

# **Three Keys to Sustainable Urban Communities: Water, Power and Transportation**

The Second Climate Change Forum sponsored by Hitachi  
and featuring panels organized by  
the American Association for the Advancement of Science and  
The Brookings Institution

## **Forum Summary Report**

Thursday, May 27, 2010

The American Association for the Advancement of Science  
Washington, D.C.

## **AAAS**

The American Association for the Advancement of Science (AAAS) is the world's largest general scientific society and publisher of the journal, *Science* ([www.sciencemag.org](http://www.sciencemag.org)). AAAS was founded in 1848, and serves 262 affiliated societies and academies of science, reaching 10 million individuals.

*Science* has the largest paid circulation of any peer-reviewed general science journal in the world, with an estimated total readership of 1 million. The non-profit AAAS ([www.aaas.org](http://www.aaas.org)) is open to all and fulfills its mission to "advance science and serve society" through initiatives in science policy; international programs; science education; and more. For the latest research news, log onto EurekaAlert!, [www.eurekaalert.org](http://www.eurekaalert.org), the premier science-news Web site, a service of AAAS.

## **The Brookings Institution**

The Brookings Institution is a nonprofit public policy organization based in Washington, DC. Our

mission is to conduct high-quality, independent research and, based on that research, to provide

innovative, practical recommendations that advance three broad goals:

- Strengthen American democracy;
- Foster the economic and social welfare, security and opportunity of all Americans and
- Secure a more open, safe, prosperous and cooperative international system.

Brookings is proud to be consistently ranked as the most influential, most quoted and most trusted think tank.

## **Hitachi, Ltd.**

Hitachi, Ltd., (NYSE: HIT/TSE: 6501) headquartered in Tokyo, Japan, is a leading global electronics company with approximately 390,000 employees worldwide. Fiscal 2007 (ended March 31, 2008) consolidated revenues totaled 11,226 billion yen (\$112.2 billion). The company offers a wide range of systems, products and services in market sectors including information systems, electronic devices, power and industrial systems, consumer products, materials and financial services. For more information on Hitachi, please visit the company's website at [hitachi.com](http://hitachi.com).

## INTRODUCTION

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On May 27, 2010 the Hitachi Corporation, Ltd., together with the Brookings Institution and the American Association for the Advancement of Science (AAAS), convened their second annual climate change forum, *Sustainable Urban Communities: Water, Power and Transportation*. The forum was held at the offices of the American Association for the Advancement of Science in Washington, DC and sought to address three issues critical to the sustainable development of our cities and ultimately to a successful response to climate change – responsible water management; efficient use of electricity; and innovation in the transportation sector.

For the first time in history, a majority of the world's population resides in urban rather than rural areas and this trend towards urbanization is expected to continue. By 2030, it is predicted that 60% of the global population or a total of 5 billion people will be urban dwellers. Cities and metropolitan regions are both drivers of economic development and large consumers of resources. Cities worldwide account for approximately 75% of total energy demand and CO<sub>2</sub> emissions. In addition, they require great infrastructure investments: roads, bridges, rail lines and parking facilities to accommodate transportation and the movement of goods and people; sewage systems, run-off technology, and water treatment plants to safely and effectively manage the water supply; and power plants, electricity lines, and metering to bring energy to homes and businesses.

How we structure and develop our cities to accommodate the anticipated urban population growth will have a major impact on our ability to continue to provide water, power and transportation services while at the same time combating climate change. The forum *"Three Keys to Sustainable Urban Communities: Water, Power and Transportation"* addressed these challenges.

## OPENING REMARKS

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**Dr. Alan Leshner**, CEO of the American Association for the Advancement of Science, provided welcoming remarks. Dr. Leshner noted that the majority of the world's population living in cities and towns for the first time in history represents a great shift in our societies and puts great pressure on infrastructure like roads and sanitation systems, as well as on the climate and quality of our air. The consortia of organizations – AAAS representing the scientific community, Brookings representing the policy research community, and Hitachi as a visionary company representing science and industry – presenting this forum reflects a necessity for bringing these diverse communities together to address the transportation, power, and water challenges our metropolitan regions face.

