UPDATE REPORT

A Climate of Progress

City of Boston Climate Action Plan Update 2011

APRIL
2011

green
BOSTON
MAYOR THOMAS M. MENINO

Dear Friends,

Since 2007, when the City of Boston published its first Climate Action Plan, evidence has continued to accumulate that climate change due to human activity is real and that it poses significant potential threats to Boston. The evidence also shows that we—here in Boston and around the world—can take effective action to reduce the threat and to prepare for any risks that remain.

Also in 2007, I signed an executive order to set clear and challenging goals, including reducing greenhouse gas emissions from government operations seven percent below 1990 levels by 2012. As a result of increasing energy efficiency in our schools and other buildings, raising the use of renewable energy, buying better-mileage vehicles, and many other measures, City Government has met that goal ahead of schedule—but that is only a start. We have much more to do.

As also promised in the executive order, I created the Boston Climate Action Leadership Committee and Community Advisory Committee—together representing all segments of the community and all neighborhoods in Boston—to recommend climate action goals for the entire Boston community and steps for reaching those goals. After a year of work and extensive public and expert consultations, the committees presented their report *Sparking Boston's Climate Revolution* on Earth Day 2010. The complete set of recommendations in that report now comprises the new Boston climate action plan.

The update in this document describes how Boston Government has been and will be implementing our plan. Its major components include:

- Reducing community greenhouse gas emissions 25 percent by 2020 and 80 percent by 2050
- Incorporating projected climate change into all formal planning and project review processes
- Engaging all segments of the community in climate action and leadership
- Developing innovative businesses and workforce skills to take advantage of climate action opportunities

Many important programs are already in place. For example, Renew Boston, through its utility partnerships and expansive community outreach, is bringing energy savings to Boston residents and businesses. Boston Bike Share will make over 600 bicycles at 61 stations publicly, available for short-term use. The Boston Water and Sewer Commission has begun long-range planning that explicitly includes sea-level rise and greater storm intensity as important factors for the storm water and sewer system. Green Jobs Boston is connecting Boston residents with green job training and employment opportunities.

However, what city government can do is only a small part of what is required. Boston is fortunate to have many businesses, institutions, community organizations, and individual residents who are demonstrating every day that climate action is good for our families, good for business, and good for the future of Boston. As the climate committees made clear, to reach our goals, everyone must contribute and everyone must benefit.

I look forward to continuing the implementation of this plan and ensuring Boston's vibrancy and leadership through the 21st century.

Sincerely,

Thomas M. Menino
Mayor of Boston

A Climate of Progress

City of Boston Climate Action Plan Update 2011

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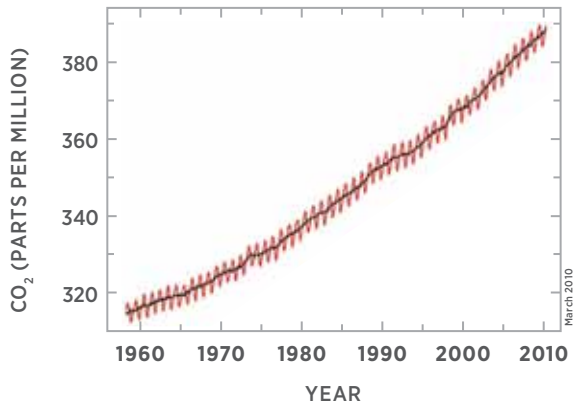
Introduction

In the atmosphere, concentrations of carbon dioxide and other greenhouse gases are increasing. All over the Earth, temperatures are going up; sea levels are rising. This is global climate change. Everything that depends on air, earth, and water must adjust. This includes Boston.

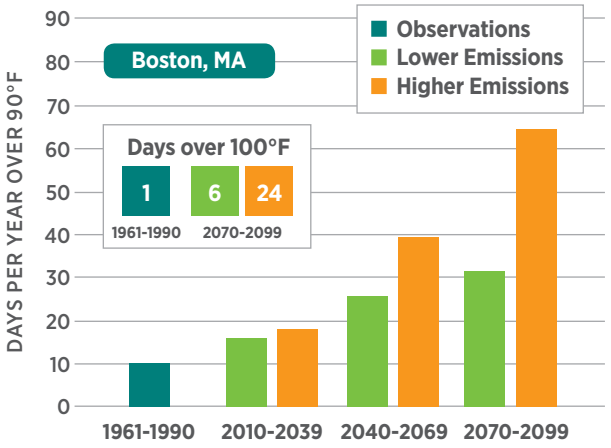
If current trends continue, climate change within this century could be more radical than at any time in the last several hundred thousand years. In Boston, heat waves and smog alerts will become more frequent. Flooding from coastal storms will become more common and more extensive. These, in turn, will affect the health of residents and visitors, the safety of neighborhoods, the success of businesses and institutions, the viability of plants and animals in local parks, and the ability of the government to cope with short-term emergencies and longer-term stresses. Potential costs for medical care, property and infrastructure repair, and lost opportunity figure in the billions of dollars. There is uncertainty about the speed at which these things will occur, but they have started.

With that description, the Mayor's Climate Action Leadership Committee and Community Advisory Committee opened their April 2010 report *Sparking Boston's Climate Revolution*. Since then, evidence of climate change continues to accumulate world-wide. Consistent with overall trends, the average temperature in Massachusetts in 2010 was the highest on record.

Atmospheric Carbon Dioxide Levels



High-Degree Days—Projections



In 2000, Boston City Government began its climate action program, when it joined the **Cities for Climate Protection Campaign of ICLEI-Local Governments for Sustainability.** The goals of climate action are to reduce contributions to the causes of climate change, reduce vulnerability to the consequences of climate change, and create new jobs and businesses that enable Boston to thrive economically while becoming more resilient and sustainable.

In 2007, Mayor Thomas M. Menino issued an executive order on climate action, which established policies for reducing greenhouse gas emissions from municipal operations and including the effects of climate change in long-range planning. The Mayor's goals included reducing greenhouse gas emissions from municipal operations to seven percent below 1990 levels by 2012. The Mayor also directed that City Government regularly update its climate action plan. This report is the first update since the publication of the original plan following the Mayor's executive order.

Because climate action goals for the entire community require the active involvement of the entire community, Mayor Menino, in 2009, created the Climate Action Leadership Committee and Community Advisory Committee and asked them to recommend:

- Greenhouse gas reduction goals for the entire community and measures to reach those goals
- A framework for making Boston more resilient to projected changes in the climate
- Policies to engage all segments of the Boston community in climate action and ensure that costs and benefits are equitably shared

The two committees and several working groups met over the course of a year, and, near the end of the period, draft recommendations were discussed at five community workshops that attracted almost 500 people. The results of this extensive public process were presented to Mayor Menino on Earth Day 2010 in the report *Sparking Boston's Climate Revolution.* The committees presented five overarching recommendations:

- The Boston community should reduce its greenhouse gas emissions 25 percent by 2020 and 80 percent by 2050 (climate mitigation).
- City Government should immediately incorporate projected climate change into all planning initiatives and activities (climate adaptation).
- City Government should lead the effort to engage all segments of the community in climate action.
- The Boston community should develop innovative businesses and workforce skills to take advantage of climate action opportunities.
- All segments of the community should find ways to exercise climate action leadership.

In addition to these, the committees submitted 175 detailed recommendations.

As Mayor Menino stated in his opening letter to this report, the recommended goals, policies, and programs of the Climate Action Leadership Committee and Community Advisory Committee constitute the new climate action plan for Boston. The following update describes the steps that City Government is taking and will take to implement that plan. Background to the plan and details regarding policies and quantitative assessments are contained in the *Sparking Boston's Climate Revolution* full report and supplementary material on the Boston Climate Action website **www.cityofboston.gov/climate.**

Boston Climate

Action	Status Existing, Expanded, Proposed	Jurisdiction Federal, Massachusetts, Boston	Share of 2020 Goal	Description
MITIGATION				
Buildings and Energy Sources — 67% of 2020 reduction goal				
Renew Boston and Electric Utility Efficiency Programs	Expanded	M, B	24%	Help residents and businesses access electric utility program resources for energy efficiency
Renewable Portfolio Standard	Existing	M	11%	Increase supply of electricity from new renewable sources
Renew Boston and Gas Utility Efficiency Programs	Expanded	M,B	7%	Help residents and businesses access natural gas utility program resources for energy efficiency
Appliance Standards	Existing	F	5%	Increase energy efficiency of appliances
Building Codes	Existing	M	2%	Raise energy standards for construction and renovation
Energy Efficiency Retrofit Ordinances	Proposed	B	7%	Require energy efficiency upgrades at time of sale
Behavior Change—Buildings	Proposed	B	3%	Motivate public to use buildings more efficiently
Oil Heat Efficiency Program	Proposed	B	3%	Establish energy efficiency program for heating oil and propane customers
Benchmarking and Labeling	Proposed	B	2%	Require publicly accessible energy efficiency ratings for buildings
Low-Carbon Standard for Heating Fuels	Proposed	M	2%	Reduce greenhouse gas from heating fuels
Stretch Code or equivalent	Proposed	M,B	1%	Raise energy standards for building construction above state base
Cool Roofs	Proposed	B	1%	Require light-colored or vegetated roofs
Transportation — 31% of 2020 reduction goal				
Federal/State Mileage and GHG Standards	Existing	F, M	14%	Increase fuel efficiency of vehicles
Vehicle Miles Traveled Reduction Strategies				Reduce vehicle use
Mass Transit/Parking	Expanded	M, B	5%	Encourage use of mass transit; raise parking costs
Car Sharing	Expanded	B	2%	Encourage use of car sharing
Bike Programs	Expanded	B	1%	Expand bicycle infrastructure
Behavior Change—Transportation	Expanded	B	4%	Motivate public to use vehicles more efficiently
Low-Carbon/Renewable Fuel Standards for Gasoline and Diesel	Proposed	F, M	5%	Reduce greenhouse gas from vehicle fuels
Anti-Idling	Expanded	B	<1%	Increase enforcement, expand education on idling
Solid Waste — 3% of 2020 reduction goal				
Commercial Solid Waste Reduction	Expanded	B	2%	Increase requirements and incentives for recycling
Residential Solid Waste Reduction	Expanded	B	1%	Increase requirements and incentives for recycling

Action Plan Summary

Action	Description
ADAPTATION	
Give adaptation the same priority as mitigation	Develop an adaptation plan; focus on sea-level rise, heat waves, and extreme storms; engage all levels of government
Assess vulnerability	Conduct a vulnerability assessment; include a range of projections; give special attention to the most vulnerable; start considering potentially catastrophic, very long-term impacts
Remain flexible	Collect and analyze new data, establish an advisory group, revise plan triennially
Include climate change in all planning and review	Include in all formal development review and capital planning; identify "no-regrets", "low-cost", and "wait-and-see" strategies; begin adaptation planning case studies
Review impacts on existing programs and infrastructure	Require every municipal department and agency to undertake a formal review of consequences of climate change
ECONOMY	
Promote good, green jobs	Extend Boston Resident Jobs Policy to climate action; expand worker and contractor databases and training programs; ensure access
Promote economic equity	Ensure that costs and benefits of climate action are shared fairly throughout the community and do not exacerbate existing inequalities
COMMUNITY ENGAGEMENT	
Promote climate action at the neighborhood level	Partner with community organizations; develop local priorities; facilitate communication; acknowledge local work; create incentives for collective action
Collaborate with community in program development and implementation	Establish public commission; actively engage all segments of community in design and implementation of policies and programs
Support a citywide awareness campaign	Frame climate action in the context of broad community concerns; customize messages for subgroups; use traditional and new media
Equip individuals to take action	Develop accessible, interactive website; establish climate information centers; promote climate education in schools
Continue to lead by example	Raise standards for municipal buildings, vehicles, operations, and procurement; engage municipal employees as models of climate action
IMPLEMENTATION	
Secure sufficient human and financial resources	Draw on public, philanthropic, and private resources; designate official with climate action responsibility
Develop a detailed plan and monitor implementation	Specify priorities, sequencing, and responsibilities for climate action; develop indicators, targets, and metrics; gather data on effectiveness, difficulties, costs, and benefits

Preparing for Change: Climate Adaptation

Adaptation is preparation for the evolving local environmental conditions that are the consequences of global climate change. For Boston, the most serious consequences are sea-level rise, increased frequency and intensity of heat waves, and increased intensity of storms.

The first imperative of climate change adaptation is mitigation, the reduction in the emission of the greenhouse gases so that the effects can be kept as small as possible. However, even as Boston reduces its emissions, the built-up momentum in the Earth's climate system guarantees that change will continue for some time. For this reason, more specific preparation for the foreseeable effects of climate change is necessary.

City Government's work on adaptation is based on a three-part framework:

- Development of a sustained and comprehensive adaptation program
- Acquisition and analysis of new information
- Incorporation of adaptation into all planning and project review processes

The responsibilities for developing and implementing adaptation measures are spread throughout municipal government. The Office of Environmental and Energy Services is taking the lead in coordinating these efforts.

Comprehensive Adaptation Program

Mayor Menino included City Government's fundamental commitment to climate adaptation in his 2007 executive order on climate action, and municipal offices increased efforts to assess potential vulnerabilities and potential responses. The Boston climate adaptation plan is now being built up out of separate measures, many of them still in initial stages, growing out of existing programs in individual departments. The first steps, in general, focus on the near term, where the magnitudes of changes are smaller and more certain.

Adaptation Management

A working group of eight city agencies and departments, under the leadership of the Office of Environmental and Energy Services, coordinates municipal adaptation efforts. The adaptation program looks beyond the basic physical phenomena—sea-level rise, flooding, heat waves, and so on—to address their health, economic, and social consequences.

The working group will look for opportunities for departments and agencies to work together, and will identify areas that require additional research, broad coordination, or fundamental policy decisions. Individual departments and agencies are responsible for applying climate concerns to their own missions, and concern for the most vulnerable—those most likely to be affected by climate change and those with the fewest resources for taking action—is one of the basic starting points. This reflects the general principle of equity that applies to all parts of the climate action plan:

Implementation of the climate action recommendations should not exacerbate existing social and economic inequalities and should, whenever possible, contribute to reducing those inequalities.

