

13

S T R A T E G Y T H I R T E E N

Conserve Natural Resources

Summary

Adopted in 2008, MetroFuture is Greater Boston's long term regional plan. The foundation of the plan is a well-defined vision for the region. Thirteen implementation strategies were included to support progress towards the vision. An extensive community engagement process ensured that MAPC constructed the vision and strategies from the hopes and dreams of the region. In anticipation of an update to the regional plan, MAPC is evaluating the extent to which regional actors implemented these strategies.

MetroFuture's vision for the region in 2030 assumed that we successfully slowed climate change. If we were not able to, the report said, we would be facing much warmer weather, rising sea levels, increasing storm intensity, and more riverine flooding. Strategy #13, [Conserve Natural Resources](#), sought to avoid that future by implementing dramatic reductions in the use of energy and water, through conservation and the use of alternative sources.

Efforts from governors and the legislature targeted natural resource conservation, including greenhouse gas (GHG) reductions, cleaner energy sources, and increased energy efficiency. There were federal and state grants to support these efforts, including subsidies for solar energy and green building technologies. State-level changes to water management processes helped reduce the impact of water withdrawals on local ecosystems. The state's Green Communities designation enjoyed widespread adoption, helping communities plan for and fund projects that reduce municipal energy consumption. These successes were established after dedicated coalitions with many organizations, including MAPC, advocated for statewide action.

Regionally, municipalities banded together to procure renewable energy, electric vehicles (EVs), and energy efficiency services. MAPC coordinated these efforts through purchasing and service agreements, toolkits, and a variety of technical assistance options. MAPC also supported regional stormwater initiatives to reduce water usage and control stormwater runoff. And just recently, the MS4 stormwater permit has introduced new requirements for municipal stormwater management.

Locally, a number of municipalities adopted green municipal aggregation, streamlining the purchase of higher percentages of renewable electricity (up to 100%), at typically lower costs. Municipalities worked to make zoning more friendly towards solar photovoltaic (PV) installations and to help residents install solar panels.

As climate change presents itself as an increasingly critical issue for the region, successful responses to mitigate and adapt to the expected impacts of climate change will be a major challenge for our cities and towns and for our state. Despite the significant progress made over the past decade, the scale and scope of investments that are needed to ensure a resilient region are massive. We have significant work to do in order to make sure our communities, businesses and institutions, infrastructure, and natural systems can thrive in light of the expected impacts from climate change.

Sub-Strategy Review

Sub-Strategy A: Plan for sustainability

EXAMPLES OF PROGRESS:

- Massachusetts passed the [Global Warming Solutions Act](#) in August 2008, which committed the state to reduce greenhouse gas (GHG) emissions by 25% below the 1990 baseline in 2020 and 80% in 2050.
- The Transportation Climate [Initiative](#) is a regional collaboration of 12 Northeast and Mid-Atlantic States and Washington D.C. that seek to develop the clean energy economy and reduce carbon emissions from the transportation sector. So far nine states and Washington D.C. have agreed to cap and reduce emissions from the transportation sector.
- The Department of Energy Resources' (DOER's) [Green Communities Division](#) not only awarded millions in grant funds to hundreds of cities and towns across the Commonwealth since 2010, but it now also funds Regional Planning Agencies (RPAs) directly to provide technical assistance to help municipalities achieve Green Communities status (Municipal Energy Technical Assistance), which renders them eligible for further sustainability funding. 75 communities in the MAPC region have received Green Communities Designation to date.
- Nonprofits such as the [Massachusetts Climate Action Network](#) and [Sierra Club](#) successfully advocated for community clean energy agendas and Green Community designations, increasing the amount of city- and town-level clean energy efforts in the region.
- MAPC demonstrated the importance of energy managers and municipal energy management, which helped lead DOER to offer grants to fund energy managers starting in 2015. MAPC helped several communities hire energy managers, of which the region now has five: in Medway/Millis, Arlington/Bedford, Winthrop/Chelsea, Marshfield, and Winchester/Woburn/Waltham.
- MAPC has undertaken energy planning throughout the region through the [Local Energy Action Planning](#) (LEAP), beginning with a number of communities in 2012. An accompanying [Local Energy Action Dashboard](#) (LEAD) allows municipalities to benchmark energy usage. In 2017, MAPC also launched a number of net zero planning resources and tools and was appointed to the state's [Zero Net Energy Building Advisory Council](#).
- MAPC has engaged in sustainability planning throughout the region. Since 2015, a number of climate and/or sustainability chapters were inserted into master plans, e.g. in Boxborough, Melrose, Hanover, and Swampscott. Additionally, dozens of Climate Vulnerability Assessments and Climate Adaptation Plans were completed, including Newton, Braintree, Brookline, and Scituate/Duxbury recently.
- MassDOT established [GreenDOT](#) to build environmental stewardship and sustainability goals into all Commonwealth transportation activities.

