

TOWN of BROOKLINE
Massachusetts

2012 CLIMATE ACTION PLAN

Prepared by the Selectmen's Climate Action Committee
Approved by the Board of Selectmen, December 11, 2012
Online at <http://www.brooklinema.gov/cap/>

Preface to the Paper Version
of
the 2012 Brookline Climate Action Plan

For presentation to the Brookline Board of Selectmen and to create a permanent public record, all of the critical portions of the 2012 Climate Action Plan (CAP) have been reproduced on paper. In paper or hardcopy form, however, a great deal of the functionality of the CAP—in its intended form, as an online wiki—is lost. For instance, though both versions have tables of contents, no index is provided since the wiki version is fully searchable. Similarly, the wiki provides live links to many external sources on the World Wide Web. These are so voluminous that it is not practical to reproduce all of them as part of the hardcopy version. In addition, the organization of a wiki—like other sites on the World Wide Web—is multidimensional rather than linear. Therefore some of the external sources and some parts of the CAP have had to be reproduced as appendices, which does not do justice to their integral relationship to the overall CAP. In the paper version of the plan, the links continue to appear in blue, and references to the appendices appear immediately after the links, to underscore how much information is accessible through the wiki version. Finally, certain pages of the wiki version are not relevant to the hardcopy version. Thus, for example, the wiki “Help” pages have been omitted.

In certain respects, the most important parts of the plan are the individual [Actions to Reduce Emissions \(Appendix A\)](#). These have been reproduced as appendices labeled A-1, A-2, etc.

The Climate Action Plan is available in online form at <http://www.brooklinema.gov/cap/>.

Preface

Brookline’s 2012 Climate Action Plan (CAP) has been prepared by the Selectmen’s Climate Action Committee (CAC). A paper copy of the CAP was presented to the Board of Selectmen and approved unanimously by them at their December 11, 2012, meeting. (Also see *Preface to the Paper Version*.) The CAP, however, was prepared in the form of a *wiki*. This was done for two primary reasons. First, a wiki is an excellent tool for collaborative drafting, and thus, volunteer members of the CAC were able to prepare the plan collaboratively using a minimum of paid town staff time. Second, throughout the planning process, the CAC has tried to maximize public participation. A wiki has been one vehicle for doing that—since the very first draft, which was prepared at the end of 2011, the entire draft has continuously remained available to the public online.

Because the Climate Action Plan is a living document in the form of a wiki, what you see here has been modified from the plan approved in 2012. The approved version is available to the public at the Brookline Public Library and in the Brookline Department of Planning and Community Development. This wiki version of the plan, however, remains active. The plan is a living document that will continue to evolve and report Brookline’s progress in addressing climate change. The document can be edited by anyone. The CAC, however, asks members of the public to please edit primary pages only if there is an indisputable error. On the other hand, members of the public should feel free to add comments, suggestions, draft language, or questions on any “Discussion” page associated with any primary page. (To do so, please [register](#), and use the normal “Discussion/Talk” page format, which is explained [here](#).) And, naturally, [liaisons](#) may update the pages for the actions on which they are working. (As with Wikipedia or other wikis, there is, of course, always the possibility of spam or vandalism. But the wiki software permits the CAC to quickly and easily undo any inappropriate changes made to the plan and recover all original text.)

The CAC hopes that the CAP will continue to be as comprehensive as possible, and therefore new Actions to Reduce Emissions can be added at any time. Any group or individual wishing to begin work on a new initiative or already engaged in climate action work that does not appear in the CAP should contact the CAC via the [Brookline Planning Department](#).

Understanding this Document

You can read this document just like any other online document; see table of [Contents](#), below. In addition, it is fully **searchable**; the search box appears in the upper right corner of every page.

If you want to participate actively in the evolution of the Climate Action Plan, these hints will be helpful:

- This Climate Action Plan is a [wiki](#) that uses the free, open source software available from [MediWiki](#) – just like Wikipedia.
- If you would like to edit or add information to the plan, you can simply click “Edit” (above) and experiment (carefully). But if you are not a member of the CAC, please do not edit primary pages unless you see an indisputable error. On the other hand, feel free to add comments, suggestions, draft language, or questions on any “Discussion” page associated with any primary page. (To do so, please [register](#), and use the normal “Discussion/Talk” page format, which is explained [here](#)).
- Our “[Help](#)” page (to the left) will give you a very brief introduction to editing. You can consult the [User’s Guide](#) for detailed information about using the wiki software.