**Mr. Bruce Katz**, Vice President and Director of the Metropolitan Policy Program at Brookings, remarked that the intersection of urbanization and climate change is critical. The Metro program at Brookings examines the 100 largest U.S. metropolitan regions within a global context. These regions are home to two thirds of the U.S. population and generate three quarters of GDP. They are the places where the assets that drive prosperity – innovation, infrastructure, human capital, quality of place – will be found. The United States is unique from its partners – Europe and Japan – in that we are experiencing population growth fueled primarily by our minority populations. Our metros experience our national trends at an accelerated pace – they are the first to see population increases or to become majority minority, for example. A discussion about the effect of this rapid change and the impact on the environment is a positive step, but even while our cities grow, sprawl is alive and well in the United States. Low-density suburbs grew at 3 times the rate of our cities. We will have a very difficult time reconciling the sustainability goals in this country if we continue on this trajectory. The issues to be raised during the forum – from the smart grid to bringing innovation to the transportation sector – are the right ones, particularly the important potential for bringing technological solutions, such as Hitachi can provide, to accommodate this growth in urban areas.

**Mr. Takahiko Ishigaki**, CEO for the Americas of Hitachi, Ltd., expressed his appreciation for the collaboration among Hitachi, AAAS and Brookings in creating a platform for sharing essential knowledge and expertise in industry, policy and science. This type of cooperation will allow us to work towards pragmatic solutions for fighting global climate change. Last year's forum was a great success in bringing this combination of expertise together to focus on energy and the environment. Many factors are necessary for sustainable urban communities, but some of the most important are access to potable water, reliable power supplies and efficient transportation systems. Hitachi is a corporate leader in many areas producing technology for all forms of power delivery – transmission and distribution – and for transportation systems. In this way, the company hopes to be able to contribute holistic solutions for the sustainable development of urban areas through Hitachi's Smart City concept.

## **PANEL ONE – POWER**

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Moderator: Dr. Charles Ebinger, Senior Fellow and Director of the Energy Security Initiative, Brookings

Panelists: Michael Miller, Director, Environment and Renewables, EPRI  
William Parks, Senior Technical advisor, US Department of Energy  
Naofumi Sakamoto, Chief Researcher, Hitachi research Institute

This panel examined the policies, regulations, and other actions that will be necessary to reduce energy demand and encourage low-carbon fuel sources in our metropolitan regions. Metro areas across the US and the world have taken the lead in piloting smart grid projects; rolling out electric car fleets and installing the accompanying battery charging infrastructure; and implementing green building code standards that seek to make our built infrastructure more energy efficient.

Within this framework, the panel explored several key issues, including how to align federal, state, and local policies to achieve sustainability goals; the interconnections between water and electricity; examples of leading metros on sustainable electricity; and the linkages between electrifying our transportation sector and energy demand in our urban areas.

The panelists felt that the most important priority is to integrate our policies and align efforts at all levels of government – federal, state and local – to reach shared goals. Not only do we want an energy system that is integrated, but we want that system to be connected with our water system and other areas of infrastructure. To do this we need state, federal, and local policies to complement one another, such as by aligning local and city building code standards with federal government appliance standards. Efficiency should be the priority for policies across all levels of government as the most cost effective means for achieving sustainability goals. Efficiency can then be integrated with renewable energy, smart building practices, and other green efforts to build into neighborhood networks that ultimately tie in electric vehicles. In some instances existing laws and codes that hinder this progress will need to be changed. Initially, volunteer action will most likely be necessary as states and the federal government tend to act territorially and have specific jurisdictions constitutionally.

The “smart grid” was a topic of much discussion for the panel – including the general benefits and a few problems encountered by some smart metering projects. The benefits of the smart grid to consumers are difficult to estimate, but the main benefits associated with smart metering are lower costs and less CO<sub>2</sub> emissions, energy security (national security) and safety. Smart meters will allow us to monitor real time energy use in our homes and are estimated to help reduce energy usage by 5-15%. We should capitalize on best available technology as well as best practices. The smart grid could help us achieve sustainability by allowing the greater use of locally produced power such as pv and solar thermal. As we increase efforts to reduce our use of fossil fuels, such as oil, we must be aware that many industries will shift to electricity because it will be cheaper. We must therefore also ensure that our electricity sources are low carbon.