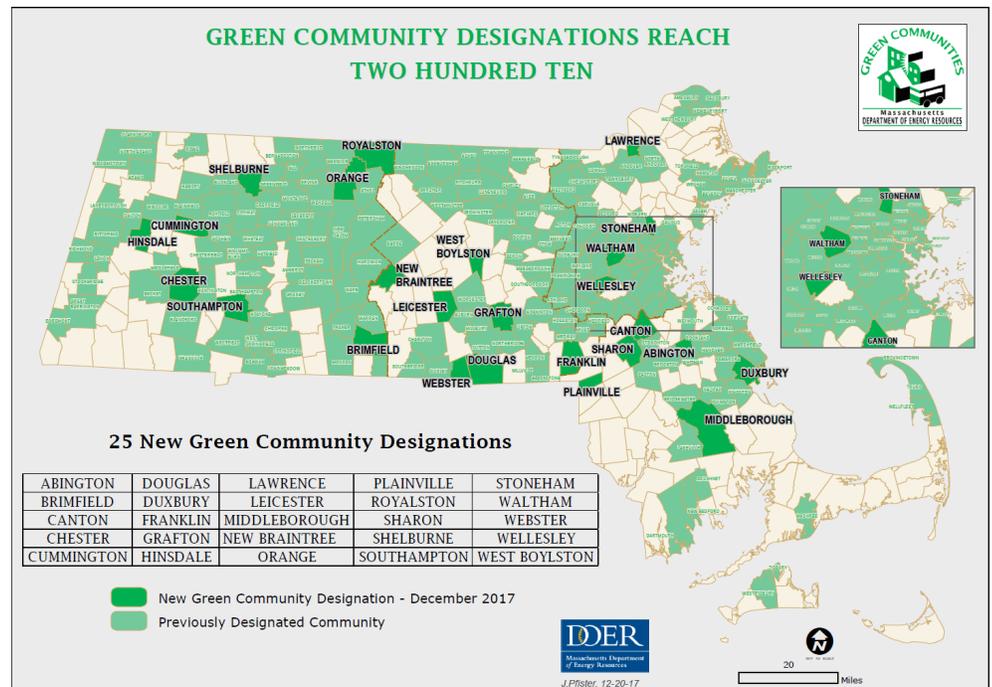
BARRIERS TO PROGRESS:

- There is often a lack of capacity in municipal staff/volunteers to engage in this work. If there is not a local champion to advance sustainability efforts then sustainability does not become a priority.
- Similarly, there is a lack of funding at the municipal level for both sustainability planning and staff.
- Political will is required to achieve sustainability planning and it is not typically a top priority for local governments.

RELEVANT INDICATORS:

- The Green Community Designation and Grant Program provides a strategy as well as financial and technical support to municipalities that 1) pledge to cut municipal energy use by an 20 percent over five years and 2) meet four other criteria listed in the Green Communities Act. Since the first group of 35 municipalities won designation in 2010, the program has grown steadily to include 210 Massachusetts municipalities. The program hopes to inspire cities and towns to engage in additional energy-related initiatives, further coordination between municipal staff and departments, and increase communication with residents about energy-related issues and actions.¹

Figure 1: Massachusetts Municipalities Designated Green Communities
<https://www.mass.gov/files/documents/2018/01/03/map-summary-green-communities-210.pdf>



¹ <https://www.mass.gov/guides/becoming-a-designated-green-community>

Sub-Strategy B: Conserve energy

EXAMPLES OF PROGRESS:

- [LED streetlights](#) have been installed in nearly every municipality across the state.
- DOER and the Clean Energy Center (MassCEC) funded [clean heating and cooling](#) technologies (\$30 million through 2020), which promotes solar hot water and air source heat pumps.
- MAPC, in coordination with municipalities, utilities, and the [Home Energy Efficiency Team](#) (HEET), undertook a program of natural gas leak mapping and surveys of best practices in over 15 communities in order to encourage more efficient and quicker repair and replacement of leak-prone pipe.
- 18 municipalities were part of two MAPC [Energy Services Company](#) (ESCO) collective procurements, which competitively procured an ESCO to perform energy efficiency upgrades of municipal facilities, from more efficient lighting to heating and cooling systems, insulation, and steam traps. Several also installed solar arrays as part of their contracts. Many more throughout the region, including nearly all with Green Communities designations, have performed energy conservation and renewable energy measures. Additionally, 45 communities participated in peak demand notification programs during the summer of 2017, learning how to reduce energy usage and decrease demand for (typically) fossil-fueled energy that is added to the grid at peak times.
- The Baker-Polito administration provided \$15 million for the [Affordable Access to Clean and Efficient Energy](#) (AACEE) Initiative. This initiative provides Affordable Access Regional Coordination (AARC) Grants from DOER that will fund RPAs to expand capacity to provide resources and connect affordable housing developers and Community Development Corporations (CDCs) to clean energy resources.
- MAPC is helping to [green municipal fleets](#) through bulk purchases of electric vehicles (EVs) and anti-idling equipment, particularly for Green Communities. Fleets and individuals in the state have purchased approximately 12,000 EVs to date; however, there remains a long way to go to achieve the state commitment of 300,000 Zero Emissions Vehicles (ZEVs) on the road by 2025.
- Boston and the Commonwealth were deemed the most energy efficient city and state in the country, respectively, several years in a row.
- The [Global Warming Solutions Act](#) (GWSA) and [Green Communities Act](#), passed in 2008, require strong energy efficiency action. The Green Communities Act launched the state's [Energy Efficiency Advisory Council](#) (EEAC) and requires a three-year energy efficiency plan for all state utilities. MAPC sits on the GWSA Implementation Advisory Committee and the EEAC.

BARRIERS TO PROGRESS:

- Green building standards are often under-promoted and underutilized; the current “stretch” energy code is limited in its reach, reducing its ability to help the state meet its energy reduction goals.
- MAPC supports a requirement for home energy audits and building labeling, but that policy proposal has not yet moved in the legislature.
- Utility companies have often declined to provide standardized or regular data on energy usage. This lack of transparency around utility energy data can prevent residents and municipalities from making data-informed decisions about conserving energy.
- Large corporate and industrial buildings are not required in most communities to track or report energy usage.
- The commercial and industrial (C&I) sector has made less progress in energy efficiency than the residential sector has, in part because of a lack or misaligned incentives, other priorities, and an reluctance to introduce potential disruptions to operations.
- Due to the great reductions made in the energy sector since MetroFuture’s publication, transportation has become the state’s largest source of GHG emissions; this sector is more challenging, owing to constraints around infrastructure, vastly distributed point sources (e.g. cars and trucks), and funding prioritization for traditional road and bridge improvements.

Sub-Strategy C: Promote the use of renewable resources

EXAMPLES OF PROGRESS:

- In Boston, the City Council voted in late 2017 to make the city the newest and largest community in Massachusetts to authorize [green municipal aggregation](#), which intentionally incorporates more renewable energy in a community’s electricity supply, generally at levels around 40 percent higher than required by state law. More than 18 cities and towns in the MAPC region have authorized such programs or are actively implementing them, often with help from MAPC clean energy staff.
- [MassCEC](#) offers the [Solarize](#) program to provide municipalities’ residents with a solar vendor and reduced prices on installing solar PV. This includes Mass CEC’s solar thermal challenge. Similarly, MassCEC offers a “Solarize Plus” program, which includes outreach and reduced prices to residents within qualifying municipalities on air source heat pumps and other heat technologies in addition to the rooftop solar offered through traditional Solarize programs (a pilot program with 4 communities including Somerville, Boston, and Lincoln/Sudbury/Wayland in the MAPC region).

- After many turbulent years, wind energy is progressing with Massachusetts adopting a law allowing electric utilities to procure 1600 MW of offshore wind energy and resulting in a request for proposal (RFP) from three respondents to supply this wind energy.
- Some solar energy installations were developed on closed landfills – for example, Saugus installed 1.6 MW of solar energy on their landfill. These types of installations are beneficial co-uses of space, using city- or town-owned land that had few other potential uses, and saving money for the community.
- MAPC served as one of the country’s first – and the first regional agency - designated [SolSmart Advisor](#), a national program funded by the U.S. Department of Energy “Sunshot” program. The intent of the program is to reduce solar “soft” costs and improve solar PV zoning bylaws. MAPC provided technical assistance that allowed 7 communities to achieve SolSmart designation. This technical assistance built on a toolkit created by MAPC on solar permitting and zoning, and continues with the application of the best practices.
- MAPC helped to establish solar Purchase Power Agreements and Energy Management Services Agreements (EMSAs) for communities, which allowed them to purchase solar energy without any upfront costs.

