The Sustainable

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THE TRUE Human Knowledge		**THE GOOD** Social Mores and Ethics	
THE BEAUTIFUL Aesthetics		**THE PROSPEROUS** Economic Life	
THE JUST AND WELL-ORDERED Political and Civil Life		**THE SUSTAINABLE** The Natural Environment	

COMMUNITY ENDOWMENT EXECUTIVE SUMMARY

Much like biologists think of an ecosystem as a community of living and non-living things working together in the natural world, Thriving Cities uses a framework we call "human ecology" to help us envision a city. The human ecologies of a city contain and depend upon an array of different, but fundamental endowments. Such endowments: (a) give expression to long-standing and universally-recognizable ends that are essential to human thriving (e.g., intellectual life, aesthetics, sociality, play, health and security, transcendence); (b) become actualized within specific social practices and institutional settings (e.g., universities, theaters, social media, soccer clubs, health care, and places of worship); (c) have distinctive histories that shape their present and future possibilities; and (d) interact dynamically with one another, creating both virtuous cycles when robust and healthy, and vicious cycles when depleted and weak, but also generating synergies with unintended consequences and tensions between competing goods.

The language of endowments is highly intentional. It stands in direct opposition to the language of "capital," used by most standard and many cutting-edge approaches. Where capital denotes abstract, a-temporal, and amoral value that is at once fungible and fluid, which is to say unfixed (which is precisely the source of its conceptual strength), the language of endowments brings the dimensions of particularity and temporality back into view—endowments are the products of investments made over time and they must be maintained in the present if they are to remain available in the future. Also, attached to the language of endowments is a sense of fiduciary responsibility and obligation. Where capital functions as a medium of value and exchange irrespective of context, endowments function as a reservoir of wealth held in common—as a trust within very definite contexts. Despite its obvious strengths, the language of capital is not able to capture these essential qualities of community life, and not surprisingly, they remain empirically elusive in approaches that rely on it.

Our distinctively cultural approach, with its emphasis on the normative dimensions of common life in cities, invites us to see them in terms of six interactive (and ever-evolving) formative contexts in which we routinely see the exercise of moral agency and practical reasoning across human communities. The first three of the six endowments build on the classical ideals of "the True," "the Good," and "the Beautiful;" the last three are what we might call the modern ideals of "the Prosperous," "the Well-ordered and Just," and "the Sustainable." Together they form some of the most recognizable horizons of the human experience.

T A B L E O F C O N T E N T S

I.   INTRODUCTION

What are the characteristics of a *sustainable* city? Cities engaged in a dialogue about a thriving future are certain to confront recent policy debates about the contribution of urban policy to the pursuit of sustainable patterns of development and urban life. According to Matthew Slaven, "Sustainable cities are those that design and manage their form of governance, economies, built environment, transportation systems, energy and water use, food production, and waste in a manner that imposes the smallest possible footprint on the environment."[1] In a similar vein, Michael Lorr states that "urban sustainable development is the process of developing and redeveloping urban areas in a way that will improve the urban environment and economy and promote equity or social justice."[2] These definitions of urban sustainability stress the importance of the active management of cities and urban space in order to enhance environmental and human well-being. A city that pursues sustainability supports local action on environmental policy and explores connections between its physical environment and its socioeconomic order. Acknowledging the conceptual necessity of urban sustainability compels cities to rethink their daily operations and the terms of the local political dialogue about their long-range economic prospects. Within the Thriving Cities framework, the sustainable city is one that promotes both environmental and human well-being.

This Endowment brief on "The Sustainable" is a contribution to the Thriving Cities Project. The project builds from a human ecology framework, which "refers to the web of symbols, norms, goods, laws, habits, rituals, practices, and institutions that ground our identities, guide our individual and collective action, and shape our life purposes within a given social, historical, and moral context."[3] The human ecology framework emphasizes the role of culture in facilitating a normative understanding of how various community Endowments contribute to vibrant and flourishing cities. Sustainability in thriving cities is explored in this brief through a consideration of how the concept of sustainability has been contested and applied to shape public action and urban policy debate over the last several decades. First, the definition of sustainability is explored, with a focus on disagreements in the scholarly literature as to what should be sustained in the urban context and how the standard of sustainability might be achieved. A "triple bottom line" framing of sustainability, encompassing economic, environmental, and equity concerns, is acknowledged; however, the Thriving Cities framing of sustainability as a concept for assessing environmental and human well-being is emphasized. Second, in order to acknowledge the political dimensions of the concept, the integration of sustainability into urban governance is explored. Next, interconnections between sustainability and other Endowments of the thriving city are considered, including the potential for conflict and complementarity. Finally, metrics of sustainability are discussed, with an emphasis on keystone measures that can create opportunities for social learning to improve cities.

Cities and policymakers can maximize locally relevant indicators of sustainability in order to contribute to the overarching goal of creating and maintaining a thriving city. This discussion of the sustainability of cities acknowledges the value of metrics and benchmarks in enabling municipal policymakers to pursue environmental and human well-being. At the same time, this Endowment brief emphasizes that cities must develop an understanding of sustainability relevant to their distinct social and ecological conditions, and that they must engage local processes of democratic governance in order to define and pursue relevant policies.

II. THE SUSTAINABLE CITY

Recent discussions about sustainable cities have been shaped by an interdisciplinary dialogue among academics, activists, and public administrators. The roots of the current discussion of urban sustainability policy can be traced to the history of fields such as urban planning, engineering, and ecology. Yet it was only in the late twentieth century that the concept of sustainability established a foothold on the policy agenda of many US cities.

The current dialogue about sustainable cities can be seen as the outgrowth of shifting thinking about responsibility for environmental policy in the US federal system. In *Toward Sustainable Communities*, Daniel Mazmanian and Michael Kraft outline three epochs of environmental policy that have shaped the current role of local governments in the United States on issues related to the environment.[4] Early approaches to the protection of local environmental quality began by the 1970s, with the development of national regulatory standards with which localities were expected to comply. A second epoch, spanning the 1980s to the end of the century, saw a new emphasis on subnational problem solving, with state and local governments taking greater initiative to address environmental concerns. The third, and current, epoch of US environmental policy, Mazmanian and Kraft explain, can be characterized by an emphasis on sustainable communities. Policymakers and community activists have placed new stress on aligning governance and policy solutions with the natural and ecological contours of environmental problems at the local level. Environmental concerns are now discussed as part of a larger framework of efforts to maintain a city's attractiveness to its residents. The emphasis on sustainable communities in environmental policy raises the prominence of local and subnational governments in environmental problem solving and has required new, often collaborative institutions of governance to align the scale of problems with mechanisms for policy development and decision making.[5] In this context, cities have taken a prominent role in policy leadership and innovation in the pursuit of sustainability.

Global policy debates about the environment and economic growth have also shaped thinking about urban sustainability. In 1987, the United Nations World Commission on Environment and Development (also called the Brundtland Commission) released a report titled *Our Common Future*, in which the commission sought to raise the salience of environmental concerns and global inequity in matters of economic development. Sustainable development was defined in the report as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[6] The *Agenda 21* report, which came out of the 1992 United Nations Conference on Environment and Development (popularly known as the Earth Summit), included a discussion of how sustainable development could be incorporated into local governance. While the scope of effort on local initiatives related to *Agenda 21* varied significantly across countries, international events in the early 1990s focused attention on the potential contributions of local government to the amelioration of global environmental policy and the integration of values supportive of sustainability into economic development concerns.[7] For example, research in Great Britain illustrates how many local authorities expanded venues for public participation in environmental policy and planning and increased environmental initiatives during the early 1990s, even though not all of these actions were mandated or required by the national government.[8] As more local governments gave attention to sustainability, international and national networks developed to share expertise on related policies, such as the reduction of greenhouse gas (GHG) emissions. Two prominent examples are the Cities for Climate Protection initiative of ICLEI Local Governments for Sustainability and the Climate Protection Agreement of the US Conference of Mayors.[9] The emergence of international networks supportive of local sustainability initiatives helps explain the diffusion of this policy concern in local governments and the spread of innovative practices for local involvement in climate and environmental policy.

A. THE SCOPE OF SUSTAINABILITY IMPLEMENTATION IN CITIES

As sustainability has diffused in the global urban policy dialogue, the concept has prompted diverse policy responses by municipal governments. The earliest comprehensive assessment of sustainability policies in US cities was done by political scientist Kent Portney. In *Taking Sustainable Cities Seriously*,

published in 2003, Portney documented the scope of the effort by US cities to place sustainability on the urban policy agenda.[10] His investigation yielded an index measuring the number of programs undertaken by each city. As part of an update to this index published in 2005, Portney wrote that "these policies and programs, ranging from revisions in zoning and land uses, to protection of green space, to commitment to green building, energy efficiency, and climate change efforts achieved through GHG emission reductions, conversion to alternative and green energy sources, and many others, are all designed to try to improve and protect the quality of the environment for the short and long term."[11] Portney found that cities varied in their commitment to sustainability policies, with leaders like Seattle and Portland adopting multiple initiatives while cities like Cleveland, Milwaukee, and New Haven enumerated far fewer programs in their sustainability plans. Portney's research showed that among the earliest initiatives cities undertake when discussing sustainability is the measurement and regular collection of a set of sustainability indicators reflecting environmental, economic, and social concerns.

Subsequently, researchers have reviewed planning documents in large samples of cities or conducted surveys to inventory the scope of urban sustainability efforts.[12] A 2010 survey by the International City/County Management Association (ICMA) provides the most comprehensive inventory of sustainability initiatives. Based on responses from 2,176 local governments, the ICMA study reports on action on 110 indicators in twelve areas—recycling, water conservation, transportation improvements, energy use in transportation and exterior lighting, social inclusion, reducing building energy use, local production and green purchasing, land conservation and development rights, GHG reduction and air quality, building and land use regulations, workplace alternatives to reduce commuting, and alternative energy generation. While the report's authors found that local governments undertake many initiatives that might be associated with urban sustainability, the extent to which governments at that local level are conscientiously planning for a sustainable future remains unclear:

> It appears that up to one-fourth of local governments have gotten on the sustainability train for the long haul with the intent of traveling to an explicitly chosen destination. Even these governments could do much more, but they are exploring a fairly wide range of options. The remaining local governments are adopting some prominent activities or identifying existing practices that are related to sustainability. In effect, they stay on the train for a few stops but have not yet committed to making the journey.[13]

The survey found that a small number of programs, including community-wide recycling collection at residential properties and the addition of walking and biking trails, are being undertaken in a majority of communities; however, many policies that environmental advocates judge central to sustainability have only limited support. For example, the authors report that "with regards to measures explicitly related to GHG, only 14 percent of respondents have determined their baseline GHG emissions, 11 percent have established reduction targets for local operations, 9 percent have determined reduction targets for the community at large, 6 percent have established targets for businesses, and 2 percent have established targets for single-family and multifamily residences."[14] In short, the scope of action on policies related to sustainability appears to be much more limited in the findings of the nationwide ICMA survey than in studies that focus on sustainability leaders or only on the nation's largest cities.