Community Outreach and intergovernmental Cooperation

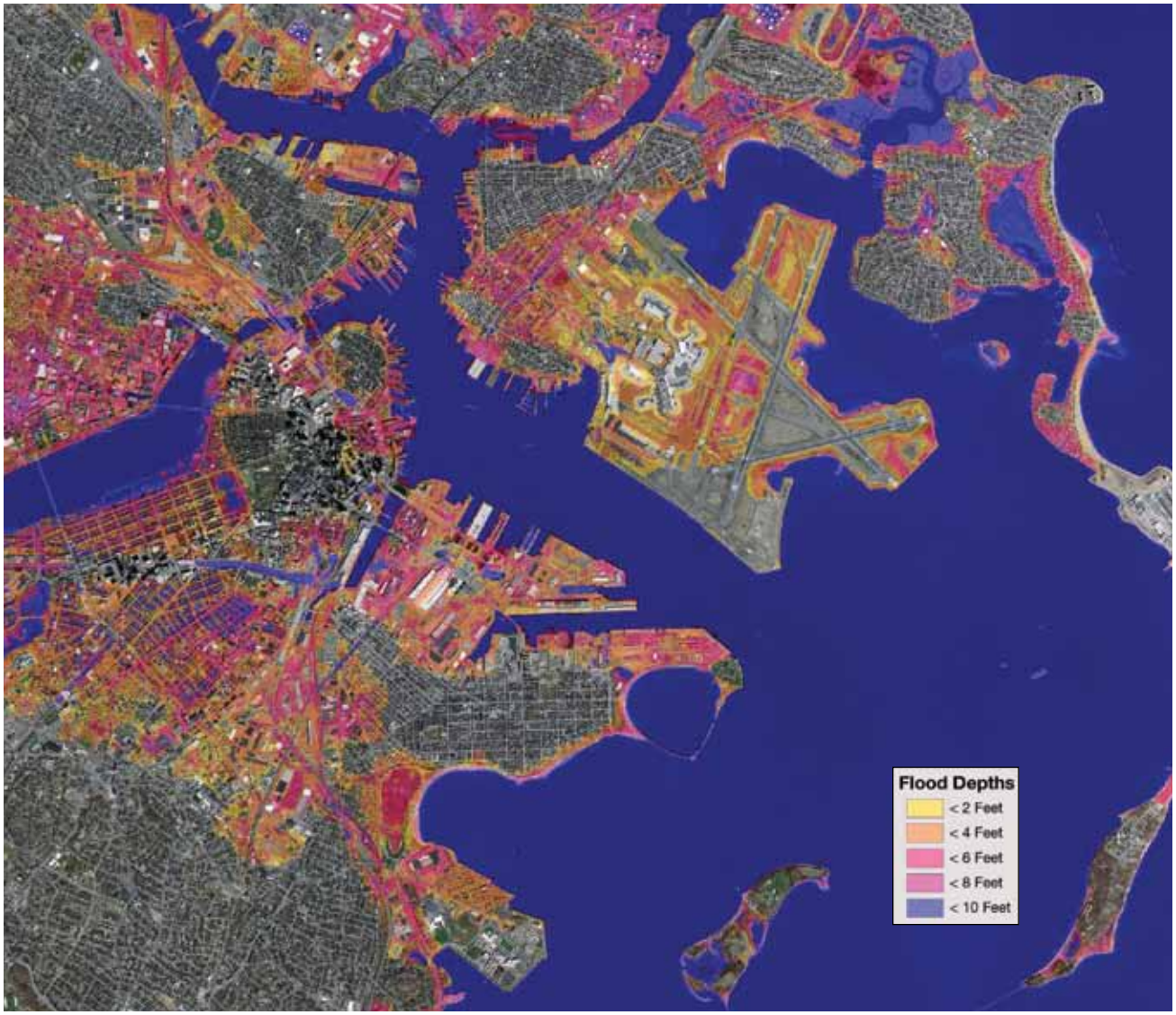
Effective climate adaptation will often require action that reaches beyond political boundaries. For example, sea-level rise in Boston Harbor will involve many property owners and businesses, a dozen communities, and municipal, state, and federal authorities. Similarly, possible adaptation strategies could require financial and other resources that exceed municipal capabilities.

Climate adaptation will require action by and support from Boston residents, businesses, and institutions. Adaptation is a central concern of the community engagement process that Boston City Government is developing around climate action. City Government is participating in many events specifically addressing adaptation, for example, The Boston Harbor Association's Sea-Level Rise Forum and two follow-up neighborhood presentations in East Boston and Dorchester in fall 2010.

The City Government is involved in adaptation activities at many levels with the Commonwealth of Massachusetts. State law now requires that all state agencies, in "issuing permits, licenses and other administrative approvals and decisions,…consider reasonably foreseeable climate change impacts…such as predicted sea level rise." In 2009–2010, Boston representatives sat on the Massachusetts Climate Change Adaptation Advisory Committee, a state-wide committee charged with developing adaptation recommendations, and its working groups. Also in 2009–2010, City Government worked with the Massachusetts Office of Coastal Zone Management (CZM) to survey policies that could be used to respond to sea-level rise. City Government is also having discussions with the Massachusetts Transportation Department (MassDOT), the Boston Public Health Commission, and the Massachusetts Department of Public Health to determine effective means of partnership. Staff from MassDOT recently joined a Boston City Government-led team that participated in a three-day "academy" focused on climate adaptation.

Boston City Government is a member of the Metropolitan Area Planning Council (MAPC), the lead organization for regional transportation issues, important in both climate mitigation and adaptation. The MAPC develops for Boston its Natural Hazards Mitigation Plan (see below). Recently, Boston joined a coalition led by the MAPC that received a federal $4-million Sustainable Communities Regional Planning Grant. City Government is working with MAPC on how to include climate change more explicitly in the grant-funded activities ranging from rewriting local zoning bylaws to developing transit-oriented neighborhoods.

Increased Storm Flooding with Sea-Level Rise



Boston City Government is also involved on a national level. In November 2010, Boston became one of eight "Inaugural Adaptation Communities" chosen by ICLEI USA, an association of local governments committed to advancing climate protection and sustainable development. Over the next year, Boston will receive ICLEI's new online adaptation tools, technical support, and other resources, and have the opportunity to discuss adaptation issues with the seven other inaugural participants, including its neighbor across the Charles River, Cambridge.

Integration of New Information

Boston is fortunate to have been the focus of pioneering work on climate adaptation, including the 2004 report *Climate's Long-term Impacts on Metro Boston* (CLIMB), led by researchers at Tufts University and Boston University, and the Union of Concerned Scientists' 2007 report *Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions.* Staff from several City Government departments are working with local universities, other non-governmental organizations, and several governmental entities to further investigate technical and policy issues.

Over the past several years, projections of changes in Boston's sea level, temperature, and storms, especially for the near-term, have remained relatively consistent, although they have tended to edge upward. On this basis, individual municipal departments and agencies have started to examine specific vulnerabilities within their areas of responsibility. In the next few years, this process will generate the questions and research needs that will form the basis of a work plan for a new Boston climate vulnerability analysis. City Government will establish a scientific advisory group and undertake a review of the most recent data and a new vulnerability analysis in conjunction with the next updating of the climate action plan. That analysis will prepare the way for a later task force to examine the potential threats from long-term and catastrophic climate change.

Planning and Review Processes

In his 2007 executive order on climate action, Mayor Menino directed municipal departments to include "the likely effects of climate change" in planning and project development review. As City Government has become more acquainted with the tools and data associated with climate change, individual departments have found means to take incremental steps to increase Boston's resilience and have started to identify larger and longer-term adaptation issues. The adaptation working group is coordinating these efforts to ensure that the work of individual departments coalesces into a comprehensive city-wide plan.

Open Spaces and Wetlands

The Boston Conservation Commission (BCC) protects and preserves open space and other natural areas of Boston, including wetlands. In particular, the BCC administers the Massachusetts Wetland Protection Act by determining wetland boundaries and reviewing and permitting projects proposed in or near wetlands.

Starting in 2009, the BCC, under a technical assistance grant, has worked with the Massachusetts Office of Coastal Zone Management (CZM) to develop a "tool box" for addressing sea-level rise in the coastal zone. The final report, expected in 2011, will summarize the ways that various levels of government can require, or provide guidance for, changes in building design, manage existing wetland resource areas, and develop long-range plans in light of sea-level rise projections. In 2011, the BCC will work with the Harvard Law School's Environmental Law and Policy Clinic to examine how new ordinance and other legal instruments might enhance the BCC's ability to protect wetlands. These projects will complete groundwork for the BCC's determining its next adaptation steps.

The BCC, while awaiting the completion of the policy research, has already developed a qualitative approach that strongly encourages permit recipients to integrate

sea-level rise into their project development. In 2010, most BCC permits included a condition similar to the following:

In the interest of prevention of pollution and storm damage prevention, the applicant should give consideration to future sea level rise over the design life of the project in determining the ground-level floor elevation for buildings, as well as the location of building mechanical equipment, utilities, storage areas for hazardous materials, underground garage portals, exhaust and ventilation infrastructure, and building entry points.

Planning, Zoning, and Project Review

The Boston Redevelopment Authority (BRA) is Boston's economic development and planning agency and administers the Boston Zoning Code as well as reviews all large projects, institutional master plans, and some smaller projects under the provisions of Article 80 of the Zoning Code.

Under Article 80, the BRA has begun asking developers of projects that may be subject to more frequent coastal flooding due to sea-level rise to analyze the effects of climate change. In 2009, as a result of such an analysis, Partners HealthCare raised the base elevation of the proposed Spaulding Rehabilitation Hospital by two feet at its new location in the Charlestown Navy Yard (now under construction). In fall 2010, the BRA inserted a climate adaptation requirement into the overall project permit for the multi-building, 6.3-million square-foot Seaport Square project in South Boston: all the individual components—residential, commercial, cultural, and educational—will have to "comply with applicable State and City strategies for addressing sea-level rise and climate change." The BRA is working to modify its Development Review Guidelines to provide more explicit direction where the effects of climate change—and possible preparations for them—should be included in the analysis and design of new projects.

The BRA will have a major role in Boston's development of more comprehensive responses to climate change, particularly any necessary zoning changes. It has participated fully in the Conservation Commission's initiatives and will take a lead role in the development of adaptation planning case studies.

Water and Sewer Infrastructure

The Boston Water and Sewer Commission (BWSC) owns, maintains, and operates the water, waste water, and storm water systems of Boston. The Massachusetts Water Resources Authority (MWRA) provides wholesale water and sewer services to much of eastern Massachusetts, including Boston. Waste water from Boston is treated at the MWRA's Deer Island Sewage Treatment Plan. The Deer Island facility, an oft-cited example of the benefits of long-range planning for climate change, was completed in 2000 and built two feet higher than it would otherwise have been so that the hydraulic head (pressure) pushing the plant's effluent through the outfall pipe into Massachusetts Bay would remain sufficient with two feet of sea-level rise. (If sea level rises more than this, it may be necessary to install pumps.)

BWSC and other municipal offices consult closely with the MWRA regarding the effects of climate change. The MWRA has looked at the adequacy of the regional fresh water supply, particularly the Quabbin Reservoir, under several climate-change scenarios. At this point, the overall quantity of water available for Boston does not appear to be a problem, because, under most climate-change scenarios, the total amount of precipitation appears to go up—despite an increased likelihood of summertime droughts.

Of greater concern is the effect of increased precipitation system-wide on flooding in Boston. Increased intensity and volume of rain may strain Boston's system of pipes, some of which were designed to far less intense storms, and sea-level rise may make it more difficult to release water into the ocean during high tide. Boston is, for a large part of the system, the low point before water goes to Deer Island or into the sea. Excess storm water getting illegally into the sewer system "upstream" causes

problems for "downstream" communities, because the MWRA sewers were not designed to carry large volumes of rainwater.

In November 2010, the BWSC began a process that will lead to a 25-year asset management plan for the waste water and storm drain system of Boston. Because sewer installations typically are in the ground for 100 years or more, the project will look at the projected effects of climate change over this 100-year timeframe. The planning work, expected to take at least three years, will look at implications for the sewer system of changes in rain intensity and volume, storm frequency, sea-level rise, and coastal flooding. It will address the system's ability to discharge waste water and storm water to the MWRA system, to redirect sewer flows, to store storm water internally and on the surface, to pump water to protect areas prone to flooding, and to make modifications, including changes to tide gates and inlet and outlet structures, that will ensure adequate performance under changed conditions.

Emergency Preparedness

The Mayor's Office of Emergency Management (OEM) develops and executes plans designed to prepare for, respond to, recover from, and mitigate against natural and man-made disasters. Recognizing the important implications that climate change has for its work, OEM is integrating it into major components of its program.

OEM and the Boston Emergency Management Team are currently working to overhaul Boston's Emergency Operations Plan, which includes Boston's preparations for extreme weather, such as flooding, severe storms, and heat waves. The effects of climate change may create additional risks to critical facilities and may require the reprioritization of resources to reflect shifts in the probability of weather-related emergencies. The new Emergency Operations Plan is expected to be completed by fall 2011. The Emergency Management Team includes most departments and agencies within the municipal government. The Boston Public Health Commission plays a particularly important role in evaluating the health effects of all manifestations of climate change.

In support of the Emergency Operations Plan update, OEM is engaged in a comprehensive Hazard Identification and Risk Assessment. This will build on an assessment previously conducted by the Metropolitan Area Planning Council (MAPC) for the *2008 Metro-Boston Multi-Hazard Mitigation Plan*. The 2008 hazard mitigation plan did not include the effects of climate change in its assessment. Boston City Government is working with the MAPC to ensure that those effects are included in the 2013 plan, subject to regulations of the Federal Emergency Management Agency (FEMA), which provides grant funding for this work.

In 2010, working with OEM and the Environment Department, graduate students at Tufts University's School of Urban and Environmental Policy and Planning undertook a study of heat waves and climate change in Boston. The study looked at the capability of Boston's response system, including cooling centers and communications and transportation networks, to assist those most vulnerable to the effects of a heat wave, particularly the elderly and lower-income residents. Partially as a result of this study, Boston City Government is planning to acquire portable emergency generators

that can be used to power air-conditioning equipment at cooling centers in the event of power outages. Outages become more likely with the stress that a heat wave places on the region's electrical grid.

Also in 2010, OEM received a federal Local Energy Assurance Planning grant to assess the reliability and resilience of energy networks—electric, gas, and fuel oil, primarily—during emergency conditions. OEM will incorporate changes to sea-level rise, heat waves, and extreme storms into the project's analysis of vulnerability and incorporate renewable energy in its planning for mitigation. OEM expects to complete this project by 2012.

Parks and The Urban Forest

The Parks and Recreation Department (PRD) preserves, maintains, and, where possible, expands Boston's street trees, parks, cemeteries, and urban wilds. The preservation and expansion of Boston's green spaces contribute to both climate mitigation and adaptation. Green spaces keep the city cooler in summer, thereby reducing the urban heat-island effect (black pavement and other urban structures absorb more solar energy than grass and trees). This reduces the amount of electricity (and associated greenhouse gases) needed for air conditioning and reduces the risks of more frequent heat waves posed by climate change. Greenery also increases the amount of groundwater recharge, thereby lowering flood risks.

In 2007, Mayor Menino, in partnership with the Boston Urban Forest Coalition (BUFC), announced Grow Boston Greener, an initiative with the goal of planting 100,000 new trees in Boston by 2020 and increasing the number of trees by 20 percent. About 35 percent of Boston trees are directly City Government's responsibility, on streets or in parks; the other 65 percent are on private property or property owned by the Commonwealth and other government entities.

Since 2007, over 4,000 new trees, public and private, have been planted in Boston. Because of tree losses, the total number of street trees has fluctuated slightly, and changes to the overall tree population are not certain. Recently, progress toward the 2020 goal has slowed, partially due to lack of private funding during the recent economic downturn. The BUFC is currently being re-established under the leadership of the Boston Natural Areas Network and will develop interim goals and an implementation plan for meeting the 100,000-tree target. City Government will work closely with the BUFC to identify new funding sources and to re-invigorate the tree-planting campaign.

	Fiscal Year 2008	Fiscal Year 2009	Fiscal Year 2010
Street Trees Planted	626	371	498

The tree-planting initiative is becoming more integrated throughout municipal departments. The Boston Redevelopment Authority and the Boston Conservation Commission routinely examine developers' proposals for participation in this program. Street trees are also an important component of the Transportation Department's Complete Streets guidelines.

Beyond the number of trees, PRD is concerned about the health of the city's trees and the urban ecosystems under its jurisdiction. Approximately every seven years, PRD prepares an Open Space Plan for the city. The current plan, for 2008 through 2014, does not analyze the effects of climate change on Boston's urban ecosystems, but PRD has started to include climate change considerations, particularly changes in heat and rainfall patterns, into its selection of tree species and other vegetation. The next plan, on which work will begin in 2011, will include an explicit analysis of climate change risks and appropriate responses.

