READY OR NOT?

PREPARING FOR OUR CLIMATE FUTURE

by Brian R. Swett

Boston faces a rapidly changing environment unlike anything it has seen in its past four centuries. Fortunately, the city has been an early national leader in weaving climate preparedness into its policies and programs, beginning with its first executive order on climate change in 2007. Building on this foundation, Imagine Boston 2030 can set the city on a course to be effectively carbon neutral by midcentury, while also prepared to survive and thrive in a rapidly changing climate.

Although the Paris climate talks at 2015's end achieved meaningful commitments to greenhouse-gas reductions, the planet is still on a path toward dangerous changes to the natural environment. Boston is at particular risk. The city is expected to experience significant increases in extreme heat waves and intense rain storms. Days over 90 degrees are projected to increase from a current average of 10 per year to 30–60 days by the end of the century.

Since many of its neighborhoods and buildings are built on filled tidelands, Boston is especially vulnerable to sea-level rise. Boston Harbor has risen roughly 10 inches since 1920; current projections indicate an additional sea-level rise of between 2 and 6 feet by the end of century. The costs could be devastating: A 2013 report from the Organization for Economic Co-operation and Development says Boston can expect losses of more than $230 million a year due to coastal flooding, making it the eighth most vulnerable city on the planet.

This threat is especially poignant in East Boston. Home to more than 40,000 residents encompassing the full swath of economic, ethnic, and demographic diversity, this shoreline community has large tracts of land that are vulnerable to flooding. Between Logan Airport and critical highway and MBTA tunnels, more than 250,000 people come through East Boston every day; the airport alone generates $20 million in daily economic activity.

For several years, the community organization Neighborhood of Affordable Housing (NOAH) has been engaging East Boston's residents in understanding how they can reduce carbon emissions while getting better prepared for climate change. In early 2015, with the financial support of the Kresge Foundation and in partnership with the Urban Land Institute and others, NOAH led a climate resiliency planning process that included community members, business owners, and major institutions such as the Massachusetts Port Authority (Massport) and the state Department of Transportation. Residents learned about simple, low-cost ways to reduce flooding risks in their homes and strategized longer-term ideas for coastal parks and green infrastructure to protect their community. NOAH recently secured a follow-up grant from Kresge to further develop this approach.

The kind of climate change planning under way in East Boston could be replicated in all neighborhoods and across all sectors of the economy. Rather than envisioning incremental change based only on what is viewed as economically, politically, and technologically possible, the city can set ambitious goals that will achieve environmental sustainability as well as economic and social resilience.

BUILDINGS

Following in the paths of New York, London, and Copenhagen, Boston should aim for buildings that are both *net-zero energy* and *carbon neutral*—that means buildings that produce or purchase enough renewable energy to meet their own energy needs and that remove or offset as much carbon from the atmosphere as they put into it.

Ambitious to be sure, but the city already has precedent-setting sustainability initiatives on which to build, including requirements that all major new buildings be LEED certifiable by the US Green Building Council. It will be important to establish clear expectations about preparedness for new residential, commercial, and industrial buildings, taking into account the ever-evolving nature of expected climate change impacts.

The city's full range of incentives should be deployed. These could include revising zoning to allow for additional height in areas where ground floors could experience flooding, incorporating "living with water" design strategies into zoning, steering project mitigation fees into neighborhood-scale resiliency efforts, and requiring buildings in projected flood zones to locate critical infrastructure out of harm's way. Strategies and incentive programs for adapting existing buildings will be more challenging but equally critical.

Given Boston's many innovative design and engineering firms, the building sector is ripe for creative solutions. A building should be as safe and useful at the end of its life as it is at the beginning; the challenge of climate change is also an opportunity for great design.

TRANSPORTATION

Boston's increasing population needs ways to get around that are affordable, safe, and ever-more carbon efficient. Mayor Martin Walsh's Complete Streets executive order encourages a mix of transportation options, from bikes to bus rapid transit.

But because our current network of roadways and mass transit is so vulnerable to sea-level rise, this is also a critical opportunity to think about how to prepare our transportation infrastructure for the coming storms. There is little point in creating climate-prepared buildings if people can't get to them after a flood or major storm. Such efforts will require close cooperation across jurisdictions, including Massport, the MBTA, and the state Department of Transportation. Boston can plan to be a city less dependent on traditional cars (and parking!) and more supportive of healthy, enjoyable, carbon-efficient, and climate-prepared mobility options that focus on people.

ENERGY

Boston's energy infrastructure has largely been built for the approach of the last century. To decarbonize our energy infrastructure and prepare it for a changing climate requires a wholesale rethinking of our supply, distribution, and end-use efficiency. By midcentury, the city will need to envision solar power covering Boston's rooftops managed by smart microgrids, a conversion from fuel oil and natural gas to super-efficient electric heat pumps or cogeneration steam for heating, the use of cold ocean water to cool our buildings through district-chilled water systems, and the large-scale procurement of wind power and hydropower. The city and its built environment are among the largest users of power in New England. To realize this energy vision, Boston will need to use that consumer power. The decisions made and investments approved by these authorities over the next 15 years will likely define Boston's energy infrastructure and supply options for much of the rest of the century.

WATER AND WASTEWATER

The Boston Water and Sewer Commission and the Massachusetts Water Resources Authority have been leaders at analyzing and planning for climate change vulnerabilities. Imagine Boston 2030 can expand on this work through embracing widespread adoption of green infrastructure solutions, such as the design of small parks and natural areas (sometimes referred to as storm swales) to better absorb rainwater. New York City and Philadelphia have made major commitments to implementing green infrastructure, and Boston should head down the same path. The ongoing restoration of the Muddy River in the Fenway—while falling short of being prepared for major storms—does demonstrate the aesthetic, recreational, and ecosystem value of such approaches; there are many more such opportunities in Boston.

OPEN SPACE

Boston is blessed with one of the nation's greatest networks of urban parks and open spaces. Beyond their beauty and tranquility, parks can help protect against storm surge, absorb precipitation, and reduce the urban heat island effect. Street trees and the urban canopy are critical resources in reducing the effects of heat waves. Planting thousands of trees to reach Boston's goal of a 35 percent tree canopy is not just about the beauty of our streets; the air quality and cooling benefits will be critical for Bostonians' health and well-being as we encounter our hot new climate in the decades to come.

NEIGHBORHOODS

Neighborhood-scale solutions undoubtedly will be a necessary element of preparing Boston for climate change as well as getting to carbon neutrality. In the Talbot-Norfolk Triangle section of Dorchester, residents have been working to develop the city's first eco-district, looking to create a new model of green and equitable redevelopment. Efforts include retrofitting an older housing stock to save energy costs and transforming vacant lots into community green spaces. The city's Climate Ready Boston program is currently working to identify resiliency districts and critical areas for preparedness planning at a local scale.

THE PATH FORWARD

Given what we know now, it is clear that climate change cannot be a separate planning consideration or a secondary principle. Boston has significant support from the private sector, civic society, and the citizenry in embracing the importance of climate change, and the city is actively participating in global groups on this topic, including the C40 Cities Climate Leadership Group. Imagine Boston 2030 is a profound opportunity to bring all these efforts together into a truly comprehensive strategy for the city's future in a changing climate. Nothing less than Boston's 500th birthday is at stake. ■

BELOW
"House," from *Natural Act*, a series of collages by Merve Özaslan that questions the relationship between nature and humanity. Image: Courtesy of the artist