Cumulatively, the quantitative and qualitative research on sustainability policy implementation in the United States unveils no uniform approach to sustainability in local government. While sustainability has become a rallying point for action in cities, it is a contested concept. As a consequence, cities emphasize different types of environmental, economic, and social policies as they develop sustainability plans. Sustainability is also discussed differently in diverse professional fields and stakeholder groups within local government.

B. SUSTAINABILITY IN PROFESSIONAL FIELDS WITHIN LOCAL GOVERNMENT

As the studies by Portney and ICMA convey, sustainability has come to shape practice in diverse professional fields within local government. Urban planning, economic development, and public admin-

istration provide examples. Within urban planning, sustainability has brought about a new emphasis on environmental protection and the ecological characteristics of land use in both advanced industrial and developing countries. Planning scholars frequently document examples of urban design that enhance environmental and human well-being. For example, in *Alternative Urban Futures,* Raquel Pinderhughes conveys examples of how urban design can be used to improve water quality, urban food systems, and public transportation. She stresses that "urban planning must focus on adopting new approaches and appropriate technologies designed to deliver and manage urban infrastructure services in ways that minimize a city's impact on the environment."[15] Timothy Beatley, reflecting on urban design in European cities, offers a similar assessment, writing that "perhaps the clearest lesson from European urban practice is that alternative patterns of growth and development do exist, and it is possible to organize space and public investments in ways that create compact, walkable, green communities—places that exhibit many highly attractive qualities."[16] In the United States, parallels are frequently drawn between sustainability principles and the goals of the New Urbanism movement. Proponents of New Urbanism, challenging suburban design patterns of the mid- and late twentieth century, promote denser patterns of urban design that include mixed-use development and reduce the need for individual automobile ownership.[17] Planners involved with New Urbanism projects express support for principles such as the interconnection of streets to promote walking, the creation of shared public spaces, diverse housing types to promote housing affordability, and infill development in existing urban areas.[18] These design principles are often associated with principles of sustainability because they acknowledge both environmental and social goals in urban design.

The emphasis on sustainability in the planning profession has also had consequences for how planners think about their role in the public process of land development. Scott Campbell, for example, argues that urban planners are well positioned to address the competing values of economic growth, social justice, and environmental protection. While sustainability may be difficult to define in the abstract, the process of development and land use places in motion forces that challenge communities to address how competing values will be accommodated in specific instances. Campbell writes that "the planner therefore needs to act as a translator, assisting each group to understand the priorities and reasoning of the others."[19] Similarly, Philip Berke writes that "sustainability can be used as an overarching framework to dramatically shift the practice of local participation from dominance by narrow special interests toward a more holistic and inclusive view."[20] Berke argues that New Urbanism has contributed to discussions about sustainability by re-focusing planners on the question of desired urban form over intergenerational time periods. But, he adds, more must be done to integrate ecological, social, and global concerns into local planning practice. Thus, in the context of planning, sustainability prompts consideration of substantive approaches to urban design as well as procedural changes in the role of the planning professional.

In the field of local economic development, the word *sustainability* is commonly associated with the emergence of new industries and jobs in a green economy. Those watching the emerging green economy believe that the technological change associated with new patterns of consumption and resource reuse will unleash innovation in the marketplace and create opportunities for economic growth. In some instances there appears to be good reason for these hopes. Some cities will capture high-paying science and technology jobs associated with product innovation, though a city's ability to compete for jobs in the green economy may hinge on its existing economic strengths.[21] For example, the expansion of the green building sector in Portland is attributed in part to investments in research and development by Oregon's state government and the co-location of supportive industries and experts.[22] Jobs in the green economy may be used as a measure of sustainability, but research suggests this measure must be carefully considered in the context of a city's sustainability goals. Critics note that industries like solar panel manufacturing require significant water and energy inputs, and that establishing such firms may have environmental costs for communities.[23] A recent study also shows that minority entrepreneurs and communities are not proportionately represented in green economy creation, a finding that raises equity concerns.[24] For these and other reasons, economic development professionals have come to associate sustainability with a wider range of activities than job creation in green industries, including community development initiatives that address economic opportunity and job access at the neighborhood level.

Finally, sustainability has become a lens through which organizations assess their internal management and their relationship with external environmental conditions.[25] Public administration has been one of the professional fields grappling with the implications of sustainability for day-to-day work in organizations. Indeed, cities run by appointed professional managers appear to take more extensive action on sustainability and climate policies.[26] Sustainability has been described as an important value for public sector organizations because government agencies must maintain a commitment to creating public value over extended periods.[27] As such, sustainability should not be thought of as a short-term initiative, but as a long-term value to which an organization commits itself. "From a policy perspective, organizations that want to make the complex concept of sustainability a part of their business need to understand that sustainability no longer is perceived as an achievable goal, but as a continuing process of improvement, requiring constant effort," argue Niels Faber, René Jorna, and Jo van Engelen.[28] In city operations, public administrators are using sustainability as a framework for thinking about the ongoing improvement of organizational performance.

For local government managers, energy use has been a central sustainability focus. According to Austin Troy, author of *The Very Hungry City*, cities vary significantly in their "urban energy metabolism" and the extent to which they are efficient consumers of energy.[29] For many city governments, sustainability was elevated on the public agenda in the wake of the Great Recession. Provisions in the American Reinvestment and Recovery Act of 2009 incentivized cities to assess their own energy consumption and the efficiency of public facilities.[30] The recent ICMA survey of local government sustainability practices showed that 63 percent of local governments had done energy audits on city buildings, and that a majority had also made retrofits for higher-efficiency lighting.[31] The same survey found lower levels of support for teleworking, though that may change as cities begin to learn from recent efforts by federal agencies to reduce the use of physical office space through teleworking, flexible work schedules, and desk hoteling.[32]

City governments can also play an important role in fostering urban sustainability through their responsibility for critical systems such as water, wastewater, public transportation, and waste management. Through the control of infrastructure critical to the functioning of cities, municipalities can invest in infrastructure in ways that promote more sustainable patterns of development. Through customer relationships with the public, city governments also have the potential to influence mass behavior by promoting water conservation, the use of public transportation, and transit routes friendly to cyclists and pedestrians. Cities also directly invest in institutions that support civic life. Steven Cohen explains:

> To sustain a high quality of life, a city must serve as a home to well-functioning cultural and educational institutions and places that amuse and entertain. Health care must be available, as must collective community events that build civic loyalty and price. Open space, recreation, and other resources that enhance the quality of life are essential elements of the sustainable city.[33]

Thus, cities must integrate thinking about sustainability into the development and maintenance of the full array of public infrastructure.[34] In order to achieve the environmental goals set out in normative statements about sustainability, public administration   working in city government will need to be informed about how sustainability can be used as a framework for assessing organizational performance.[35] In *Sustainability Management: Lessons from and for New York City, America, and the Planet,* Cohen emphasizes the critical role of public management in the process of developing sustainable cities and public organizations. He argues that "if this organizational capacity is to be developed, the field of sustainability management must replace the field of general management."[36]

The scope of local government action on sustainability and the integration of the concept into diverse professional fields in local government speak to the relevance of the concept of sustainability to cities today. Still, as a concept, *sustainability* remains unclear, contested, and open to debate. By reflecting on "The Sustainable" as a concept debated in social, ecological, and governance systems, we can come to a clearer understanding of this Endowment within the Thriving Cities framework.

C. CONTESTING SUSTAINABILITY

The evolving local interest in the sustainability of cities masks a high level of uncertainty about the meaning of sustainability in both theory and practice. Scholars debate the clarity and relevance of the concept as applied to an urban context. Those working in the fields discussed above, including environmental regulators, local economic development officials, and transnational advocates of action on climate change, employ the concept in different ways, as it relates to their policy goals. Charting the contours of debate about the meaning of *sustainability* in the context of cities is a meaningful precursor to exploring how the concept might be deployed as an Endowment and as a standard for community assessment.

Sustainability, as a concept, has surged in popularity in scholarly and popular discourse.[37] Through *Our Common Future*, the Brundtland Commission provided a framing for sustainability that emphasized the intergenerational importance of addressing environmental resource use, as well as global inequality, in ways that showed mindfulness of the need to manage resources and counter environmental degradation.[38] As sustainability was popularized in public discourse in the United States, the concept was embraced by many in the business community as a new framework for discussing corporate social responsibility.[39] For business, sustainability was often framed in terms of the triple bottom line of attention to economy, environment, and equity.[40] In addition to accounting for economic performance, businesses were encouraged to be more transparent about the environmental costs of their operations and to explain how production or operations were being refined to care for or even enhance the organization's relationship with the natural environment. This emphasis has contributed to a range of voluntary standards through which production processes have been refined to improve resource use and mitigate contamination.[41] Corporations were also pressured to be more transparent about their efforts to promote social improvement in the communities in which they worked, and in parts of the globe from which they derived key resources. However, critics argue that the corporate embrace of sustainability has led to more symbolic action and marketing than sincere rethinking of organizational strategy and process.[42] *Greenwashing* has emerged as a term to describe symbolic environmental programs not fully in line with higher standards of sustainability. Critics fear that the popularization of sustainability has eroded the sense of urgency about the scope of social change necessary to achieve the environmental and social goals at the heart of the sustainability discourse.[43]

While heuristics like the triple bottom line eased the integration of sustainability into popular discourse, significant debates persist about how sustainability should be pursued and assessed in the context of cities and metropolitan regions. William Rees argues that the ecological footprint of a city, or the natural resources required to sustain an urban region, extends far beyond the borders of the city.[44] Many of the resources required to support cities, including water, energy, food, and building materials, are brought from outside cities and metropolitan regions. Drawing from ecological economics, Rees suggests that cities and regions have stocks of natural capital that must be maintained through from generation to generation in order to support the production of the resources needed to sustain life. Because cities draw upon resources from around the world, they are major importers of natural resources, in a way that may be depleting natural capital. Rees argues that "the city's role in wealth creation invariably depends on the continuous production of ecological goods and services somewhere else. In ecological terms, the city is a node of pure consumption existing parasitically on an extensive external resource base."[45] Cities may now be more attentive to their dependence on external regions for natural resources to sustain life, but the costs of these interdependencies remain opaque for many communities. So too, the implications for standards of urban sustainability remain unclear. At the least, the ecological perspective has drawn into sharper focus the resource needs of cities and the distance that goods travel to urban markets for consumption.

While the ecological perspective on urban sustainability is critical, it has also been emphasized that the environment cannot be considered in isolation from other social and cultural forces. John Dixon and Louise Fallon, for example, explain that one view of sustainability considers resource use in the context of human welfare. They write that "sustainable development does not require that any particular

economic activity continue indefinitely. In fact, it will usually require that structural changes occur in an economy and new activities replace old ones."[46] Dixon and Fallon further explain that sustainability, in the context of social systems, does not offer a clear path, but instead poses questions that society must address as the connections between the physical environmental and human welfare are contemplated. Some of the most challenging questions involve assumptions about the extent to which technology will improve to allow for more efficient use, or recovery, of resources in the future. This process of questioning brings into focus a need to address the interconnectedness of human well-being and ecological systems. When social and ecological systems are considered together, governance and collective action become central challenges in the effort to resolve the meaning of sustainability.

