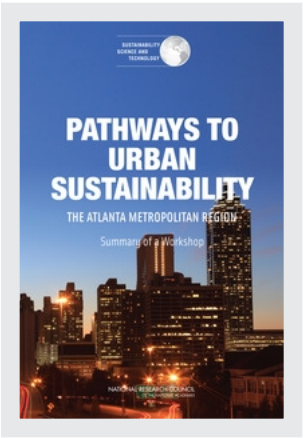




# Pathways to Urban Sustainability: The Atlanta Metropolitan Region: Summary of a Workshop

**DETAILS**

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# PATHWAYS TO URBAN SUSTAINABILITY

## THE ATLANTA METROPOLITAN REGION

Summary of a Workshop

**Derek Vollmer, Rapporteur**

**Committee on Regional Approaches to Urban Sustainability**

**Science and Technology for Sustainability Program**
**Policy and Global Affairs**

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# PREFACE AND ACKNOWLEDGMENTS

The National Academies Science and Technology for Sustainability Program (see Appendix C) has regularly helped organize workshops to convene diverse stakeholders and to discuss the role that science and technology can play in fostering a "transition to sustainability." It is this idea of a transition that has helped the program focus on the salient trends, actors, and approaches that are part of this "collective, adaptive, and uncertain endeavor."[1] Urbanization is one such trend that has been the subject of many sustainability discussions over the years.

In 2009, the National Academies hosted a forum to engage federal, academic, and private researchers focusing on urbanization.[2] The rationale was that urbanizing regions are playing, and will continue to play, an important role in addressing climate change and many other sustainability challenges. Emerging research on urban systems—research that focuses on human–environment interactions and the interplay among energy, water, transportation, and other systems—could help decision makers address the complex challenges their cities face. One clear message that emerged from this initial forum was that, given the diverse regional economies, ecosystems, and communities throughout the United States, solutions to make urban systems more sustainable would have to be context-specific and place-based. Recognizing that many metropolitan areas in the United States have been experimenting with various approaches to sustainability, and that, despite the differences among regions, there were likely to be some core similarities and transferable knowledge, Roundtable members suggested that a series of workshops be organized to examine regional approaches to sustainability.

A committee was appointed by the National Research Council to organize an initial workshop on September 30 and October 1, 2010, in Atlanta, Georgia, titled "Pathways to Urban Sustainability: Lessons from the Atlanta Metropolitan Region." Atlanta was selected based on its

[1] NRC (National Research Council). 1999. Our Common Journey: A Transition toward Sustainability. Washington, DC: The National Academies Press.
[2] NRC (National Research Council). 2010. Pathways to Urban Sustainability: Research and Development on Urban Systems—Summary of a Workshop. Washington, DC: The National Academies Press.

rapid growth rate; its well-documented challenges with water, land use, and transportation; and its level of engagement with federal government agencies on matters related to sustainability. The committee identified panel topics, invited speakers, and developed an agenda along cross-cutting themes that encouraged interdisciplinary discussions. Participants were encouraged to examine metropolitan Atlanta as a system or, as some later rephrased it, to start "connecting the dots."

In addition to the planning committee's efforts, the workshop also benefited from the work of several individuals. Kathleen McAllister, Emi Kameyama, and Marisa Escudero (National Academies) and Coleen Chima (Georgia Tech) deserve special recognition for the research and administrative support they provided. Howard Frumkin (University of Washington), Regina Gray (Department of Housing and Urban Development [HUD]), Sam Lytle (HUD), Dee Merriam (Centers for Disease Control and Prevention), and Wayne Zipperer (U.S. Forest Service) all provided timely feedback leading up to the workshop. We would like to acknowledge Thomas Burnett, Christine Mirzayan Science & Technology Policy Fellow with the National Academies, for his contributions to earlier drafts of the report.

This summary has been prepared by the rapporteur as a factual summary of what occurred at the workshop. The planning committee's role was limited to planning and convening the workshop. The statements made in this volume do not necessarily represent positions of the workshop participants, the Roundtable, or the National Academies.

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Academies' Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for quality and objectivity. The review comments and draft manuscript remain confidential to protect the integrity of the process.

We wish to thank the following individuals for their review of this report: John Anderson, Rice University; Cyrus Bhedwar, International Council for Local Environmental Initiatives; Glen Daigger, CH2M Hill, Inc.; Andrew Dannenberg, Centers for Disease Control and Prevention; Regina Gray, U.S. Department of Housing and Urban Development;

Malka Pattison, U.S. Department of the Interior; and Dan Reuter, Atlanta Regional Commission.

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the content of the report, nor did they see the final draft before its release. Responsibility for the final content of this report rests entirely with the rapporteur and the institution.

Derek Vollmer, *Rapporteur*

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# 1

# INTRODUCTION

The U.S. population is more than 80 percent urban, and while these urban environments have been the locus of modern economic development, they have also contributed to environmental and social inequities. In many cases, these issues involve complex interactions (e.g., between humans and their environment, between energy and water use) that are not fully understood or adequately acknowledged. Moreover, the institutions that have developed over time to manage the urban environment are not typically accustomed to cooperating on cross-cutting issues, though there are encouraging signs that cities are recognizing this and identifying more integrated approaches to the challenges they face. The federal government has also recently enhanced efforts to support metropolitan regions in becoming more sustainable. This has required an unprecedented degree of collaboration among agencies and stakeholders working across their respective sectors to address these complex interrelated issues.

In 1993, the President's Council on Sustainable Development (Clinton, 1993) provided a working definition for sustainable communities as "healthy communities where natural and historic resources are preserved, jobs are available, sprawl is contained, neighborhoods are secure, education is life-long, transportation and health care are accessible, and all citizens have opportunities to improve the quality of their lives." Thus a key challenge for U.S. cities and their metropolitan environs is to "develop sustainable urban systems that provide healthy, safe, and affordable environments" (NRC, 2010). The systems aspect was emphasized throughout the workshop because, as the workshop organizers and participants noted, decisions made in one sector have (often unintended) consequences for other sectors. Climate change has served as a useful lens for urbanized areas to begin thinking about sustainability issues and developing responses, although a holistic approach to sustainability will require responses that go beyond energy

and climate change adaptation. Unpacking the complexities of a sustainable urban system will often require context-specific and place-based approaches, given the diverse regional economies, ecosystems, and communities in the United States. The intent of this workshop (and the proposed series of regional workshops) was to examine a metropolitan region as case study so that researchers and practitioners could improve their understanding of some of the spatial and temporal aspects of urban sustainability.

The metropolitan Atlanta region provided a compelling example for exploring urban sustainability issues because the region faces rapid growth and has experienced well-documented challenges related to water, land use, and transportation. As of 2009, approximately 515,000 people resided in the city of Atlanta; about 43 percent of the population were white and 50 percent were African American. The median household income (in inflation-adjusted dollars) was about $50,000, and about 46 percent of the population had a bachelor's degree or higher. About 18 percent of families lived below the poverty level during this period (U.S. Census Bureau, 2011a). The Atlanta metropolitan area includes 28 counties in northern Georgia. In 2009, the total estimated population for this area was 5,475,213 (U.S. Census Bureau, 2011b).

## ORGANIZATION OF THE WORKSHOP

An expert planning committee was appointed by the National Research Council to organize a workshop in Atlanta, Georgia, that would explore the region's approach to urban sustainability, with an emphasis on building the evidence base upon which policies and programs might be developed. On September 30 and October 1, 2010, an ad hoc committee on behalf of the National Academies' Science and Technology for Sustainability Program hosted the workshop, and participants examined how the interaction of various systems (natural and human systems; energy, water, and transportation systems) affected the region's social, economic, and environmental conditions (see Appendix A).

The four objectives of the workshop were as follows:

1. Discuss the ways that regional actors are approaching sustainability—specifically, how they are attempting to merge environmental, social, and economic objectives.

2. Share information about ongoing activities and strategic planning efforts, including lessons learned.
3. Examine the role that science, technology, and research can play in supporting efforts to make the region more sustainable.
4. Explore how federal agency efforts, particularly interagency partnerships, can complement or leverage the efforts of other key stakeholders.

The workshop was designed to allow discussion of challenges faced by the Atlanta metropolitan region regarding sustainability efforts and to explore innovative approaches to addressing these complex challenges, performance measures to gauge success, and opportunities to link knowledge with on-the-ground action. It should be noted that many of the sustainability efforts described in the report focus on the city of Atlanta, which represents about 20 percent of the population of the Atlanta metropolitan region. Although the specific efforts discussed will not all be directly applicable to the entire metropolitan area, several (e.g., transportation and energy challenges) will be relevant to the larger Atlanta metropolitan region.

The planning committee developed an agenda to address topical concerns that cut across the concerns of individual institutions. These topics were intended to be timely and reflect the interests of a variety of stakeholders. Panelists were encouraged to share their perspectives on a given topic. However, each panel was designed to raise critical issues and to provoke discussion that took advantage of the broad experience of the participants.