Transportation Infrastructure and Planning

The complex Boston transportation system is subject to an intricate mix of state, regional, and city authorities. Massport, the state-created authority that owns and operates Logan Airport and the commercial port of Boston, and City Government work closely on many issues, including harbor planning; many Massport activities require approval from the Boston Conservation Commission. Massport is currently developing more detailed analyses of the vulnerability of its operations, particularly to sea-level rise.

On land, Boston City Government is responsible for the maintenance of local roads. The Boston Public Works Department has started to evaluate the effect of heat waves and more extreme storms on the durability of streets (for example, changes in freeze-thaw cycles will affect the occurrence of potholes) and its implications for design, choice of materials, and allocation of resources. Decisions regarding location of new streets and street elevations, which may have adaptation implications, also involve the BRA, the Boston Water and Sewer Commission, and the Boston Transportation Department. In 2011, City Government will continue to develop its Complete Streets Guidelines, which incorporate climate adaptation measures such as more trees for shade and the use of permeable pavements and rain gardens for storm water management. The guidelines apply to new development and municipal street and sidewalk reconstruction projects.

Boston City Government is in discussions with the Massachusetts Transportation Department (MassDOT) and the Massachusetts Bay Transportation Authority (MBTA) regarding the consequences of climate change for the Massachusetts Turnpike, the Central Artery, the Harbor Tunnels, and the region's mass transit system.

Boston Harbor Islands

The Boston Harbor Islands National Park Area is managed by the Boston Harbor Islands Partnership, which represents a range of federal, state, city, and nonprofit agencies. Like all national parks, the Harbor Islands are required to "consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans...". At this point, the Harbor Islands are engaged in several activities to understand in more detail the effects of climate change on the islands. These activities include:

- Implementing long-term phenology monitoring, which tracks trends in biological events such as leaf-out, flowering, and bird nesting
- Continuing a permanent "vital signs monitoring" program in salt marshes on Thompson, Peddocks, and Calf islands, which will track changes in marsh vegetation and marsh elevation
- Obtaining high-accuracy elevation data through establishing a series of geodetic monuments throughout the park
- Using sea-level rise modeling to assist in prioritization of threatened coastal resources

Minimizing Change: Climate Mitigation

In 2009, the Boston community was responsible for the emission of about 8.2 million tons of greenhouse gases (measured as carbon dioxide equivalent, eCO_2). Two-thirds of the emissions are tracked by the measurement of energy actually used; the other one-third of emissions come from sources that require estimates based on models and other approximations. Detailed GHG-emission inventories for the Boston community and for municipal operations are located on the Boston Climate Action website.

The 2009 total was slightly less than the 2005, 2007, and 2008 emissions, but greater than the 2004 and 2006 totals.

Roughly half of the emissions come from commercial, industrial, and institutional sources, one-fourth from residences, and one-fourth from transportation. The residential and commercial/industrial emissions include those from the disposal of solid waste, which accounts for only two percent of the total. Another way of summarizing the data is that three-fourths of emissions come from building use and one-fourth comes from transportation.

GHG emissions per resident were less than 13 tons in 2009, the lowest level in the six years that City Government has been tracking emissions. This reflects the overall stability of total emissions in relationship to the city's increasing population. However, per capita emissions have fluctuated considerably.

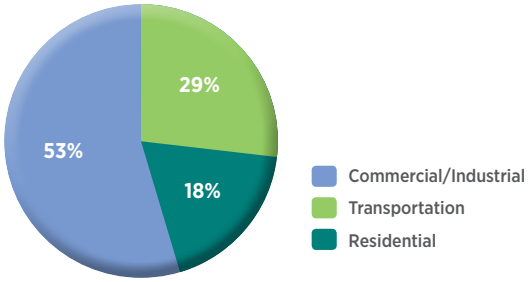
Given fluctuations in weather from year to year that affect energy use, the 2009 economic recession, and other sources of variation, there is no clear sign yet of an overall change in Boston's GHG emissions.

GHG Reduction Goals

In 2007, Mayor Menino set the goal of reducing municipal GHG emissions 7 percent by 2012 and 80 percent by 2050. In 2009, he asked the Climate Action Leadership Committee and Community Advisory Committee to establish GHG goals for the entire Boston community.

After considering the likely effects of various levels of greenhouse gases in the atmosphere, the practical

2009 Community GHG Emission by Sector



Boston Community Greenhouse Gas Emissions

Boston Community GHG Per Capita Emissions

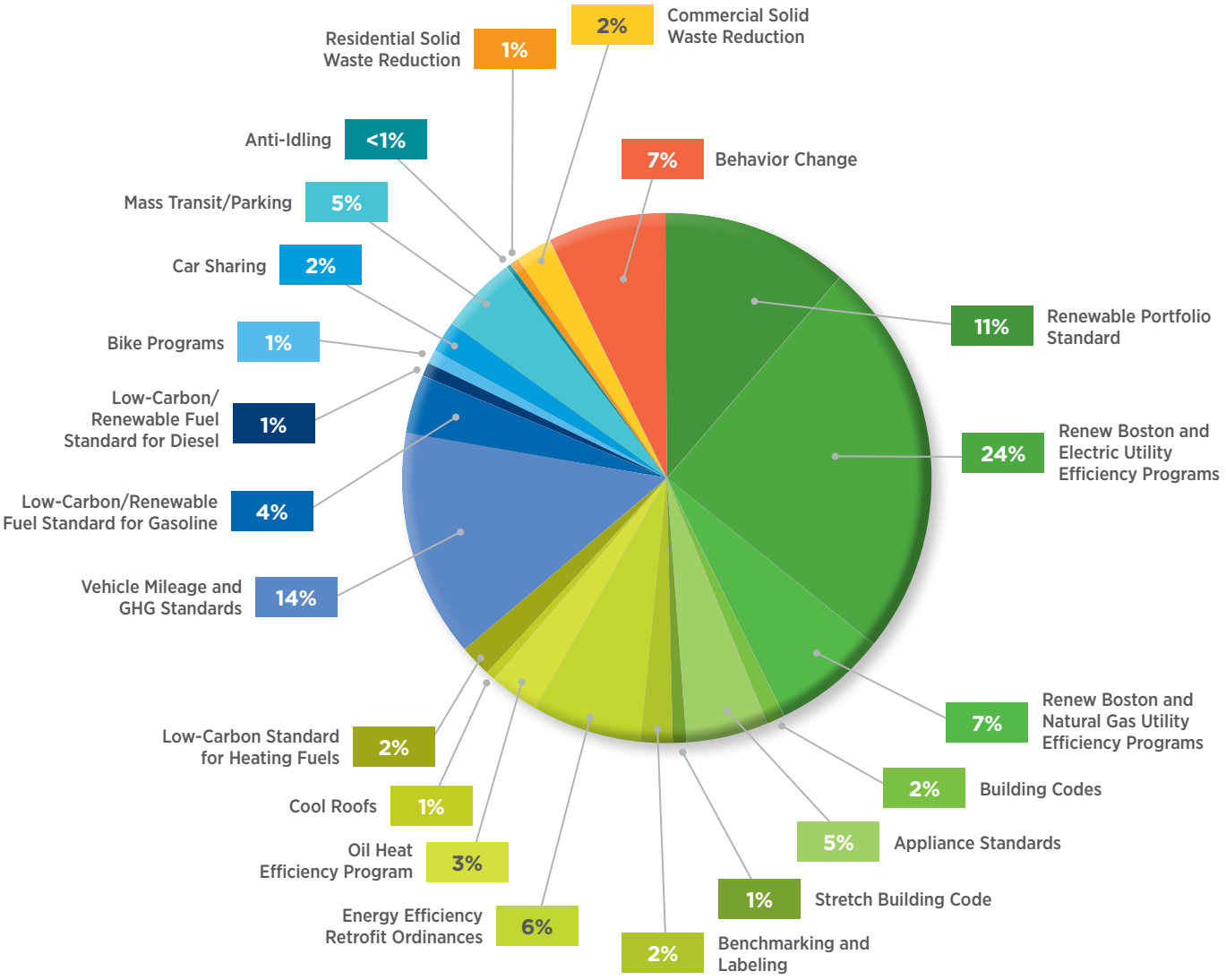
measures that could reduce Boston's emissions in the short term, and economic costs and benefits, the Climate Action committees recommended that the Boston community reduce its overall greenhouse gas emissions 25 percent by 2020 and 80 percent by 2050. Reaching that goal depends on federal and state policies and programs and on policies and programs that City Government has or can put in place. Most of all, it depends on the active participation of all segments of the Boston community.

In December 2010, the Commonwealth of Massachusetts, in accordance with the requirements of the 2008 Global Warming Solutions Act, issued the *Massachusetts Clean Energy and Climate Action Plan for 2020*. With this plan, the Commonwealth established short-term and long-term GHG reduction goals for the state that are identical to Boston's. Although there are some differences in details, the measures chosen to meet the goals by Boston and Massachusetts are similar. This reflects both the common knowledge of how to reduce energy use and greenhouse gas emissions and the frequent consultations at staff and leadership levels. Boston City Government representatives were members of the state's Climate Protection and Green Economy Advisory Committee and its subcommittees, which assisted the state in developing its goals and plans.

The Economic Benefits of GHG Reduction

Climate mitigation will bring economic gains to Boston. After accounting for initial costs, residents, businesses, and institutions will have total net savings of $2 billion in energy costs by 2020. In addition, Boston will benefit from improved public health and reduced health care costs from reductions in air pollution, less traffic congestion, and a safer, cleaner environment.

Boston 2020 Greenhouse Gas Reductions by Program — Shares of 2020 Goal



Climate mitigation will also bring jobs. The Commonwealth of Massachusetts estimates that implementation of its plan will create 42,000 to 48,000 jobs in the entire state. City Government is establishing programs to ensure that Boston residents and businesses are prepared to take advantage of those job opportunities.

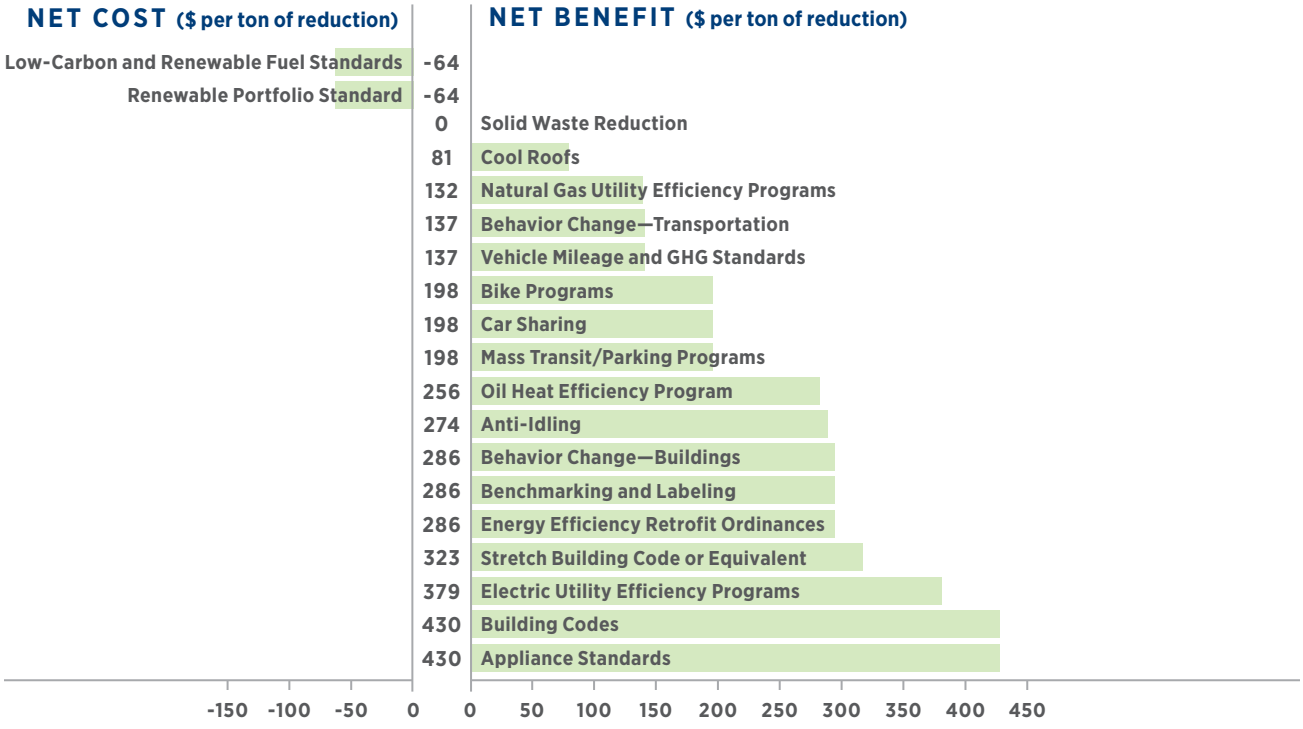
Furthermore, policies that concentrate regional growth, residential and commercial, in Boston will contribute to the reduction of regional greenhouse gas emissions, because Boston, like most cities, has lower per capita greenhouse gas emissions than its suburbs. For its part, Boston City Government is employing smart growth policies and land use and transportation planning to enhance its economic, social, and cultural richness and its density, walkability, and transit; and municipal policies are congruent with the Commonwealth's smart growth and clean transportation policies included in its new climate plan. City Government is working to develop a methodology to account for possible relative increases in its GHG emissions that produce greater regional reductions.

The rest of this section—divided into four parts: Buildings, Transportation, Solid Waste and Recycling, and Municipal Operations—describes the steps that City Government is taking to implement the mitigation measures necessary to reach Boston's 2020 GHG-reduction goal. Measures whose implementation falls outside the three-year time frame of this update may not be discussed. Measures solely in the jurisdiction of federal and state governments, also not discussed, include:

- Massachusetts Renewable Portfolio Standard
- Federal appliance standards
- Federal and state low-carbon fuel standards
- Federal and state vehicle mileage and greenhouse gas standards

Altogether, these measures account for a third of the reductions necessary to meet the 2020 goal.

Net Savings from Greenhouse Gas Reduction Measures



Buildings

2008 GHG emissions: 5.7 million tons eCO2 (71 percent of community total)

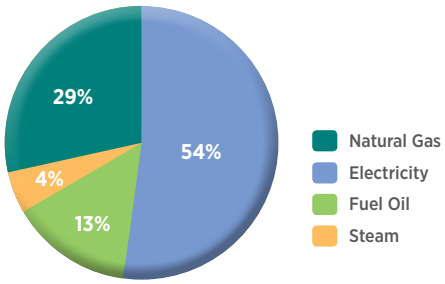
2020 reduction goal: 24 percent

Primary indicators: Total electricity, natural gas, and fuel oil use; number of energy retrofit projects; renewable energy capacity

In 2009, energy use in Boston buildings produced about 5.6 million tons eCO_2, approximately two-thirds of total community GHG emissions. Of those emissions, three-fourths came from commercial, industrial, and institutional properties, and one-fourth from residences. The most important energy sources were, in order: electricity, natural gas, fuel oil, and steam. (Both electricity and steam are themselves produced using a variety of fuels, including coal, natural gas, and oil, and for electricity, nuclear, wind, and solar.)

The Climate Action Plan goal is to reduce GHG emissions from buildings by 24 percent by 2020.