The interplay between social and ecological systems, and the role of human decision making at this interface, leads many to discuss sustainability as a problem of governance or collective choice for society.[47] Elinor Ostrom has advanced a framework for assessing sustainability and the outcomes of complex social and ecological systems.[48] She proposes analysis of the interactions of resource systems, resource units, governance systems, and users. For the sustainability of resource systems, she emphasizes, "simple blueprint policies do not work."[49] Instead, Ostrom and her collaborators have found, diverse institutional configurations, tailored to the demands of social and ecological systems, contribute to sustainable resource management.[50] Parallels can be drawn between Ostrom's research on common pool resources and the sustainability challenges facing cities today. The task of understanding urban sustainability requires nuanced exploration of a wide range of resource systems within a community.

One approach to resolving tensions over the definition of urban sustainability is to explore the local subjective meaning of the term. Within the fields of environmental policy and urban sustainability, local actors have different understandings of the challenges to and priorities for public action. Researchers can systematically assess these perceptions to explore the scope of viewpoints in policy debate.[51] In the context of cities and metropolitan areas, local actors support different sets of environmental, economic, and social goals in a manner consistent with a triple-bottom-line definition of sustainability.[52] Indeed, for some, the concept of sustainability is more closely associated with economic renewal and the general improvement of urban living conditions than with the environment or human health, per se. Consequently, investigating the local meaning of *sustainability* within cities and communities can be viewed as a precursor to public action. Assessing the local understanding of the areas in which a community is not currently sustainable, and pointing toward the locally desired action to pursue sustainability, can help policymakers understand sustainability within the social context of communities. While policymakers in local government can look to a wide range of examples of best practice for action, piecemeal adoption of these initiatives may bring little local value or have limited impact on sustainability outcomes if policy is not integrated with the local understanding of what it means to be a sustainable city.

D. SUSTAINABILITY AND URBAN GOVERNANCE

In the early 1960s, public administration scholar Lynton Caldwell urged government professionals to incorporate a scientific understanding of the environment into the development of rational public policy to enhance the protection of the natural environmental systems of society. While Caldwell expressed optimism about the potential for bolder environmental policy, he also acknowledged challenges in the political realm:

> A focus on environment may facilitate, but would not lessen, the political task of reconciling a great diversity of interests and values. The scientific base and content of environment-focused decisions would no doubt be increased beyond that employed in our characteristically segmental decisions. But value judgments, particularly with respect to ends, ethics, and accountability in public action, would also gain significance.... Scientists may one day tell us what kinds of environment are best for our physical and mental health, but it seems doubtful if scientists alone will be able to determine the environmental conditions that people will seek.[53]

Writing almost a decade later, Harvey Lieber echoed this concern, stating that "we have reached an awareness of the seriousness of these [environmental] problems, but our political structures are still not keeping up with changes in the biophysical environment."[54] These same concerns about political decision making may be articulated by the environmental policy professionals at work in city government today. For advocates of urban sustainability, developing the political capacity to discuss the balance of environmental quality, economic growth, and social well-being within the city has become a focus in and of itself. Thus, governance for sustainability is a necessary aspect of any assessment of a city's sustainability efforts.

Civic engagement appears to be central to the development of a sustainable city. Recent analyses show that the scope of local sustainability efforts is shaped in part by the number of nonprofit organizations working within a city; these analyses also indicate that environmentally focused groups form tight networks of advocacy to advance sustainability initiatives.[55] Cities making progress on sustainability planning create opportunities for citizen participation and institutionalize participation through formal advisory boards on sustainability.[56] Public engagement in sustainability is described as an important factor in the integration of environmental and social sustainability goals, especially when efforts are made to engage the full diversity of a community.[57] In some conceptualizations of sustainability, expanded public participation in planning may be a central policy goal.[58]

While much debate exists on the ideal models for sustainability governance, an emerging consensus suggests that consideration must be given to the establishment of strong connections between the mass public, government, and other venues for collective action.[59] Developing robust governance arrangements can complement the goal of sustainability itself by putting in place institutions for collective deliberation and choice that allow cities and communities to come to collective decisions about their current and future states of resource use and well-being.[60] Thinking about governance is complementary to the human ecology framework of the Thriving Cities Project because explicit discussions about governance for sustainability can help foster processes of adaptation and learning that are necessary for survival in complex human and ecological systems.[61] Understanding the design of mechanisms for sustainability governance will be critical to bridging professional divides that currently have the potential to fragment discussions about urban sustainability. Reflection on the institutions that link public action in government with concern about sustainability in the mass public will be equally important. To paraphrase John Dewey, a public comes about through the development of a shared understanding of public problems.[62] If that is the case, much work remains to be done to develop public consciousness on sustainability, as research suggests that even environmentally minded individuals do not make choices or change behaviors in the interest of collective sustainability.[63] Cities that consciously reflect on sustainability as a goal for both governments and governance will be better positioned to face these challenges and to reconcile conflicting values that emerge from debate about the local meaning of sustainability.[64]

E. SUSTAINABILITY IN THE THRIVING CITIES FRAMEWORK

In the Thriving Cities framework, the focus of the Endowment of The Sustainable includes both environmental and human well-being within the city. The preceding discussion acknowledges that urban sustainability, as discussed and practiced in cities today, extends well beyond environmental and human considerations. However, different Endowments in the Thriving Cities Project address many of these attendant concerns. Readers already familiar with sustainability are encouraged to ponder the alternative framing of the thriving city, and consider how environmental and human well-being contributes to this goal or standard.

For some, the environment is the primary motivation for discussing sustainability. Recent studies suggest that conditions in the physical environment and a city's exposure to environmental risks help explain the extent to which a city will take action on sustainability.[65] Further, GHG inventories and policies to mitigate or adapt to climate change are key components of many cities' sustainability efforts.[66] The contemporary scientific and political discourse on sustainable cities has brought into

sharper focus the potential contributions of local governance to ensuring environmental quality.

As sustainability gains traction in urban policy discussions, several rationales for enhancing understanding of urban environments have been articulated. Stephanie Pincetl summarizes three arguments for renewed attention to nature in cities.[67] First, she explains, scientists and economists have made cities the focus of ecological research because of a new appreciation of the value of ecosystem services, or the economic benefits of well-functioning natural systems within cities.[68] Second, as urban designers have modified landscapes, the urban built environment has come into interaction with nature. Researchers who focus on urban ecology strive to understand the interactions of humans with both the built and natural environments.[69] Finally, analogies between nature and cities, including the concept of *urban metabolism*, have drawn together the natural and social sciences in new ways. Thinking about nature and natural processes might improve thinking about urban design, particularly in areas like water and wastewater management. Pincetl argues that exploration must continue of the novel aspects of nature in cities and "human intentionality" in shaping cities and nature.[70] Cities are also human systems, and a discussion of urban sustainability would be incomplete without an assessment of human health and well-being. Human health has entered discussions about urban sustainability because both environmental conditions and the built form of cities have consequences it. Beyond this, human health is being used as an independent metric by which to assess the quality of cities.[71] Health is not a new standard for assessing urban sustainability. For example, the introduction of sanitary sewers and wastewater treatment has been widely acknowledged as a critical step toward ensuring human health in dense urban settings.[72] Yet effective wastewater treatment remains inaccessible in many developing countries[73]; also, in the United States, the expansion of wastewater infrastructure has been acknowledged as a factor facilitating suburban development and lower-density land use.[74] Thus, integrating health into the dialogue about urban sustainability is not as simple as identifying factors that enhance human well-being. Instead, thinking about health and sustainability entails scrutinizing the unique challenges and opportunities for the human condition of living in dense urban and metropolitan settings.

The most explicit connections between human health and urban sustainability are being made by those discussing the health implications of urban planning and design.[75] Timothy Beatley suggests that city residents often under-appreciate the nature that surrounds them on a daily basis.[76] Given the demonstrable benefits of connecting humans with nature, Beatley argues, more can be done to support and enhance urban ecology and foster connections between city residents and their surrounding environment. Others recommend that social and educational institutions in cities develop strategies to increase human contact with nature in order to recognize health benefits, including reduced stress.[77] While Beatley reminds us to take advantage of the nature already available in cities, opportunities also exist to modify urban design to enhance contact with nature. As planners rethink urban design, critical steps toward enhancing health and, thereby, urban sustainability will include giving attention to alternatives to automobile transportation,[78] expanding and maintaining open space,[79] cultivating resilience in response to extreme climate events,[80] and ensuring abundance within urban food systems.[81]

Improved public health is frequently discussed as a primary or indirect benefit of land-use reforms that would also address environmental concerns within cities. For example, walking and bicycling are promoted as transportation alternatives to driving, because these methods not only have the effect of reducing emissions of carbon and other air pollutants but also provide individuals with opportunities to improve their health. Modifying streets, sidewalks, and block length have the potential to alter the habits of pedestrians and drivers. However, studies suggest that modifications to land use that enhance walkability might cause greater traffic congestion and, concomitantly, reduce air quality.[82] While density may have attendant problems, there is evidence suggesting that better-connected street systems encourage walking.[83] Thus, measures to enhance public health must be considered in the context of a complex urban system.

Among the many areas of reform, healthy food has taken a large role in the public discourse about sustainable cities. The expansion of urban agriculture is identified as a contributor to both environmental and social sustainability. Governmental and nongovernmental actors are developing strategies

to address "food deserts," neighborhoods in which healthy food and standard groceries are not available because of economic or transportation challenges. In cities that have experienced decline, urban agriculture can return unused land to productive use through small-scale neighborhood gardening or larger commercial initiatives. Growing food in cities can enhance local food security, especially when agricultural efforts are joined with community programs to educate residents about raising and consuming healthy food.[84] The planning and maintenance of community gardens may serve a social function, building relationships within a neighborhood in addition to providing nourishment.[85] Public health advocates are experimenting with other approaches to address the lack of healthy food in urban neighborhoods, including incentive programs for corner stores to carry healthier selections.[86] The goal of achieving social and human sustainability by improving human health through better access to healthy food is fostering experimentation and innovation.