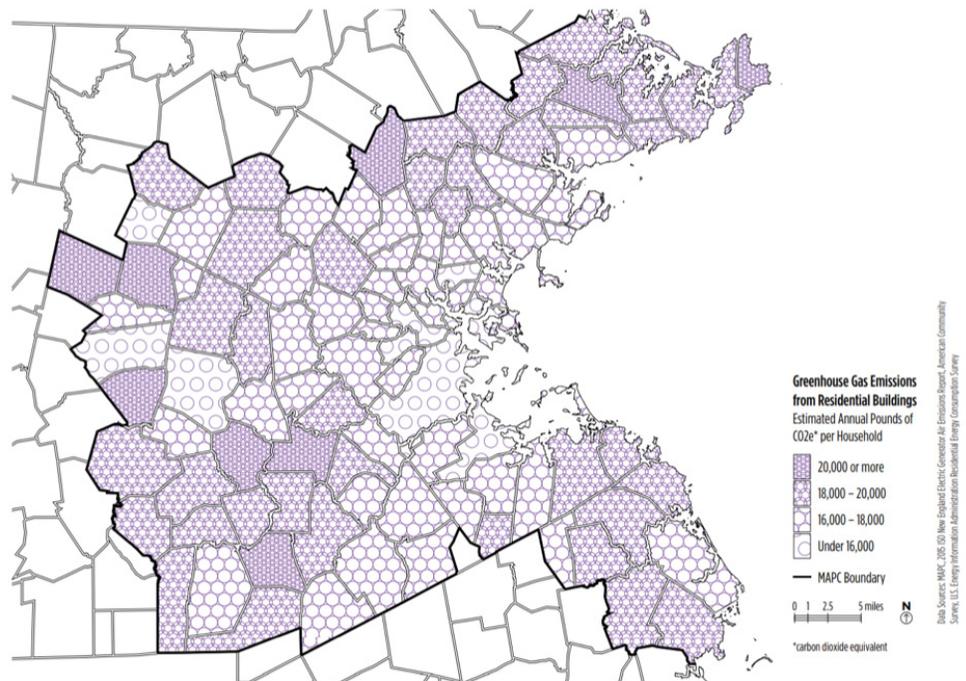
BARRIERS TO PROGRESS:

- While the Regional Greenhouse Gas Initiative (RGGI) established a regional cap and trade carbon agreement between states in the North East to cap carbon dioxide from power plants in 2007, creating a carbon registry has not gained traction at the state level.
- The adoption of zoning and permitting that encourages more renewables have been slow going and communities are at times hesitant to approve these changes. Online permitting has not yet been adopted by every community, making the process time consuming, cumbersome, and often costly.
- Not in my backyard (NIMBY) attitudes can exist toward renewable energy installations, as well as concerns about wildlife, aesthetics, health, and noise.
- Geothermal technology has a high up-front capital cost, making it more of a niche application.
- State-level policy has been particularly challenging for solar installations due to oft-fluctuating state incentives and net metering caps – the solar industry lost 20% of its jobs in Massachusetts in 2016 primarily as a result of reduced incentives, leading to reduced demand for installations.
- Massachusetts is also seeking to import significant amounts of hydro power from Quebec, but permitting and legal challenges in developing the transmission lines between Quebec and Massachusetts are complicating this new source of renewable power.

RELEVANT INDICATORS:

- MAPC's Local Energy Action Dashboard (LEAD) offers communities a snapshot of the carbon footprint of their residential, commercial, and industrial buildings. This enables strategic decision-making about reducing their climate impact. The average single-family detached house consumes more than twice the energy as an average apartment in a large multifamily building. As such, cities with more high-density housing boast a lower per-household carbon footprint. Of the three main fuel sources powering Massachusetts homes—oil, natural gas, and electricity—oil releases the most greenhouse gases (GHGs). Burning natural gas in furnaces and boilers is relatively clean, but the leaky delivery system releases methane gas—a very destructive GHG—directly into the atmosphere. As the mix of fuel sources at power plants supplying electricity to New England shift away from fossil fuels toward renewable sources like solar and wind, electricity will become an even greener option. Efforts to help homeowners and landlords shift away from oil heat, reduce natural gas leaks at the municipal level, and eliminate barriers to residential solar are all ways our region can work to reduce the collective carbon footprint.

