anti-growth advocates for the conservation of wild animals and unspoiled habitats, casting human encroachment on nature as environmental catastrophe (Du Pisani 2006). Today, they advocate for investment in sustainable cities. But in spite of the environmental movement's urban turn, it remains a challenge for advocates to "see" the ecological content of grey urban nature issues or build alliances across what are effectively green and grey environmental movements, as Cohen (2017) has recently argued in the context of climate politics in São Paulo. In what ways do urban sustainability governance agendas and coalitions differ when mobilized around green or grey urban natures? Who

"counts" as an environmental actor in formal urban environmental politics, and on the basis of what representations of urban sustainability?

Fourth and finally, both green and grey forms of urban sustainability thinking have developed in a far more system-affirmative direction than their postwar precedents. In contrast to the dominance of market-oriented, pro-growth conceptions of sustainability today, 1960s and 1970s forerunners of sustainability discourse such as *The Limits to Growth* (Meadows et al. 1972), and the steady-state economics of Daly (1973), all adopted effectively anti-capitalist critiques which saw environmentally harmonious outcomes as incompatible with endless accumulation. Today, though green and grey urban natures both contain seeds of concern for social equity, these have tended not to be at the forefront of actually-existing urban sustainability policy, as the case of Vancouver illustrates. How can existing progressive and radical visions of urban sustainability be supported, and how can new visions be developed?

Acknowledgements

We wish to thank Roger Keil and two anonymous reviewers for their helpful comments on earlier versions of this article. We also received valuable feedback from participants at the "Democratizing the Green City" conference at the University of California Santa Cruz, and a paper session at the 2017 annual meeting of the Association of American Geographers. Thanks to Neil Brenner for supervising the 2009 reading group in which this idea first germinated, and especially to fellow participant Aaron Jakes for coining the phrase "green and grey".

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