Making preparations so that residents can face harsh weather with resilience is also an important factor in urban human health. Perhaps the most notorious cautionary tale of the dangers of extreme weather in recent history relates to the Chicago heat wave of July 1995. As recounted by Eric Klinenberg in his book *Heat Wave: A Social Autopsy of Disaster in Chicago*, an extended period of extreme hot weather caused a spike in heat-related deaths and illnesses, the full scope of which was not apparent until well after the onset of high temperatures.[87] Chicago officials later calculated that more than 700 people died in the heat wave.[88] Cities must be prepared to deal with extreme weather and the attendant stress it can place on emergency medical response. As explained by Klinenberg, this includes neighborhood and social institutions that can respond to support vulnerable populations, in addition to city policies that do not downplay the significance of weather threats. Because of the condition known as the *urban heat island effect*, in which temperatures in the urban core can be higher than those in surrounding suburban or rural areas,[89] cities must prepare for heat-related illnesses and otherwise plan to mitigate the effects of heat on residents. To maintain public health during adverse weather events, city governments, health facilities, and social institutions must coordinate preventive action and emergency responses to aid vulnerable populations.

While public health policymakers and practitioners have long been concerned with opportunities for human vitality in the urban context, only recently has public health become more clearly integrated into mainstream discussions about urban sustainability. In discussions of urban health, an emphasis can again be seen on the need to tailor sustainability thinking to the context of local action. Yvonne Rydin et al., for example, write that "urban policy needs to focus on experimentation and trial-and-error in order to develop effective approaches for improving health outcomes. This means a project-based emphasis, sensitive to local circumstances and drawing, where possible, on the potential of community organizations to self-organise and develop solutions out of local knowledge."[90] As discussions about the sustainable city progress, it would be beneficial to give more attention to the link between urban conditions and human health. This should include incorporating indicators of human health in overall assessments of the sustainable city, but also acknowledging that cities must tailor community health interventions to local needs.

III.   SUSTAINABILITY IN CONTEXT

Sustainability challenges us to reconcile competing values in policy discussions about the development, growth, and future of our cities. Because of this, our understanding of urban sustainability is shaped in part by the social and political conditions of cities. To move away from unsustainable conditions, cities are challenged to rethink existing patterns of development and technological commitments that no longer correspond with their goals. The present section is a review of how sustainability may stand in tension with a city's existing economic, technological, and political commitments. This review is followed by a consideration of the complementarity of The Sustainable with three other Endowments in the Thriving Cities framework—"The Prosperous," "The Just and Well-Ordered," and "The Beautiful."

A. THE ECONOMIC CHALLENGE

The tension between economic growth, environmental quality, and human well-being is central to sustainability. Conceptually, sustainability challenges us to move away from zero-sum thinking in which investments in the environment and well-being come at the expense of economic growth and prosperity. Integrating sustainability and economic growth may be the primary challenge to the sustainability of cities. Economist Matthew Kahn, in his book *Green Cities: Urban Growth and the Environment*,[91] asserts that an environmental Kuznets curve[92] helps explain the motivations of cities to pursue policies that enhance the environment and quality of life. Environmental degradation, Kahn explains, may be tolerated by cities with struggling economies, as the need for jobs trumps the desire to regulate industry or impose costs on new development to protect local environmental resources. However, as incomes rise, the expectations of residents for the quality of the urban environment also rise. Economically prosperous cities will address environmental quality, argue Kahn and others, in order to continue to fuel the economic growth of the higher-income postindustrial economy. Kahn writes, "In short, for richer cities the outlook is good. However, cities that are still climbing the environmental Kuznets curve slope may face decades of growing pollution ahead."[93] The environmental Kuznets curve challenges urban policymakers to assess the state of local opinion about the tradeoffs between environmental quality and economic growth. Both globally and in the United States, the argument may raise concern that tolerance of pollution will exist in many US cities, sustained by concerns about economic growth and the need for jobs. However, in the context of cities, causal arguments associated with the environmental Kuznets curve remain unclear. Cities investing in local sustainability programs might be more attractive venues for jobs, growth, and workers.[94] This uncertainty raises the importance of understanding the connections between prosperity and sustainability in the Thriving Cities framework.

Promoting sustainability in contemporary discussions about economic development might also be difficult because alternate outlooks on economic development may hold more sway with the political leaders and economic development professionals promoting their communities and shaping paths for growth. Many cities include a commitment to green jobs and growth in the green economy in their official sustainability plans. For some of these cities, the narrow foundation of existing complementary economic activity may become a significant challenge to attaining green jobs goals.[95] A narrow association between sustainability and green jobs might even hinder broader discussions about sustainability. Some economic development professionals may prefer to substitute other terminology for *sustainability*, such as *quality of life*.[96] Alternate frameworks for economic development, particularly those promoting the recruitment of educated workers for technological jobs and those promoting lifestyle amenities, may seem attractive to local officials responsible for making their communities attractive to business.

While some scholars suggest complementarity between the adoption of sustainability policies and community attributes associated with the creative economy,[97] the extent to which local practitioners view these frameworks for economic growth as complementary remains uncertain. Clarifying the place of sustainability in the local discourse on economic development may be one of the most import-

ant challenges to sustainability in the thriving city; promoting dialogue in this area may be one of the most productive methods scholars and practitioners can use to foster engagement and progress. Of equal concern to US cities in the post-recession era are the real and opportunity costs of investing in sustainability policies. While city budget concerns are a distinct challenge from the integration of sustainability and local economic growth, these concerns may be more salient in the day-to-day lives of local government practitioners. Studies that review local policies in support of sustainability almost uniformly acknowledge the challenge of local budget constraints. Cities appear to prefer early adoption sustainability policies with no cost, very little cost, or demonstrable cost savings. Scholars often describe financial benefits as "co-benefits" of the environmental goals of local sustainability policies.[98] Establishing the financial case for investing in sustainability is important for local officials who are accountable to the general public and the electorate in a time of economic stress.

Budgetary pressures on sustainability should be kept in mind for at least two reasons. First, if efforts to enhance local sustainability have financial benefits for local governments, these benefits enhance the argument that sustainability contributes to thriving cities. Parallels between sustainability and efficiency in the use of public resources can help local officials build an argument for investing in sustainability. Second, advocates of sustainability must acknowledge when a clear financial case for sustainability does not exist. Sustainability efforts will sometimes have costs, or will sometimes have benefits that can only be achieved over the long term. In these areas, policymakers must foster public dialogue in order to consider the value tradeoffs that might exist between budgetary commitments to sustainability and support of a less sustainable status quo.

B. THE TECHNOLOGICAL CHALLENGE

Technological advancement is a second challenge for urban sustainability. As the salience of sustainability rises in various professional communities, the normative pressures and financial incentives for innovation increase. The business case for sustainability often involves the potential for profit associated with new products that promise to provide social and environmental protection while also opening new markets.[99] The pressure for technological innovation related to sustainability is reshaping how cities are designed, built, and operated. For example, stormwater management is one area in which engineers and planners have developed new technology and system designs to ameliorate environmental problems.[100] Urban planners and engineers have also worked toward systems that are more resilient and redundant in order to ensure that the critical tasks of urban infrastructure are executed, even if individual system components fail.[101] Many of the sustainability policy goals articulated by cities today will be accomplished in part through technological innovation.

The introduction of new technology may also been seen as a threat to the sustainability of cities. Technology can be a critical aid in moving cities toward greater sustainability; however, some would caution against an over-reliance on technology to address urban sustainability challenges. Sustainability critics emphasize the importance of changing human behavior in the pursuit of communities that are more sustainable and more just.[102] An emphasis on new technologies with environmental benefits may lower expectations about the need or desire for individual actions to promote more sustainable communities. Relying on technology in the pursuit of sustainability in cities makes sustainability an expert problem, rather than a challenge for broad public debate. An over-dependence on technological change may limit the individual-level actions and benefits of sustainability thinking at the individual level.

C. THE POLITICAL CHALLENGE

A third challenge, and perhaps the most pressing for urban sustainability, is the political climate in which urban sustainability policies are discussed. The political coalitions that form in cities to support sustainability are both distinct and unique to their local context. Recent case study inquiries into the development of political support for urban sustainability and urban environmentalism show that political mobilization around sustainability occurs in multiple ways.[103] In *Alternative Routes to the Sustain-*

able City, Steven Moore documents the evolution of sustainability discussions in Austin, Curitiba, and Frankfurt.[104]   Sustainability efforts in Curitiba, a city of almost two million in southern Brazil, were guided "from the top down," through mayoral leadership and a strong planning emphasis on transportation and urban design, By contrast, sustainability emerged as an issue in Austin and Frankfurt "from the bottom up," through the efforts of local interest groups. Moore emphasizes that cities must come to an understanding of urban sustainability through a process of abductive reasoning (also referred to as inferential reasoning), or through a pragmatic policy process in which cities take the actions most appropriate to their context and their sustainability goals. Similar arguments can be found in the public policy and political science literature. For example, Elinor Ostrom's research on common pool resource management, while not fully parallel with study of the problems of urban sustainability, emphasizes the potential of local resource users to design cooperative policy institutions appropriate to their local context and resource needs.[105] Gilles Paquet also argues for multiple adaptive approaches to addressing sustainability dilemmas, based on multiple scales of problem solving.[106] In short, descriptions, prescriptions, and assessments of urban sustainability must be grounded in a firm understanding of local governance and political processes, and scholars and practitioners must be prepared to mold their arguments about urban sustainability to the social, political, and ecological contexts of individual cities.

Given the centrality of local political processes to sustainability, we should expect to see strong links between local civic life and sustainability policy. Political participation and civic engagement can be considered both a factor that contributes to local sustainability and the goal or product of local sustainability efforts. High levels of civic engagement, public concern about the environment, and a supportive political climate may be helpful preconditions to a city's pursuit of sustainability. A growing number of studies show connections between various measures of civic engagement or social capital and local action on sustainability.[107] Research on urban politics has documented the value of civic engagement and participation in neighborhood governance in enhancing the quality of local policy outcomes.[108] Citizens who are civically engaged may be more prepared to discuss the integration of the environmental, economic, and social priorities of their communities. While researchers are just beginning to explore the mobilization of citizens and nongovernmental organizations around urban environmental goals, there is good reason to hypothesize a positive relationship between citizen cooperation, co-production behaviors, and coordinated governance of urban sustainability.

Advocates of sustainability also seek to enhance public engagement in urban planning and local policy development as a policy goal. Public engagement with local government can be considered a contribution to urban sustainability because an engaged and knowledgeable public may be better prepared to invest in long-term thinking about its city's future. An engaged public may also contribute to the co-production of urban sustainability initiatives, thereby lowering the costs of public action or enhancing the scope of impact. Through participation in planning and the co-production of sustainability efforts, citizens can participate in the development of local norms of sustainable urban living. This interactive and iterative process of engaging the public, enlisting public involvement in social and environmental program co-production, and strengthening social connections around the local sustainability agenda requires additional research and understanding. While scholars in political science and public administration illustrate the importance of crafting collaborative venues for civic engagement in local policy,[109] more must be done to expand understanding of how participatory venues can be linked to the conceptualization and implementation of sustainability in thriving cities.