Background

- Activities and membership of the Selectmen’s [Climate Action Committee \[Appendix B\]](#)
- Official responsibilities and composition of the Selectmen’s Climate Action Committee as [voted \[Appendix C\]](#) by the 2008 Annual Town Meeting
- [Climate change action in Brookline \[Appendix D\]](#), including [Climate Action Brookline \(CAB\)](#)

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Introduction to Climate Change and Its Impact

What is Climate Change?

Climate Change is a significant and persistent change in the mean state of the climate or its variability. Climate change occurs in response to changes in some aspect of Earth's environment: these include regular changes in Earth's orbit about the sun, re-arrangement of continents through plate tectonic motions, or anthropogenic modification of the atmosphere. By the mid-20th century, scientists became aware of global climate changes, understood to be brought about through increasing concentrations of particular gases in our atmosphere, known as greenhouse gases.

Why Respond to Climate Change on the Local Level?

Brookline has a choice. We can take positive steps to reduce our greenhouse gas (GHG) emissions, or we can continue to wait for some other entity to come up with a universal "fix." A fundamental principle in planning is its focus on long-range impacts. As climate disruption continues to bring profound changes to the natural world in the form of species migration, increased severe weather events, drought and flooding, agricultural disruption, rising ocean levels, etc., cities and towns around the world will find themselves vulnerable. There are steps to take on the local level to both reduce GHG emissions and to transform our communities into ones that are more resilient and therefore capable of surviving and even thriving in such challenging conditions.

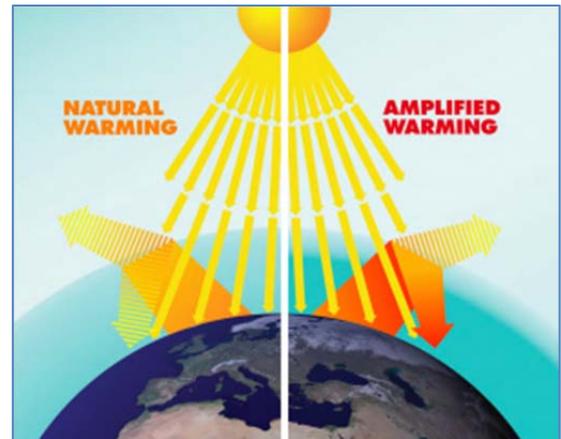
Response to climate change has been slow and muted on the federal level. States and municipalities are in some cases more nimble, experimental and proactive when it comes to innovating place-based policies and technologies. This is an advantage smaller units of government can exploit, giving them the edge when it comes to invention and new organizational options. Locally, each community has its own socioeconomic and cultural fabric into which proactive policy innovation and new technologies can more easily be deployed. The failure to respond is both a human failure and a step towards planetary catastrophe.

Adaptation to the increased variability of our climate is necessary to prevent costly damage and repair to our built environment, our infrastructure and natural systems. For instance, stabilizing soils with plant material, minimizing pavement and planting trees and vegetation all help buffer our habitat from strong winds, heavy rains, drought and excessive heat. These measures also save energy through reducing urban heat island effects, etc. As we move into the future, the costs to retrofit and rebuild infrastructure, repair damaged environments and replace lost or damaged structures will only increase. It only makes sense to take whatever steps we can to prevent the damage in the first place. The cost of doing nothing is greater costs in the future.

The Science in Detail

The Greenhouse Effect

Earth's climate is influenced by interactions involving the sun, ocean, atmosphere, clouds, ice, land and life. Covering 70% of Earth's surface, the ocean exerts a major control on climate by dominating Earth's energy and water cycles. It has the capacity to absorb large amounts of solar energy. Heat and water vapor are redistributed globally through density-driven ocean currents and atmospheric circulation. Changes in ocean circulation caused by tectonic movements or large influxes of fresh water from melting polar ice can lead to significant and even abrupt changes in climate, both locally and on global scales.



The amount of solar energy absorbed or radiated by Earth is modulated by the atmosphere and depends on its composition. Greenhouse gases—such as water vapor, carbon dioxide, and methane—occur naturally in small amounts and absorb and release heat energy more efficiently than abundant atmospheric gases like nitrogen and oxygen. Small increases in carbon dioxide concentration have a large effect on the climate system.^[1] Collectively, those gases are referred to as greenhouse gases (GHGs) because they can cause increased atmospheric warming on Earth in a manner analogous to the micro-climate under the glass of a greenhouse.

