

We Have Met the Future, and It's up to Us

Climate change is the ultimate intersectional challenge. It demands the best efforts of everyone — scientists, policymakers, private citizens, and corporations — to work together in building a livable future.

By Meredith Holmes, SWE Contributor

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We used to speak of climate change only in the future tense: “Northern states like Minnesota will have much longer, hotter summers”; “Storms in the Midwest will be more intense”; “If the Greenland Ice Sheet melts, it will cause sea levels to rise 20 feet.”

Lately, however, we’re using the present tense. The 2005 hurricane season had more storms than any in U.S. history. There were 27 named storms, including Irene, Katrina, and Rita, which wreaked havoc on the densely populated

and industrialized East and Gulf coasts. The extent of the destruction caused by these storms, and in the case of Katrina, the inadequate response, got the nation’s full attention.

When Hurricane Sandy, which affected states from Florida to Maine, hit the East Coast in October 2012, it was a turning point in the public debate about climate change. Even though scientists cannot yet attribute this event directly to climate change, images of seawater pouring into subways; cars afloat on city streets; and

roads, bridges, and homes swept away by the storm surge made a deep impression on everyone who saw them.

What had been a contentious political issue began to be framed as a pressing practical problem. Instead of asking, “Is climate change real?” we began to ask, “How can we protect our coastlines from another super storm?” and “How can we make our cities more resilient?”

These are questions of adaptation, an approach that accepts the reality of climate change and moves to prepare for

it. Leah Cohen, New York City's climate resilience advisor, defines resilience as a kind of risk management, the capacity "to withstand and recover from environmental changes." This includes storms like Sandy and other extreme weather events, such as drought, heat waves, and floods.

It's important to point out that a coherent response to climate change has been difficult to achieve because so many stakeholders are involved, it's a complex issue, and its effects are gradual. One observer has called climate change the "slow-motion catastrophe." The scientific community, however, reached consensus some time ago about the causes and effects of climate change; and ongoing research and better communication have begun to narrow the knowledge gap between scientists and the general public.

Cities take the wheel

Local government — especially cities — will take the brunt of the effects of climate change. When storms and floods hit, cities, counties, and states are responsible for safe drinking water, road repair, emergency housing, rescue services, and police protection. Climate change adaptation is a good investment.

New York City has been working on climate-change-related strategies since 2007, when the mayor's office created the City Panel on Climate Change, a group of climate change experts and social scientists within the Mayor's Office of Long-Term Planning and Sustainability. Several projects initiated by this office — a 16 percent reduction in greenhouse gas emissions between 2007 and 2012, restored wetlands, and elevated buildings — were in place when Sandy struck, blocking some of the storm's punches.

A Stronger, More Resilient New York, the city's roadmap for resiliency, details plans to protect buildings, utilities, transportation systems, parks, hospitals, water, and food supplies. It includes major construction engineering projects, such as floodgates, levees, an armored shoreline, and break walls; green infrastructure, such as dunes, wetlands,

and increased inland green space; and revision of zoning and building codes.

Many U.S. cities are engaged in climate change adaptation, and some have long experience with disaster preparedness — San Francisco with earthquakes and New York with Atlantic storms, for example. But adaptation demands a different kind of preparedness that varies from region to region. It involves gathering and analyzing new sets of data, assessing risks far into an uncertain future, and prioritizing new projects and costs. Seattle has done an exhaustive analysis and determined that it's vulnerable to rising sea levels, increased flooding, impacts to fisheries, decreased water supply due to reduced snowfall and mountain snowpack, more precipitation, more frequent and intense storms, and increased erosion. The city is acting to cut water consumption and refine weather forecasts.

Chicago can expect increased precipitation, flooding, drought, and more frequent, more intense storms, and, ironically, lower water levels in Lake Michigan. Because of higher temperatures and longer, drier summers, lake levels are likely to drop 1.5 to 4.5 feet by the end of the century, impacting shipping, recreation, and wildlife. The city is managing storm-water runoff by increasing pervious surface and green space. Phoenix faces drought, higher temperatures, and growing demands on a water supply that could shrink by 23 percent. The city has cut water consumption, stores excess surface water in underground aquifers, and reuses treated wastewater for irrigation and industrial cooling.

We'll always need mitigation

A push for adaptation does not exclude a commitment to mitigation. Since 2005, when Seattle Mayor Greg Nickels launched the U.S. Conference of Mayors Climate Protection Agreement to advance the goals of the Kyoto Protocol, 1,060 U.S. cities have signed on. Signatories agree to meet or beat Kyoto Protocol targets for reducing greenhouse gas emissions and to lobby for cutting

the nation's carbon footprint.