These optimistic observations on the links between civic engagement and urban sustainability must be tempered by acknowledging the barriers to pursuing a politics supportive of urban sustainability. First, sustainability will compete with other important local policy priorities for the attention of citizens with scarce time and resources to contribute to local political processes. In order to have citizen engagement be most effective in local governance, cities might need to engage in the development of capacities specific to the areas of public policy in which citizen co-production is sought.[110] Cities might also need to invest in a broader general understanding of science and the environment among the mass public in order to foster higher levels of engagement with the fields of policy relevant to urban sustainability.[111] Second, US cities working on urban sustainability will have to engage a political climate that, in some places, can be hostile to policy prescriptions or institutional actors associated with the global

sustainability movement. Skepticism about global climate change and concern about the global governance institutions and networks involved with sustainability policy discussions have led to a political backlash against discussions of sustainability in some parts of the United States.[112] Some opposition to policies associated with urban sustainability aligns with contemporary political cleavages between Republicans and Democrats, with party affiliation predicting whether city officials will support climate change policies.[113] For those who believe that sustainability prescribes uniform policies across localities, policy prescriptions inappropriate to the local context may be highlighted in public debate in order to raise general public or elite concern about sustainability as an urban policy goal. Advocates of urban sustainability as a concept or policy initiatives associated with sustainability must directly face the political arguments against it.

D. COMPLEMENTARY THRIVING CITIES ENDOWMENTS

Conceptually, sustainability calls upon cities to explore the integration of environmental, economic, and social equity imperatives. So far in this Endowment brief, environmental and economic imperatives have been emphasized. For a more complete understanding of sustainability, considering the connections between the Endowment of The Sustainable and The Prosperous, The Just and Well-Ordered, and The Beautiful within the Thriving Cities framework seems necessary, in that it will enable a more complete discussion of sustainability as currently conceptualized and applied in urban policy. Discussion of these links should also point to areas of intersection between Endowments that can be explored in more detail through the development of metrics for the Thriving Cities Project.

1. The Sustainable and The Prosperous

First, a sustainable city must be a prosperous city. The environmental priorities associated with contemporary discussions about urban sustainability should not eclipse the question of desired states of physical and economic development. Conceptually, sustainability places prosperity in a global context. Our cities can no longer be defined as prosperous if local prosperity comes at the cost of severe disruption or damage to social and ecological systems beyond the city's borders. Municipal governments are now hard-pressed to think about economic flows that bring physical resources into cities and the chains of social and ecological impact associated with those inflows. Cities' residents and public and private sectors must also give closer attention to the waste byproducts of their various activities, reflecting on the impact of those wastes on other communities and resource bases. Sustainable prosperity and local economic growth cannot be predicated on the transfer of resources or the shifting of negative externalities to other communities. For many cities, these imperatives will require a more careful consideration of regional models of governance, particularly in regard to water resources, public transportation, air quality management, food systems, and solid waste management.[114]
Linking sustainability and prosperity should also challenge cities to consider their true economic strengths and the economic transactions that occur within their borders. In many ways, the field of local economic development is already focused on the development of local economic strengths because of theories of economic growth, including those advanced in the work of Michael Porter, that direct policymakers to analyze and build upon local clusters of economic strength.[115] This logic integrates with the approach of sustainability advocates who encourage economic development practitioners to foster activity in the local economy by maintaining connections among local business and industry before turning outside the city.[116] Just as cities become more contentious about external economic dependencies, they must seek to build more interconnected networks of local business, economic change, and locally based economic growth.

2. The Sustainable and The Just and Well-Ordered

Second, a sustainable city must also be just and well ordered. Concerns about social justice and equity are central to discussions of urban sustainability. Environmental sustainability has come into focus for cities alongside the rethinking of the benefits of urban economic development. Sustainable cities must create opportunities for a wide range of city residents, and advocates of sustainable development should promote many of the same policies that have been discussed by advocates of equity in urban development over the last three decades.[117] Sustainable cities must create paths of economic opportu-

nity for the full range of city residents and other participants in urban life.[118] Beyond this, justice and equity extend to environmental concerns. The environmental disamenities associated with urban life, including proximity to environmental risks, industrial pollutants, and locally undesirable land uses, must be analyzed within an equity framework to consider their geographic location and distribution within cities. Cities that are just, well ordered, and sustainable will make investments in urban environments and economic growth in a manner that will broadly benefit all of their neighborhoods and socioeconomic segments.

3. The Sustainable and the Beautiful

Third, a sustainable city should give careful consideration to the integration of beauty as a sustainability goal. Urban sustainability advocates are giving attention to beauty in nature, urban design, and human expression in public spaces. Enhancing urban beauty through the expansion of natural spaces may be one goal, but sustainability may also require municipal governments to help residents rethink their ideas about natural beauty. Education about the local landscape and native flora may be required, particularly in cities where non-native plant species are popular.[119] Public art can also be used as an avenue for the extension of urban sustainability efforts. For example, sustainability education delivered through public schools and nongovernmental organizations frequently integrates art in order to communicate environmental goals or messages to the broader public. These efforts include large murals, installations in parks and public spaces, and signs and displays around drain covers and other public infrastructure. In sum, The Sustainable can challenge our conceptualization of environmental beauty in the city as well as integrate our concern about sustainability with art.

This section has highlighted three challenges for The Sustainable as an Endowment of thriving cities—economic, technological, and political. Complementarity between sustainability and three other Endowments has also been discussed tentatively, with a focus on The Prosperous, The Just and Well-Ordered, and The Beautiful. Next, tentative suggestions on how to measure the performance of sustainability in cities will be offered, with an emphasis on the importance of public inclusion, dialogue, and policy learning.

IV. SUSTAINABILITY METRICS

Urban sustainability has become extensively measured by city governments and nongovernmental organizations. In his early assessment of sustainability efforts in US cities, Kent Portney noted that sustainability indicators initiatives were frequently among the first things undertaken by cities starting work on a sustainability program.[120] Indicators of the status of local environmental, economic, and social conditions can provide cities with a foundation for understanding the current state of affairs, establishing goals for a sustainable future, and assessing progress toward sustainability on a regular basis. Sustainability indicators progress reports can now be found for cities across the United States, such as Baltimore, Grand Rapids, Minneapolis, Seattle, and Tallahassee. The careful tracking of local sustainability data may be seen as complementary to the goals of the Thriving Cities Project. Cities are establishing metrics with which to assess performance and measure progress toward a more sustainable future. Yet the wide range of metrics being tracked by cities portend difficulty in establishing common ground across cities if we hope to assess a limited number of keystone indicators related to sustainability. In the present section of this Endowment brief, consideration is given the characteristics we might desire of keystone indicators of urban sustainability. The brief then concludes with the identification of a set of broad but important indicators of sustainability that might be assessed across a wide range of local contexts.

An emphasis on performance measurement has significantly influenced the current practice of public management in city governments.[121] While some cities have invested in making big data available to the public and civic hackers, management systems have not kept pace with the growing collection of information available about city conditions and services. Public organizations appear limited in their ability to use data to learn about problems or pathologies in organizational processes in order to fundamentally rethink policy design or approaches to solving public problems.[122] For cities thinking about

sustainability as a dimension of thriving, attention should be given to the intended use of sustainability metrics. Metrics will be useful to the extent that they help cities learn and make progress toward their sustainability goals. Many current metrics of urban sustainability offer snapshot tracking of indicators, but do not provide cities with clear guidance on policy or operations. Further, many sustainability indicators are specific to the social, political, and ecological context of the city that selected them, an attribute that can complicate comparisons across jurisdictions. In order to move toward sustainability metrics that allow for broad assessment of sustainability in the context of a thriving city, the discussion below emphasizes sustainability metrics—i.e., keystone measures—that could be deployed in a wide range of cities to assess urban sustainability consistently across diverse ecological and social contexts.

The emphasis on community assessment also pushes us to consider sustainability metrics that do not copy current practices in the field. Any city beginning a sustainability metrics project can scrutinize the work of other cities and copy and paste measures that seem relevant to its local context. Re-articulating popular measures would not be useful here. Instead, scholars and practitioners are encouraged to consider measures of urban sustainability that will tell a clear story about environmental and human well-being, regardless of a city's distinct ecology. In other words, sustainability metrics must avoid measuring things that are easy to count, like annual tree plantings, but that provide unclear or unequally distributed environmental and human health benefits.[123]

Keeping in mind the challenge of designing assessment metrics that allow for learning and comparability across jurisdictions, the following five measures are proposed as keystone indicators of urban sustainability, as defined by environmental and human well-being.

First, on the basis of the work of Portney,[124] it can be observed that sustainability requires local knowledge of relevant environmental and health indicators. Many cities begin with a sustainability indicators project because this work helps focus a city's attention on the environmental and social concerns most relevant to the local context. While sustainability indicators have grown very complex in some communities, the establishment of a core set of sustainability indicators that are monitored and reported on annually can serve as a foundation for assessing the extent to which a community is tracking sustainability. This requires an ongoing commitment to monitor, report, and reflect upon measures of concern in the community.

Second, given the prevalent focus on GHG emissions and climate change, air pollutants and climate must be factors in the assessment of urban sustainability. However, per capita GHG reductions and other measures do not necessarily allow for clear comparability across cities, and the link between environmental and human health is opaque. Instead, a set of assessment measures linking air, climate, and health should be considered. For example, the National Weather Service issues "Excessive Heat Warnings" when high temperatures post a danger to human health. The US Environmental Protection Agency's Air Quality Index, a metric the EPA uses to alert the public to unhealthy and hazardous levels of air pollutants, provides a more precise indicator of potential health consequences of poor air quality. For the purpose of assessment, both measures could be used to assess the number of days per year that a city experiences conditions that pose an environmental health risk to the public.

Third, good water quality and effective wastewater treatment have long been recognized as essential to human health and urban sanitation. Still, cities throughout the United States find it necessary to pump untreated wastewater into waterways during extremely heavy rains or other emergencies. Cities monitor and report combined sewer overflows and sanitary sewer overflows to both the EPA and the general public. The annual number of discharge events serves as one indicator of the extent to which water quality is being maintained, in this case through the effective treatment of effluent. A ratio measure, such as annual overflow gallons per capita in a city or metropolitan region, might be preferred for comparing water quality across jurisdictions.

Fourth, research reviewed in this Endowment brief points to potential human benefits of maintaining connections with nature. A per capita measure of preserved open space, trails, and parkland would

thus be beneficial to an understanding of the potential in a city or metropolitan region for human contact with nature. While this measure would not convey information about the actual individual-level experience of nature, it would acknowledge that a stock of public open space and park infrastructure provides opportunities for outdoor recreation and engagement.

Fifth, local governments frequently receive advice from appointed citizen boards or committees in order to gauge informed public sentiment about various issues. While cities like Baltimore benefit from the presence of a federally funded long-term ecological research program, many others do not have at their disposal relevant environmental and public health research to inform local decision making. A new standard for local environmental governance might be the assembly and appointment of a science committee to review research relevant to local government.[125] While more cities are establishing sustainability committees to comment on city policy, these committees might not contain a membership that is able to scrutinize and synthesize the best scientific advice for the community. Outreach by city governments may be necessary to forge links with the scientific community so that research findings could be translated into language relevant to a city's social and ecological context. This is not to suggest that democratic governance defer to scientific expertise; rather, cities should be acknowledged for taking steps to improve their understanding and use of science to inform local policy.