The abundance of greenhouse gases in the atmosphere is controlled by biogeochemical cycles that continually move these components between their ocean, land, life and atmosphere reservoirs. The abundance of carbon in the atmosphere is reduced through seafloor accumulation of marine sediments and accumulation of plant biomass and is increased through deforestation and the burning of fossil fuels, as well as through other processes.

Among the most notable GHGs are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and chlorofluorocarbons (CFCs). Their sources include fossil fuel combustion, agriculture and industrial processes. Global atmospheric warming is occurring because of an increased greenhouse effect brought on by human activities, primarily burning fossil fuels and changing land cover patterns, which are increasing the concentrations of some of these gases. Therefore, an amplified greenhouse effect is occurring, with a greater amount of the sun's warming radiation being trapped in the Earth's atmosphere.

Steep increases in atmospheric GHG concentrations have occurred since the industrial revolution (Figure 1: Atmospheric Concentrations of CO₂, Methane, and Nitrous Oxide).

Burning fossil fuels, releasing chemicals into the atmosphere, reducing the amount of forest cover, and rapid expansion of farming, development and industrial activities are releasing carbon dioxide into the atmosphere. Those increases are unprecedented in Earth's history. Because these gases can remain in the atmosphere for hundreds of years before being removed by natural processes, their warming influence is projected to persist into the next century.

As a result of higher GHG concentrations, global average surface temperature has risen by about 0.6°C (1.08°F) over the twentieth century. Additional warming of more than 0.25°F (0.14°C) has been measured since 2000, with 10 of the last 12 years likely the warmest on record since 1861. Though the total increase may seem small, it likely represents an extraordinarily rapid rate of change compared to changes in the previous 10,000 years.

The Intergovernmental Panel on Climate Change (IPCC) concluded that the warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level.

Notes

1. ↑ Climate Literacy Booklet

Future Climate Change Predictions

Over the 21st century, climate scientists expect Earth’s temperature to continue increasing, very likely more than it did during the 20th century. The International Panel Climate Change predicts that average global temperature will increase by 2 degrees by 2025 and by 5.4 degrees by the end of the century. Two anticipated results are rising global sea level and increasing frequency and intensity of heat waves, droughts, and floods. These changes will affect almost every aspect of human society, including economic prosperity, human and environmental health, and national security.

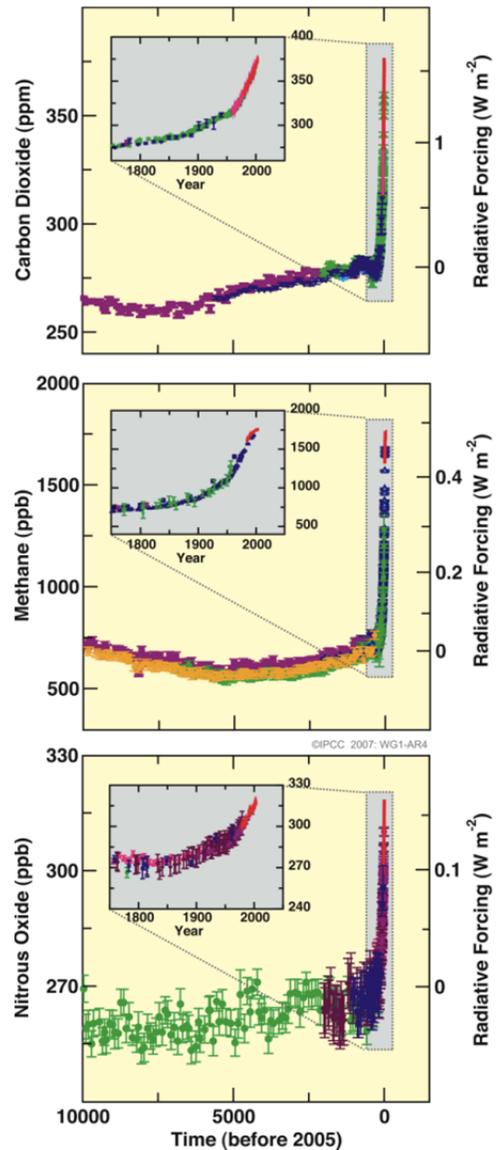


Figure 1: Atmospheric Concentrations of CO₂, Methane, and Nitrous Oxide

Climate Change Impacts

The following general climate change impacts are predicted:

Sea-Level Rise: Melting of ice sheets and glaciers, combined with the thermal expansion of seawater as the oceans warm, is causing sea level to rise. Seawater is beginning to move onto low-lying land, to contaminate coastal fresh water sources, and to submerge coastal facilities and barrier islands. Sea-level rise increases the risk of damage to homes and buildings from storm surges such as those that accompany hurricanes.