Information on the workshop, including archived presentations, can be found at the following website: http://sites.nationalacademies.org/PGA/sustainability/atlantaurban/index.htm. The event was carried out in cooperation with local partners and was hosted at the Georgia Institute of Technology, but it also engaged local, state, and federal agencies in order to explore how their resources could best support sustainable improvements in the Atlanta metropolitan region. This document offers a broad contextual summary of workshop presentations and discussions related to urban sustainability issues in the metropolitan Atlanta region.

## ORGANIZATION OF THE WORKSHOP SUMMARY

Dr. Denise Stephenson Hawk, consultant and former associate director of the National Center for Atmospheric Research, opened the discussion by introducing the scope and objectives of the workshop. She emphasized the importance of urban sustainability as an immediate and critical issue. The objectives of the workshop, as described by Dr. Hawk, included exploring how the interaction of various systems (natural and human systems; energy, water, and transportation systems) affects the region's social, economic, and environmental conditions. The workshop discussion would also examine the challenges faced by the Atlanta region and would engage local, state, and federal agencies in exploring how their resources could best support sustainable improvements in the Atlanta metropolitan region.

Chapters 2–6 of the report summarize the individual presentations and panel and breakout group discussions. Each panel and breakout group was designed to discuss a specific subject (see Appendix A), but throughout the workshop there were also several overarching themes that emerged in more than one discussion. These themes were not discussed in any depth, but they are nonetheless significant because they reflect some commonalities among different aspects of sustainability issues in the Atlanta metropolitan region. There were also important terms, such as infrastructure ecology, or health impact assessments, which were discussed in several presentations and sessions. These terms are defined in the chapters where they first appear, but they are also referred to in subsequent chapters. Sustainability, arguably the most important term discussed, was initially framed by workshop participants as a "goal of meeting human needs while conserving natural life support systems" (WCED, 1987). Several participants reframed the term, to place it in either a location-specific context or to reflect complementary goals (e.g., resilience or livability). In addition, several participants expressed differing views of sustainability; some viewed the concept from an economic perspective, while others related it more to environmental and social issues.

Chapter 2, Reframing the Problem, captures how many of the participants framed sustainability and identifies ways in which regional actors are currently addressing some of the linkages among environmental, economic, and equity concerns. In Chapter 3 (Knowledge Gaps, New Markets, and Political Will), the discussion focuses on some

of the perceived knowledge gaps in the region. The chapter also describes the critical role that individual behavior plays in sustainability challenges and the importance of framing some of these specific challenges in terms of furthering the economic development of the region. Chapter 4 summarizes panelists' and participants' comments on sustainability indicators for the region and how competitiveness among metropolitan areas may influence this field. Institutionalizing Sustainability, the title of Chapter 5, refers to the efforts occurring in the region and at a federal level to use sustainability as an organizing principle and to move from ad hoc approaches to a more coordinated response. Finally, Pathways Forward (Chapter 6) summarizes some of the ideas participants discussed that could help put metropolitan Atlanta on a trajectory toward sustainability, and some of the early successes on which they can build.

# 2

# REFRAMING THE PROBLEM

The workshop opened with presentations on sustainability perspectives from the region. Speakers collectively represented a variety of sectoral expertise (energy, transportation, environment, and health) but each speaker emphasized the linkages from one sector to others in an urban system. Key issues that arose included connecting sustainability issues with more general societal goals, framing sustainability to include human health factors of concern in the region, and thinking about metropolitan Atlanta as a system of interdependent parts.

## LINKING ENVIRONMENT, ECONOMY, AND EQUITY

Dr. Carol Couch, Senior Public Service Associate, College of Environment and Design, University of Georgia, began by referring to the Brundtland Commission's well-known definition of sustainable development as "development that meets the needs of the present without compromising ability of future generations to meet their own needs" (WCED, 1987). To achieve sustainability in the Atlanta metropolitan region and in other metropolitan regions, she added that it is necessary to reframe the problem by eliminating the thinking that environmental protection and economic development are mutually exclusive concepts. By that same token, institutions must consider social equity issues, along with environmental protection and economic development issues. Dr. Couch noted that the solutions must be societally acceptable if they are going to be implemented. She added that the "command and control" approach that characterized previous decades of environmental regulation does not lend itself to regulating individual behavior.

Dr. John Frece, Director of the Environmental Protection Agency's (EPA's) Office of Sustainable Communities, expanded on this topic and emphasized that we should not expect "single outcomes from single

actions." He explained that EPA's present interest in supporting sustainable communities is driven by a number of separate but related factors: concern with projected urbanization trends and growth patterns (as they relate to environmental impacts), a demand for more walkable communities, and the rapid loss of scenic vistas within the United States.

Environmental issues have not typically been discussed as limits to further development in the region, although Dr. Couch suggested that this may be changing. Water resources in particular have been a point of contention, and future growth in metropolitan Atlanta (and an expected increase in municipal demand) could be constrained in order to meet competing needs in the aquatic systems that form part of the watershed. As several participants noted, the 2009 federal court's ruling on Georgia's limited rights to use Lake Lanier might be a turning point and, at a minimum, has increased the scrutiny of municipal withdrawals, including regional coal-fired power plants.

By altering the landscape, Atlanta's built environment has become less and less resilient to natural disturbances. The flooding in fall 2009 provided one such example, when as much as 20 inches of rain in a 24-hour period overwhelmed metropolitan Atlanta; severe weather events like this could become more frequent or severe with climate change.

Renee Glover, President and CEO, Atlanta Housing Authority, noted that, while sustainability is a laudable goal, we must consider whether efforts to achieve sustainability continue to support other goals for urban areas, such as reducing poverty and providing affordable housing. She stated that regional stakeholders can probably agree to some of the long-term visions for metropolitan Atlanta (e.g., more walkable communities) and can use that as a basis to try to integrate what have traditionally been separate goals. She further stated that sustainability should be something that is desirable—achieving outcomes that everyone in society can recognize and benefit from.

## SUSTAINABILITY AND HUMAN HEALTH

Dr. Christopher Portier, director of the National Center for Environmental Health, U.S. Centers for Disease Control and Prevention, discussed interactions between human and natural systems in the built environment from a public health perspective. He noted that we tend to understand the impact physiological factors can have on our health. For

example, improvements in air and drinking water quality in urban areas have led to direct improvements in human health and well-being. However, our personal health is also influenced by internal factors (namely, our genetic makeup) and external factors that include our social support system, access to health care, and employment. These external factors are part of our urban environment and, thus, ought to be included when we are evaluating sustainability issues on an urban scale. He added that it will be important to work across our traditional silos when addressing urban sustainability issues, to be willing to make decisions with sometimes incomplete information, and to course-correct when we learn something new.

Dr. Portier stated that community design has been shown to affect our physical and mental health (for a region-specific discussion of this issue, see, for example, IOM, 2002). The configuration of a city or neighborhood affects land-use patterns, automobile dependency, and certain social interactions, all of which in turn can affect physical activity, safety, and social capital. He cited a recent study of transportation and health linkages in New Delhi and London (Woodcock et al., 2009) that suggested that fuel quality improvements (e.g., switching from gasoline or diesel to natural gas or electrified transport) contribute to improvements in health, but larger gains seem to result from a switch to more "active" forms of mobility (bicycles and walking). The connection between increased physical activity and decreased obesity-related illnesses might seem obvious, but the implication is that our transportation choices in an urban area can have a dramatic impact on our personal health.

Dr. Portier expanded further on this idea, stating that health care amounts to over 16 percent of U.S. gross domestic product (compared to 10 percent in Switzerland, his example), and U.S. energy consumption per capita is roughly double that of Switzerland. His point was that if we fully accounted for the costs and benefits of a healthier and more sustainable lifestyle, expenditures on health care and energy could be put to more productive or beneficial use.

## METROPOLITAN ATLANTA AS A SYSTEM

Catherine Ross, director and Harry West Chair, Center for Quality Growth and Regional Development, Georgia Tech, noted that sustainability mandates interdisciplinary solutions to economic and

social challenges and opportunities. Dr. Ross maintained that addressing sustainability requires a "systems approach" because the major environmental and societal components—energy, transportation, food, water, waste, housing, health, and security—are interconnected and interrelated. She suggested that considering these issues in isolation can be counterproductive and that the important questions are not merely engineering challenges, but fundamental questions about how residents in metropolitan Atlanta live, and the role that the region plays in the global economy.

Dr. Ross used the transportation sector as an example. Transportation challenges can be framed as mobility needs, which for Atlanta are local, regional, and global. Atlanta, like other U.S. metropolitan areas, is now operating as a global gateway and so its mobility needs include considerations of logistics and infrastructure that will enable the regional economy to remain globally competitive. She also highlighted specific local mobility needs, such as the lack of east–west connectivity in the metropolitan area. Other participants noted that these connectivity problems seem more acute due to the dispersed pattern of employment in the region.