The panel stressed the importance of public education and consumer outreach in the success of the smart grid. An example of where a project went wrong was given – a smart meter project in northern California rolled out by PG&E. The company received a backlash from the communities who thought that the new meters were causing an increase to their electric bills, were not functioning properly, and were potential health hazards for their children. Policymakers and the private sector need to communicate better to the users what the smart meters are for and what they can do.

Elsewhere, progress is being made in making these shifts. Austin, TX has been tracking demand response. Project Better Place has been working in Tel Aviv with an installation for tracking electric vehicle deployment.

The smart grid will also be necessary to enable electric vehicles to reach their potential. With 246 million cars on the road today in the United States, even with fairly fast adoption of electric vehicles, it will be many years before they become a real force on the road. Panelists saw this as a major challenge for policymakers trying to, for example, avoid the costs of building redundant infrastructure. We will most likely see slow steps towards adoption of electric vehicles, such as by families that have two cars designating one car for “local” destinations or shorter trips and places being designed to accommodate small electric cars.

It was noted that some of our competitors are also pursuing smart grid technology. China, for example, is interested in it because they are creating wind and solar farms in western China and they need to transmit that power thousands of miles to their cities in the eastern part of the country. They have been building high-voltage transmission lines to connect the regions at a large scale.

And lastly, the panel stressed the importance of the inextricable link between electricity production and water. Nearly 40% of the fresh water that is drawn from rivers and lakes in the United States is used for electricity production, mostly for cooling. This makes the electricity sector second only to the agricultural sector for water withdrawal. Most of the water is returned to the source, but as water resources get stretched the competition gets tighter. Even a shift to renewable energy will, for the most part, not sever the energy and water connection. The only power-generating sources that do not use a lot of water are wind and solar pv; concentrated solar power is also a large consumer of water.

Power plants are attempting to reduce the amount of fresh water that they need in several ways. One is to use lower quality water – water from waste water treatment plants for cooling. Another is to utilize dry cooling methods that are based on fans and large towers, but those systems are less reliable in hot weather days when energy demand is at its highest. Additionally, power plants are simply implementing water conservation strategies and trying to become more energy efficient, which also reduces water usage.

## **PANEL TWO – TRANSPORTATION**

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Moderator: The Honorable Dave McCurdy, President and CEO, Alliance of Automobile Manufacturers

Panelists: Matthew Klein, President, Akridge

Dr. Michael Meyer, Director, Georgia Transportation Institute, Georgia Institute of Technology

Robert Puentes, Senior Fellow, Metropolitan Policy Program, Brookings

This panel explored how metro regions can develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce the nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.

Within this framework, the panel explored several key issues, including components of sustainable mobility; the linkages with other policy areas such as energy and water; the importance of transportation options to the real estate market; and the HUD-DOT-EPA Interagency Partnership for Sustainable Communities (coordination between land and transportation planning).

The transportation panel brought together not only policymakers, but also practitioners, the people who are going to make the shift in transportation happen by, for example, providing the electric vehicle charging stations. The audience was informed that the auto industry is currently the only industry in the United States that is regulated for CO<sub>2</sub>. Anticipating the coming shift in the automobile sector, the Alliance of Automobile Manufacturers has developed an Electric Vision – a vision for being electric-ready that includes the following recommendations: 1. Incentives for vehicles – new technology will be costly, so government incentives will likely be needed to encourage first movers. This does not necessarily mean monetary incentives – allowing hybrid vehicles to drive in HOV lanes was a major incentive in Northern Virginia, for example. 2. Infrastructure – encourage investment in charging infrastructure in the home, workplace and publicly accessible locations 3. Align regulatory efforts and permitting requirements; 4. Have a good public education and outreach strategy; 5. Train first responders and service technicians on this new technology.

Sustainable mobility, however, includes many aspects of transportation beyond simply the electrification of automobiles. Alternative fuels, modal split and mode choice must also play a role. The questions of how we get people out of single occupancy vehicles, freight out of trucks and onto rail, and generally influence travel behavior were raised. In the United States and the rest of the world, many solutions have focused on toll-roads and congestion pricing as well as urban form/urban design and transportation and the relationship between the two.