Changing Precipitation Patterns: Climate plays an important role in the global distribution of freshwater resources. Changing precipitation patterns and temperature conditions will alter the distribution and availability of freshwater resources, reducing reliable access to water for many people and their crops. Winter snowpack and mountain glaciers that provide water for human use are declining as a result of global warming.

Increased Extreme Weather Incidents: Incidents of extreme weather are projected to increase as a result of climate change. Many locations will see a substantial increase in the number of heat waves they experience per year and a likely decrease in episodes of severe cold. Precipitation events are expected to become less frequent but more intense in many areas, and droughts will be more frequent and severe in areas where average precipitation is projected to decrease.

Increasing Ocean Acidity: The chemistry of ocean water is changed by absorption of carbon dioxide from the atmosphere. Increasing carbon dioxide levels in the atmosphere is causing ocean water to become more acidic, threatening the survival of shell-building marine species and the entire food web of which they are a part.

Ecosystem Disturbance: Ecosystems on land and in the ocean have been and will continue to be disturbed by climate change. Animals, plants, bacteria and viruses will migrate to new areas with favorable climate conditions. Infectious diseases and certain species will be able to invade areas that they did not previously inhabit.

Increased Mortality for Vulnerable Populations: Human health and mortality rates will be affected to different degrees in specific regions of the world as a result of climate change. Although cold-related deaths are predicted to decrease, other risks are predicted to rise. The incidence and geographical range of climate-sensitive infectious diseases—such as malaria, dengue fever, and tick-borne diseases—will increase. Drought-reduced crop yields, degraded air and water quality, and increased hazards in coastal and low-lying areas will contribute to unhealthy conditions, particularly for the most vulnerable populations.

Climate Change Impacts in Massachusetts and the Northeast

Average temperatures in Massachusetts have risen more than 1.5°F since 1970. Winters are warming most quickly, with an increase of nearly 4°F occurring between 1970 and 2000. Over the next several decades, temperatures across the Northeast will rise 2.5°F to 4°F in winter and 1.5°F to 3.5°F in summer regardless of the emissions choices we make now (due to heat-trapping emissions released in the recent past). By mid-century and beyond, however, today's emissions choices generate starkly different climate futures. Without significant change in emissions growth, average temperatures in the Northeast are expected to rise 8-12°F above historic levels in winter and 6-14°F in summer by late century, causing Boston's climate to possibly feel like that of Memphis, Tennessee. Cities across the Northeast, which today experience few days above

100°F each summer, could average 20 such days per summer. The length of the winter snow season could be cut in half across northern New York, Vermont, New Hampshire and Maine, and reduced to a week or two in southern parts of the region. Winter precipitation in the Northeast is projected to increase by 20-30%, with more rain than snow.

Massachusetts' Climate Change Impacts

Global average sea level is conservatively projected to rise one to two feet. Massachusetts is vulnerable to severe impacts from climate change that are expected to include:

- **Increased coastal flooding** from intense storms and permanent inundation of low-lying coastal areas; infrastructure and development located along the coast affected by storm surges, sea level rise and saltwater intrusion;
- **Degraded water quality and quantity**, habitat loss and increased sedimentation and pollution of waterways due to changes in precipitation;
- **Increased number of extreme heat days**, impacting those with respiratory and cardiovascular conditions; habitat for commercially important fish and shellfish species, such as cod and lobster, shifted northward; and for recreation areas, decreased average ski and snowboard seasons and increased need for artificial snow making;
- **Local and regional air pollution:** In addition to causing climate change, emissions from the combustion of fossil fuels result in a range of negative human health and ecosystem impacts. The U.S. Environmental Protection Agency (EPA) has established health-based National Ambient Air Quality Standards (NAAQS) for six pervasive pollutants that have well-documented health and environmental impacts: ozone (O₃), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM), lead, and carbon monoxide (CO). Exposure to each of these pollutants has been linked to adverse health effects. These pollutants also damage ecosystems. Acid rain is created when SO₂ and NO_x emissions mix with water in the atmosphere. Acid rain lowers the pH levels of lakes, rivers and soils, harming fish and invertebrates. Exposure to ozone is associated with a range of adverse impacts to vegetation, including impairment of tree growth and loss of agricultural crop yield. Ozone can increase the rate of water loss by trees causing forests to drain streams and soils of water, thus stressing natural ecosystems beyond the trees themselves. The Boston metropolitan region is non-compliant with US EPA air quality standards for ozone. Therefore, any meaningful reduction in GHG emissions, especially from the transportation sector, will also have significant health and ecological co-benefits.