Several speakers and participants emphasized the important role that infrastructure plays in the look, feel, and function of the metropolitan area. Dr. Ross explained that infrastructure includes the transportation corridors, electrical and energy systems, water and waste handling, as well as green infrastructure, the natural systems that exist in and around metropolitan Atlanta.

As some participants noted, Atlanta is investing heavily in upgrading infrastructure systems ($2 billion for the Atlanta BeltLine initiative, and approximately $4 billion in wastewater infrastructure). There is increasing recognition that improving these infrastructure systems is a key opportunity for the region to become more sustainable and that there are natural overlaps among these systems (which tend to be planned and managed independent of one another). Dr. Couch cited the example of land-use planning in metropolitan Atlanta not accounting for water needs, and the complications that have resulted. Infrastructure ecology represents one approach to understanding these interactions and offers insights into how they could be jointly managed more efficiently and sustainably.

John Crittenden, director of Brook Byers Institute for Sustainable Systems with the Georgia Institute of Technology, discussed modeling

sustainable and resilient urban infrastructure in the Atlanta metropolitan region, using decision support tools. His current efforts include modeling a business-as-usual growth scenario versus a compact growth scenario to help planners and decision makers understand future infrastructure needs and the consequences of following a particular pathway. Dr. Crittenden's team is also beginning to investigate material flows within metropolitan Atlanta, modeling, for example, optimal use of recycled plastics or potential reuse of batteries from electric vehicles. Overall, he stressed that our infrastructure must be not only sustainable, but resilient, describing infrastructure resilience as maintaining functionality in the face of exogenous and endogenous stressors.

# 3

# KNOWLEDGE GAPS, NEW MARKETS, AND POLITICAL WILL

Presenters and participants discussed typical approaches to more sustainable development, such as increasing residential density near existing transit corridors. Several speakers pointed out that the challenges in Atlanta were not necessarily about knowing what principles to follow but in overcoming the barriers to adoption and diffusion of these innovations. These barriers take many forms, and some are institutional in nature. Participants discussed a number of perceived knowledge gaps which could influence behavior, and some of the challenges associated with a still-developing market for sustainable products and services in the region. Several workshop participants noted that engaging the community is critical in fostering behavioral change and in providing an impetus for elected leaders to address sustainability issues. There was rich discussion of the role of political will to foster some of these changes and the time frames and priorities of elected leadership. Discussions also centered around the role that residents' values play as a driver in transitioning to sustainability and the opportunities for community-led groups to help educate and engage the citizenry.

## THE REGION'S NATURAL CAPITAL

Though it is not always apparent amid the skyscrapers and paved roadways that characterize Atlanta's built environment, there is a vast amount of natural capital in the region in the form of trees and forested land, biodiverse waterways, and open space. Many participants emphasized that these natural assets are undervalued and that public understanding of their role in the urban environment is low. The ecosystem services that they currently provide (including microclimate

regulation, stormwater retention, and recreational space) are accepted as free, but their loss is not routinely factored into development decisions.

Dr. Carol Couch, Senior Public Service Associate, College of Environment and Design, University of Georgia, stated that the eutrophication of northern Georgia waterways is an environmental concern for the Atlanta region, but it is difficult to remedy because roughly 80 percent of water pollutants are released from unregulated sources, particularly nonpoint sources. Fertilizer runoff has deposited heavy levels of phosphorus in Lake Allatoona, near Atlanta. She noted that the declining water quality in Georgia's waterways threatens biodiversity, which in turn reduces the value and quality of recreation in those areas. If citizens had a fuller understanding of these linkages, she suggested, efforts to promote conservation through behavior change might be more effective. As Karen Guz, Director of Conservation at the San Antonio Water System, pointed out, changing behavior often entails an up-front cost, and so the challenge is to be able to communicate tangible benefits (see Box 3–1).

## MARKETING SUSTAINABILITY

Mr. Charles Whatley, Director of Commerce and Entrepreneurship, Atlanta Development Authority (ADA), discussed the balance between sustainability and economic growth from ADA's perspective. He stated that ADA focuses on business attraction and retention, meaning that ADA must pay attention to trends and evolving interests within the private sector. In the past several years, sustainability and resilience have become the new buzzwords. This relates to the types of businesses Atlanta hopes to encourage, the type of environment that businesses are seeking when choosing a location for their firm, and a recognition that future economic development should not undermine the region's long-term efforts to become more sustainable. Mr. Whatley pointed out that this does not preclude maintaining Atlanta's industrial base; in fact, he noted that ADA would like to be able to preserve this base, although it has been in decline for many years.

One fundamental challenge ADA is facing is the lack of a market for more sustainable products and services. As Mr. Whatley noted, markets still think in an unsustainable way. Conventional thinking for development agencies like ADA had been to attract businesses into a

**BOX 3-1 Water Conservation Challenges and Successes: Lessons from San Antonio**

San Antonio, the seventh largest city in the United States, has much in common with Atlanta in terms of water management issues—a sprawling population, highly variable rainfall, and a climate that is prone to drought. In 1996, the Edwards aquifer, which serves the San Antonio area, was found to be low enough that it threatened the status of five federally protected endangered species, causing the federal government to impose pumping limits. The city was tasked with developing a conservation plan immediately.

After this concerted effort, San Antonio has become a water conservation success story. Since 1984, the San Antonio Water System (SAWS) experienced a 67 percent increase in customers, but it has observed no increase in the percentage of water usage (see Figure 3-1). Through the San Antonio experience, SAWS staff have learned that it is possible to grow and thrive economically while meeting water management challenges, and that drastic lifestyle changes are not required to make dramatic changes in gallons per capita.

SAWS developed a three-pronged approach to conservation. The first is creating financial incentives for customers, such as rebates for new equipment in homes and businesses, as well as rate structures that discourage high discretionary usage. The second is education and outreach: SAWS hosts public events, produces an e-newsletter, and provides home consultations, particularly for the top 1 percent of residential water users. News outlets report aquifer levels every day, making the entire community aware of their water-use limits. Education of the community is considered an important and ongoing effort. The third approach is the development of reasonable regulations or far-reaching ordinances that cover a wide range of activities involving water.

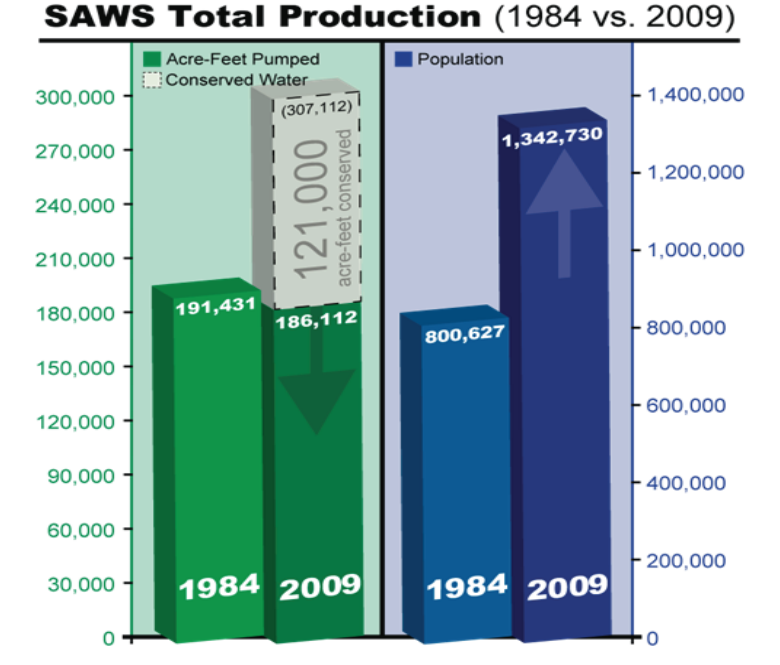



**FIGURE 3-1** San Antonio Water Systems' supply and demand under drought conditions.

Source: Guz, K. 2010. Saving Water: Challenges & Opportunity. Presented at the National Academies September 2010. Saving Water: Challenges & Opportunity. Presented at the National Academies September 2010 Pathways to Urban Sustainability: Lessons From the Atlanta Metropolitan Region Workshop. [online]. Available: http://sites.nationalacademies.org/PGA/sustainability/atlantaurban/index.htm#meetings. [accessed February 28, 2011]

SAWS concluded that neither conservation nor efficiency alone is sufficient to meet water demand in an arid environment. But San Antonio has demonstrated that it is possible to grow and thrive while meeting water management challenges. This does not require residents to make drastic lifestyle changes in order to make dramatic savings in water usage per capita.

Source: Guz (2010).

market that was already mature, whereas the challenge now is to help develop and define the markets for sustainability.