Patricia Gómez, P.E., is sustainability/energy program manager at the Miami-Dade County Office of Sustainability, Department of Regulatory and Economic Resources. She has worked on climate change and sustainability-related issues since she joined the county in 2000. Her responsibilities center on mitigation. One of her first assignments was to work on the Long-Term Urban CO₂ Reduction Plan that Miami-Dade County established in 1992.

Gómez has a master's in environmental engineering and a bachelor's in chemical engineering. She is a LEED AP BD+C accredited professional, a certified energy manager, certified green building engineer, and a professional engineer in Florida. "My engineering background helps me understand the complexity of climate change and its possible impacts on our daily lives," she said. "Also, my education and experience are helpful when it comes to doing calculations for energy and water savings, and greenhouse gas emissions reductions."

Currently facilitating 30 projects, Gómez works on a daily basis with engineers, electricians, building managers, landscape designers, and consultants, plus finance, IT, budget, and management staff. She was involved with all Miami-Dade County departments engaged in construction to implement the Sustainable Buildings Program of 2007. She also heads up the Miami-Dade County's Electricity Master Plan to reduce county operations' electricity consumption by 20 percent (234,000 megawatt hours), which would save about \$23 million annually. "As a change agent, one of my primary roles is to break down government silos and to connect the cross-cutting goals of sustainability initiatives across various departments and programs," she said.

Wetlands, shorelines, and coastal development

Stephanie Krueel is executive secretary of the Boston Conservation Commission, which implements the Massachusetts Wetlands Protection Act.

She reviews development projects that impact wetlands, making sure they are protected during and after construction, and that construction complies with storm-water standards. Krueel is also the point person for rising sea level issues in the city of Boston.

She is currently working on a local wetlands ordinance that addresses the impact of sea level rise on wetlands. Passage of the ordinance will mean that projects within current and future floodplains must ensure that inundation will not pollute or damage wetlands. Krueel noted, "This is a huge issue for Boston, where retreat from the shoreline

isn't feasible."

Krueel has a master's in city planning from Georgia Tech, and nine years of experience with community planning and regulatory boards. "My work is extremely multidisciplinary," she said, "and requires a broad knowledge base, including soil characteristics, construction methods, real estate law, and public participation methods." She works with people from many different professional backgrounds — engineers, architects, landscape architects, marine scientists, environmental scientists, attorneys, real estate developers, business interest groups, public interest groups, and

individual property owners. She also collaborates with state agencies, such as the EPA, Coastal Zone Management, Conservation and Recreation, and Marine Fisheries.

"It is important to have the ability to work with and understand people in different professions when dealing with climate change because it impacts nearly every aspect of life," said Krueel. Sea level rise, for example, will affect homeowners who need to waterproof their basements; engineers with the Army Corps as they design or retrofit dams; lobstermen whose catch will be affected as ocean bathymetry changes;

Climate Change Officer: An Emerging Profession

In June, President Obama announced that the executive branch would be prioritizing reducing greenhouse gas emissions and enhancing resilience and preparedness to climate change. This initiative builds on climate change mitigation and adaptation work already underway by federal agencies under Obama's 2009 executive order, as well as the work conducted at the municipal, state, and regional levels, and by individual businesses and universities. The new profession of climate change officer has emerged to fill the need for action on climate-change-related impacts. The Association of Climate Change Officers (ACCO) was founded in 2008 to support and advance this profession.

Headquartered in Washington, D.C., ACCO's mission is to provide support and education to climate change professionals and empower them to respond effectively and authentically to the challenges of climate change. The young organization has more than 150 members

lessons learned from the U.K., the Netherlands, and local government professionals in South Florida, New York, Boston, and Seattle. ACCO produced the 2011 and 2012 GreenGov Symposium events in partnership with the White House Council on Environmental Quality, and co-produced the EPA's Climate Leadership Awards.

Executive Director and co-founder Daniel Kreeger said, "Women engineers have been highly involved in ACCO since our inception, and there is strong participation from women at our events, as well as similar programs produced by our peers."

ACCO's board chair, Valerie Patrick, has a Ph.D. in chemical engineering from the California Institute of Technology, and is the senior sustainability coordinator at Bayer Corp. TJ DiCaprio, another ACCO board member, is senior director of environmental sustainability at Microsoft. She recently persuaded the CFO to have Microsoft commit to achieve

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— Daniel Kreeger, executive director and co-founder, Association of Climate Change Officers

from industry, government, academia, and the nonprofit sector. ACCO publishes reports, produces education and training events, and plans to launch a credentialing program in 2014.

ACCO's programs focus upon any area of business or operations impacted by climate change. Its June 2013 Rising Seas Summit included sessions about sea-rise vulnerability in coastal communities and featured

carbon neutrality and was recognized for this effort with the U.S. EPA's Climate Leadership Award.

Dr. Patrick and DiCaprio, along with Nancy Gillis, Ernst & Young, and Leanne Nurse, EPA, are co-leading the launch of a women's network in fall 2013 for climate and sustainability professionals. "Some of the best climate adaptation and resilience programs in the country, such as the Southeast

and emergency workers who need to plan alternate routes through low-lying areas during coastal storms.