2009 Building GHGs by Source



Government action to reduce GHG emissions from buildings involves an interplay of laws, regulations, ordinances, and programs for implementation at the federal, state, and local level, often with the essential participation of private parties. For example, standing alone, the Commonwealth's Renewable Portfolio Standard, which requires utilities to provide progressively more electricity from renewable sources, will reduce Boston's GHG emissions without further effort by local government or building owners. On the other hand, the Commonwealth's Green Communities Act requires Massachusetts utilities to administer ratepayer-funded energy-efficiency programs. Their successful implementation depends on the voluntary participation of ratepayers; and Mayor Menino's Renew Boston program draws on municipal resources to develop measures and partnerships that assist Boston residents, businesses, and institutions in taking full advantage of the utility programs.

Energy-efficiency retrofits of existing buildings will account for two-thirds of the reductions needed to meet the 2020 building GHG goal. Better energy performance in new buildings is essential in looking beyond 2020 to the 2050 goal. Energy-efficiency measures fall into three broad categories: incentives, markets, and requirements. The last group of building-related GHG measures address renewable energy.

The Mayor's Office of Environmental and Energy Services has lead responsibility for most of the measures described in this section.

Incentives for Energy Efficiency

Renew Boston and Utility Energy-Efficiency Programs

Renew Boston is the lead municipal program for catalyzing energy efficiency and renewable energy in Boston buildings. Renew Boston's goals include serving 150,000 households, as well as thousands of small and medium businesses, and saving 2 million MWh of electricity annually by 2020.

Under requirements of the Green Communities Act, Boston's electric and natural gas utilities are rapidly expanding their energy efficiency programs. Utility spending on energy efficiency—in the form of rebates and other assistance programs—is expected to triple by 2012 to more than $60 million per year for Boston (and over $145 million from 2010 to 2012). This will be split about 25-75 between residential customers and commercial, industrial, government, and institutional customers combined. These expenditures include money from the state-wide energy efficiency and renewable energy System Benefit Charges on electricity and natural gas bills and the proceeds of GHG allowances under the Regional Greenhouse Gas Initiative (RGGI). Renew Boston is using Boston's three-year, federal Energy Efficiency Community Block Grant (EECBG) and working closely with utilities, neighborhood and business groups, and other government departments to ensure that all segments of the Boston community can take maximum advantage of federal, state, and utility energy programs.

Throughout 2010, Renew Boston has moved quickly to develop a network of partners, a neighborhood-based public outreach campaign, and a management structure for guiding residents and businesses through the energy

Climate Mitigation Policies and Programs for Buildings

retrofit process. In particular, Renew Boston has:

- Launched residential ($1.8 million) and small business ($1 million) programs that combine existing utility rebates with EECBG funds to assist qualified Boston homeowners, landlords, and businesses in making energy improvements to their properties. Eligible Bostonians receive low-hassle, no-cost home energy assessments and free efficiency upgrades including insulation, air sealing, water saving devices, and high-efficiency light bulbs
- Contracted with 13 community-based organizations to conduct local outreach, and contracted with three full-time community coordinators to oversee the outreach city-wide
- Reached agreements with NStar and National Grid that place a utility program manager in the Renew Boston offices to facilitate coordination
- With private funding, established an Energy Use Data Task Force to develop guidelines for confidential data management
- Launched a $900,000 retrofit program specifically directed at low-income, multi-family buildings. This federally funded effort will supplement $1 million in energy retrofit funds made available by the Boston Redevelopment Authority (BRA) and a low-income multi-family grant program funded by the utilities

In 2011, Renew Boston will:

- Promote comprehensive projects—including combined heat-and-power installations—by large commercial, industrial, and institutional energy users by coordinating utility energy efficiency work with local industrial development financing
- Investigate the establishment of a loan-loss reserve fund to support landlord financing of retrofits in multi-family buildings, particularly three-deckers
- Market energy efficiency to homeowners interested in residential solar energy and coordinate utility energy efficiency incentives with third-party financing for over 100 solar energy systems on retrofitted homes

In support of Renew Boston's efforts, the Boston Commission on Affairs of the Elderly, in 2011, began recruiting 55 volunteers through its Retired Seniors Volunteer Program to work 5 to 10 hours per week with the community-based campaigns. The BRA has initiated a Green Triple Decker pilot program, which will provide grants, matched with utility incentives, to five owners to substantially improve energy performance in Boston's historic three-deckers. Project partners include the utilities NStar and National Grid, and Historic Boston Inc., which will ensure that the retrofits, while achieving energy goals, maintain the structures' historic character and details. During the project, to begin in 2011, building owners and contractors will create and follow an energy-efficiency retrofit work plan and budget, with the potential for up to $27,000 per building in rebates.

Oil-Related Energy Efficiency Programs

About a quarter of the residences of Boston get their heat from fuel oil, which produces more GHG emissions per unit of energy than natural gas. Although Massachusetts law currently mandates a electric and natural gas "systems benefit charge" paid by ratepayers to fund energy efficiency programs, there is no funding source for targeted heating oil-related energy efficiency programs. However, some of the current utility efficiency programs may assist low-income heating oil customers.

Boston City Government will work with the Massachusetts legislature, the Department of Energy Resources, and others to establish a statewide fuel oil surcharge and oil-related energy efficiency programs. An important concern for Boston is to protect low-income residential oil users from undue hardship due to additional costs. When such programs are created, Renew Boston will work with the Commonwealth to deliver them to Boston residents and businesses and ensure that the investments in energy efficiency that Boston residents and businesses receive are commensurate with their surcharge payments.

Buildings and Behavior

An important inducement, beyond economic incentives, for many people and businesses to take climate action is the opportunity to learn something new, exercise responsibility, and participate in a community effort. Boston City Government's ongoing education and motivational effort around energy efficiency includes:

- Renew Boston's substantial community outreach (see above)
- Informational material available in printed form and on its website (for example, Residential Energy Savings Tips)

- Tools to assist residents in investigating their own energy use (for example, the Kill-A-Watt program, which makes available at local libraries devices that residents can use to track and calculate the electricity usage of their appliances by the hour or day)
- Campaigns to encourage businesses to reduce outdoor lighting, in particular, the Lights Out Boston program, in which participating building owners and managers agree to turn off or dim all architectural and internal lighting between 11 p.m. and 5 a.m. during migratory bird seasons, thereby saving money, reducing energy use, and protecting wildlife
- City-wide gestures such as participation in Earth Hour, organized by the World Wildlife Fund, for which Mayor Menino invited all residents and businesses to extinguish all non-essential lighting from 8:30 to 9:30 p.m. In 2011, Earth Hour took place on March 26.

Energy Efficiency and The Market

Energy Rating and Labeling

Across the country, many organizations are developing evaluation tools that provide a summary of a building's energy performance. When this information becomes easily available, understandable, and comparable for owners, occupants, and prospective buyers and tenants, energy performance can come to have a value in the real estate market. This, in turn, can create incentives to improve energy efficiency.

Boston City Government is working closely with the Commonwealth's Department of Energy Resources (DOER) regarding the development of possible state-wide labeling requirements. Currently, DOER is designing a U.S. Department of Energy-funded pilot study of residential labeling in the Springfield area.

With regard to commercial buildings, DOER—with a collaborative team that included City of Boston staff—published a white paper "Establishing a Building Energy Asset Labeling Program in Massachusetts" in December 2010. The report, which highlighted the Boston Leadership Committee's recommendations in this area, addressed policy questions and technical issues, and proposed a program framework. Boston City Government has already expressed its interest in participating, and recruiting commercial partners to participate, in a two- to three-year pilot study.

Green Leases

Green leases allow owners and tenants of commercial and residential buildings to equitably share the costs and benefits of energy-efficiency retrofits and other changes that reduce the environmental impact of buildings. They can be a valuable tool for addressing the "split incentive," the possible mismatch between the person who pays for an energy retrofit and the person who receives the monthly benefit of lower energy bills. Several model green leases are already available from a variety of individuals and organizations. City Government intends to monitor, as best it can, the type of legal arrangements that the real estate market produces, and promote the use of green leases where appropriate.

Energy-Efficiency Requirements

Energy Building Codes

In 2009, the Commonwealth adopted, as part of its building code, the most recent International Energy Conservation Code (IECC), which raised the requirements for energy efficiency in all new buildings and major renovations. This state-level measure will produce significant energy and GHG reductions. The Commonwealth also created an optional, more rigorous "stretch energy code," which could lead to buildings being about 10 percent more efficient than those built to the base code. Adoption of the stretch energy code can be a component for a municipality's qualifying as a Green Community and becoming eligible for additional energy grants. (Under Massachusetts law, individual cities and towns cannot make their own changes to the building code.)

In November 2010, Mayor Menino submitted, and the Boston City Council unanimously approved, an order to accept the Massachusetts stretch energy code for Boston. The concurrency (transition) period for the new code began on January 1, 2011, and it will be in full effect by the end of the year. Adoption of the stretch code will reduce Boston's GHG emissions about 1 percent by 2020.

Some Boston property owners are concerned that adoption of the stretch code could create disparities in the commercial real estate market. For example, the renovation of older buildings, not affected by the stretch code, might have an unfair advantage over the construction of new buildings, which are. To at least partially close this gap, Boston City Government and the Massachusetts Department of Energy Resources are working together to propose greater lighting efficiency requirements for the base energy code. If adopted, the higher lighting standards would then apply to everyone. The Board of Building Regulations and Standards will consider the proposal in 2011.

There are separate concerns regarding the possible effect of the energy code on historic buildings. The Boston Landmarks Commission is working with the Massachusetts Historical Commission and others to ensure that new construction codes do not affect City Government's ability to protect Boston's architectural heritage. The energy code already includes exemptions for several categories of historical buildings. The Landmarks Commission is also consulting with other municipal offices to explore ways to make older structures more energy efficient without harming their historic integrity. The greatest savings available through historic preservation is the savings of embodied energy, which includes all the energy used for the materials in and construction of the original building. (Another way of looking at it: preserving the existing building eliminates the need to expend energy for demolition of the old building and construction of a new one.)

Energy Conservation Ordinances

Building owners and users have good economic reasons for investing in energy. Nonetheless, some owners of existing buildings may still not take action after many years. An energy conservation ordinance would require energy-performance improvements in existing buildings that do not meet some minimum standard.

The necessity for, and the structure and content of, conservation ordinances will depend greatly on the strides that the Boston community makes in creating more efficient buildings and reducing greenhouse gas emissions in the next several years. Conservation ordinances will be considered after a rating and labeling requirement is in place. They may require energy retrofits, for example, at the time of sale, and the amount of required investment may be capped. This type of ordinance would require action by the City Council.

New Green Buildings

Boston City Government requires that several categories of new buildings achieve standards based on the U.S. Green Building Council's LEED (Leadership in Environmental and Energy Design) rating systems, which include energy requirements as well as many other desirable green building measures. For example, projects funded under the Department of Neighborhood Development's Green Affordable Housing Program must meet the LEED Silver standard; and in 2007, Mayor Menino directed that all new municipal buildings should be should be certified to the LEED Silver standard.

Article 37, "Green Buildings," of the Boston Zoning Code requires all new private development projects greater than 50,000 square feet to be "LEED-certifiable under the most appropriate LEED building rating system." Buildings complying with the LEED NC (new construction) standard must have energy performance at least 10 percent better required by the local zoning code. To include more buildings under Article 37 requirements, the BRA, which oversees the Zoning Code, and other municipal agencies are discussing lowering the threshold to include all buildings greater than 20,000 square feet. An amendment to this effect may be submitted to the Boston Zoning Commission in 2011.

Working with Office of Environmental and Energy Services, the BRA has developed an energy protocol

for its Article 80 review process, which now requires project developers to provide energy load, source, and infrastructure information for new buildings and develop strategies to reduce energy loads and infrastructure. As a result of this process, the Seaport Square project proposed two central combined–heat-and-power facilities for the entire development and a localized smart grid to support onsite renewables and real-time user response to load reduction needs.

Energy Positive Buildings, Green Roofs, and Other Opportunities

The Boston real estate market is already responding robustly to demand for highly efficient and sustainable buildings. Although the Boston Zoning Code requires new, large projects to meet the requirements for LEED certifiability, several major new commercial projects and existing buildings undergoing improvements are voluntarily achieving certification at the higher LEED Silver, Gold and Platinum levels. Builders and developers are also adjusting to the Commonwealth's and the city's changing minimum construction standards as contained in the stretch energy code.

City Government is eager to assist building owners and developers in identifying and eliminating obstacles to higher energy performance and to provide showcases for exemplary performance. In 2011, City Government, along with local utilities and other partners, will launch the Energy Positive Green Building Demonstration Program. In its initial phase, City Government will invite developers to submit competitive proposals to buy three municipally-owned land parcels and develop one- to four-unit residential buildings that produce more energy than they consume and meet the highest green building standards. Selected project teams will receive energy efficiency assistance from the utilities and an E+ Award of $15,000 per unit.

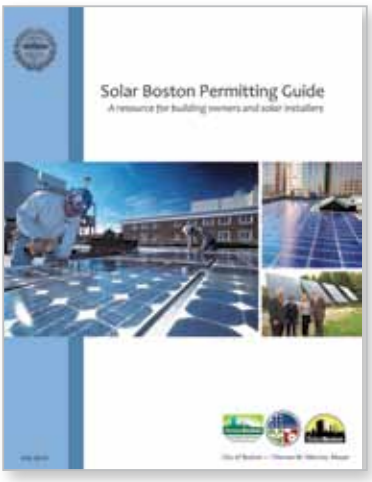
Private developers and builders are also showing an increased willingness to use cool and vegetated roofs to meet green-building goals. Cool roofs are light-colored roofs that reduce summer cooling requirements by reflecting more of the sun's energy than dark roofs. Vegetated roofs, Vegetated roofs, which are more expensive than cool roofs, provide more insulation and on-site water retention, and can have benefits in both cold and hot weather. Boston City Government included a vegetated roof in its new LEED-Gold certified addition to the Roosevelt School in Hyde Park. An important aspect of both the Zoning Code's green building requirements and the new energy stretch code is the flexibility that developers, designers, and builders have in choosing how to meet energy-performance requirements. Developers are finding that cool and vegetated roofs often can cost-effectively contribute to meeting LEED and building code requirements and also provide attractive spaces for tenants and residents. Cool and vegetated roofs also contribute to climate adaptation by reducing the urban heat-island effect.

City Government is helping to inform property owners about the opportunities that their roofs represent. In October 2010, the BRA convened A View From the Top: Sustainable Roofs in Boston, where over 175 attendees heard about the key features, benefits, financing pathways, and project management best practices of implementing solar photovoltaic, solar thermal, vegetative, and high-performance roofing technologies. The BRA has also convened a technical advisory group on rooftop agriculture.

Over the next several years, City Government will monitor the energy achievements of new buildings, the extent of adoption of sustainable roofs, and the barriers that prevent greater performance. It will then determine what additional incentives or requirements, if any, are needed to ensure that Boston remains on a path to meet its GHG reduction goals.

Renewable Energy

The development of renewable, non-GHG-producing energy—particular solar- and wind-generated electricity—will make a significant contribution to GHG reductions in Boston. The Massachusetts Renewable Portfolio Standard and Alternative Energy Portfolio Standard (and similar requirements in other New England states) together require that 20 percent of electricity sales must come from renewable and alternative sources by 2020. In Boston, this will lead to a GHG reduction of about 3 percent.