Recent Experiences of Climate Change Impacts in the News

Increased land, air and ocean temperatures trigger a whole host of interrelated climate impacts. Warmer air and water allows storms to carry greater moisture content, resulting in more severe weather events and changes to precipitation patterns around the globe. A June 16, 2011, *Boston Globe* article titled “A Spring of Extremes Like No Other,” notes:

Spring 2011 saw an unprecedented confluence of floods, tornados and fires in the USA. “The tornado outbreak, floods and drought during April were comparable to extreme events in the past, but never so close together in recorded history,” agreed Deke Arndt, chief of the climate monitoring branch at the National Climatic Data Center in Asheville, N.C. The researchers explained that April brought an active weather pattern across the 48 contiguous United States, with strong storms moving through the center of

the country, tapping into moisture from the Gulf of Mexico as they matured across the mid-Mississippi Valley. Contributing to the thrashing were the La Niña conditions in the Pacific Ocean, unusually warm ocean temperatures in the Gulf of Mexico, and the increase of moisture in the atmosphere caused by the warming climate.

These types of extreme weather events cause significant property damage, business interruption and harm to human life and limb. The additional costs, impacts and harm from these events will touch every aspect of our economy. The insurance industry, as well as many in the financial service sector, health care and our own Defense Department, has taken note of the need to study and plan for the ramifications of climate change disruptions. A January 2011 *Insurance Journal* article titled “Insurance Industry Worries about Growing Risks from Climate Change” reported:

Overall losses from weather-related natural catastrophes rose by a factor of 3 in the period 1980-2009, taking inflation into account, while insured losses from such events increased by a factor of about 4 during the same period. Total insured losses from natural disasters in 2010 were \$37 billion... While taking into account rising wealth, population and urbanization, “there is evidence indicating that the growing number of weather-related catastrophes most probably cannot be fully explained without climate change,” [global re-insurer Munich Re] says.

Even more profound are the fundamental disturbances to ecosystem balance that can be triggered by climate change. Individual organisms survive within specific ranges of temperature, precipitation, humidity, and sunlight. Organisms exposed to climate conditions outside their normal range must adapt or migrate, or they will perish. Flora, fauna and insects that once inhabited a place may, due to changing climate conditions, no longer be able to survive in that same place. Altered populations can upset existing predator/prey or food chain relationships, putting whole species at risk. Consider the case of the Colorado Mountain Pine Beetle, which had been somewhat limited in its damage by sustained freezing temperatures in the winter. However, recent winters have been warmer, allowing the beetle population that successfully overwinters to grow, posing a severe threat to Colorado’s pine forests. The potential for serious food shortages arise as once relied upon crops, fisheries and animal husbandry operations are no longer viable due to changes in natural conditions.

Responding to Climate Change

The impacts of climate change may affect the security of nations. Reduced availability of water, food and land can lead to competition and conflict among humans, potentially resulting in large groups of climate refugees.

Humans may be able to mitigate climate change or lessen its severity by reducing greenhouse gas concentrations through processes that move carbon out of the atmosphere or reduce greenhouse gas emissions. A combination of strategies is needed to reduce greenhouse gas emissions. The most immediate strategy is conservation of oil, gas and coal, which we rely on as fuels for most of our transportation, heating, cooling, agriculture and electricity. Short-term strategies involve switching from carbon-intensive to renewable energy sources, which also require building new infrastructure for alternative energy sources. Long-term strategies involve innovative research and a fundamental change in the way humans use energy. Humans can adapt to climate change by reducing their vulnerability to its impacts. Actions such as moving to higher ground to avoid rising sea levels, planting new crops that will thrive under new climate

conditions, or using new building technologies, represent adaptation strategies. Adaptation often requires financial investment in new or enhanced research, technology and infrastructure.

The History of Climate Change Action Planning in Brookline



2002 Local Action Plan on Climate Change

Brookline was one of the first communities in Massachusetts to respond to climate change. In the span of three months in 2000, three key, related events took place. Under the auspices of the Brookline Conservation Commission and the Brookline Green Space Alliance, a community-wide symposium on climate change was convened. In addition, the first meeting of Climate Change Action Brookline (now known as [Climate Action Brookline](#) or CAB), a local, grass-roots organization, was held, and it went on to become a founding member of the [Massachusetts Climate Action Network](#). And, on April 25, 2000, responding to advocacy from town residents and leadership by Conservation Commission staff and other town staff, the Brookline Board of Selectmen passed a resolution acknowledging that “greenhouse gases released into the atmosphere will have a profound effect on the Earth’s climate.”