Water, water, everywhere

“As a water agency, virtually everything we do is impacted by climate change,” said Kate White, Ph.D., P.E., a civil engineer who has worked for the U.S. Army Corps of Engineers (USACE) for 25 years. The USACE protects and manages the nation’s water resources — coastlines, navigation channels, wetlands, harbors, and lakes — and civil and military infrastructure. Dr. White is senior lead for global and climate

change, USACE Institute for Water Resources, where she develops policy and guidance for climate change adaptation. She describes her responsibilities, which are nationwide, as “translating science into practice for engineers.”

Dr. White has bachelor’s and master’s degrees in civil engineering and a Ph.D. in civil and environmental engineering. “The courses I took in hydrology, hydraulics, physics, and chemistry all come into play in the work I do now,” she said. “These and other science and engineering courses help me understand some of the processes in the atmosphere and in biosequestration, the water quality

implications of changing temperatures, and how land cover and land use interact with climate change to increase or decrease the risk of flooding.” Because civil engineers are involved with infrastructure projects — big investments with a long service life — they must understand how to plan for an uncertain future, an important skill for dealing with the likely effects of climate change. “That background is directly applicable to what I do now,” she said.

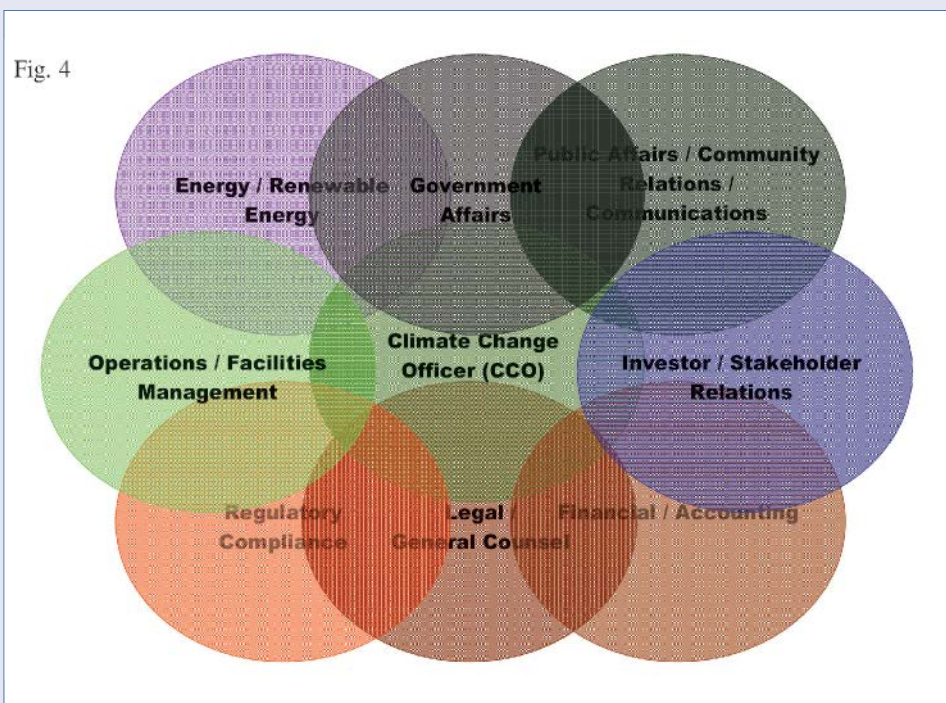
The USACE has been focused on adaptation since about 2005. “We recognized changes were occurring, especially in snow-dominated watersheds in the

Florida Regional Climate Change Compact, are being led by women with STEM backgrounds or roles that require that expertise,” said Kreeger.

Kreeger sees change management education as an important part of his ACCO leadership. The responsibilities of a climate change officer are not likely to fit most current job descriptions, organizational structures, or cultures. Climate change requires highly skilled generalists, savvy in business, politics, and science. Environmental and economic literacy as well as strategic execution and public engagement skills are also important skills for climate change officers.

The position is highly intersectional, cutting across professional, political, and even ideological boundaries. Kreeger observed, “Climate change presents diverse and complicated challenges and opportunities for larger organizations. Our members are tackling supply chain risks, investor relations, greenhouse gas management strategies, energy management, environmental commodities (e.g., carbon offsets and renewable energy credits), and green building/facilities. Given the broad range of issues involved in addressing climate change at an enterprise level, the function is incredibly multidisciplinary.”

For more information, please see <http://www.accoonline.org/>



The responsibilities of climate change officers position them at the intersection of all major functions of an organization. Diagram courtesy of the Bureau of National Affairs, Oct. 22, 2009, *World Climate Change Report*.