Boston is contributing to meeting the state goals. In 2008, Mayor Menino set a goal for the Solar Boston program of increasing Boston solar electric capacity to 25 megawatts (MW) by 2020. In October 2010, City Government released a new *Solar Boston Permitting Guide*, and, in December, the City Council approved a reduction in construction permit fees for solar energy projects. Because the most effective deployment of solar energy occurs on buildings that have also achieved a high level of energy efficiency, Renew Boston is developing a program that helps residents and businesses combine energy retrofits with solar installations. A significant obstacle to the expansion of photovoltaic installations, particularly in the downtown area, is the technical problem of safely connecting distributed generation facilities to the complex electrical grid in that part of the city. Boston City Government continues to work with its utility and state partners to resolve this issue.

Municipal agencies are also encouraging the development of solar thermal installations (that is, for heating and hot water), which often have a greater financial return than photovoltaics. In 2010, BRA allocated $500,000 to subsidize the installation of solar thermal systems in multi-family affordable housing. Multi-family housing projects are often good candidates for solar thermal systems because of high hot water consumption and shared hot water systems. The first project being funded is a 108 kBTU/hr solar thermal system on a 103-unit affordable housing development undergoing substantial renovation in Jamaica Plain.

City Government is increasing the solar capacity of municipal buildings. Recent and upcoming photovoltaic installations include:

- Boston Housing Authority's Maverick Landing, 33 kW completed
- Boston Housing Authority's Franklin Hill Public Housing Development, 29 kW ongoing
- City of Boston's Camp Harbor View on Long Island, 6.7 kW completed
- Boston Water and Sewer Commission headquarters in Roxbury, 240 kW completed
- City of Boston Archives in West Roxbury, 150 kW ongoing, funded by the federal Recovery Act grant

In an innovative $1.3-million project, City Government, through a federal American Recovery and Reinvestment Act grant, is creating a solar-powered evacuation route (with street lights, informational signs, and City Government's own main fuel pumps) to ensure that it can operate during a power failure. Boston overall, public and private, now has about 3.2 MW of solar PV capacity and another 6 MW in various phases of development.

City Government has also been active in the area of wind power. In 2009, the new article 88 of the Boston Zoning Code established standards for siting wind energy facilities. Boston is now working with the City of Quincy to install a 1.65 MW wind turbine on Moon Island, a Boston Harbor island owned by Boston but within the legal boundaries of the City of Quincy. The initial $27,000 feasibility study for the Moon Island project was funded primarily by a grant from the Massachusetts Technology Collaborative; and Boston funded a separate potential noise analysis. The project is awaiting approval by the Quincy Planning Board. Under the Commonwealth Wind Community-Scale Wind initiative, the Massachusetts Clean Energy Center is prioritizing another $400,000 to pay for installation, expected to be completed in 2012.

Transportation

2008 GHG emissions: 2.3 million tons eCO2 (27 percent of community total)

2020 reduction goal: 28 percent

Primary indicators: Vehicle miles traveled, mode share

Transportation accounts for about a quarter of Boston's GHGs. In 2008, all vehicles driving in Boston and the operations of the MBTA emitted about 2.3 million tons eCO2.

The estimate of GHGs from private vehicles (85 percent of all transportation emissions) is based on the types of vehicles that traveled in Boston and the number of miles that they traveled ("vehicle miles traveled," VMTs). Unfortunately, neither of these items is known directly, and the estimate is made on the basis of several models. (For details, see the GHG inventory on the Climate Action website.) By these models, VMTs in Boston have increased about one-fourth of one percent annually over the past decade, which is roughly consistent with the traffic-count and other data that the Boston Transportation Department has gathered. (The development of better indicators and data for actual vehicle miles traveled in Boston will be an important task in the next several years.) Overall, vehicular GHG emissions have decreased slightly due to greater vehicle efficiency.

The Climate Action Plan goal is to reduce GHG emissions from transportation by 28 percent by 2020. About two-thirds of this overall reduction comes from existing and proposed federal and state standards that increase vehicle efficiency and reduce the carbon intensity of fuel. Improving vehicle operation and maintenance practices also increases vehicle efficiency. Additional GHG reductions come from reducing VMTs.

The Boston Transportation Department has lead responsibility for implementing most of the measures described in this section.

Vehicle Efficiency

The largest contributors to the reduction of GHG emissions from transportation in the next 10 years will be vehicle mileage and GHG standards that federal and state authorities are implementing or proposing. Boston City Government generally encourages residents and businesses to obtain the most efficient vehicles necessary for their needs, and is taking specific actions to increase the number of electric vehicles and low-GHG taxis.

Electric Vehicles

Boston City Government has had long-term policies and programs directed at encouraging the use of public transportation and minimizing the growth of vehicular traffic, though these were not initially motivated by climate change concerns. One example among many: since the late 1970s, the City has administered a commercial parking freeze in downtown Boston as part of the Commonwealth's State Implementation Plan for reducing ozone levels, as required under the federal Clean Air Act. The downtown freeze caps the total number of off-street commercial parking spaces downtown. Recommendations from the Leadership Committee largely build upon other existing programs, as described below.

Electric vehicles (EV)—both all-electric vehicles and plug-in hybrids—have the potential to significantly reduce GHG emissions, especially if the electricity comes from renewable sources.

In spring 2010, both the Air Pollution Control Commission (APCC), which administers Boston's parking freezes, and the Boston Transportation Department, which develops Transportation Access Plan Agreements (TAPAs) for new projects, began asking building and property owners to make commitments to install charging stations in parking facilities. The first six months of this policy produced commitments for at least 22 charging stations to be installed at four locations by spring 2011. As building activity picks up in the recovery from the 2007–2009 recession, there will be additional opportunities to promote charging stations; and as plug-in hybrids and all-electric vehicles come on the market, existing parking facilities will likely install chargers to meet market demand. City Government intends to develop an online map showing the locations of EV facilities.

Boston City Government is developing a comprehensive strategy for increasing the number of electric-vehicle charging stations throughout the city, and is collaborating with New York City and Philadelphia to develop policies that will lead to widespread charging infrastructure throughout the Northeast. To demonstrate Boston's commitment to EV infrastructure, City Government will install three electric vehicle charging stations on Cambridge

Street in front of City Hall Plaza in 2011. Use of the spaces may be split by vehicles from City Hall, a car-sharing company, and the public.

Interest in developing Boston's electric-vehicle infrastructure is growing. In December 2010, City Government, joined by six private partners, submitted an application to the Commonwealth's Department of Energy Resources for funds to install 32 additional charging stations; four other businesses and institutions indicated their interest in participating in future applications. In 2011, City Government will organize a consortium of key stakeholders in the Boston metropolitan area to develop and coordinate charging infrastructure planning. Boston residents are also increasingly expressing interest in EV. In 2011 or 2012, City Government plans to publish an EV permitting and installation guide.

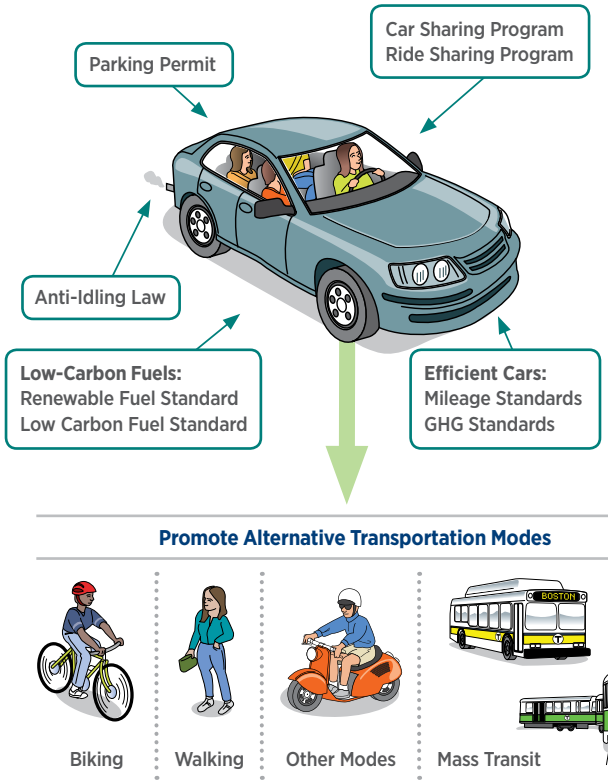
Low-GHG Taxis

Cabs in Boston drive many times farther per year as most other cars. Making them more efficient is an especially effective way of reducing emissions of greenhouse gases as well as other air pollutants.

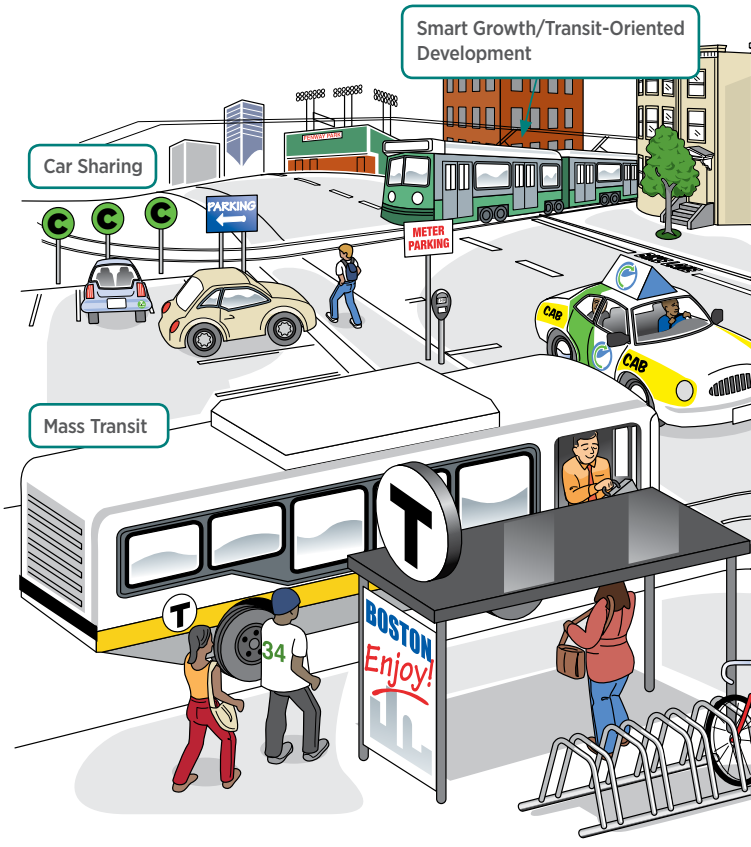
In 2006, Boston City Government, the Boston Public Health Commission, and Massport put together a series of incentives—$1,000 grants from City Government and "head-of-the-line" privileges from Massport—to encourage taxicab owners to increase the number of hybrid and other high-mileage vehicles in their fleets. As a result, the number of hybrid cabs rapidly increased. In 2008, the Boston Police Department, which regulates the taxi fleet and drivers, instituted a "Clean Taxi" requirement, which would have converted all Boston cabs to high-efficiency vehicles by 2015; and the existing incentives were discontinued. However, as the result of a lawsuit, a federal court determined in 2009 that Boston's clean taxi requirements were pre-empted by federal laws and regulations and declared them invalid. New York City, which had a similar requirement for its taxis invalidated by a federal court, has appealed its case to the U.S. Supreme Court, and Boston has submitted an amicus curiae brief in support of New York City's position. The Mayor's Office is also working closely with the Massachusetts congressional delegation to introduce federal legislation that would explicitly permit municipalities to establish such requirements.

Notwithstanding the legal setback, the number of low-GHG taxis in Boston continues to grow as owners and drivers become more familiar with the technology and more aware of the financial benefits, and as taxicab users express their preferences. As of January 2011, 586 of

Climate Mitigation Policies and Programs for Personal Automobiles



Climate Mitigation Policies and Programs for Transportation



Boston's 1800 cabs were hybrid vehicles, an increase of more than 240 in one year.

Pedicabs—cyclist-powered taxis—are also licensed by the Police Department, with approval by the Transportation Department required for routes and times of operation. In the past three years, Boston has gone from no licensed pedicabs to 21 pedicabs operated by two companies. Within the next three years, City Government intends to evaluate whether the current number can be safely raised.

Vehicles Miles Traveled Reduction

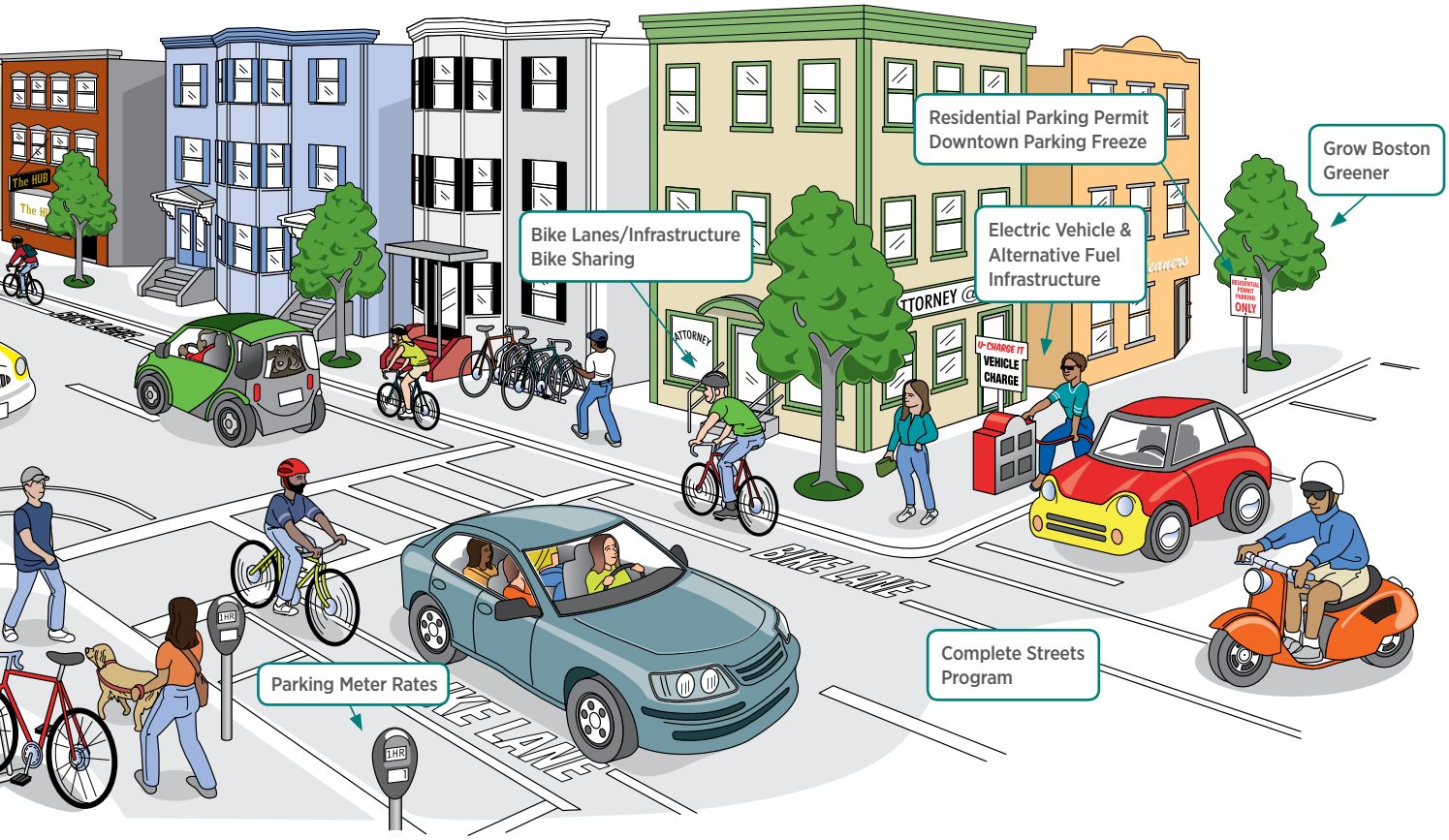
After vehicle efficiency, the major category of GHG-reduction measures for transportation is reducing the total number of vehicle miles traveled (VMTs). The Climate Action Plan has a goal of reducing total VMTs in Boston 7.5 percent below 2010 levels by 2020, compared to the 2.5 percent increase in the "business-as-usual" projection.