The Board of Selectmen’s 2000 climate change resolution also committed the town to joining with communities all over the world in the Cities for Climate Protection Campaign. That campaign, sponsored by the International Council for Local Environmental Initiatives (ICLEI), provided a methodology for assessing the town’s current greenhouse gas (GHG) emissions and for creating a plan to reduce them. Using that methodology, the town’s first Greenhouse Gas Emissions Inventory was completed during the summer of 2000, and town staff, with the assistance of town-resident-volunteer members of CAB, began preparing the town’s first climate action plan. In February 2002, the Board of Selectmen adopted Brookline’s [Local Action Plan on Climate Change](#).

The town immediately began to take steps to implement the climate action plan, as described in [“Where We Are Today,”](#) below. But as awareness of climate change increased and as the complexity of the required response became clear, it also became apparent that greater progress could be made by institutionalizing the effort in town government. With the support of the Board of Selectmen and town staff, in May 2008 members of CAB presented a warrant article to Brookline Town Meeting, which overwhelmingly voted to create a fifteen-member Selectmen’s Climate Action Committee to propel and coordinate implementation of the climate action plan. That committee has worked and continues to work on a number of successful projects, but determined in late 2010 that its efforts and those of town staff, residents and businesses would be even more effective if coordinated by means of an updated climate action plan.

Where We Are Today

Progress Made Under the 2002 Local Action Plan on Climate Change

In May 2000, the Town of Brookline elected to participate in the Cities for Climate Protection Campaign, a program of the International Council of Local Environmental Initiatives (ICLEI). The Cities for Climate Protection Campaign follows a ‘Five Milestone’ process:

- Milestone One: Conduct a Greenhouse Gas Emissions Inventory and Report
- Milestone Two: Set a Greenhouse Gas Emissions Reduction Target
- Milestone Three: Develop a Local Climate Action Plan
- Milestone Four: Implement the Local Climate Action Plan
- Milestone Five: Monitor Emissions Reductions

The Town completed the first three milestones in the ICLEI program, publishing a greenhouse gas inventory in August 2001 and a Greenhouse Gas Emissions Reduction Target and Climate Action Plan in February 2002. The August 2000 Greenhouse Gas Inventory reported emissions for calendar years 1995 and 1998. These initial findings were updated in 2010 to include inventories for calendar years 2003 and 2008. Details are included in the report “Brookline Greenhouse Gas Inventory 2008” which is available for viewing and download at [\[1\]](#).

For the period 1995 to 2003, Brookline’s greenhouse gas emissions followed a path consistent with the goal of a 25% reduction from 1990 to 2020. (See Table 1 and Figure 2, below.) Greenhouse gas emissions were unchanged at roughly 469,000 metric tons of CO₂ per year over the five-year period from 2003 through 2008.

Residential sector emissions, including motor vehicles owned by Brookline residents, account for approximately three-quarters of Brookline’s greenhouse gas emissions. Government operations are the source of three percent of Brookline’s greenhouse gas emissions. Greenhouse gas emissions from Brookline’s government operations for 2008 are essentially unchanged from those previously reported for 1995.

Emissions from MBTA trolleys and buses were not included in this analysis. Emissions from these sources are likely about one percent of the reported totals.

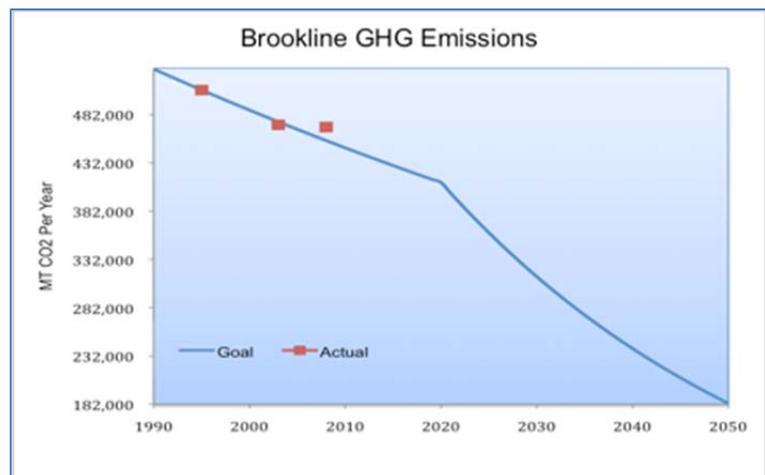


Figure 2: Brookline GHG Emissions Trend

Metric Tons CO ₂ Per Year		
	1995	2008
Electricity	127,819	124,376
Heat	223,144	208,337
Transportation	137,247	117,000
Waste	19,165	19,287
Total	507,374	469,000