He cited the example of clean energy technologies, and the multiple levels of effort required within the U.S. Department of Energy (DOE) to help bring these to market. DOE supports research to develop technologies and partners with the private sector to refine them and make them commercial. DOE is also getting involved in standards setting, marketing, creating incentives, engaging states and municipalities, and integrating the technologies (through its work on modernizing the U.S. electrical grid).

Mr. Whatley described two local initiatives where the market is just beginning to develop. He is part of a taskforce that is exploring the Mondragon cooperative model, pioneered in Spain and more recently replicated in Cleveland, Ohio. These worker-owned cooperatives have performed well in Spain, and communities in the United States are exploring the model, particularly to support smaller-scale sustainability-oriented businesses. Mr. Whatley also mentioned plans to launch an urban agriculture program in Atlanta, with the goal of fostering a profitable business beginning with a 3- to 4-acre site.

The goal for ADA, he stated, will be to support entrepreneurs willing to take some risks to produce goods or provide services (e.g., weatherize homes) locally, at a scale allowing them to remain profitable. In other words, they will not promote "green jobs" for the sake of being green. A number of philanthropic foundations in the area are currently supporting these and similar efforts to build new markets for sustainability, and Mr. Whatley suggested that this support can be most useful as loan guarantees (as opposed to grants) in order to encourage more entrepreneurial risk.

James Marlow, CEO of Radiance Solar, offered the perspective of someone who has taken an entrepreneurial risk to deploy solar energy technologies in Georgia. Mr. Marlow underscored that solar energy is not a new business concept, but it has been slow to take hold in Georgia due to a lack of incentives, particularly a renewable portfolio standard at the state or national level. He described a number of benefits of solar energy in metropolitan Atlanta, including reduced lifecycle energy costs, $CO_2$, SOx, NOx, and mercury emissions compared to the coal-fired power stations that provide most of the regional power supply.

From a larger systems perspective, Mr. Marlow noted that solar energy has the potential to significantly reduce water withdrawals for power generation, another major concern for the region. Mr. Marlow stated that thermoelectric power generation accounts for roughly 50 percent of the water withdrawals in the state. He added that there are numerous opportunities for integrating solar energy into metropolitan Atlanta's current infrastructure, ranging from commercial roof installations like the downtown aquatic center (currently the largest installation in the region) to solar shade ports over surface parking lots, providing some shade to vehicles while also producing power.

Greg Chafee, chair of the Green Business Practice, Morris, Manning & Martin, LLP, stated that, in addition to the business community, regional universities have supported the development of several emerging technologies. He added that it would be useful if regional actors became more heavily involved in research and development efforts to meet the needs of the regional market.

## CHAMPIONING SUSTAINABILITY

Mandy Mahoney, Director of Sustainability, city of Atlanta, stated that Mayor Reed hopes to make Atlanta one of the ten most sustainable cities in America; however, it will be challenging to deal with diffuse development of the metropolitan area and inefficient land use within the city limits. Ms. Mahoney remarked that progress to date has been incremental, continuing with plans started when Mayor Franklin signed the U.S. Mayors Climate Protection Agreement. The city is now on track to meet its greenhouse gas emissions reduction target for 2012. Ms. Mahoney emphasized that it is important for the city's credibility that these data are independently verified. To address this issue, a team of researchers at Georgia Tech are currently involved in assessing the city's progress in reducing its carbon footprint.

Ms. Mahoney also explained that Atlanta has become a national leader in green buildings by instituting agreements to encourage or require Leadership in Energy & Environmental Design (LEED)-rated structures. These types of incremental changes are indicative of the pragmatic approach the city is currently taking to pursue sustainability objectives. Tom Weyandt, former Director of Comprehensive Planning with the Atlanta Regional Commission, explained that, when engaging state legislature, the first thing to do is get their attention. In other words,

"sustainability" may be too imprecise a term. Marilyn Brown, professor, School of Public Policy, Georgia Tech, pointed out that there frequently has to be a balance between state imperatives and local will, citing the fact that state energy codes can be revised to promote deeper energy savings, but enforcement is a local prerogative.

## ENGAGING THE PUBLIC

Ms. Mahoney remarked that the city government has established neighborhood planning units to allow citizens to participate in comprehensive planning. She echoed the comments of other participants that public health goals are increasingly being connected to sustainability goals, citing the example of obesity rates and access to local, healthy foods. John Crittenden, director of the Brook Byers Institute for Sustainable Systems with the Georgia Institute of Technology, added that, as the urban infrastructure is being further developed, the input of residents will play a critical role. What residents consider most important—proximity to work, school, shopping, restaurants, entertainment, public transit, and walkability—will shape the development of the community.

Lisa Gordon, CEO of Atlanta BeltLine, Inc., described a major regional initiative (Box 3–2) that is designed to connect the public through its planning process and also in its end result. Vicki Coleman, business relations manager in the Fulton County government, stated that public and political consensus is needed to achieve sustainable development goals. Communicating with the public and tailoring the message to the appropriate audience is crucial. She noted that policy makers have been more likely to follow the ground support of citizen willingness.

**BOX 3-2 The Atlanta BeltLine Project**

The Atlanta Beltline is an integrated park, trail, and transit system, along a proposed project corridor located 2 to 3 miles from downtown Atlanta. The BeltLine connects 45 neighborhoods, all of Atlanta's major submarkets, and four MARTA rail stations. The project is composed of corridors ranging from 68 to 198 feet in width, so there is little need to displace current buildings, homes, or activities. Additionally, most of the infrastructure, such as water and electricity, is already in place. Moreover, 22 percent of the Atlanta population lives in close proximity to the planning area, making it likely that large numbers of residents will benefit from the project. However, one early lesson from the planning phase was that the project needed to include a lot of "spurs" to include neighborhoods and parts of the city that residents felt were not connected.

The project will include a 6,500-acre redevelopment area, with plans to develop 22 miles of transit and 33 miles of trails. Five thousand units of affordable housing will be built and there is a possibility that the project could create up to 30,000 jobs. Environmental cleanup is also a significant consideration; ABI is working closely with the Georgia Environmental Protection Department and EPA to carry out remediation efforts. The cost of the project is about $3 billion, with $1.7 billion coming from its designation as a tax allocation district. Atlanta Beltline, Inc. (ABI) is the implementing body, but ABI is coordinating with numerous agencies at both federal and state levels.

ABI has also developed a comprehensive community engagement framework. Some communication efforts include quarterly public briefings, monthly study group meetings, weekly guided tours, and regular community celebrations. Mayor Shirley Franklin established the Beltline Partnership in 2005 to raise additional funds for education and outreach initiatives. Atlanta residents contributed to decisions of where to locate many of the trails and connectors, and they are consulted about each facet of development.

Source: Gordon (2010).

Wayne Zipperer, research scientist with the U.S. Forest Service's Southern Research Station, reminded participants that there is a moral and ethical dimension to sustainability. This was an important motivating factor in the early environmental movements of the 1970s. He acknowledged that is difficult to quantify, and that it sometimes gets lost

amid discussions of the so called "triple bottom line".[3] Nonetheless, he suggested that the ethical dimension of sustainability should not be overlooked when engaging the public on the issue.

[3] The triple bottom line refers to the three dimensions of sustainability (environment, social, and economics) as a model for evaluating sustainability in decision making.

# 4

# INDICATORS OF SUSTAINABILITY

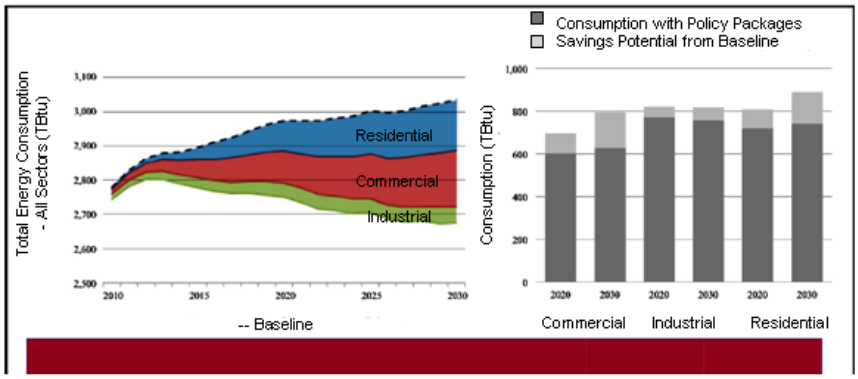
Sustainability indicators and performance metrics were specifically addressed in the day two panel discussion but were also raised by other presenters and participants. As metropolitan Atlanta attempts to put sustainability principles into practice, stakeholders are interested in measuring their progress. Participants described existing metrics, particularly to measure reductions in $CO_2$ emissions, but several participants also described other types of metrics (e.g., related to community health or mobility). Many participants also noted that these metrics could become important in the context of competitiveness among metropolitan regions if citizens begin to demand more action on sustainability.