In 2003, City Government published a long-term transportation plan, Access Boston, which included important VMT reduction measures, including off-street maximum parking ratios, transportation demand management requirements for new developments, the

foundation of a bicycle-lane network, and a slate of public transportation projects for implementation by MassDOT. The VMT reduction measures in the Climate Action Plan build on that foundation.

Complete Streets

The Boston Complete Streets program, launched in 2009, aims to put pedestrians, bicyclists, and transit users on equal footing with drivers, and promote a vision of streets that are safe, attractive, and conducive to healthy, active transportation. By ensuring that "the car is no longer the king in Boston," the program will contribute to reducing vehicle use and VMTs.



The Complete Streets Advisory Committee, including City Hall staff, outside experts, and community stakeholders, is developing recommendations to ensure that Boston streets are:

- Multimodal—safe and equally accessible for all modes of transportation and for people of all ages and abilities
- Green—sustainable, energy-efficient, low-maintenance, and vibrant with plantings
- Smart—incorporating innovative technologies to improve efficiency and comfort

The recommendations are being codified in guidelines, drafts of which will be made available for public comment during 2011.

As a result of this program, City Government has already:

- Approved a narrower minimum width (10 feet instead of 11) for vehicle travel lanes to accommodate wider sidewalks and more bicycle facilities
- Started using permeable pavement and rain gardens in sidewalks to allow storm water to seep directly into the soil
- Issued, or will soon issue, guidelines for on-street parking of bicycles, shared cars, electric vehicles, and scooters
- Established minimum sidewalk widths and clear zones for pedestrians
- Developed a new classification of city streets that makes location and use explicit
- Adopted a new multimodal approach to intersection analysis and design

These measures are already being implemented in design or construction of projects in Peabody Square, Broad Street, Audubon Circle, Boylston Street (Fenway), Central Square, Causeway Street, Sullivan Square, Rutherford Avenue, Summer and Congress Streets, and the Boston Symphony area.

Specifically addressing the needs of pedestrians, the Boston Transportation Department has established a partnership with the Boston Public Health Commission and the non-profit group WalkBoston to design comfortable walking environments and to encourage walking in the neighborhoods, particularly those with high rates of obesity. Together, they will hold a series of "Complete Streets Walks" in 2011.

Public Transportation

Boston is fortunate to have an extensive public transit system, which, despite its well publicized difficulties, has relatively high ridership compared to other similarly sized cities. This transit system— subways, buses, commuter rail, and ferries—is largely under the control of the Massachusetts Bay Transportation Authority (MBTA), a state agency. To increase ridership further, Boston City Government works closely with the MBTA to identify and implement bus and subway improvements through the city. City Government also collaborates with Boston's representatives at the state and federal levels to help develop solutions for the long-term financial stresses on the T, while protecting the interests of Boston residents, particularly those least able to afford rate increases.

For example, City Government is working with the MBTA in a $6-million, federally funded project to improve service and amenities on 15 high-ridership, high-frequency "key routes" in Boston by 2012. Improvements include installation of bus shelters, benches, and solar-powered trash receptacles, consolidation of stops, improved accessibility, curb extensions, signal upgrades, clear signage, and pavement markings. Another important project is the MBTA's Improvements Program along the Fairmont commuter rail line. Renovation and reconstruction of two existing stations, Morton Street and Uphams Corner, have been completed, and three new stations—Four Corners, Talbot Avenue, and Newmarket—are currently under construction; another station, Blue Hill Avenue, is undergoing location review. The program also includes bridge replacement and other infrastructure upgrades. Parallel to the MBTA improvements, Boston City Government and a coalition of community development corporations are developing an integrated "Fairmount Greenway" of open space and pedestrian and bicycle accommodations.

In recent years, a lack of space at South Station has become a major obstacle to expanding rail service into Boston. In October 2010, the Commonwealth of Massachusetts won a federal grant that included $32.5 million for the environmental permitting and design phase of the South Station expansion project. The expansion, including construction of seven new tracks, would support a significant increase in Amtrak Acela Express High Speed Rail service to Boston and expansion of MBTA commuter rail service. The Boston Transportation Department and the BRA have been working with the MBTA and other agencies for several years on preliminary work regarding South Station expansion. Expansion will require the relocation of the U.S. Postal Service facility next to South Station to South Boston, a move that will benefit all parties and neighborhoods involved. The BRA is the lead agency in Boston on these two related projects, both of which City Government strongly supports.

Transportation Access Plan Agreements

The Boston Zoning Code (Article 80) requires developers of large projects, greater than 50,000 square feet, to sign a Transportation Access Plan Agreements (TAPAs) with the Boston Transportation Department. Boston City Government has used this tool effectively for many years—and will continue to use it, now in conjunction with Complete Street Guidelines—to develop the streetscape, keep down parking capacity, expand traffic management tools, expand bicycle infrastructure, and expand the use of transportation demand management (TDM) by businesses and institutions.

Parking Freezes

Off-street parking in Boston is subject to the city's zoning code and parking freezes in three parts of the city: Downtown, South Boston, and East Boston. The parking freeze regulations, administered by the Air Pollution Control Commission (APCC), vary by district. The South Boston and Downtown freezes cap the number of off-street commercial parking spaces. The East Boston freeze is directed at rental car facilities and airport park-and-ride lots. Currently, South Boston and East Boston permits require annual renewal and payment of a fee. Downtown permits require no fee and do not require regular renewal. Effective administration and enforcement of the Downtown and South Boston parking freezes, by limiting parking availability, discourage commuters from driving in Boston and reduce VMTs.

In 2011, City Government will undertake a new inventory of downtown parking spaces, a determination of compliance with existing APCC permits and TAPAs, and a re-evaluation of current Boston maximum parking ratio guidelines (the number of parking spaces per residential unit or 1,000 square feet of office or retail space). This work will form the basis for a revision of off-street parking policies generally and for proposed amendments to the Downtown parking freeze regulations, including a requirement for periodic renewal of Downtown parking freeze permits and the payment of a renewal fee. Parking freeze amendments will require a public hearing and a vote by the APCC.

On-Street Parking

City Government seeks to manage and enforce on-street metered parking to optimize turnover at—and discourage cruising for—metered parking places and to discourage driving to transit-served locations. To this end, City Government will continue to consider opportunities to expand use of multi-space meters, lengthen meter hours, and raise rates. There are currently 8,041 metered parking spaces on Boston streets, 7,221 spaces subject to single-space parking meters and 820 spaces serviced by 107 multi-space meters. In January 2011, the Transportation Department increased the parking meter fee from $1 per hour to $1.25 per hour. This was the first street parking fee change since the mid-1980s, when all of the old nickel and dime meters were removed from city streets.

In recent years, the Transportation Department, through replacement and improved maintenance, has raised the operability rate of parking meters (from 78 percent being operational on a given day to a now consistent 98 percent) and converting more unmetered spaces into metered ones, thereby increasing turnover at on-street parking sites.

Transportation Demand Management

Transportation demand management (TDM) is the process for ensuring that transportation resources are used effectively. Although City Government engages in TDM in the largest sense, TDM usually refers to the efforts of property owners, businesses, and institutions to encourage the use of public transportation, bicycles, and walking. In Boston, the single-most important goal of TDM is to reduce the number of commuters in single-occupancy vehicles (that is, cars with a driver and no additional passengers).

For several years, parking freeze permits and TAPAs have required building owners to establish TDM programs. If the APCC does adopt a renewal fee for downtown spaces under its jurisdiction, Boston City Government intends to use that revenue to fund a TDM coordinator position. The TDM coordinator would provide TDM education and assistance to building owners and tenants, businesses, and institutions; enforce TDM requirements incorporated into TAPAs and parking freeze permits; and oversee mode reporting requirements and ridesharing and other programs (see below).

One effective component of a TDM program is membership in a transportation management association (TMA). TMAs are independent associations of businesses and institutions that coordinate resources and services to increase the use of public transportation and decrease the use of single-occupancy vehicles by their employees, students, clients, and other visitors. Boston currently has five TMAs—in the Financial District, Back Bay, South Boston Seaport, South End, and the Longwood Medical Area—who have been active partners in improving all aspects of transportation in the city. When appropriate, City Government, through the TAPA and parking freeze permitting processes, asks developers and building owners to join their local TMAs. City Government has taken the further step of specifying that a building owner should join on behalf of all tenants and appoint an on-site transportation coordinator to ensure that all tenants and employees are aware of the TMA and all public transportation resources.

To increase TDM effectiveness, the Commonwealth of Massachusetts' Rideshare program imposes requirements directly on large businesses and institutions: they must collect data on commuting patterns and to take measures to reduce employee driving. Boston City Government may be able to more effectively oversee the Rideshare program than the Commonwealth can, especially by linking it with municipal programs and requirements, and will pursue an agreement with the Commonwealth to share responsibilities for the Rideshare program.

Reduction In Car Ownership

A person who owns a car is more likely to use a car—and contribute to total VMTs—than someone who doesn't. According to one car-sharing company, members of their program, on average, drive 2,500 miles per year less than they did before joining and, presumably, giving up their cars. There are several components to reducing car ownership by Boston residents. These include:

- Ensuring convenient public transportation and safe walking and biking
- Ensuring the availability of vehicles when someone really needs one
- Removing incentives to car ownership
- Educating residents about transportation options and actively encouraging them to give cars up

There are about 84,000 Residential Parking Permits issued for on-street parking in certain neighborhoods of Boston, which is about four times the available spaces for all on-street parking spaces in these neighborhoods. Permits are free and valid for two years, with no limit on the number of permits per household. This permit program, which keeps commuters away from residential streets, also gives some residents the impression that parking should be available and free.

A parking permit fee, with a rapidly increasing cost for each additional vehicle registered at the same address, could induce residents to reconsider car ownership and reduce VMT by better balancing the supply of and demand for on-street residential parking spaces. City Government intends to conduct an analysis to determine what fee structure will be both effective and equitable in 2011 and propose a fee structure in 2012. Potential impacts on lower-income residents could be addressed by using the proceeds to fund alternative transportation or by allowing fee reductions or waivers for low-income residents.

An important inducement for giving up a car is the knowledge that one can easily obtain a car when needed. In recent years, car-sharing companies, which allow members to rent locally placed cars by the hour, have appeared to meet—and spur—this demand. Shared-car availability in Boston is expanding. In addition to ZipCar, the pioneering Boston-based shared-car company, other businesses—for example, Hertz and RelayRides—are working to establishing competing services. ZipCar had about 22,000 members and 450 cars in Boston in 2010.

Boston City Government would like to ensure that every Boston resident lives within one-fourth of a mile of a shared car by 2020. The Boston Transportation Department routinely requires developers and parking facility owners to work with car-sharing companies to determine whether their facilities can be sites for shared cars. Residential developments are increasingly seeing the availability of shared cars as a desirable amenity to offer, which has the added benefit of allowing the developer to reduce the number of parking spaces that need to be built. To date, there is little evidence, that car-sharing companies are having difficulties finding locations at which to place cars as membership grows. Nonetheless, City Government is using its contracting authority to increase the number of car-sharing opportunities. A RFP issued in November 2010 solicited proposals from car-sharing providers for: a) a fleet of approximately 19 vehicles at two locations that would be reserved for City Government employees during working hours but be available to the general public at other times and b) an additional fleet of up to 20 vehicles that would be located in areas outside of Downtown, possibly located in municipal parking lots. A contract may be awarded in 2011.

Bicycles

Bicycle riding in Boston is increasing rapidly. Boston Bikes, the municipal office for bicycle programs, estimates that ridership during peak traffic hours rose 43

percent from 2007 to 2009. (The American Commuter Survey estimated a 208 percent increase in Boston during this period.) In 2009, bicycle rides accounted for about 2.1 percent of commuter trips in Boston, ranking tenth among the 70 largest U.S. cities. City Government has a goal of raising the proportion of commuter trips (mode share) for bicycles to 10 percent by 2020 by expanding bike lanes, public and private bicycle storage, bike-sharing facilities, and changing facilities. Because about one-seventh of additional bike rides replace automobile trips, this rise in bicycle use will lead to about a one percent reduction in VMTs.

From 2007 to 2010, City Government installed 38 miles of bike lanes. The bike lanes incorporated progressive elements including bike boxes, green color, extra width, and thermoplastic buffers. In 2011, Boston Bikes will complete a plan to guide infrastructure improvements for a bikeway network of nearly 140 miles by 2020. City Government hopes to include separated bike lanes (also know as cycle-tracks), which provide a buffer between cyclists and motor vehicles.

City Government is also increasing the number of public bike parking spaces. In 2008 and 2009, 500 bike racks (two parking spaces per rack) were installed on sidewalks, and in 2010, parking for up to 500 bicycles, with an emphasis on public housing developments and schools as well as business districts were installed. City Government also tested an on-street rack on Newbury Street, which included removal of a parking space. To ensure racks are installed where demand is highest, most locations are determined based on public requests.

Just as with electric-vehicle charging stations, City Government is using its permitting and review authority

to ensure that new developments and parking facilities include bicycle storage and changing facilities. In 2011, new Off-Street Bicycle Parking Guidelines will establish minimum guidelines for the number of covered and outdoor bicycle parking and showers facilities required from projects subject to BRA and BTD review.

Many other recent initiatives are encouraging the use of bicycles in Boston. These include:

- Community bike programs, such as Roll It Forward, which will collect, repair, and distribute up to 1,000 donated bikes to Boston neighborhoods, and the Youth Cycling Program, which provided cycling instruction to over 2,000 youth in 2010
- Stolen Bikes Boston Community Alert, which makes the reporting of stolen bikes easier and increases the chances of recovery
- Bicycling Safety Summits in April and September 2010
- The annual Bike Friendly Business Awards, first awarded in 2008
- Creation and distribution of a city bike map

2011 will see the opening of Boston Bike Share. Supported by $5.2 million in federal funding, grants, and corporate sponsorships, this program will permit participants to rent bicycles by the half hour and to pick them up and deliver them at any participating station. The initial system will comprise roughly 61 station and 610 bicycles. Station sites include locations along all four subway lines and 40 bus lines of the MBTA, who is a partner in the federal grant. The goal of Boston Bike Share is to create a network with 5,000 bicycles—3,000 in Boston, and the rest in surrounding communities (Cambridge, Somerville, and Brookline, who are eligible to use a portion of the federal funding). City Government hopes to use expansion of the bike-sharing program to develop a more extensive network of shower and storage facilities available to all bicyclists.

Public Education and Behavior Change

Particularly in transportation, public engagement is an essential component of effective climate action, because individuals have so many choices. Many municipal programs already incorporate outreach elements. For example, TAPAs require new developments to have onsite transportation coordinators to ensure that all residents, businesses, and employees in a building are aware of the many ways they can minimize vehicle use. Other programs, particularly Boston Bikes, have developed compelling, targeted public campaigns; and efforts to stop excessive idling will always depend more on education and motivation than enforcement. As gasoline prices climbed higher, Mayor Menino issued his "Tips for Saving Fuel." Transportation has been, and will remain, an important topic in climate change communication.