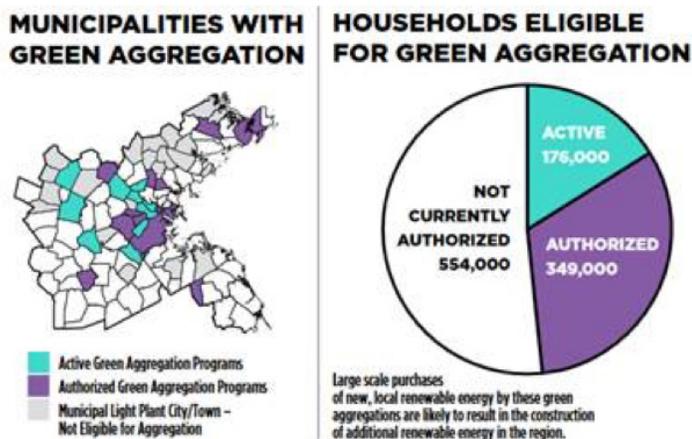
Figure 2: Annual Greenhouse Gas Emissions from Residential Buildings 2015



- Massachusetts residents and businesses have a lot of choice when it comes their energy source. One option is for customers to band together to buy their electricity using “municipal aggregation.” With aggregation, a city or town contracts with an electricity supplier on behalf of all residents and businesses who have not already selected one. By entering into long-term contracts and leveraging significant buying power, aggregations can provide cost savings and more price stability than the utility. While Massachusetts law mandates that all electricity suppliers include a minimum amount of new renewable energy sources from our region, aggregations

may opt to exceed that. MAPC has supported the implementation of “green” municipal aggregation, in which the default electricity supply includes extra New England-sourced renewable energy. A green aggregation is intended to help build new renewable resources within our electric grid, while still delivering savings and stability. MAPC partnered with Melrose to pioneer this approach in 2016. Since then, many municipalities have adopted the idea. Ten municipalities now have active green municipal aggregations, and another 10 have authorized it. Together, the combined impact of these aggregations in the state could add more than 50 new one-megawatt wind turbines to the New England grid.

Figure 3: Municipalities with Green Aggregation Programs and Households that are Eligible



Sub-Strategy D: Manage water demand through education, pricing, technical assistance, and regulation

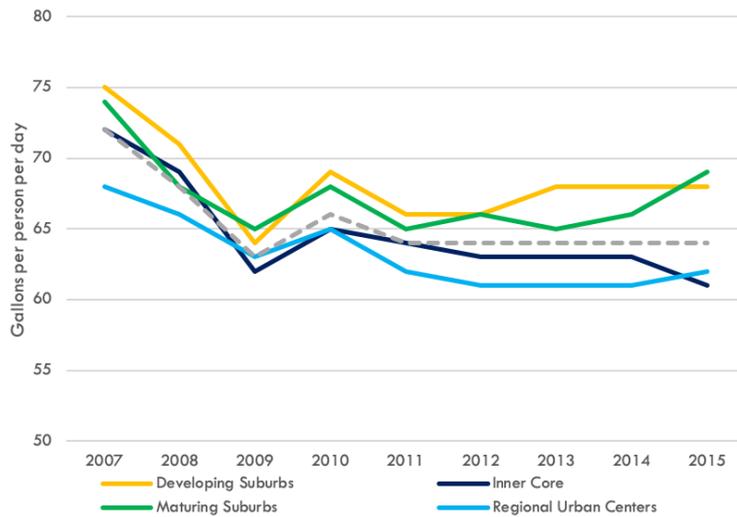
EXAMPLES OF PROGRESS:

- The Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) prepared and updated a [State Drought Management Plan](#) to plan for sustainable water usage.
- The Massachusetts Sustainable Water Management Initiative (SWMI) assessed environmental costs of water withdrawals. MAPC was directly involved as an appointed member of the statewide SWMI Advisory Group, and implemented stormwater management projects through two SWMI grants, for the Neponset Watershed and the SuAsCo Watershed. This framework is now included in the regulation of water supplies.

RELEVANT INDICATORS:

- Between 2007 and 2015, per capita residential water demand declined 11% in the region. Water use per capita after 2011 diverged by community type. Residents in Developing Suburbs and Maturing Suburbs increased consumption per capita by 3% and 6%, respectively, while residents in the Inner Core decreased use by 5% and residents in Regional Urban Centers held use relatively steady.