## REDUCING THE REGION'S CARBON FOOTPRINT

Marilyn Brown, professor, School of Public Policy, Georgia Tech, examined sustainability through the lens of energy consumption and greenhouse gas emissions. She began with a forecast of the growth of $CO_2$ emissions in the United States and noted that a national goal ought to be not only to stop cumulative growth in emissions, but to make these growth rates negative. To do so, the United States needs to have a cumulative emissions budget. As Dr. Brown pointed out, however, implementation will fall primarily to cities and local governments, and thus it is important to understand emissions at the metropolitan level.

Dr. Brown cited a 2005 study by The Brookings Institution (Brown et al., 2008) of carbon footprints of the 100 largest metropolitan areas, which found that people living in dense urban areas generate significantly lower emissions. She explained that U.S. cities offer great opportunities for improvements in energy efficiency and conservation because of the high concentration of buildings and the compact

infrastructure (see Figure 4–1). Although they contain 65 percent of the population and create 76 percent of gross domestic product, they only produce 56 percent of carbon emissions. Dr. Brown noted that obtaining energy data at a county or zip code level is difficult. Some data are proprietary and can only be estimated.




| Indicator | 2020 | 2030 |
|---|---|---|
| Public Sector Policy Incentives (in million $2007) | 882 | 1,299 |
| Private Sector/Household Productive Investment (in million $2007) | 349 | 391 |
| Change in Electricity Costs (in million $2007) | -2,070 | -3,824 |
| Change in Natural Gas Costs (in million $2007) | -341 | -513 |
| Annual Increased Employment (ACEEE Calculator) | 32,200 | 43,100 |
| Change in Gross State Product (in million $2007) | 70 | 94 |

**FIGURE 4-1** Projections for energy efficiency gains in Georgia.
Source: Brown, M.A., E. Gumerman, X. Sun, Y. Baek, J. Wang, R. Cortes, and D. Soumonni. 2010. Energy Efficiency in the South (Atlanta: Southeast Energy Efficiency Alliance), April 2010. [online.] Available: http://www.seealliance.org/programs/se-efficiency-study.php. [accessed April 9, 2011]

## SUSTAINABILITY AS A POINT OF DIFFERENTIATION

K.C. Boyce, Deputy Executive Director, Membership and Regional Impact, ICLEI-Local Governments for Sustainability, discussed how progress toward sustainability might be measured in the region. He presented the STAR Community Index, which uses comparative analysis to provide a common way of measuring progress in sustainability—

economic, environment, and equity indices. The index has 81 metrics categorized under 10 goal areas; each has its own structure, consisting of a goal, purpose, and measure. He emphasized that the STAR Community Index has a "high bar, but a low floor" so that top-performing communities would have incentive to continue making progress, but lower-performing communities would not be precluded from measuring their progress. Mr. Boyce also remarked that communities were expressing interest in understanding the range of positive possibilities for becoming more sustainable (rather than only measuring the decrease in undesirable indicators).

Mr. Boyce noted that, until recently, indicators of sustainability for different cities did not have enough in common to make useful quantitative comparison. This makes it difficult if not impossible to verify claims emanating from communities. To share a common vision and carry out concerted action, it is useful to have a common language and set of metrics. He acknowledged that this is not without challenges, and he cited the example of defining "adequate" health care. At the same time, Mr. Boyce noted that not all sustainability indicators are directly comparable between communities.

Carol Couch, Senior Public Service Associate, College of Environment and Design, University of Georgia, elaborated on this when she pointed out that stakeholders needed to have a benchmark for the region's ecosystem services. Quantifying (and, where possible, monetizing) these services would help improve decision makers' understanding of the tradeoffs inherent in different patterns of development. Graeme Lockaby, director, Center for Forest Sustainability, Auburn University, pointed out that macroeconomic analyses are not suited to local ecological scales, and so it is easy to miss declines in ecosystem services resulting from urban expansion. He cited two specific examples from his studies in western Georgia—first, that regional water availability tends to decrease as urbanization (i.e., land conversion) increases, and second, that the threshold for urban forest canopy and species diversity is about 15 percent. In these cases, changes to the land threaten services that at least some residents in the region value.

Environmental justice, a priority issue in metropolitan Atlanta and at a federal level, is another spatial indicator. Several participants noted that, in addition to concerns about environmental pollution's adverse impacts on segments of the regional population (e.g., by race or income),

it will also be important to measure the degree to which all segments of the population are benefiting from environmental improvements in the region. Examples included access to green space, healthy food options, and multiple modes of transit.

## PUBLIC HEALTH INDICATORS

Christopher Portier, Director of the National Center for Environmental Health, U.S. Centers for Disease Control and Prevention (CDC), suggested that health indicators, such as gains in life expectancy from pollution reductions, offered a positive way to communicate the impact of sustainability efforts. In the same way that efficiency improvements are communicated in terms of consumer savings over time, improvements in the built environment that also improve health outcomes can be monetized (e.g., reduced medical expenditures) and provide a direct connection to citizens. Dr. Portier concluded that the way we design our communities and use our land will either promote or harm human health. Therefore, the CDC is becoming more involved in building capacity to support Health Impact Assessments for land-use and transportation projects.

Jeremy Hess, assistant professor, Department of Environmental Health, Rollins School of Public Health, Emory University, posed a question to the group about which health indicators could be used as a measure of urban sustainability. As many participants noted, health problems such as asthma and obesity are significant concerns in metropolitan Atlanta, and so linking these concerns to their environmental stressors could help make sustainability a more tangible idea for residents in the region. Dr. Hess added survival from common cancers to this list. These indicators are highly correlated with poverty and restricted access to health care. Incidence of obesity and diabetes are linked to limited mobility, limited access to nutritious food, and poor education. Dr. Hess reiterated that shifting our attention and investment to creating livable and sustainable communities can have a positive impact on public health.

# 5

# INSTITUTIONALIZING SUSTAINABILITY

As many participants pointed out, transitioning to sustainability will require changes in the institutions that manage and support our urban environments. This does not necessarily mean creating new institutions, but it does entail increased, more regular interaction among institutions. This, in turn, can help "institutionalize" sustainability, reducing the transaction costs of cooperating across sectors and making sustainability part of a given organization's work stream instead of a special or ad hoc project. This chapter summarizes the discussions on this issue, which included coordination at a federal level, multistakeholder partnerships, and sustainability-oriented research programs.

## BUILDING FROM THE FEDERAL GOVERNMENT'S EXAMPLE

Catherine Ross, director and Harry West Chair, Center for Quality Growth and Regional Development, Georgia Tech, pointed out that a great example of systems thinking is that several federal agencies are now attempting to coordinate their sustainability efforts, including the Department of Housing and Urban Development (HUD), the Environmental Protection Agency (EPA), and the Department of Transportation (DOT). This partnership signifies progress for the federal government because it requires agencies with overlapping missions to coordinate on complicated issues. Renee Glover, president and CEO, Atlanta Housing Authority, described this as connecting the dots and suggested that we have known for years that different agency missions (local, state, and federal) are interrelated, so it is encouraging to finally see connections being made. Catherine Ross also mentioned that the White House's Office of Urban Affairs could help direct federal policy supporting metropolitan areas, staging policies for the long term so that

regional actors could determine the particular pathway and correct course as needed.

John Frece, director, Office of Sustainable Communities, EPA, described how the agency has recently partnered with the DOT and HUD to jointly address issues they now recognize as being connected. The interagency "Partnership for Sustainable Communities" has organized itself around a core set of livability principles:

- "Provide more transportation choices. Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.
- Promote equitable, affordable housing. Expand location- and energy-efficient housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- Enhance economic competitiveness. Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services and other basic needs by workers, as well as expanded business access to markets.
- Support existing communities. Target federal funding toward existing communities—through strategies like transit oriented, mixed-use development, and land recycling—to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes.
- Coordinate and leverage federal policies and investment. Align federal policies and funding to remove barriers to collaboration, leverage funding, and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy
- Value communities and neighborhoods. Enhance the unique characteristics of all communities by investing in healthy, safe, and walkable neighborhoods—rural, urban, or suburban" (EPA, 2011a).

Mr. Frece added that EPA's Office of Sustainable Communities is focusing on three major goals. The first is to change the conversation to embrace sustainability as a central principle, not an optional add-on. The

second is to change the rules to promote or incentivize more sustainable options. For example, existing policies incentivize new development over redevelopment; in fact, HUD has even had a prohibition on building on brownfields. The third goal is to help the willing by working with businesses, local governments, and communities that ask for input and advice on sustainability.

EPA already boasts 14 years of smart growth programs,[4] and currently they are promoting Greening America's Capitals,[5] a pilot program with demonstration projects in five state capitals. Mr. Frece noted that EPA and other agencies have taken notice of the projected changes in demographics in U.S. cities. The share of the population that is 65 and older will double in the next 20 years. That shift necessitates different access to transportation and health care—the status quo will not suffice. Additionally, there is already a growing desire for walkable communities. Mr. Frece remarked that the demand far outstrips current supply, driving prices up and making walkable communities less accessible to lower-income groups.