Solid Waste and Recycling

Current GHG emissions: 0.18 million tons eCO2 (2 percent of community total)

2020 reduction goal: 40 percent

Primary indicators: Total solid waste, diversion rate

In 2009, disposal of commercial and residential solid waste accounted for GHG emissions of about 180,000 tons eCO2, two percent of total community emissions. GHG emissions from solid waste are produced by decomposition in landfills, by incineration, and by other disposal methods. Most of Boston's non-diverted (non-recycled) waste is incinerated.

The processing of recycled material does not contribute GHGs, except for energy used at the local processing facility. In 2009, all residential recycled material was processed in Charlestown. Emissions from the pickup and hauling of trash and recycling are included under transportation. The emissions number does not include the disposal of hazardous waste.

The Climate Action Plan goal is to reduce solid waste-related GHG emissions 40 percent by 2020. Reductions in emissions can come from reducing the total amount of waste, increasing reuse and recycling, and changing or modifying disposal methods. While Boston is working towards a long-term goal of zero waste, the 2020 goal can be met primarily through increased recycling.

The Waste Reduction Division within the Department of Public Works (DPW) is the lead office in the implementation of most solid waste and recycling measures.

Commercial, Industrial, and Institutional Solid Waste

Commercial, industrial, and institutional waste accounts for about three-fourths of Boston's solid waste-related GHG emissions.

Boston businesses and institutions arrange for their own waste disposal. Since 2008, private trash haulers have been required to offer recycling services and educational materials to these clients, but businesses and institutions are not required to make use of them. Haulers (but not including those who pick up recyclable material only) must also file annual reports on the number and percentage of commercial customers that utilize recycling service and the total amount of solid waste and recyclables collected. Compliance with this requirement has been increasing, but is not yet at a level where the data is reliable. City Government is increasing its oversight to foster compliance from haulers, which, it is expected, will also raise diversion rates among businesses and institutions.

City Government has or is developing a variety of programs to encourage recycling by businesses and institutions:

- Boston's "LEED-certifiability" requirement for large projects (see above) includes a prerequisite that buildings provide easily accessible recycling facilities and grants LEED "points" for reducing construction waste and reusing materials
- Development of an organic waste processing facility (see below) would provide a significant recycling opportunity for food waste
- A BRA-sponsored project in the Newmarket Business District will, among other things, look at the possibility of creating an "eco-industrial zone" where the waste stream of one business can contribute to the raw materials of another

City Government's consideration of a mandatory residential recycling ordinance (see below) will include an evaluation of whether to include commercial and institutional facilities.

Based on the Commonwealth's figures for waste per employee by job sector and on Boston employment figures, Boston commercial non-diverted solid waste amounts to 640,000 tons with a diversion rate of 38 percent. The Climate Action Plan, consistent with the Commonwealth's Solid Waste Master Plan, envisions the commercial diversion rate rising to 70 percent by 2020.

Recycling In Public Places

Boston City Government's first introduction of public recycling bins will take place in conjunction with the expansion in the number of solar-powered trash compactors, Big Bellies. The trash compactors, first placed on Boston streets in 2006, reduce the amount of trash subject to spillage from ordinary trash barrels and require less frequent visits from trash-collection vehicles. Currently, Boston has over 200 Big Bellies. With $450,000 from the U.S. Department of Energy and municipal funds, Boston will purchase 70 more units to be located in Downtown Crossing, the Financial District, and Chinatown. Twelve of the compactors will also have single-stream recycling bins attached. In 2011, Boston will receive seven Big Bellies with recycling bins

from the Commonwealth as part of its designation as a Massachusetts Green Community. These units will be placed in the Boston Common.

The Public Works Department will evaluate experience with these first public recycling bins to determine how to expand the program. The Department of Energy grant includes funding for the Babson Business School to gather data and evaluate the effect of Big Bellies and recycling bins on municipal greenhouse gas emissions.

Residential Solid Waste

Residential waste accounts for about one-fourth of Boston's solid waste-related GHG emissions.

Boston City Government currently provides curbside pickup for all trash and recycling in residential buildings. Residents in buildings with up to six units receive single-stream recycling carts from City Government; larger residential buildings must supply their own recycling receptacles. Residential solid waste includes typical household and kitchen trash, yard waste, commonly recycled materials such as paper, cans, and bottles, as well as old refrigerators, air conditioners, televisions, and computer monitors (a constantly expanding list).

From 2007 to 2010, the total amount of residential solid waste and the waste per household decreased, and the diversion rate (percentage of waste recycled) increased from 10 percent to 17 percent. Together, these changes lowered total non-diverted waste—and, therefore, GHG emissions—about 13 percent over this period. Although City Government instituted important expansions of its waste reduction programs during this time, it is likely that the overall amount of waste is down, because the economic recession of 2007–2009 and the slow recovery reduced consumption.An important factor in the rise in diversion rate was the completed implementation of single-stream recycling city-wide. As of July 2009, Boston residents no longer had to separate paper and cardboard from cans and bottles. Instead, they could mix all recyclable materials together in 64-gallon wheeled carts, which the Department of Public Works (DPW) delivered neighborhood–by-neighborhood. DPW completed cart distribution in June 2010.

The goal under the climate action plan is to raise the residential diversion rate to 50 percent by 2020. To reach that goal, Boston City Government is taking or investigating actions in five areas:

- Ensuring that all residents have equipment, information, and motivation
- Establishing a mandatory recycling policy
- Developing a comprehensive program for organic wastes
- Establishing or advocating for new policies for plastic bags, bottle deposits, and some manufactured goods
- Instituting an economic incentive for recycling

Equipment, Information, and Motivation

DPW maintains an active outreach program to ensure that new residents obtain recycling carts, that all residents receive information on annual dates for yard waste pickup, hazardous materials drop-off, and so on, and that everyone is motivated to recycle. The comprehensive Recycling and Trash Directory, mailed to every household in the city, includes: recycling and waste disposal guidelines; information on hazardous waste drop-off and yard waste pickup; schedules; and answers to frequently asked questions. In the fall of 2010, a city-wide Recycle More promotional campaign began with ads posted on MBTA buses, stations, and subway cars, and on street furniture.

Residential Solid Waste	FY07	FY08	FY09	FY10
Solid waste per household per month (lbs.)	140	134	131	130
Total annual solid waste collected (tons)	263,000	252,000	252,000	247,000
Diversion rate	10%	12%	14%	17%
Total recycling collected (tons)	27,000	31,000	36,000	41,000
Net non-diverted waste (tons)	236,000	221,000	216,000	206,000
Change in non-diverted waste from FY07	—	-6%	-8%	-13%

An important challenge in Boston is to ensure that residents in large multi-unit residential buildings (7 units or larger) have access to recycling services. Current Boston law requires owners of large residential buildings to provide it, but, as of the end of 2009, about 40 percent of Boston's 131,000 units in large buildings did not have recycling access. In 2009, 2,867 units in 66 buildings did begin receiving recycling services. The Waste Reduction Division works with the Inspectional Services Department (ISD) to conduct inspections for required services. In 2009, 32 owners of large residential buildings received Notices of Violation letters. 21 of these were referred to ISD for the issuance of fines; and 20 of the 21 then began providing recycling access. Public Works can suspend trash collection service to non-compliant buildings.

Mandatory Recycling

Current city ordinances and regulations "define goals and mechanisms for maximizing" residential recycling in Boston, but they do not require anyone to recycle. DPW is conducting research on possible components of an ordinance to require recycling for both residential and commercial properties.

Organic Waste

Organic waste—including yard waste, discarded waste, and manure—produces methane, a potent greenhouse gas when it decomposes in a landfill; but this same methane, the principal component of natural gas, is a source of energy when captured. Organic material, after methane extraction, can also be turned into fertilizer, compost, and other valuable products.

Boston City Government is already collecting spring and autumn residential yard waste and Christmas trees and turning it into compost. City Government is looking into developing a more comprehensive program, which could include, for example, year-round curbside pickup for residential food waste and acceptance of food waste from commercial and institutional food handlers (that is, restaurants, cafeterias, distributors, and so on). In 2008, Boston City Government received several responses to a Request for Expression of Interest in developing a year-round composting facility capable of accepting a wide range of organic material. City Government continues to explore possible sites and technologies, and hopes to establish a pilot program for curbside pickup of organics by 2012 and to see the development of a year-round anaerobic digester or composting facility by 2013.

Plastic Bags, Bottles, and More

The waste stream has many potential targets for increased recycling. Boston City Government strongly encourages manufacturers' take-back policies (taking back old equipment, appliances, or consumer goods for recycling when a person buys new ones) and alternatives to plastic bags. Many stores in Boston already offer incentives for customers to bring their own bags. City Government will continue to observe the evolution of these practices in the marketplace and the effectiveness of requirements in other jurisdictions.

Cans and bottles that do not require deposits are included in the residential curbside and other recycling programs. To create a greater recycling incentive, Boston City Government supports an expansion of the types of cans and bottles that must be subject to deposits and an increase in the deposit amount. As he has done for several years, Mayor Menino called for an expansion of the Massachusetts bottle bill in the legislative initiatives that he presented to the Massachusetts legislature in 2011.

Economic Incentives

Many cities, in the Commonwealth and elsewhere in the U.S., have discovered that voluntary recycling has been insufficient to meet recycling and waste-reduction goals. To provide a disincentive for trash (and an incentive for recycling), some jurisdictions impose a fee for the pickup of non-recyclable trash, with no fee for recycling. Boston has received a grant from the Commonwealth to perform a cost/benefit analysis of economic incentives to increase waste diversion. Several concerns beyond cost must be addressed before Boston adopts any type of unit based pricing for trash collection. These include implementation difficulties for multi-unit buildings, the risk of increased trash dumping by people attempting to evade fees, particularly in parts of Boston that already suffer from illegal dumping, and effects on low-income residents. The study will be completed in 2012.

Municipal Operations

2008 GHG emissions: 0.2 million tons eCO2 (2 percent of community total)

2020 reduction goal: 25 percent

Primary indicators: Total electricity, natural gas, diesel fuel, and gasoline use

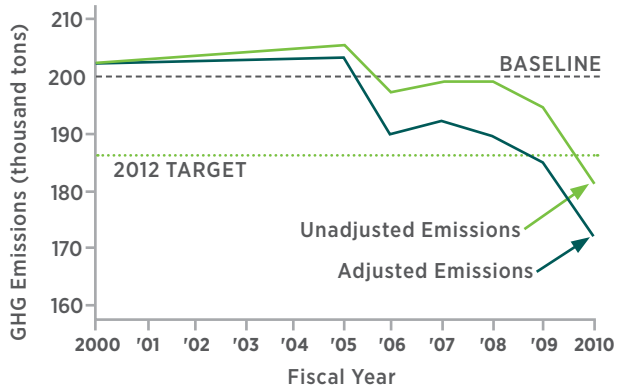
In fiscal year (FY) 2009, Boston's municipal operations were responsible for the emission of about 190,000 tons of GHGs. Energy needs included heating and electricity for the city's schools, libraries, police stations, community centers, traffic and street lights, and other public facilities and equipment, and gasoline and diesel fuel for school buses, police cars, fire trucks, and other municipal vehicles. Overall, buildings and streetlights accounted for about 80 percent of GHG emissions, and transportation for 20 percent.

As described in the 2007 Climate Action Plan, Boston City Government, for twenty years, has been taking an increasing number of steps to reduce the energy consumed and the GHG produced through municipal operations. In his 2007 executive order on climate action, Mayor Menino directed that:

> *1. The City of Boston…shall strive to meet or exceed the goal of reducing its annual greenhouse gas emissions seven percent below 1990 levels by 2012….*

Boston City Government has met the 2012 goal established by the Mayor. In FY2010, unadjusted GHG emissions from municipal operations were 10 percent lower than those in FY2000. Adjusted emissions, which include reductions for municipal purchasing of renewable energy credits and for the use of biodiesel were even lower. (Because the earliest reliable inventory of municipal emissions is from FY2000, the FY1990 baseline is assumed to be roughly the same, in line with calculations and assumptions by the Commonwealth of Massachusetts and the Leadership Committee). One major contributor to municipal GHG reduction was the replacement of old boilers that ran on fuel oil with more efficient boilers—often combined heat-and-power (CHP) units—that ran on natural gas, which produces fewer GHGs per BTU than fuel oil.

Greenhouse Gas Emissions from Municipal Operations



Boston City Government intends to reduce the GHG emissions from municipal operations at least 25 percent below 1990 levels by 2020.

As part of qualifying as a Massachusetts Green Community in 2010, City Government developed the City of Boston Energy Reduction Plan. The Energy Reduction Plan—based on the recommendations of the Leadership Committee and the Integrated Energy Management Plan from 2004, and on more recent developments in the energy marketplace—describes how City Government will reduce its energy use 20 percent below FY2010 levels within five years. Because GHG emissions are roughly proportional to energy use, successful completion of the Energy Reduction Plan will mean that the goal of 25 percent GHG reductions for municipal operations will be met by 2015 or 2016.

Municipal Buildings and Streetlights

Buildings and streetlights account for about 80 percent of municipal GHG emissions. Mayor Menino directed, in 2007, that all new municipal buildings meet LEED Silver standards, which will have significant long-term effects. To meet shorter-term energy and GHG reduction goals, City Government is continuing an aggressive program to:

- Track all energy use
- Develop comprehensive energy-efficiency retrofit plans
- Expand sources of renewable energy

Energy Managers

Boston Public Schools have had a dedicated Energy Office for over 20 years. In 2011, City Government will complete the hiring of two full-time energy managers funded by the federal Energy Efficiency and Conservation Block Grant to bring greater focus to tracking energy use and implementing energy efficiency throughout municipal operations and capital expenditures. After the federal funding runs out, the energy manager positions will be self-financing by capturing a portion of energy savings each year.

Energy Use Tracking and Benchmarking

As part of the development of its Energy Reduction Plan, City Government began using MassEnergyInsight, an inventory and tracking tool developed by the Commonwealth to assist green communities. With this tool, City Government is tracking energy use in each of its buildings. As energy and other data become complete, City Government has the intention to benchmark the performance of its buildings according to available national standards. Many school buildings, for example, have already received ratings through the federal Energy Star system.

Energy-Efficiency Implementation

As in the overall Boston community, the greatest opportunity for reducing energy use and GHG emissions in municipal operations is through greater energy efficiency in existing municipal buildings.

The 2004 Integrated Energy Management Plan laid out a retrofit plan for Boston's Top Ten municipal energy users—with the Copley Square library and City Hall at the top. The School Department, the Boston Centers for Youth and Family, and the Boston Public Libraries have developed extensive plans for many of their facilities.

Energy efficiency work is accelerating through use of existing municipal funds and federal grants. City Government is working with local utilities to take maximum advantage of the same energy-efficiency incentive programs offered to the general public. Boston has already secured a $6.2 million commitment from NStar to support retrofits of City Hall, the Copley Library, and several smaller library buildings through 2012. 45 percent of the savings described in the Energy Reduction Plan will come from existing buildings. Major facilities that will get retrofits, upgrades, or recommissioning include:

- Copley Library
- City Hall
- 400 Frontage Road
- Curley Community Center
- Tobin Community Center
- Several other Centers for Youth and Families
- Fire Department Headquarters
- Engine 41 Fire Station
- Police Academy
- All Police Department area headquarters
- At least 18 Boston public schools

Green Schools

The Boston Public Schools (BPS) have been leaders in energy efficiency since the 1980s and contributed half of municipal GHG emissions reductions from 2005 to 2010. Many Boston public schools have already received Energy Star ratings. Because the schools still account for a third of the GHGs from municipal operations, the new Energy Reduction Plan makes clear that school facilities remain important targets for continued improvements. However, as BPS especially recognizes, climate action must reach beyond physical structures to the way people think and behave.