Figure 4: Residential Water Demand Per Capita 2007-2015
 Data Source: Massachusetts Department of Environmental Protection



Sub-strategy E: Implement water/wastewater/stormwater utility “best practices” across the region

EXAMPLES OF PROGRESS:

- MAPC created a [stormwater best practices kit](#) using a HUD Sustainable Communities grant for stormwater utilities and financing, which was publicized with the help of the Neponset stormwater partnership and implemented by the town of Milton, which created a stormwater utility.
- Leak detection procurement programs are utilized within Massachusetts Water Resource Authority (MWRA) communities, along with low-interest loans for water system repairs, and in turn communities are more quickly identifying water issues and have the means to fix them.

BARRIERS TO PROGRESS:

- Massachusetts water infrastructure is aging and there is massive- and unfunded- cost to upgrade and modernize these systems.

Strategy F: Expand the use of reclaimed water and alternative supplies

EXAMPLES OF PROGRESS:

- There are several large projects outside of the MWRA service area that implemented reclaimed water systems, including Gillette Stadium, Intel, and Wrentham Premium Outlets.

BARRIERS TO PROGRESS:

- Reclaimed water projects can be expensive and there are currently no state incentives or financing programs to support them, which leaves projects to find their own financing. Projects typically only make financial sense when they are outside of the MWRA service area, have particular water quality needs, and/or have unique water demands, such as large demand spikes.

Strategy G: Use technical analysis to support more flexible regulatory mechanisms for water withdrawal

EXAMPLES OF PROGRESS:

- In 2012-13, the SWMI program resulted in changes to state regulation around criteria for water withdrawal to make it more sustainable, comparing trade-offs for watersheds, fisheries, and habitats in addition to balancing human and natural uses. As towns withdraw water at greater levels they have to mitigate appropriately.
- Following SWMI state regulation changes, the state offered money for technical assistance to help towns figure out how to change and adjust to the new regulations. They set up a funding program providing regional grants to help municipalities with SWMI implementation.

BARRIERS TO PROGRESS:

- Water suppliers, the entities being regulated, strongly opposed SWMI. They claimed the regulations were too stringent and threatened litigation.
- Watershed groups were not happy with SWMI, either, claiming it was incremental change that did not go far enough to protect water resources.

Strategy H: Promote local treatment and recharge of stormwater and wastewater

EXAMPLES OF PROGRESS:

- MAPC established stormwater partnerships for the [Neponset Watershed](#) and [MAGIC](#) subregion to promote regional water treatment and recharge strategies.
- MAPC provided technical assistance on decentralized wastewater systems under the HUD Sustainable Communities grant in partnership with the [Charles River Watershed Association](#), focusing on the towns of Sherborn and Wrentham.

BARRIERS TO PROGRESS:

- The cost of local water treatment and recharge is prohibitive; municipalities are consistently running into financial constraints.
- Regulatory issues can arise; for example, there were a few cases where local treatment and recharge faced regulatory hurdles around water quality.

Strategy I: Protect the quality of water supplies through source controls and land use planning

EXAMPLES OF PROGRESS:

- MAPC has conducted municipal-specific consultations on land use and water quality for many years. Most of the practical improvements for aquifer zoning have been completed. Continued incremental progress has been made, but most of it had been accomplished before MetroFuture had been adopted.

Strategy J: Increase waste reduction and recycling

EXAMPLES OF PROGRESS:

- In 2014 Governor Patrick signed an environmental bond bill included \$10 million for waste reduction and recycling to improve solid waste management.
- The Massachusetts Department of Environmental Protection (MassDEP) implemented organic waste regulations to expand processing facilities.
- More communities have adopted single-stream recycling, increasing the rate of recycling.
- Recently, some municipalities have introduced town-wide or curb-side composting.

BARRIERS TO PROGRESS:

- Expanding bottle deposits and diverting unredeemed deposit money to fund waste reduction failed in the legislature.
- Due to global markets, the profitability of some types of recyclable materials have disappeared.
- Many municipalities are missing opportunities to mandate recycling, especially for businesses.

Emergent Themes

- Climate change is an issue that requires more focus and interdisciplinary strategies than MetroFuture envisioned. Climate change preparedness, adaptation and resiliency are extremely important for the region, and clean energy and sustainable transportation will be critical to directly and indirectly mitigate climate change.
- Becoming a net zero region is emerging a goal shared by policy makers, advocates, and foundation partners.
- Energy storage is another that will be a big factor in the next five to 10 years, as is strategic electrification.