Transportation policy has been highly influenced over the last years by environmental policy. Many energy and water planning concerns influence transportation policy. We need to have a systems perspective of how all these things relate to one another instead of our

current siloed approach. Climate change and financing are the other two major forces influencing transportation policy. Identifying revenue sources in this current economic climate presents enormous challenges, while efforts we could undertake – investing in rail, transit, smart growth – are fairly easily identified.

Transportation clearly has linkages to energy and the environment, but also to our economic development. Along with infrastructure, transportation is one of the most important factors to the economy. Three reasons were identified as to why transportation has become such an important public policy conversation at the moment: 1) A simple result of the transportation challenges with which we are all familiar – daily traffic congestion – which has gone beyond being a mere annoyance to being a drag on economic productivity and a hindrance to achieving environmental sustainability. Safety is an additional issue – when the bridge collapsed in Minneapolis it sparked awareness of infrastructure and how we maintain what is in place today. 2. Legislative piece – the six year reauthorization of the Transportation Bill has been stalled for almost a full year and is now postponed until at least after the new year. Some in Congress are thinking progressively of transformative changes to the way we do transportation policy, but policy is not holding up the Bill – money is. We have no way to pay for even our existing transportation costs, and what is being proposed is a doubling in spending on transportation. 3. American people understand the connections among and between transportation, energy, housing, education, etc. It is only within our government structures and institutions that these issues are stove-piped and addressed individually. Other countries have already recognized this and have government agencies that take a more holistic approach.

Clearly the resident demand for housing with greater transportation options is there, but it is more than the convenience of being located near a transit hub. And yet, community opposition to high-density development remains. It is still easier to build in the outer rural areas than it is to develop in what are considered “smart growth” areas. Office rent is another barrier to smart growth. In tough economic times, businesses face pressure to reduce costs. One way they can do this is by relocating their offices outside of the cities where rent is higher to lower priced space in the suburbs.

## **KEYNOTE – WATER**

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Peter Silva, Assistant Administrator for Water, U.S. Environmental Protection Agency

**Mr Peter Silva** filled in as keynote speaker for EPA Administrator Lisa Jackson, who was called away to testify on the Gulf oil spill. Mr. Silva opened his remarks by commenting on how the recent Gulf Coast oil spill and the damaging affects on the coastal region of Louisiana bring into perspective how fragile our water resources are. People are starting to make the connection between how they live and the way they consume and the impact on the world at large. We can see that the growth patterns of the past – epitomized by auto-dependent development that is far away from the center of cities, large parking lots and sprawling shopping centers – do not make much environmental sense nor allow us to protect our natural resources.

In the western region of the US, the mantra has been expansion. But this has created problems in a region that suffers from water scarcity. Roads and buildings prevent water returning to the ground from being naturally filtered. Instead we have run-off that collects pollutants as it rushes into streams and waterways. We are now rethinking how we look at wastewater today.

Climate change presents us with an additional challenge. Again using the West as an example, California has a high reliance on the Colorado River, but due to climate change the amount of rainfall has decreased, the region experiences long periods of drought and less snowfall. There was an urgent need to look at water conservation because of the low levels of the river. We are seeing that we now need more reservoirs to capture rainfall which comes in large quantities more quickly than the traditional melting snow pack.

What we do in the United States could serve as lessons for developing countries. Strategies for green infrastructure could help the world more generally if the United States takes the lead. Some encouraging examples can already be found, such as Chicago's green roofs, which are reducing storm water run-off by 40%. Atlantic Station – a brownfield redevelopment site in Atlanta, Georgia – was designed to keep rainwater on site and reduce run-off.

Mr. Silva concluded by recognizing several ways in which the Environmental Protection Agency has engaged to improve the quality and quantity of US water resources. EPA has formed several partnerships with cities to help them in efforts to make water resources more sustainable. EPA is also working with HUD and the Department of Transportation to work on smart growth issues and includes smart growth for disadvantaged communities. EPA is also using its regulatory rule-making authority and has set a storm water rule that sets numeric standards for construction sites throughout the country. EPA is also making efforts to improve the monitoring and reporting on drinking water and starting to work with the private sector to develop innovative ways to treat contaminates.