



Climate Change

Climate change is an existential threat facing our region and our world. The planet is warming significantly as a result of human-generated greenhouse gas (GHG) emissions. This is changing our weather system, bringing more frequent and intense storms, extreme temperatures, sea-level rise, and flooding. It's affecting human health and disrupting animal and plant life. It is making the oceans not only warmer, but also more acidic.

These changes are already altering our built and natural environments – food production, land use, transportation, the economy, and health, to name just a few – and the effects will only continue to worsen and grow over time. The more we do now to mitigate climate change and adapt to its effects, the better off we will all be in 2050.

While we are likely unable to reverse these climate-change effects completely, we can reduce their severity and we must prepare and adapt. Climate-change mitigation through energy efficiency, renewable energy, smart growth, clean mobility, natural assets for carbon storage, electrification, and many other measures can reduce current – and avoid future – GHG emissions. These emissions are the direct drivers of climate change, and we know that the best and most up-to-date science, as memorialized by the Intergovernmental Panel on Climate Change, asserts that we must substantially reduce GHG emissions to restrict the increase in global temperature to less than 1.5 degrees Celsius and avoid the most catastrophic impacts of climate change.¹

Clean energy and other climate-smart technologies, systems, and policies – many of which can be deployed or incentivized by cities and towns – are a tremendous opportunity to decrease carbon pollution while also supporting innovation, workforce and economic development, and new models that re-envision and rebuild our communities more equitably.

One of the most compelling justifications for climate action locally is the financial case, both in terms of cost savings from more efficient systems and the opportunity to avoid increased costs from inaction and from impending risk. As a coastal region, we are under threat by sea-level rise. Three feet of rise could cost the region \$104 million in property taxes over 89 metropolitan Boston municipalities.²

Communities further inland are already experiencing increased flooding and extreme heat impacts. And the current and future impacts of climate change will continue to burden some populations and locations more than others. Low-income and BIPOC communities, while contributing the least to the causes of climate change, stand to bear the worst impacts due to systemic inequities that contribute to heightened sensitivity to climate-change impacts, and constrained capacity to adapt.

¹ <https://www.ipcc.ch/sr15>

² Shi and Varuzzo. Surging seas, rising fiscal stress: Exploring municipal fiscal vulnerability to climate change. In *Cities*, Volume 100, 2020.

Older adults and those with certain health conditions are particularly vulnerable. Today in Greater Boston, 13% or over 400,000 residents live in census tracts that have the highest vulnerability. Seven cities in our region are especially at risk: Boston, Chelsea, Everett, Framingham, Lynn, Malden, and Revere. Many of these same communities, not coincidentally, have also experienced some of the worst impacts from the COVID-19 pandemic.

There is much that we can do here locally to reduce and prepare for impacts and lessen the burden on low-income and BIPOC communities. In the last ten years, the Commonwealth of Massachusetts and many of its municipalities have made significant strides to reduce GHG emissions and to initiate the actions necessary to build a more resilient region. And with the Biden Administration prioritizing federal climate action, the prospect for federal resources and pro-climate administrative actions is more promising.

One challenge we will continue to face is coordinating across many sectors and levels of government to take the actions that are needed quickly and efficiently. Behavior changes from all of us will play a large role in our success as well – from decisions about where we live and shop to how we travel.

Vision

- ▶ **In 2050**, the Metro Boston region is prepared for the extremes of a changing climate. We are prepared for more high-heat and extreme-cold days, increased rainfall, extended periods of drought, stronger storms, and a rising sea. Homes, schools, workplaces, facilities storing or producing hazardous materials, and infrastructure are located away from serious threats or are designed to withstand them. When major climate events interrupt critical services, the response is managed to minimize disruption and speed recovery. People have the resources, networks, and supports to withstand climate emergencies and to recover when disaster strikes. Older adults, children, residents with lower incomes, Environmental Justice communities and other vulnerable populations can live safely and can fully enjoy outdoor activities. Neighborhoods are designed and improved to protect the health of residents, with ample shade, drainage, and green space. Wetlands, water bodies, forests, and plant and animal communities are restored and protected, and are able to adapt to climate-change impacts.
- ▶ **In 2050**, Metro Boston is deeply energy efficient and climate-smart. We power our communities, buildings, and vehicles with renewable energy. The region benefits from having made deep cuts in GHG before 2030 and reaching net zero emissions by 2050, as part of the state and global effort to avoid the worst impacts of the climate crisis. Making zero-emissions choices for food, clothing, and other goods is easy, affordable, and convenient for everyone. The public health, resiliency, and other benefits of a net-zero carbon future are distributed equitably, lifting up all communities, particularly those who had historically borne greater burdens. The new energy economy is affordable, even for those with limited incomes or other economic burdens.

- ▶ **In 2050**, our air is pure, indoors and out. Our cities and towns are healthy, with beautiful parks and natural areas accessible to all. And our cities are quieter, with less polluting and more efficient transportation technologies. Contaminated sites are cleaned up and have been turned to new uses. There is less waste. Unavoidable waste produces energy, fertilizes soil, or is reprocessed. We have enough fresh water from our wells, streams, and reservoirs to meet the needs of people and wildlife. Our farms and fisheries produce plentiful and healthy yields and are sustainable. Habitats, forests, wetlands, and other natural resources are protected and enhanced.