These five metrics are proposed in the interest of advancing a discussion about how communities can position themselves to learn more about sustainability and thriving. With this small list of indicators, cities of any size can move forward with a sustainability discussion that allows a more focused local dialogue on environmental and human well-being. This simple list of indicators also captures relevant observations of environmental and governance conditions that can be applied to begin an assessment of the Endowment of The Sustainable.

V.   CONCLUSION

Sustainability should be considered a fundamental concern for a thriving city. Cities will not achieve a state of thriving, nor will they perpetuate that state, if they do not craft policies that support the environmental and human well-being of current and future residents. Urban sustainability has become a focus for city governments across the United States, though cities vary in the extent to which they pursue sustainability policies and in the extent to which they associate these policies with a sustainability framework. This Endowment brief reviewed the debate surrounding the concept of *urban sustainability*. Sustainability is now discussed in cities around the globe, with diverse initiatives underway to address economic, environmental, and social goals. The discussion in the present brief has focused on the narrow framing of The Sustainable within the Thriving Cities framework, as an Endowment related to environmental and human well-being. This constrained definition was then discussed in the context of other Endowments related to a thriving city.

By situating The Sustainable as a narrow Endowment within the broader Thriving Cities framework, this discussion embraces the need to contest and debate the meaning of sustainability within the social and ecological context of individual cities. If goals such as being sustainable or thriving are to be pursued, new procedures of governance must be developed to aid communities in scrutinizing current assumptions about how we use natural resources and how we interact with the environment. The reader is encouraged to ponder these challenges while sitting on a park bench, taking every opportunity to observe the intersection of nature and human life within his or her city and community. The Endowment of The Sustainable should foster more attention to how we live in our urban environment, and how we assemble the necessary expertise to make decisions to design our cities in a way that protects and promotes environmental resources while also maximizing the benefits to human health of nature and urban design.

N O T E S

(Endnotes)

1 Matthew Slaven, *Sustainability in America's Cities: Creating the Green Metropolis* (Washington, DC: Island Press, 2011), 2.

2 Michael Lorr, "Defining Urban Sustainability in the Context of North American Cities," *Nature and Culture* 7, no. 1 (2012), 23.

3 Thriving Cities Project, *Guidelines for City Profiles* (Charlottesville: Institute for Advanced Studies in Culture, University of Virginia, 2014), 8.

4 Daniel Mazmanian and Michael Kraft, *Toward Sustainable Communities: Transition and Transformations in Environmental Policy*, 2nd ed. (Cambridge, MA: MIT Press, 2009).

5 These approaches are described in Ann Dale, William Dushenko, and Pamela Robinson, *Urban Sustainability: Reconnecting Space and Place* (Toronto, Canada: University of Toronto Press, 2012); Christopher Gore and Pamela Robinson, "Local Government Response to Climate Change: Our Last, Best Hope?," in *Changing Climates in North American Politics: Institutions, Policymaking, and Multilevel Governance*, ed. Henrik Selin and Stacy D. VanDeveer (Cambridge, MA: MIT Press, 2009), 137–58; Judith Innes and David Booher, "Metropolitan Development as a Complex System: A New Approach to Sustainability," *Economic Development Quarterly* 13, no. 2 (1999): 141–56; Nicholas Lutsey and Daniel Sperling, "America's Bottom-up Climate Change Mitigation Policy," *Energy Policy* 36, no. 2 (2008): 673–85.

6 World Commission on Environment and Development, *Our Common Future* (New York, NY: Oxford University Press, 1987), 43.

7 See, for example, Solfie Adolfsson Jörby, "Local Agenda 21 in practice: A Swedish Example," *Sustainable Development* 8, no. 4 (2000): 201–14; Isabel Garcia-Sanchez and Jose-Manuel Prodo-Lorenzo, "Determinant Factors in the Degree of Implementation of Local Agenda 21 in the European Union," *Sustainable Development* 16, no. 1 (2008): 17–34; Janet Rowe and Colin Fudge, "Linking National Sustainable Development Strategy and Local Implementation: A Case Study in Sweden," *Local Environment* 8, no. 2 (2003): 125–40; Walter Sancassiani, "Local Agenda 21 in Italy: An Effective Governance Tool for Facilitating Local Communities' Participation and Promoting Capacity Building for Sustainability," *Local Environment* 10, no. 2 (2005): 189–200; Paul Selman, "Local Agenda 21: Substance or Spin?," *Journal of Environmental Planning and Management* 41, no. 5 (1998): 533–53.

8 Ben Tuxworth, "From Environment to Sustainability: Surveys and Analysis of Local Agenda 21 Process Development in UK Local Authorities," *Local Environment* 1, no. 3 (1996): 277–97.

9 Harriet Bulkeley et al., "Governing Climate Change Transnationally: Assessing the Evidence from a Database of Sixty Initiatives," *Environment and Planning C: Government and Policy* 30, no. 4 (2012): 591–612; Harriet Bulkeley and Michelle Betsill, *Cities and Climate Change: Urban Sustainability and Global Environmental Governance* (New York, NY: Routledge, 2003); Bulkeley and Betsill, "Rethinking Sustainable Cities: Multilevel Governance and the 'Urban' Politics of Climate Change," *Environmental Politics* 14, no. 1 (2005): 42–63; Bulkeley and Betsill, "Revisiting the Urban Politics of Climate Change," *Environmental Politics* 22, no. 1 (2013): 136–54.

10 Kent Portney, *Taking Sustainable Cities Seriously: Economic Development, the Environment, and Quality of Life in American Cities* (Cambridge, MA: MIT Press, 2003).

11 Kent Portney, "Civic Engagement and Sustainable Cities in the United States," *Public Administration Review* 65, no. 5 (2005): 579–91.

12 Examples of this approach can be found in Philip Berke and Maria Manta Conroy, "Are We Planning for Sustainable Development? An Evaluation of Thirty Comprehensive Plans," *Journal of the American Planning Association* 66, no. 1 (2000): 21–33; Conroy, "Moving the Middle Ahead: Challenges and Opportunities of Sustainability in Indiana, Kentucky, and Ohio," *Journal of Planning Education and Research* 26, no. 1 (2006): 18–27; Conroy and Philip Berke, "What Makes a Good Sustainable Development Plan? An Analysis of Factors That Influence Principles of Sustainable Development," *Environment and Planning A* 36, no. 8 (2004): 1381–96; Conroy and Al-Azad Iqbal, "Adoption of Sustainability Initiatives in Indiana, Kentucky, and Ohio," *Local Environment* 14, no. 2 (2009): 109–25; Susan Opp and Kyle Saunders, "Pillar Talk: Local Sustainability Initiatives and Policies in the United States: Finding Evidence of the 'Three E's': Economic Development, Environmental Protection, and Social Equity," *Urban Affairs Review* 49, no. 5 (2013): 678–717; Devashree Saha and Robert Paterson, "Local Government Efforts to Promote the 'Three E's' of Sustainable Development: Survey in Medium to Large Cities in the United States," *Journal of Planning Education and Research* 28, no. 1 (2008): 21–37.

13 James H. Svara, Tanya C. Watt, and Hee Soun Jang, "How Are U.S. cities Doing Sustainability? Who Is Getting on the Sustainability Train, and Why?" *Cityscape* 15, no. 1 (2013), 29.

14 Ibid., 25.

15 Raquel Pinderhughes, *Alternative Urban Futures: Planning for Sustainable Development in Cities throughout the World* (Lanham, MD: Rowman & Littlefield, 2004), 226.

16 Timothy Beatley, *Green Urbanism: Learning from European Cities* (Washington, DC: Island Press, 2000), 414–15.

17 Peter Calthorpe and William Fulton, *The Regional City: Planning for the End of Sprawl* (Washington, DC: Island Press, 2001). See also Calthorpe, *Urbanism in the Age of Climate Change* (Washington, DC: Island Press, 2011).

18 Ajay Garde, "New Urbanism as Sustainable Growth? A Supply-Side Story and Its Implications for Public Policy," *Journal of Planning Education and Research* 24, no. 2 (2004): 154–70.

19 Scott Campbell, "Green Cities, Growing Cities, Just Cities? Urban Planning and the Contradictions of Sustainable Development," *Journal of the American Planning Association* 62, no. 3 (1996), 305.

20 Philip Berke, "Does Sustainable Development Offer a New Direction for Planning? Challenges for the Twenty-First Century," *Journal of Planning Literature* 17, no. 1 (2002), 34.

21 Karen Chapple, Cynthia Kroll, T. William Lester, and Sergio Montero, "Innovation in the Green Economy: An Extension of the Regional Innovation System Model?," *Economic Development Quarterly* 25, no. 1 (2011): 5-25. See also Joan Fitzgerald, *Emerald Cities: Urban Sustainability and Economic Development* (New York, NY: Oxford University Press, 2010).

22 Jennifer Allen and Thomas Potiowsky, "Portland's Green Building Cluster: Economic Trends and Impacts," *Economic Development Quarterly* 22, no. 4 (2008): 303–15.

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

24 Elsie Harper-Anderson, "Exploring What Greening the Economy Means for African American Workers, Entrepreneurs, and Communities," *Economic Development Quarterly* 26, no. 2 (2012): 162–77.

25 Andrew Hoffman and Marc Ventresca, *Organizations, Policy and the Natural Environment: Institutional and Strategic Perspectives* (Stanford, CA: Stanford University Press, 2002).

26 Various authors have made this observation, such as Jungah Bae and Richard Feiock, "Forms of Government and Climate Change Policies in US Cities," *Urban Studies* 50, no. 4 (2013): 776–88; Opp and Saunders, "Pillar Talk"; Svara et al., "How Are US Cities Doing Sustainability?"

27 Daniel Fiorino, "Sustainability as a Conceptual Focus for Public Administration," *Public Administration Review* 70, no. S1 (2010): S78–S88; Deniz Leuenberger, "Sustainable Development in Public Administration: A Match with Practice?" *Public Works Management and Policy* 10, no. 3 (2006): 195–201; Leuenberger and John Bartle, *Sustainable Development for Public Administration* (Armonk, NY: M.E. Sharpe, 2009).

28 Niels Faber, René Jorna, and Jo van Engelen, "The Sustainability of 'Sustainability': A Study into the Conceptual Foundations of the Notion of 'Sustainability,'" *Journal of Environmental Assessment Policy and Management* 7, no. 1 (2005), 28.

29 Austin Troy, *The Very Hungry City: Urban Energy Efficiency and the Economic Fate of Cities* (New Haven, CT: Yale University Press, 2012).

30 Nathan Francis and Richard Feiock, *A Guide for Local Government Executives on Energy Efficiency and Sustainability* (Washington, DC: IBM Center for the Business of Government, 2011).