Table 1: Brookline Greenhouse Gas Inventory

Uncertainties in Brookline’s Reported Greenhouse Gas Emissions

Brookline has adopted Massachusetts’ reduction target of 25% below 1990 levels by 2020, with targets for each decade after that, culminating in at least an 80% reduction by 2050. The choice of 1990 as the base year is consistent with the Kyoto Protocol. It should be noted that Brookline energy usage data for 1990 are not available. The earliest Brookline data were those reported for 1995 in the Greenhouse Gas Inventory and Forecast.^[1]

Electricity usage and natural gas usage trends from 1995 through 2008 exhibit anomalies for both utilities. An apparent significant reduction in consumption of gas and electricity from 1998 to 2002 is inconsistent with both population growth in Brookline and national trends in residential energy consumption during that period.^[2] This may be related to record keeping procedures associated with deregulation of electricity and natural gas that occurred during the intervening years.^[3]

CO2 emissions from vehicles traveling in Brookline may also have been overstated, based on a November 2009 report from the United States Environmental Protection Agency. Vehicle emission factors generated for 1995 by the ICLEI software (CACP 2009) were based on projections that predated the recent EPA report.

Greenhouse Gas Inventory Does Not Include Emissions Outside of Brookline

The Brookline Greenhouse Gas Inventory does not include greenhouse gas emissions that occur outside of Brookline but are attributable to actions of Brookline residents, businesses and municipal government. A significant example is the consumption of beef in Brookline homes, schools and restaurants. Raising, slaughtering, processing and delivering beef to grocery stores generates CO2 emissions far exceeding those for vegetables and most fish, fowl and other meats. Since the CO2 emissions for these activities occur outside of Brookline, they are not included in Brookline’s Greenhouse Gas Inventory, which is based on generally used protocols for reporting greenhouse gas emissions. This Climate Action Plan does however include actions that affect greenhouse gas emissions outside of Brookline such as *Meatless Days* (to promote vegetarian meals) and *Pay as You Throw* (to discourage waste).

Our Goal

25% reduction in GHG emissions from 1990 levels by 2020; 80% reduction by 2050 (based on Massachusetts Global Warming Solutions Act)

The goal of the Brookline 2012 Climate Action Plan is to outline a set of actions, policies and factors that would, if implemented, significantly contribute to the outcome of reducing Brookline's 2020 total greenhouse gas emissions by 25% below our estimated 1990 emission level. This goal was chosen to be consistent with the Commonwealth of Massachusetts' 2020 GHG reduction goal of 25% below 1990 emissions. The state's plan, "Massachusetts Clean Energy and Climate Plan for 2020," was mandated by the adoption of the Global Warming Solutions Act of 2008 (M.G.L. c. 21N) and outlines the measures that will be adopted to achieve this goal. It was also determined that a 25% reduction by 2020 was an achievable and desirable emissions reduction goal.

What can a Brookline Climate Action Plan do?

Actions taken by individuals, communities, states and countries all influence climate. Mitigating and adapting to climate change will require a multi-faceted approach, involving all segments of society and all levels of government. Local governments are uniquely situated to develop innovative, community-based responses to climate change. Because of the unique nature of local governmental control, many important building and infrastructure decisions that directly affect greenhouse gas emissions are under local authority. Practices and policies followed in homes, schools and businesses, and governments can affect climate. As a community, Brookline can re-tool these practices and policies to respond to climate change, and in the process, may provide future generations with other benefits, such as improved public health infrastructure and sustainable built environments.

The range of actions considered and ultimately included in this plan are focused on both reducing overall GHG emissions and adapting to the inevitable effects of climate change. As noted earlier, these changes have already begun, and due to the persistence (100 years) of GHG already in the atmosphere, they will continue, even if we are successful in radically reducing our production of these emissions. In general terms, energy use reduction is targeted for both building and transportation uses through a variety of initiatives. To augment conservation and demand reduction strategies, supporting initiatives such as alternative transportation infrastructure and renewable energy generation are recommended. Together, these strategies represent an integrated package, designed to reduce GHG emissions, improve public and environmental health, promote economic prosperity and advance social cohesion.