Mr. Frece described some early successes from the interagency partnership work: DOT wants to change its New Starts program—discretionary funding to support locally planned, implemented, and operated transit projects—and is seeking congressional approval. HUD wants to change the way it spends $44 billion, that is, its entire budget, by making all of its investments oriented toward sustainability.[6] These are challenging changes to enact, but Mr. Frece noted that the discussions have had more traction since the agencies began

[4] The EPA smart program was designed to assist communities in improving their development practices by working with local, state, and national experts to "discover and encourage successful, environmentally sensitive development strategies" (EPA, 2011b).

[5] Greening America's Capitals, a project of the Partnership for Sustainable Communities between EPA, HUD, and DOT, was designed to assist state capitals in developing an implementable vision of "distinctive, environmentally friendly neighborhoods that incorporate innovative green building and green infrastructure strategies" (EPA, 2011c).

[6] HUD's Office of Sustainable Housing and Communities is guiding this effort to promote sustainability throughout the agency. In addition, this office oversees the Sustainable Communities Regional Planning Grants program, a $150 million competitive grant program to promote integrated planning at the community and regional levels (HUD, 2011).

collaborating. He also pointed out that the agencies have learned that they need to do a better job of communicating internally, across different offices. As an example, he cited his office's coordination with the Water Office and said it is critical because that office controls $3 billion for water and wastewater infrastructure across the country and fixing this infrastructure is a top priority.

Mr. Frece noted that the EPA, DOT, and HUD are now jointly drafting Requests for Proposals, making public appearances together, coordinating budget advising, and pooling funds for projects.[7] They are working extensively with regional representatives and seeking partnerships with other federal agencies, including the Federal Emergency Management Agency, the Department of Health and Human Services, the Department of Defense, the Department of Agriculture, and the Department of General Services.

These efforts have taught several valuable lessons. For partnerships to become a habit, agencies must collaborate from the very beginning of their new initiatives. It entails not only regular meetings between leaders but full staff-to-staff interaction.

Mr. Frece concluded with the call to institutionalize these partnerships so that they survive changes of administrations and the vicissitudes of the political climate. One way to do so would be to co-locate government buildings, making it much easier for different offices to coordinate weekly meetings and regular interactions. Also, he added that we need to quantify the successes of such collaboration—the more we can show the value of this work, the easier it will be to continue. A participant suggested that the partnership identify some early "wins" from the process, so that communities can identify what works and begin to embed this type of interagency approach.

## TAKING STEPS IN THE ATLANTA REGION

Tom Weyandt, former director for Comprehensive Planning at the Atlanta Regional Commission (ARC), explained that the ARC has been supporting transit-oriented and sustainability-oriented developments

[7] Agencies are also working with partner agencies to identify issues where program alignment may occur. DOT and HUD, for example, have recently collaborated on various planning grants for communities.

since at least 1999, primarily through the Livable Centers Initiative.[8] This initiative was the response to an air quality crisis—the metropolitan region was in nonconformity status with regard to federal standards and was in danger of losing federal transportation funding. Mr. Weyandt described two recent redevelopment projects in Atlanta that were affiliated with the Livable Centers Initiative (see Box 3). According to Mr. Weyandt, projects coming before the ARC are now primarily pedestrian-friendly, suggesting that the market is changing and that this could be a positive indicator.

Carol Couch, Senior Public Service Associate, College of Environment and Design, University of Georgia, highlighted the institutional complexity inherent in comprehensive planning in metropolitan Atlanta. For example, the North Georgia Water Planning District comprises 15 counties, 91 cities, and 7 water authorities (see Figure 5–1). The number of jurisdictions involved in Georgia's watersheds complicates comprehensive water planning. Institutionalizing sustainability (e.g., via partnerships among these communities) would be no small task.

John Wegner, Senior Lecturer and Chief Environmental Officer, Department of Environmental Studies, Emory University, discussed sustainability efforts on the Emory University campus, noting that the university has institutionalized important changes. For example, the Board approved applying LEED standards to all buildings, and a land-use plan for campus was developed that sets aside 50 percent of the campus for green space. Also, about one quarter of employees live within 3 miles of campus, easing much of the transportation challenges that many organizations face. The academic curriculum has also changed in response to these efforts. Emory University now offers a joint bachelor of science/master of public health program in environmental science and public health, and undergraduates can also opt for a sustainability minor as well.

[8] The Livable Centers Initiative, created in 1999, has awarded over $141 million in planning grants on a competitive basis to local governments and nonprofit organizations to assist in preparation of plans to define future development strategies and transportation improvements, as well as support public and private investments (ARC, 2011).

**BOX 5-1 A Tale of Two Brownfields: Atlantic Station and Edgewood Avenue**

Edgewood Retail, in close proximity to two MARTA stations, is the former site of Atlanta Gas Light office and maintenance facility. ARC's initial review of the redevelopment proposal was that it was "not in the best interest" of the community. The developer added 44 percent more residential units, planned residential and office space above commercial and retail stores, and proposed a shuttle circulator to MARTA stations, thereby improving pedestrian connection. With these changes in place, ARC changed its ruling to "in the best interest" of the community. The project was carried out and completed, creating a major new retail center in an urban location. The project is pedestrian-friendly and contains multiple connections to the neighboring community. Its high occupancy rates are notable as well. However, the project has few public gathering areas and little park area. It is also still fairly difficult to traverse as a pedestrian and contains more parking spaces than necessary. Affordable housing is limited, and commercial occupancy is composed mostly of national retail chains.

Atlantic Station, another recently redeveloped brownfield site, is located near the midtown Atlanta MARTA and is the site of an old steel mill. As with the Edgewood site, ARC's initial review also deemed this project "not in the best interest" of the community because it lacked funding for a bridge necessary to connect it to the adjacent neighborhood. But the governor created a "green light" committee to resolve issues with the 17th Street bridge, and the city gave approval for its construction. Atlantic Station was designated a tax allocation district to raise revenue for development.

Atlantic Station has succeeded in turning a low-value parcel of property into a vibrant, tax-revenue-generating property. It reused a significant amount of the mill's concrete from old foundation and became an excellent example of environmental remediation. Its high-intensity mixed-use development complements Midtown and hosts numerous attractions such as Cirque de Soleil, Bodies, and Dialogue in the Dark. Atlantic Station has a shuttle connection to MARTA boasting high ridership—high enough that there is discussion of converting the route to light rail. However, office and retail occupancy is not as high as desired, and the connections to neighboring districts are limited. Pedestrian access from Midtown is difficult, though internally it is quite walkable.

Source: Weyandt (2010).

Catherine Ross discussed some integrated analyses that Georgia Tech's Center for Quality Growth and Regional Development recently led. She cited the Atlanta BeltLine health impact assessment, where the primary goal of the project was to measure the health impacts of the project on affected populations, especially disadvantaged and vulnerable groups, through both quantitative and qualitative analyses and metrics (Ross, 2010). She noted that this could be a useful template for further Health Impact Assessments work in the region. Troup County also requested a spatial strategy for sustainability (Ross, 2010), suggesting that even outlying counties were trying to think more strategically about sustainability.

Many participants pointed out that private developers play a substantial role in metropolitan Atlanta's development. They are major investors, and major landholders, and thus potential drivers for sustainable development. However, potential developers may not naturally lead the way in innovative practices since they build according to local specifications, and sustainable practices are perceived as an added cost that cuts into projected profits. Local specifications are shaped in part by federal and state policies, and current policies frequently do not distinguish between greenfield development (new suburban or exurban developments) and redevelopment (brownfields and other infill developments). One participant suggested that one way to change business as usual would be to waive impact fees for sites that were previously developed. This would encourage in-fill within cities rather than furthering sprawl. Another participant suggested that HUD funding to AcoRA (the agency responsible for managing Atlanta as a HUD-designated Renewal Community) might be reconfigured to focus on sustainability concerns. The current program provides tax incentives in an effort to promote employment opportunities, economic development, and affordable housing in distressed neighborhoods, and these all seem to be complementary goals to a sustainability agenda.