31 Svara et al., "How Are US Cities Doing Sustainability?," 20.

32 *Selected Agencies Plan to Use Workforce Mobility to Reduce Space, but Most Efforts Are Too New to Have Realized Savings*, Report No. GAO-14-41, US Government Accountability Office, 2013, http://www.gao.gov/assets/660/658454.pdf.

33 Stephen Cohen, *Sustainability Management: Lessons from and for New York City, America, and the Planet* (New York, NY: Columbia University Press, 2011), 124.

34 Richardson Dilworth, Robert Stokes, Rachael Weinberger, and Sabrina Spatari, "The Place of Planning in Sustainability Metrics for Public Works: Lessons from the Philadelphia Region," *Public Works Management and Policy* 16, no. 1 (2011): 20–39.

35 XiaoHu Wang, Christopher V. Hawkins, Nick Lebredo, and Evan M. Berman, "Capacity to Sustain Sustainability: A Study of US cities," *Public Administration Review* 72, no. 6 (2012): 841–53.

36   Cohen, *Sustainability Management*, 154.

37   Benigno Aguirre, "'Sustainable Development' as Collective Surge," *Social Science Quarterly* 83, no. 1 (2002): 101–18.

38   World Commission on Environment and Development, *Our Common Future*.

39   Christopher Laszlo, *Sustainable Value: How the World's Leading Companies Are Doing Well by Doing Good* (Stanford, CA: Stanford Business Books, 2008); Adam Werbach, *Strategy for Sustainability: A Business Manifesto* (Boston, MA: Harvard Business Press, 2009).

40   John Elkington, "Towards the Sustainable Corporation: Win-Win-Win Business Strategies for Sustainable Development," *California Management Review* 36, no. 2 (1994): 90–100.

41   Aseem Prakash and Matthew Potoski, *The Voluntary Environmentalists: Green Clubs, ISO 14001, and Voluntary Regulations* (New York, NY: Cambridge University Press, 2006).

42   Christopher Laszlo and Nadya Zhexembayeva, *Embedded Sustainability: The Next Big Competitive Advantage* (Stanford, CA: Stanford Business Books, 2011).

43   An example of this line of criticism can be found in Adrian Parr, *Hijacking Sustainability* (Cambridge, MA: MIT Press, 2009).

44   William Rees, "Ecological Footprints and Appropriated Carrying Capacity: What Urban Economics Leaves Out," *Environment and Urbanization* 4, no. 2 (1992): 121–30.

45   Ibid., 128.

    ohn Dixon and Louise Fallon, "The Concept of Sustainability: Origins, Extensions, and Usefulness for Policy," *Society and Natural Resources* 2, no. 1 (1989), 77.

47   William Lafferty, ed., *Governance for Sustainable Development: The Challenge of Adapting Form to Function* (Northampton, MA: Edward Elgar, 2004); Peter May et al., *Environmental Management and Governance: Intergovernmental Approaches to Hazards and Sustainability* (New York, NY: Routledge, 1996).

48   Elinor Ostrom, "A General Framework for Analyzing Sustainability of Social-Ecological Systems," *Science* 325 (2009): 419–22.

49   Ibid., 421.

50   C. Dustin Becker and Elinor Ostrom, "Human Ecology and Resource Sustainability: The Importance of Institutional Diversity," *Annual Review of Ecological Systems* 36 (1995): 113–33; Michael McGinnis, ed., *Polycentric Governance and Development: Readings from the Workshop in Political Theory and Policy Analysis* Amy Poteete, (Ann Arbor: University of Michigan Press, 1999); Ostrom, *Understanding Institutional Diversity* (Princeton, NJ: Princeton University Press 2005); Marco Janssen, and Ostrom, *Working Together: Collective Action, the Commons, and Multiple Methods in Practice* (Princeton, NJ: Princeton University Press, 2010).

51   See, for example, Helen Addams and John Proops, eds., *Social Discourse and Environmental Policy: An Application of Q Methodology* (Northampton, MA: Edward Elgar, 2001).

52   I have talked about the "triple bottom line" in two of my own writings: *Collaborative Strategies for Sustainable Cities: Economy, Environment, and Community in Baltimore* (New York, NY: Routledge, 2014) and "What Does Sustainability Mean to City Officials?," *Urban Affairs Review* 45, no. 2 (2009): 247–73.

53   Lynton Caldwell, "Environment: A New Focus for Public Policy?," *Public Administration Review* 23, no. 3 (1963), 138–39.

54   Harvey Lieber, "Public Administration and Environmental Quality," *Public Administration Review* 30, no. 3 (1970), 285.

55   Jeffery Berry and Kent Portney, "Sustainability and Interest Group Participation in City Politics," *Sustainability* 5, no. 5 (2013): 2077–97; James Connolly, Erika S. Svendsen, Dana R. Fisher, and Lindsay K. Campbell, "Organizing Urban Ecosystem Services through Environmental Stewardship Governance in New York City," *Landscape and Urban Planning* 109, no. 1 (2013): 76–84; Damian Pitt, "Harnessing Community Energy: The Keys to Climate Mitigation Policy Adoption in US Municipalities," *Local Environment* 15, no. 8 (2010): 717–29; Kent Portney, "Civic Engagement"; Portney and Jeffery Berry, "Participation and the Pursuit of Sustainability in US Cities," *Urban Affairs Review* 46, no. 1 (2010): 119–39; Portney and Zachary Cuttler, "The Local Nonprofit Sector and the Pursuit of Sustainability in American Cities: A Preliminary Exploration," *Local Environment* 15, no. 4 (2010): 323–39; Michele Romolini, "Adaptive Governance for Twenty-First-Century Sustainable Cities: Comparing Stewardship Networks in Baltimore and Seattle" (PhD diss., University of Vermont, 2013).

56   Christopher Hawkins and XiaoHu Wang, "Sustainable Development Governance: Citizen Participation and Support Networks in Local Sustainability Initiatives," *Public Works Management and Policy* 17, no. 1 (2012): 7–29.

57   Julian Agyeman and Briony Angus, "The Role of Civic Environmentalism in the Pursuit of Sustainable Communities," *Journal of Environmental Planning and Management* 46, no. 3 (2003): 345–63; Agyeman, Robert D. Bullard, and Bob Evans, eds., *Just Sustainabilities: Development in an Unequal World* (Cambridge, MA: MIT Press, 2003).

58   Eric Zeemering, "What Does Sustainability Mean to City Officials?," *Urban Affairs Review* 45, no. 2 (2009): 247–73.

59   Andrew Jordan "The Governance of Sustainable Development: Taking Stock and Looking Forwards," *Environment and Planning C: Government and Policy* 26, no. 1 (2008): 17–33; Lafferty, *Governance for Sustainable Development*.

60   Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (New York, NY: Cambridge University Press, 1990); and *Understanding Institutional Diversity*.

61   Gilles Paquet, *The New Geo-governance: A Baroque Approach* (Ottawa, Canada: University of Ottawa Press, 2005).

62   John Dewey, *The Public and Its Problems* (New York, NY: Holt, 1927).

63   Stewart Barr, *Environment and Society: Sustainability, Policy, and the Citizen* (Burlington, VT: Ashgate, 2008).

64   Steven Moore, *Alternative Routes to the Sustainable City: Austin, Curitiba, and Frankfurt* (Lanham, MD: Lexington Books, 2007); Paquet, *The New Geo-governance*.

65   Sammy Zahran, Samuel D. Brody, Arnold Vedlitz, Himanshu Grover, and Caitlyn Miller, "Vulnerability and Capacity: Explaining Local Commitment to Climate-Change Policy," *Environment and Planning C: Government and Policy* 26, no. 3 (2008): 544–62; Zahran, Himanshu Grover, Samuel D. Brody, and Arnold Vedlitz, "Risk, Stress, and Capacity: Explaining Metropolitan Commitment to Climate Protection," *Urban Affairs Review* 43, no. 4 (2008): 447–74.

66   Bulkeley and Betsill, *Cities and Climate Change*; Bulkeley and Rafael Tuts, "Understanding Urban Vulnerability, Adaptation, and Resilience in the Context of Climate Change," *Local Environment* 18, no. 6 (2013): 646–62; Rachael Krause, "An Assessment of the Greenhouse Gas Reducing Activities Being Implemented in US Cities," *Local Environment* 16, no. 2 (2011): 193–211; Rae Zimmerman and Craig Faris, "Climate Change Mitigation and Adaptation in North American Cities," *Current Opinion in Environmental Sustainability* 3, no. 3 (2011): 181–87.

67   Stephanie Pincetl, "Nature, Urban Development, and Sustainability: What New Elements Are Needed for a More Comprehensive Understanding?," *Cities* 29, no. S2 (2012): S32–S37.

68   See, for example, Timothy Beatley and Kristy Manning, *The Ecology of Place: Planning for Environment, Economy, and Community* (Washington, DC: Island Press, 1997); Gretchen Daily and Katherine Ellison, *The New Economy of Nature: The Quest to Make Conservation Profitable* (Washington, DC: Island Press, 2002).

69   See, for example, Ted Gragson and J. Morgan Grove, "Social Science in the Context of the Long-Term Ecological Research Program," *Society and Natural Resources* 19, no. 2 (2006): 93–100; Stewart Pickett et al., "Beyond Urban Legends: An Emerging Framework of Urban Ecology, as Illustrated by the Baltimore Ecosystem Study," *BioScience* 58, no. 2 (2008): 139–50.

70   Pincetl, "Nature, Urban Development, and Sustainability," S36.

71   Brenda Chamness et al., *ACSM American Fitness Index 2014* (Indianapolis, IN: American College of Sports Medicine, 2014).

72   Martin Melosi, *The Sanitary City: Urban Infrastructure in America from Colonial Times to the Present* (Baltimore, MD: Johns Hopkins University Press, 2000).

73   Duncan Mara, *Domestic Wastewater Treatment in Developing Countries* (London, England: Earthscan, 2004).

74   Richardson Dilworth, "From Sewers to Suburbs: Transforming the Policy-Making Context of American Cities," *Urban Affairs Review* 38, no. 5 (2003): 726–39; John Ottensmann, "LUCI: Land Use in Central Indiana Model and the Relationships of Public Infrastructure to Urban Development," *Public Works Management and Policy* 8, no. 1 (2003): 62–76; Richard Tabors, Michael H. Shapiro, and Peter P. Rogers, *Land Use and the Pipe: Planning for Sewerage* (Lexington, MA: Lexington Books, 1976).

75   Michael Bentley, "An Ecological Public Health Approach to Understanding the Relationships between Sustainable Urban Environments, Public Health, and Social Equity," *Health Promotion International* 29, no. 3 (2014): 528–37, doi:10.1093/heapro/dat028; Nisha D. Botchwey, Matthew Trowbridge, and Tom Fisher, "Green Health: Urban Planning and the Development of Health and Sustainable Neighborhoods and Schools," *Journal of Planning Education and Research* 34, no. 2 (2014): 113–22; Jennifer Kent and Susan Thompson, "The Three Domains of Urban Planning for Health and Well-Being," *Journal of Planning Literature* 29, no. 3 (2014): 239–56, doi:10.1177/0885412214520712.