Boston schools are finding ways to engage their students with climate change and energy science, engineering, and environmental policy. The Boston Youth Climate Action Now (YouthCAN), based at the Boston Latin School, has taken the initiative in developing and implementing plans for a new school roof incorporating solar power and a vegetated roof, and in organizing an annual climate summit. In fall 2011, pending state approval, the Boston Green Academy, a Horace Mann Charter School in the South Boston Educational Complex, will enroll 340 students in grades 9-12 to a program that will "focus on leadership, science, and global citizenship" and use a "green" theme to connect all subjects

To address the system as a whole, in 2011, Boston Public Schools were selected as one of the two school systems nationally to host a Green Schools Fellow from the U.S. Green Building Council. The mission of the fellow is "to drive change in how schools and campuses are designed, constructed and operated…and bring green schools to every child within this generation." The fellow will assist BPS in implementing the elements contained in LEED standards and in bringing environmental learning into district classrooms.

Streetlights

In addition to the savings in buildings, the Energy Reduction Plan specifies a 40-percent reduction in the energy use of street lights. In the next five years, City Government, supported by funding from NStar, will place more-efficient LED bulbs in 29,000 of its 64,000 electric street lights. In all of its 2,790 gas street lights, City Government will place sensor-controlled valves and igniters that can turn off the gas during the daytime (currently, gas street lights are on all the time).

Renewable Electricity

City Government has a goal of obtaining 20 percent of its electricity from renewable sources by 2020.

In 2010, approximately 11 percent of municipal electricity was covered by renewable energy credits purchased by City Government. (The renewable energy credits represent electricity from renewable sources certified by a third-party non-profit organization.) The amount of electricity produced by municipally-owned photovoltaic (PV) installations is not yet substantial, but is growing. There are currently 200 kW of PV installed on municipal facilities, with an additional 800-900 kW of PV and a 1.65 MW wind turbine planned over the next few years. These installations, when complete, will cover about three percent of current municipal electricity usage.

The Commonwealth's Renewable Portfolio Standard requires that 20 percent of electricity sales in Massachusetts in 2020 come from renewable sources and alternative sources (for example, combined heat-and-power). The combination of these three sources of renewable electricity makes it likely that City Government will meet its renewable-energy goal before 2020.

Municipal Transportation

Mayor Menino's 2007 executive order on climate action established that municipal departments must purchase hybrid, alternative-fueled, or high-efficiency vehicles whenever possible. Hybrids in the municipal fleet now number over 80. The Energy Reduction Plan lays out additional measures to reduce energy use for municipal transportation 20 percent between 2010 and 2015. These include:

- Continued replacement of school buses with more efficient models
- More efficient school bus routing

- Starting in 2011, replacement of current standard police cruisers with more efficient models
- Installation of anti-idling equipment for police vehicles and increased enforcement of anti-idling for all municipal vehicles

Municipal Procurement and Food Programs

As a result of Mayor Menino's 2008 executive order on greening municipal operations, the Purchasing Office and the Department of Innovation and Technology issued Environmentally Preferable Procurement Guidelines and a Green Information Technology Roadmap. Both policies include energy efficiency and recycling as important components. Although, under Massachusetts law, Boston City Government may not give preferences in its procurement practices to local vendors, City Government has been active in encouraging the development of local businesses, including green businesses, that may be capable of competing successfully for municipal contracts.

In the area of food, City Government intends, as a pilot project, to make available three municipally owned lots for urban agriculture. The goal is to encourage small commercial operations that go beyond the community gardens, which primarily serve individual families. In 2011, the Zoning Commission will receive proposals to rezone the three parcels to permit urban agriculture, which will then be opened up for bids to lease. City Government has been active in promoting access to local food for all residents: in 2010, Boston had 28 regular farmers' markets.

Implementation, Community Engagement, & Economic Development

Boston City Government is committed to ensuring that the development and implementation of its climate action policies and programs engages the entire Boston community, has human and financial resources adequate to its goals, and promotes the economic vitality of all segments of the community. Indeed, the Boston community cannot reach its climate-action goals unless those three conditions are met.

Collaboration

Attainment of the city's climate goals will require the active participation of all segments of the Boston community and, in many cases, the coordination of Boston measures with climate action at regional, state, and federal levels. The mitigation and adaptation sections of this report detail many ways that City Government is formally and informally partnering with other government entities and non-profit organizations. However, it is paramount that Boston residents, businesses, and institutions have a clear understanding of the need for and benefits of climate mitigation and adaptation, an active role in the formulation and implementation of policies and programs, and the motivation and resources for effective action.

In November 2011, a group of more than 30 Boston business and civic leaders organized themselves into a Green Ribbon Commission to promote climate action in Boston. With Mayor Menino as a co-chair, the Commission, including expertise that spans academia, biotech, construction, energy, financial services, health care, philanthropy, real estate, tourism and more, will help to lead implementation of Boston's climate strategies and review City Government's progress in meeting its goals. City Government is also pursuing resources to establish a community climate action committee that will bring the expertise of Boston's neighborhoods and small business community to bear on climate policies and measures and to help energize the community around climate action.

The Boston community is already providing substantive assistance in the effective implementation of climate action measures. Polling conducted during five community workshops held in early 2010 showed that community-based organizations are often more trusted sources of energy information than governments or utility companies. Therefore, Renew Boston, City Government's major program for assisting Boston's residents, businesses, and institutions with energy efficiency and renewable energy, developed a community-based marketing and outreach strategy. Since the fall of 2010, this strategy is being deployed by 13 community-based organizations to connect Boston households with no-cost weatherization services. In 2011, Renew Boston contracted with three neighborhood organizations to serve as network coordinators for this effort.

In another example of reaching out to involve the community in policy development, in 2011, the Boston Redevelopment Authority, supported by federal funding, will convene businesses in the Newmarket Business District to develop recommendations for assisting Newmarket businesses in increasing energy efficiency and use of renewable energy sources.

In conformance with existing law, City Government is also committed to ensuring that the Boston community has a formal voice in the consideration of ordinances and regulations. In November 2010, the City Council

considered whether to adopt a higher energy efficiency standard (known as the stretch energy code) for new construction. Representatives of business, the community, and environmental groups testified at the Council hearing. (The Council subsequently voted in favor.) Many specific climate measures discussed later in this plan will require new or modified ordinances and regulations, for which public hearings are required. City Government will continue to strongly encourage public participation.

City Government will also engage the community through a citywide awareness campaign and through education and the provision of information. There are recently deployed media campaigns around specific elements of the climate action plan: Renew Boston's energy efficiency program, expanded recycling, new bicycle lanes. City Government has begun consultations with a local media firm to develop a more general climate awareness campaign that can work in conjunction with more narrowly focused messages. The experience of the Boston Public Health Commission will be useful: first, because of the Commission's experience in reaching out to vulnerable and difficult-to-contact populations and in communicating complex issues; second, because of the value of placing climate change within the context of public health.

Boston City Government will continue to improve the level and accessibility of climate-action information on its website. In September 2010, the Center for Digital Government rated Boston's municipal web portal the best in the country, and City Government is determined to remain a leader. In the fall of 2010, the climate pages on the website were reorganized; Renew Boston opened its own website; and many smaller improvements and additions occurred. The amount of—and need for—information on climate and energy are continually expanding, and the website will reflect this dynamism.

Resources for Successful Action

Although all government functions are being pressed as a result of stresses in the national and local economy, Boston City Government understands that climate action is not an additional task that it needs to take on, but central to the mission that it already has. For this reason, climate action can be—and to be most effective, must be—integrated into existing programs, particularly those that involve capital and long-range planning.

Climate mitigation, primarily by reducing energy use and, therefore, energy costs, will produce a net return of over two billion dollars to Boston residents, businesses, and institutions through 2020, but initial costs of efficiency measures are often difficult to meet. For the next several years, Boston City Government has ensured that there are sufficient financial resources through federal grants and state-mandated, utility-administered energy efficiency programs to provide financial assistance and incentives to residents, businesses, and institutions and to cover some administrative costs of government programs. Local foundations have been particularly generous in providing funding that supports community and technical advisory panels assisting these efforts. City Government will continue working with all of its partners to identify continuing sources of financial support as well as more effectively folding climate activities into existing programs.

The Mayor's Office of Environmental and Energy Services coordinates climate action across municipal departments and agencies, although individual departments remain responsible for actions within their own areas of authority.

Monitoring Progress

Boston City Government will continue to issue an annual inventory of greenhouse gas emissions for both municipal operations and the community as a whole. This inventory remains the ultimate indicator of the progress of Boston's mitigation efforts, but some details of programmatic progress can be revealed by the new list of Selected Climate Mitigation Indicators, which will also be updated annually. Some municipal and community climate action indicators will also be incorporated in the publicly available Boston About Results Performance Management System. However, many possible indicators remain problematic, because they are difficult to measure, difficult to define, or difficult to tie directly to GHG reductions. Boston City Government is committed to expanding the list of reliable programmatic indicators as well as its ability to collect data. Nevertheless, implementation of measures will not wait for the development of rigorous indicators.

Selected Climate Mitigation Indicators

Indicator	Source	Year	Value
Community greenhouse gas emissions	Environment Dept.	2009	8.2 million tons[1]
Municipal greenhouse gas emissions	Environment Dept.	2010 fiscal[2]	0.17 million tons[3]
Residential electricity	NStar	2010	1,226 million kWh
Residential natural gas	National Grid	2009	73.2 million therms
Residential fuel oil	Environment Dept.	2009	34.5 million gals[1]
Commercial/industrial electricity	NStar	2010	5,418 million kWh
Commercial/industrial natural gas	National Grid	2009	204.5 million therms
Commercial/industrial fuel oil	Environment Dept.	2009	31.4 million gals[1]
Energy efficiency retrofits	Renew Boston	In development	In development
Street trees	Urban Forest Coalition	2010 fiscal[2]	34,217 trees
Vehicle miles traveled	MassDOT	2010	3.1 million miles[1]
Public transportation mode share	Transportation Dept.	In development	In development
Electric-vehicle charging stations	Transportation Dept.	2010	10
Low-GHG taxi cabs	Police Dept.	2010	586 hybrid cabs
Bike lanes	Boston Bikes	2010	38 miles
Residential parking permits issued	Transportation Dept.	2010 fiscal[2]	63,253 permits
Solid waste per household per month	Public Works Dept.	2010 fiscal[2]	130 pounds
Residential waste diversion rate	Public Works Dept.	2010 fiscal[2]	17 percent

Notes:

1. Value is calculated based on models or assumptions, or contains components so calculated.
2. The City of Boston fiscal year runs from July 1 to June 30.
3. Adjusted to include reductions from purchase of renewable energy credits and biodiesel.

Fortunately, the most important set of climate actions, those that revolve around increasing the energy efficiency of buildings, is most amenable to measurements of effectiveness and cost. The Renew Boston program is developing the necessary data collection and analysis tools.

Several Boston City Government staff are working on a national project to develop standards for assessing community sustainability. The Star Community Index is a project of ICLEI-Local Governments for Sustainability, the U.S. Green Building Council, and the Center for American Progress. The index will include standards for measuring progress in climate and energy goals, but also address natural systems, land planning, workforce development, education and health care, and other topics. A small selection of the goals will start "beta testing" in several communities in 2011.

Equity and Economic Development

The Climate Action Leadership Committee stated, "Implementation of the climate action recommendations should not exacerbate existing social and economic inequalities and should, whenever possible, contribute to reducing those inequalities." This guidance is fully consistent with the Boston City Government's policies in all areas. Renew Boston has had a special focus on bringing energy efficiency to households with between 60 to 120 percent of median household income. (Households with lower income were already eligible for free weatherization services.) Although a specific adaptation recommendation calls for giving "special attention" to the most vulnerable members of the community, policies and programs of the Office of Emergency Preparedness and the Public Health Commission already are aligned with that goal.

In line with the equity goals, the Leadership Committee emphasized that City Government needs to ensure compliance with its Resident Jobs Policy, help prepare residents and businesses for the economic demands that climate action will create, and maximize access to training and placement programs to spur economic development. The Commonwealth of Massachusetts estimates that its Clean Energy and Climate Plan, which parallels Boston's plan, will produce 42,000 to 48,000 jobs state-wide in the next ten years. In the next several years, City Government will:

- Continue, through Green Jobs Boston, to connect Boston residents with green job training and employment opportunities by working directly with employers, training agencies, and the One-Stop Career Center system
- Through its Green Building Contractor Training Institute, which offered its first workshops on Green Building 101 in 2010, repeat this course and develop additional courses (for example, on green roofing)
- Establish hiring goals identical to those in the Boston Resident Jobs Policy (50% resident, 25% minority, 10% women) for climate-action projects, as Renew Boston did for the workforce on its 1-4 family residential energy-efficiency program as a model. The project's principal implementation partner has, to date, exceeded those hiring goals.
- Work with local training programs, led by the community action agencies, to align training with standards set by the U.S. Departments of Energy and Labor
- Work with other green job training funders, led by the Skillworks Initiative in Boston, to expand green job training options beyond weatherization and energy efficiency to include recycling and green manufacturing; sustainable deconstruction/waste management/toxic remediation; and water/wastewater/storm water management
- Track, to the extent feasible, the number of green jobs created and the wages for those jobs

Sparking the Climate Revolution

The Mayor's Climate Action Leadership Committee and Community Advisory Committee concluded their April 2010 report to Mayor Menino with an exhortation that speaks for Boston City Government and the Boston community:

There is much to do. Successful implementation of [climate measures] will require hard work and broad cooperation. The Boston community and its government will need to prioritize actions, establish benchmarks of progress and methods of measurement, prepare as well as possible, re-evaluate costs and benefits, and adjust programs and policies, while keeping long-term goals firmly in mind.

With eagerness to learn, flexibility to respond, concern for this generation and those to come, and willingness to share the burdens and benefits of climate action, Boston can—and should—grow, lead, and prosper. In the urgency of this moment—as in other tumultuous and historic moments—Boston stands ready to act.

Resources for Climate Action

For more information about Boston's climate action and sustainability programs, please visit:

Boston Climate Action:
http://www.cityofboston.gov/climate

Office of Environmental and Energy Services:
http://www.cityofboston.gov/environmentalandenergy

Energy Retrofits for Existing Buildings

Renew Boston: http:// renewboston.org
Residential: 617-635-SAVE
Commercial: please contact RISE Engineering at 800-422-5365 x122
Email: saveenergy@renewboston.org

New Green Buildings

Boston Green Building:
http://www.cityofboston.gov/environmentalandenergy/buildings/

Boston Zoning Code, Article 37, Green Buildings:
http://cityofboston.gov/bra/pdf/ZoningCode/Article37.pdf

Renewable Energy

Solar Boston: 617-635-3425
http://www.cityofboston.gov/environmentalandenergy/renewableenergy/solar.asp

Wind Energy: 617-635-3425
http://www.cityofboston.gov/environmentalandenergy/renewablenergy/wind.asp

Transportation

Boston Complete Streets: www.bostoncompletestreets.org

Boston Bikes: 617-918-4456
http://www.cityofboston.gov/bikes/

Recycling

Boston Office of Waste Reduction: 617-635-4500
http://www.cityofboston.gov/publicworks/recyclingandsantiation

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MAYOR THOMAS M. MENINO

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