How we got here

The industrialization and urbanization of the United States since the late 1800's has been powered largely by fossil fuels. These fuels continue to account for most of our energy generation and transportation fuels, generating unsustainable levels of GHGs and other air pollutants. Our entire modern infrastructure is heavily reliant on fossil fuels – from how we heat our millions of homes to how we power most of our cars. Converting infrastructure dating back more than a half century to renewable and non-polluting sources will take massive investments and behavior changes.

The way Greater Boston has grown, urbanized, and suburbanized has also contributed to increased emissions and a reduced capacity to minimize the negative impacts of climate change. Low-density, auto-dependent suburban growth requires more energy per household and is often farther from public or active transportation. Converting undeveloped lands and filling wetlands to accommodate development has increased impervious surfaces and reduced capacity to absorb and infiltrate stormwater, contributing to increased heat and flood vulnerabilities and water pollution.

We have also built a region that is not particularly resilient. Many aspects of our built and social environments lack the ability to adjust under stress. The levees in New Orleans were not designed to handle the floodwaters of Hurricane Katrina in 2005, which led to catastrophic failure. Had the coastal wetland system been left intact, New Orleans would likely have been spared the worst of the hurricane. Closer to home, the New York metropolitan area of 2012 was poorly prepared to absorb and recover from the impacts of Hurricane Sandy.

Here in Greater Boston, we also have lost or damaged our coastal wetland. Nor is resiliency built into our electric grid and delivery system design. If one part of the system is knocked out of commission, downstream customers also lose power.

Social resiliency also varies dramatically by wealth, race, age, and geography. The COVID-19 pandemic bore out the worst of these disparities. During the pandemic, some people with means temporarily relocated out of the city, and others had the option to drive into work or to work from home. But these options were not available to all. Often, lower-income and BIPOC service workers had no choice but to go to work in person and were among those most hard-hit by COVID-19.

Individuals and communities with the highest barriers to bouncing back after a disaster (due to poor infrastructure and maintenance, less access to information because of the digital divide, and poor public disaster response systems) and those most at risk of severe health complications during disasters (due to age, social isolation, pre-existing health risks, crowded housing conditions, or exposed working conditions) bear the most risk to the impacts of climate change.

Challenges

We face many challenges to realizing a net zero, climate resilient region, but these challenges are surmountable. The pace at which we must act, however, is daunting. Current international consensus is that we have until 2030 to reduce global GHG by at least 45% below 2010 levels and achieve net zero by 2050 to mitigate the worst impacts of climate change.

Here in Massachusetts, the new climate law, An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy, signed by Governor Baker in early 2021, commits the Commonwealth to attain 50% reductions below 1990 levels by 2030 and 75% by 2040, on our way to net zero by 2050.

All of these targets require immediate action to undertake the necessary changes to achieve these statutory outcomes fully and on time. Failure is not an option. The decisions made by various levels of government (federal, state, regional, and local); individuals; and private sector organizations must be aligned, regardless of corporate or political cycles. We cannot allow quarterly profit targets and two- to four-year political terms become barriers to making decisions and investments that are needed to protect future generations.

Price signals are another barrier to consumers making choices that could minimize the relentless march of climate change. There are longstanding subsidies supporting fossil fuels, industrial agriculture, and global trade. Because of these subsidies, cheap and more environmentally-damaging clothes, food, cars, heating and cooling systems, and other goods are often the less expensive option for consumers. For households with limited discretionary budgets, the less expensive option is often the only option.

We've recently seen renewable energy generation costs become competitive with fossil fuels, and rebates for electric vehicles are narrowing the price premium over gas-powered cars. But for so many products and goods, the least expensive options are those with the highest environmental impact and the conventional product, even with cost parity, is often the preferred choice. These transitions are slow, unpredictable, and often need support to accelerate or shift more rationally.

Another key challenge is the amount of collaboration and coordination necessary to rise to the challenge. Climate mitigation and adaptation touch many sectors, from emergency management to wetlands restoration and public schools. While the new state climate law is a landmark step towards meeting our net zero goals, now comes the hard work of implementation, while we must also move forward on adaptation planning and investments and system modernization across energy, water and land management, telecommunications, commerce, transportation, and much more.

Recommendations

We'll need to increase renewable energy production and energy efficiency dramatically – and quickly – while ensuring access and affordability for EJ populations. We must implement microgrids, energy storage, and reduce peak demand. Electric and gas utility markets will need to support greater decentralized generation, better and more expanded transmission, and much higher levels of renewable energy. We will need resources for deep energy retrofits and higher performance standards for both new construction and renovation of existing buildings. Furthermore, public and personal transportation will need to turn sharply toward an electric future that does not aggravate congestion or sprawl.³

To move towards a more resilient region, we must focus on the following priority areas:

- ▶ Expanding green infrastructure, microgrids, and energy storage, especially in Environmental Justice locations
- ▶ Preparing our buildings and infrastructure to better withstand the negative impacts of climate change
- ▶ Moving out of harm's way, through a willing seller's program, better regulatory signals on where to build and where not to build, and improving our flood programs and data

Climate change will also significantly threaten and impact our water resources, including drinking water and stormwater. To better manage our finite freshwater resources, we need to move to an integrated water resource management approach, increase local recharge, and ensure affordable access to water through investments and limits on non-essential outdoor water use.

³ <https://www.mapc.org/resource-library/vehicle-miles-traveled-emissions/>