76   Timothy Beatley, *Biophilic Cities: Integrating Nature into Urban Design and Planning* (Washington, DC: Island Press, 2011).

77   Botchwey et al., "Green Health"; Cecily Maller, Mardie Townsend, Anita Pryor, Peter Brown, and Lawrence St. Leger, "Healthy Nature, Healthy People: 'Contact with Nature' as an Upstream Health Promotion Intervention for Populations," *Health Promotion International* 21, no. 1 (2005): 45–54.

78   Peter Newman and Jeffrey Kenworthy, *Sustainability and Cities: Overcoming Automobile Dependence* (Washington, DC: Island Press, 1999).

79   Jolanda Maas, "Green Space, Urbanity, and Health: How Strong Is the Relation?," *Journal of Epidemiology and Community Health* 60, no. 7 (2006): 587–92, doi:10.1136/jech.2005.043125.

80   Anthony J. McMichael, Rosalie E. Woodruff, and Simon Hales, "Climate Change and Human Health: Present and Future Risks," *The Lancet* 367, no. 9513 (2006):

859–69, doi:http://dx.doi.org/10.1016/S0140-6736(06)68079-3.

81   Mustafa Koc, Rod MacRae, Jennifer Welsh, and Luc Mougeot, eds., *For Hunger-Proof Cities: Sustainable Urban Food Systems* (Ottawa, Canada: International Development Research Centre, 1999).

82   Lawrence Frank and Peter Engelke, "Multiple Impacts of the Built Environment on Public Health: Walkable Places and the Exposure to Air Pollution," *International Regional Science Review* 28, no. 2 (2005): 193–216, doi:10.1177/0160017604273853.

83   Jean Wineman, "Designing Healthy Neighborhoods: Contributions of the Built Environment to Physical Activity in Detroit," *Journal of Planning Education and Research* 34, no. 2 (2014): 180–89.

84   Kate Brown and Andrew Jameton, "Public Health Implications of Urban Agriculture," *Journal of Public Health Policy* 21, no. 1 (2000): 20–39.

85   Leigh Holland, "Diversity and Connections in Community Gardens: A Contribution to Local Sustainability," *Local Environment* 9, no. 3 (2004): 285–305.

86   Hee-Jung Song et al., "Korean American storeowners' perceived barriers and motivators for implementing a corner store–based program," *Health Promotion Practice* 12, no. 3 (2011): 472–82.

87   Eric Klinenberg, *Heat Wave: A Social Autopsy of Disaster in Chicago* (Chicago, IL: University of Chicago Press, 2002).

88   Cindy Schreuder, "The 1995 Chicago Heat Wave," *Chicago Tribune*, accessed June 7, 2015, http://www.chicagotribune.com/news/nationworld/politics/chi-chicago days-1995heat-story-story.html.

89   T. R. Oke, "The Energetic Basis of the Urban Heat Island," *Quarterly Journal of the Royal Meteorological Society* 108, no. 455 (1982): 1–24.

90   Yvonne Rydin et al., "Healthy Communities," *Local Environment* 17, no. 5 (2012), 557.

91   Matthew Kahn, *Green Cities: Urban Growth and the Environment* (Washington, DC: Brookings Institution Press, 2006).

92   "The environmental Kuznets curve is a hypothesized relationship between various indicators of environmental degradation and income per capita. In the early stages of economic growth degradation and pollution increase, but beyond some level of income per capita (which will vary for different indicators) the trend reverses, so that at high-income levels economic growth leads to environmental improvement." From David I. Stern, "The Environmental Kuznets Curve," International Society for Ecological Economics, June 2003, http://isecoeco.org/pdf/stern.pdf. The originator of the Kuznets curve describes it in Simon Kuznets, "Economic Growth and Income Inequality," *American Economic Review* 49 (1955): 1 28.

93   Kahn, *Green Cities*, 137.

94   Kent Portney, "Local Sustainability Policies and Programs as Economic Development: Is the Nw Economic Development Sustainable Development?," *Cityscape* 15, no. 1 (2013): 45–62.

95   Jennifer Allen and Thomas Potiowsky, "Portland's Green Building Cluster: Economic Trends and Impacts," *Economic Development Quarterly* 22, no. 4 (2008): 303–15; Karen Chapple et al., "Innovation in the Green Economy."

96   Eric Zeemering, "What Does Sustainability Mean to City Officials?" *Urban Affairs Review* 45, no. 2 (2009): 247–73.

97   See, for example, Sacha Kagan and Julia Hahn, "Creative Cities and (Un)sustainability: From Creative Class to Sustainable Creative Cities," *Culture and Local Governance* 3, no. 1-2 (2011): 11–27.

98   Bulkeley and Betsill, *Cities and Climate Change*; Davashree Saha, "Empirical Research on Local Government Sustainability Efforts in the USA: Gaps in the Current Literature," *Local Environment* 14, no .1 (2009a): 17–30; Saha, "Factors Influencing Local Government Sustainability Efforts," *State and Local Government Review* 41, no. 1 (2009b): 39–48.

99   Christopher Laszlo and Nadya Zhexembayeva, *Embedded Sustainability*.

100   Joshua Newell et al., "Green Alley Programs: Planning for a Sustainable Urban Infrastructure?," *Cities* 31 (2013): 144–55, doi:http://dx.doi.org/10.1016/j.cities.2012.07.004. Allison Roy et al., "Impediments and Solutions to Sustainable, Watershed-Scale Urban Stormwater Management: Lessons from Australia and the United States," *Environmental Management* 42, no. 2 (2008): 344–59, doi:10.1007/s00267-008-9119-1.

101   Jack Ahern, "From Fail-Safe to Safe-to-Fail: Sustainability and Resilience in the New Urban World," *Landscape and Urban Planning* 100, no. 4 (2011): 341–43.

102   Parr, *Hijacking Sustainability,* and Ross, *Bird on Fire.*

103   Ibid. See also William Swearingen, *Environmental City: People, Place, Politics, and the Meaning of Modern Austin* (Austin: University of Texas Press, 2010); Eric Zeemering, *Collaborative Strategies for Sustainable Cities: Economy, Environment, and Community in Baltimore* (New York, NY: Routledge, 2014).

104   Moore, *Alternative Routes to the Sustainable City.*

105   Ostrom, *Governing the Commons.*

106   Paquet, *The New Geo-governance.*

107   See, for example, William Budd, Nicholas Lovrich Jr., John C. Pierce, and Barbara Chamerlain, "Cultural Sources of Variations in US Urban Sustainability Attributes," *Cities* 25, no. 5 (2008): 257–67; Pitt, "Harnessing Community Energy"; Portney and Berry, "Participation and the Pursuit of Sustainability."

108   Jeffery Berry, Kent Portney, and Ken Thomson, *The Rebirth of Urban Democracy* (Washington, DC: Brookings Institution Press, 1993); Richardson Dilworth, *Social Capital in the City: Community and Civic Life in Philadelphia* (Philadelphia, PA: Temple University Press, 2006); Archon Fung, *Empowered Participation: Reinventing Urban Democracy* (Princeton, NJ: Princeton University Press, 2004).

109   Examples of these scholars' research include Richard Feiock and John Scholz, *Self-Organizing Federalism: Collaborative Mechanisms to Mitigate Institutional Collective Action Dilemmas* (New York, NY: Cambridge University Press, 2010); Martha Feldman and Anne Khademian, "The Role of the Public Manager in Inclusion: Creating Communities of Participation," *Governance: An International Journal of Policy and Administration* 20, no. 2 (2007): 305–24; Feldman and Kathryn Quick, "Generating Resources and Energizing Frameworks through Inclusive Management," *International Public Management Journal* 12, no. 2 (2009): 137–71.

110   Fung, *Empowered Participation.*

111   See, for example, Agyeman and Angus ,"The Role of Civic Environmentalism"; Karin Bäckstrand, "Civic Science for Sustainability: Reframing the Role of Experts, Policy-Makers, and Citizens in Environmental Governance," *Global Environmental Politics* 3, no. 4 (2003): 24–41.

112   Peter Jacques, Riley Dunlap, and Mark Freeman, "The Organisation of Denial: Conservative Think Tanks and Environmental Skepticism," *Environmental Politics* 17, no. 3 (2008): 349–85.

113   Elisabeth Gerber, "Partisanship and Local Climate Policy," *Cityscape* 15, no. 1 (2013): 107–24.

114   Stephen Wheeler, "Planning for Metropolitan Sustainability," *Journal of Planning Education and Research* 20, no. 2 (2000): 133–45; Eric Zeemering and Juan Romero, "The Evolution of Sustainable Cities as a Metropolitan Policy Challenge," in *Networked Governance: The Future of Intergovernmental Management*, ed. Jack Meek and Kurt Thurmaier (Thousand Oaks, CA: CQ Press, 2012): 281–302.

115   Michael Porter, *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York, NY: Free Press, 1980).

116   See, for example, Heike Mayer and Paul Knox, "Slow Cities: Sustainable Places in a Fast World," *Journal of Urban Affairs* 28, no. 4 (2006): 321–34.

117   Michael Bennett and Robert Giloth, eds., *Economic Development in American Cities: The Pursuit of an Equity Agenda* (Albany: State University of New York Press, 2007).

118   Agyeman et al., *Just Sustainabilities.*

119   A. D. Kendle and J. E. Rose, "The Aaliens Have Landed! What Are the Justifications for 'Native Only' Policies in Landscape Plantings?," *Landscape and Urban Planning* 47, no. 1-2 (2000): 19–31, doi:http://dx.doi.org/10.1016/S0169-2046(99)00070-5.

120   Portney, *Taking Sustainable Cities Seriously.*

121   David N. Ammons, Ellen G. Liston, and Jordan A. Jones, "Performance Management Purpose, Executive Engagement, and Reported Benefits among Leading Local Governments," *State and Local Government Review* 45, no. 3 (2013): 172–79, doi:10.1177/0160323x13498261.

122   Donald Moynihan, *The Dynamics of Performance Management: Constructing Information and Reform* (Washington, DC: Georgetown University Press, 2008).

123   See, for example, Diane Pataki et al., "Coupling Biogeochemical Cycles in Urban Environments: Ecosystem Services, Green Solutions, and Misconceptions," *Frontiers in Ecology and the Environment* 9, no. 1 (2011): 27–36, doi:10.1890/090220. See also and Stephanie Pincetl, "From the Sanitary City to the Sustainable City: Challenges to institutionalising Biogenic (Nature's Services) Infrastructure," *Local Environment* 15, no. 1 (2010): 43–58, doi:10.1080/13549830903406065.

124   Portney, *Taking Sustainable Cities Seriously.*

125   Here, the relevant metric is the establishment of institutions for local sustainability monitoring and governance. This is, in some respects, a dichotomous measure. In other respects, this is an ongoing process measure.