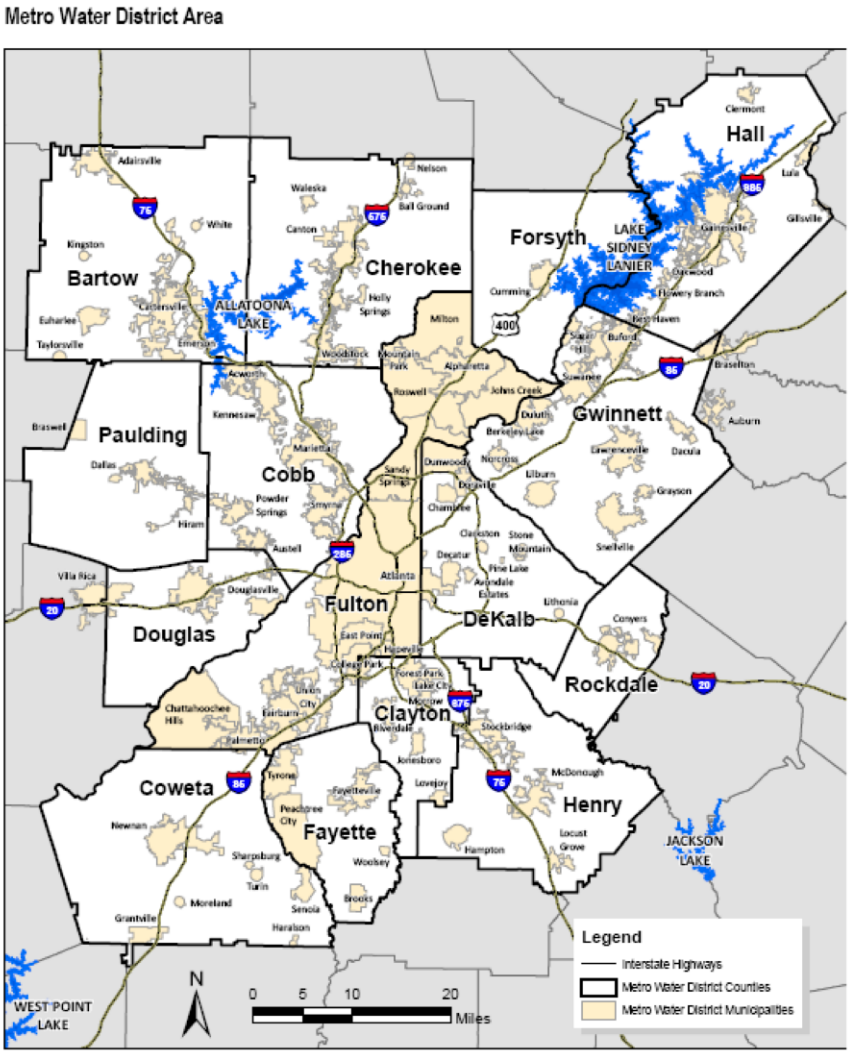



**FIGURE 5-1** Metropolitan North Georgia Water Planning District. Source: Metropolitan North Georgia Water Planning District. 2009. Water Supply and Water Conservation Management Plan. May 2009.

# 6

# PATHWAYS FORWARD

As several participants noted, a vision for a sustainable metropolitan Atlanta should look out over several decades, but residents should also be able to envision the steps that might be taken during this transition so that actions taken today help shift the region's trajectory. This final chapter summarizes participants' discussion of the opportunities and challenges implicit in such a shift. Specific issues participants raised included the need to change perceptions of (and in) the region, the power of example from highly connected, neighborhood-scale redevelopment, and the opportunity to employ adaptive management principles in pursuit of sustainability.

## ENVISIONING A SUSTAINABLE ATLANTA REGION

Jeremy Hess, assistant professor, Department of Environmental Health, Rollins School of Public Health, Emory University, remarked that sustainability as a goal sounds like a utopian ideal, and so it is helpful to focus on asking what a sustainable Atlanta region would look like. Numerous participants emphasized that there did not seem to be a collective vision for the region, but that such a vision might help individuals and institutions coalesce around this idea of sustainability. One participant suggested that area residents resist changing the paradigm if they feel it is threatening their way of life or requiring them to give something up. To counteract this resistance, other participants suggested that the discussion needed to be framed in a positive light and, rather than antagonize specific acts, the discussion needs to highlight the gains from more sustainable approaches and to focus energy on developing incentives for these approaches.

Renee Glover, president and CEO, Atlanta Housing Authority, pointed out that Atlanta has been on the uptick for years, but this has

gone unnoticed. She reminded participants that, prior to Atlanta hosting the 1996 Olympic Games, it was considered one of the most violent cities in the United States, and one of the poorest; it was losing population; and it had a poor education system. Ms. Glover remarked that Atlanta had made great strides, and the sacrifices that residents assumed they would have to make as part of this transition have not been so noticeable. Other participants suggested that the image of Atlanta has been slower to change than the reality on the ground.

Ms. Glover stated that residents in the region, after decades of moving farther from the urban core, are realizing that this pattern is neither sustainable nor desirable. Long commutes, isolation, and expenses associated with sprawling development may provide the impetus for more residents to get involved in developing a shared vision for metropolitan Atlanta. She referred to this visioning as communities of choice that provide the amenities people desire, all at a reasonable distance.

Some groups have already been working on developing visions for a more sustainable Atlanta. The Atlanta Regional Commission developed the Atlanta Fifty Forward initiative; this visioning effort was designed to delve into critical sustainability issues that will shape the Atlanta metropolitan area for 50 years into the future. The initiative will include a series of public forums held quarterly to discuss a variety of key topics associated with sustainability in Atlanta.

In addition, John Crittenden, director of the Brook Byers Institute for Sustainable Systems with the Georgia Institute of Technology, mentioned a recent Georgia Tech project to model scenarios where sprawling development was "reversed" and metropolitan Atlanta's natural systems (primarily forest cover) were restored within 100 years. Dr. Crittenden mentioned an exercise referred to as the Red Fields to Green Fields project, the red fields referring to underperforming commercial assets, which present a challenge in the region. The project proposes to set up a $200 billion land bank to buy up failed commercial properties, get them off of banks' books, and convert them to parks for 10 years. This would give the remaining commercial properties a better chance of survival. Afterward, they would redevelop 70 percent of the purchased land, while 30 percent becomes dedicated public park space.

## EDUCATING THE PUBLIC

Though education was not a formal topic on the agenda, it was frequently a subject of discussions and presentations, and many participants emphasized that education would be a critical part of metropolitan Atlanta's transition to sustainability. As one participant noted, the overall quality of education systems in the region will affect metropolitan Atlanta's ability to attract and retain businesses. Other participants remarked that failing schools in the city of Atlanta had been a primary driver in the expansion of the suburbs.

More specifically, however, participants discussed how and why education on sustainability issues could have an impact on the region. To begin, several participants remarked that, although sustainability was a complex and sometimes abstract topic, it may not be helpful to always reduce it down to sound bites. Instead, the important message is that the built environment and the natural environment are inextricably linked, that choices made in one facet inevitably affect other facets, and that a more sustainable approach could reinforce a number of goals.

Additionally, an informed citizenry has the potential to influence the political climate and to elect leaders and public officials that are receptive to creating sustainability goals and implementing programs that achieve those goals. A number of participants suggested that, without a bottom-up demand for sustainability, it is unlikely that champions would emerge in the region's elected leadership.

## CHALLENGES FOR RESEARCH

Participants discussed a number of areas where targeted research could help close knowledge gaps, enhance the effectiveness of education, and provide information that influences decisions in the region. One recurring theme was full costing (and calculable benefits) for a business-as-usual scenario vis-à-vis a sustainable growth scenario. Participants noted that local and state governments are constantly struggling to evaluate full costs and benefits of their decisions and that conventional accounting approaches are insufficient.

A number of workshop participants noted that research into visualization and simulation tools would be welcome and it would be useful to take advantage of computational power and access to computers

so that Infrastructure Ecology principles could inform simulations by any citizen to model changes at the national, regional, local, and single-family-home levels (e.g., SimCity). Finally, many workshop participants indicated that research should help scientists and other stakeholders distinguish between audiences and the learning styles (communications tools) of those audiences.

One participant questioned whose responsibility it is to shepherd research findings into operations and suggested that research that relies on public funding, but does not then reach the public (via influencing decision makers), is not actually benefiting the public good. As several speakers and participants noted, this appears to be a role for multistakeholder partnerships, where research agencies have their priorities informed by decision makers' informational needs, and research outputs can be handed off to organizations who can disseminate (or translate, as needed) relevant findings.

## TOWARD ADAPTIVE MANAGEMENT IN THE REGION

Finally, a number of participants suggested, given that metropolitan Atlanta is a complex system, that it might be useful to explore adaptive management principles from ecology. Adaptive management is defined by the U.S. Geological Survey as a "structured approach to resource management" (USGS, 2011). It is an iterative process, consisting of 5 steps, including "1) [c]onsidering various actions to meet management objectives; 2) [p]redicting the outcomes of these management actions based on what is currently known; 3) [i]mplementing management actions; 4) [m]onitoring to observe the results of those actions; and 5) [u]sing the results to update knowledge and adjust future management actions accordingly" (USGS, 2011). When managing a socioecological system with so much complexity, it is not possible to always understand and anticipate how the system will react. Rather, adaptive management recognizes that these systems are dynamic, and so managing them requires continual accumulation of evidence, learning from it, and accepting some uncertainty. Wayne Zipperer, research scientist with the U.S. Forest Service's Southern Research Station, noted that decision makers do not like uncertainty, but he also emphasized that learning is an important part of adaptation and that metropolitan Atlanta would continue to improve as decision makers continue to adapt to changes and new information.

Graeme Lockaby, director, Center for Forest Sustainability, Auburn University, stated that it is important to recognize societal benefits and the value of preserving ecosystems that exist on the urban–rural boundary. Ecologists want to be part of the sustainability solution and their knowledge of local ecosystems and adaptive management principles could be employed to enhance public understanding of the issues.

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# A

# WORKSHOP AGENDA

**Pathways to Urban Sustainability:**
**Lessons from the Atlanta Metropolitan Region**

**A National Academies Workshop**
**September 30–October 1, 2010**
**Georgia Tech Global Learning Center**
**Room 222**
**Atlanta, Georgia**

## OBJECTIVES

- Discuss the ways that regional actors are approaching sustainability, specifically, how they are attempting to merge environmental, social, and economic objectives
- Share information about ongoing activities and strategic planning efforts, including lessons learned
- Examine the role that science, technology, and research can play in supporting efforts to make the region more sustainable
- Explore how federal agency efforts, particularly interagency partnerships, can complement/leverage the efforts of other key stakeholders

## Thursday, September 30, 2010

9:00 AM Welcome and Goals of the Workshop

*Denise Stephenson Hawk, Consultant and Former Director, Societal-Environmental Research and Education Laboratory, National Center for Atmospheric Research*

9:15 AM Interactions Between Human and Natural Systems in the Built Environment

*Christopher Portier, Director, National Center for Environmental Health, Centers for Disease Control and Prevention*

**Session I: Perspectives on sustainability in the Atlanta metropolitan region**

Plenary presentations will reinforce the value-added benefits of interdisciplinary solutions to urban challenges, and illustrate a "systems" approach to sustainability.

Moderator: *Glen Daigger, Senior Vice President and CTO, CH2M Hill, Inc*.

9:30 AM *Marilyn Brown, Professor, School of Public Policy, Georgia Tech*

10:00 AM *Carol Couch, Senior Public Service Associate, College of Environment and Design, University of Georgia*

10:30 AM BREAK

10:45 AM *Catherine Ross, Director and Harry West Chair, Center for Quality Growth and Regional Development, Georgia Tech*

11:15 AM Panel Discussion—sustainability and economic growth

*Charles Whatley, Director of Commerce and Entrepreneurship, Atlanta Development Authority, and Greg Chafee, Chair of the Green Business Practice, Morris, Manning & Martin, LLP*

12:00 PM LUNCH BREAK

**Session II: "Building Bridges"**

Presentations from a range of organizations and stakeholders will address a set of core questions.

Moderator: *Steven Olson, Director, Center for Ethics and Corporate Responsibility, Georgia State University*

1:15 PM A Tale of Two Brownfields: Atlantic Station and Edgewood Avenue

*Tom Weyandt, Director of Comprehensive Planning, Atlanta Regional Commission*

1:45 PM Atlanta BeltLine Project

*Lisa Gordon, COO, Atlanta BeltLine, Inc.*

2:15 PM Water conservation challenges and successes: Lessons from San Antonio

*Karen Guz, Director of Conservation, San Antonio Water System*

2:45 PM Advancing solar energy and the new energy economy in Georgia: a private sector perspective

*James Marlow, CEO, Radiance Solar*

3:00 PM The role of natural ecosystems in sustaining societal values: the West Georgia Project

*Graeme Lockaby, Director, Center for Forest Sustainability, Auburn University*

3:15 PM Decision-support tools: Modeling sustainable and resilient urban infrastructure in the Atlanta region

*John Crittenden, Director, Brook Byers Institute for Sustainable Systems, Georgia Tech*

3:30 PM BREAK

3:45 PM Breakout groups

Neighborhood and city-scale projects

*Andrea Pinabell, Program Manager, Sustainable Community Development, The Home Depot Foundation*

Regional projects and plans

*Ed Macie, Urban Forestry Group Leader, USDA Forest, Service Southern Region*

Policy and Research

*Anne Keller, Senior Sustainability Advisor, USEPA Region 4*

4:45 PM Report back in plenary

5:30 PM Adjourn

**Friday, October 1, 2010**

9:00 AM Federal agency efforts to support sustainable communities

*John Frece, Director, Office of Sustainable Communities, U.S. Environmental Protection Agency*

**Session III: "Integrating Goals, Measuring Progress, Translating Results"**

Panelists representing a variety of perspectives will take part in a moderated discussion on how progress toward sustainability might be measured in the region. This session will highlight indicators that are currently in use, the timescales for measuring progress, potential returns on investments in sustainability, and methods for communicating results.

Moderator: *Wayne Zipperer, Research Scientist, USDA Forest Service Southern Research Station*

9:30 AM Panel Discussion

*K.C. Boyce, Deputy Executive Director, Membership & Regional Impact, ICLEI- Local Governments for Sustainability*

*Renee Glover, President and CEO, Atlanta Housing Authority*

*Jeremy Hess, Assistant Professor, Department of Environmental Health, Rollins School of Public Health, Emory University*

*Mandy Mahoney, Director of Sustainability, City of Atlanta*

*John Wegner, Senior Lecturer and Chief Environmental Officer Department of Environmental Studies, Emory University*

10:45 AM BREAK

| | |
|---|---|
| 11:00 AM | Moderated Q&A with audience |
| 12:00 PM | LUNCH BREAK |

**Session IV: "Moving Forward"**

Participants will focus their discussion on a set of questions intended to illuminate how stakeholders in the region could take a more integrated approach to sustainable development

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|---|---|
| 1:00 PM | Breakout groups<br>Closing the "Knowing-Doing" Gap<br>*Kevin Moody, Ecologist, Federal Highway Administration Resource Center, U.S. Department of Transportation*<br>Incentives to Change Practice<br>*Vicki Coleman, Business Relations Manager, Fulton County Government* |
| 3:30 PM | Report back in plenary |
| 4:00 PM | Adjourn |

# B

# REGISTERED PARTICIPANTS LIST

**Pathways to Urban Sustainability: Lessons from the Atlanta Metropolitan Region**
**A National Academies Workshop**

**Georgia Tech Global Learning Center**
**Room 222**
**Atlanta, Georgia**
**September 30-October 1, 2010**

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# C

# ROUNDTABLE ON SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

Established in 2002, the National Academies' Roundtable on Science and Technology for Sustainability provides a forum for sharing views, information, and analyses related to harnessing science and technology for sustainability. Members of the Roundtable include senior decision-makers from government, industry, academia, and non-profit organizations who deal with issues of sustainable development, and who are in a position to mobilize new strategies for sustainability.

The goal of the Roundtable is to mobilize, encourage, and use scientific knowledge and technology to help achieve sustainability goals and to support the implementation of sustainability practices. Three overarching principles guide the Roundtable's work in support of this goal. First, the Roundtable focuses on strategic needs and opportunities for science and technology to contribute to the transition toward sustainability. Second, the Roundtable focuses on issues for which progress requires cooperation among multiple sectors, including academia, government (at all levels), business, nongovernmental organizations, and international institutions. Third, the Roundtable focuses on activities where scientific knowledge and technology can help to advance practices that contribute directly to sustainability goals, in addition to identifying priorities for research and development (R&D) inspired by sustainability challenges.

In September 2009, the Roundtable adopted a two-pronged strategy to address sustainability. The first part of this strategy attempts to define inter-sectoral dynamics essential to long-term science and technology approaches to sustainability. The second builds on that, but goes one step further and looks to apply these approaches and concepts to sustainability challenges.

- *Focus on Long-Term Science and Technology Strategy for Sustainability*
  Acknowledging that sustainability is an interdisciplinary topic that crosses domains, sectors, and institutions, the Roundtable launched a series of discussions to outline the major connections between human and environmental systems. This focus builds on the comparative advantage of the Roundtable versus the field-specific boards around the National Research Council. The September 2009 Roundtable discussions examined linkages in the energy domain between energy and water, energy and food systems, and energy and public health. The May 2010 Roundtable discussed water linkages at the nexus of energy, public health and urban development, food and sustainable livelihood, and biodiversity.

- *Applied Sustainability*
  As a second area of programmatic emphasis, the Roundtable is sharpening its focus on sustainability challenges in applied situations where STS works with specific communities within our RT membership.

The Roundtable is the key component of the Science and Technology for Sustainability (STS) Program in the division of Policy and Global Affairs at the National Research Council. The STS program has become a gateway to the National Academies' rich portfolio of sustainability related programs. The Roundtable is being supported by the National Academies' George and Cynthia Mitchell Endowment for Sustainability. For more information, please visit our website at: www.nas.edu/sustainability or contact Marina Moses, Director of the National Academies' Roundtable on Science and Technology for Sustainability (mmoses@nas.edu; 202-334-2143).

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