Planning Process and Methodology

In late 2010, the Climate Action Committee neared completion of two major initiatives: first, “Brookline 2010,”^[4] a year-long campaign with Climate Change Action Brookline that involved nearly one hundred local partner organizations in raising awareness and taking action to reduce the community’s carbon footprint, and second, coordination, with town staff, of efforts to qualify as a Green Community under the state’s Green Communities Act, G.L. c. 25A, § 10. As these were completed, the Committee realized that in order to better coordinate future efforts to address climate change, it was critical to update Brookline’s 2002 Climate Action Plan.

At the CAC’s January 31, 2011, meeting, the committee established a Climate Action Plan Subcommittee (Appendix E) (CAPS) to begin the process. With the assistance of Planning Department staff and an intern, the subcommittee reviewed plans developed in nearly 60 United States Communities and several communities in Europe. In March 2011, the subcommittee prepared a report evaluating the progress that Brookline has made under the 2002 plan. (See “Where We Are Today.”)

During the spring of 2011, the CAC publicized a website on which members of the public could suggest possible climate actions. Eighteen Brookline residents responded with 41 specific suggestions of actions to address climate change.

On April 25, 2011, the CAC conducted a workshop among its own members, and in a preliminary manner, identified over two dozen actions to consider for the new plan.

In May 2011, Brookline town departments and staff, particularly the Selectmen’s Office, the Building Department, and the Department of Planning and Community Development, finalized an energy baseline and a thirty-five page *Town of Brookline Energy Reduction Plan*. That plan will form the basis for a number of energy reduction measures that are included in or complement the CAP.

Also in May 2011, the Brookline Conservation Commission, working with the Parks and Open Space Division and representatives of many other town boards and commissions, completed its five-year update of the town’s open space plan, *Open Space 2010: Open Space and Recreation Plan for the Town of Brookline*. While many of the environmental issues addressed in that plan are broader than specific concerns about climate change, most of the resource protection goals and actions identified in the plan have a positive effect on climate, and several of them address climate concerns directly.

On June 9, 2011, the CAC sponsored a public meeting in Hunneman Hall of Brookline’s Main Library to continue the process of identifying and discussing actions to include in the CAP. This workshop identified over three dozen possible climate change actions.

In July 2011, the subcommittee, CAPS, began to analyze and synthesize over 150 actions identified in the 2002 plan, at the public meetings, and from other sources, using a mathematical ranking methodology. It also drafted the text portions of the plan.

As the draft of the plan was nearing completion, the CAC convened a public hearing on April 23, 2012, and solicited comments from Brookline residents, stakeholders and municipal officials.

Over the summer of 2012, the CAP was finalized, and submitted to the Board of Selectmen for review in December. On December 11, 2012, the Board of Selectmen voted to approve the plan.

Summary of Specific Inputs to the Planning Process

- Previous Work on Climate Change, including the 2002 Climate Action Plan
- Website Poll (spring 2011)
- CAC Workshop (April 25, 2011)
- *Town of Brookline Energy Reduction Plan* (May 2011)
- *Open Space 2010: Open Space and Recreation Plan for the Town of Brookline* (May 2011)
- Public Meeting (June 9, 2011)
- [Public Hearing \(April 23, 2012\)](#)
- Selectmen's Review and Approval (December 11, 2012)

Methodology

The Climate Action Plan Subcommittee (CAPS) developed a mathematical methodology for ranking a total of [over 150 possible actions \(Appendix F\)](#) using weighted scoring. Using several spreadsheets, CAPS experimented with organizing the actions into various categories and subcategories. It then established five rating criteria, CO₂ savings, feasibility, co-benefits, community support, and cost. Each member of the subcommittee rated each of the 150 actions, at first working collectively during CAPS meetings in order to develop similar approaches among the members. The average rating was calculated for each action, and CAPS then decided on weighting factors for each of the rating criteria. Finally it assigned a weighted score to each action consisting of the sum of the five weighted average ratings, and prepared a general ranking of all of the actions. For a more detailed explanation, see [Parameters \(Appendix G\)](#). The rankings were examined using different weighting factors, but assuming reasonable values for the factors, there were no great changes in the general ranking.

After discussions with the full CAC, CAPS used the general ranking of all 150 actions to choose a smaller group of 37 actions for further consideration. Individual members of the subcommittee then began drafting the descriptions of the actions that appear in this CAP prior to making further decisions on which actions to pursue. Special attention was given to estimating the total GHG emission reductions associated with each action. After further discussion with the CAC, town staff and interested stakeholders, and after the public hearing on April 23, 2012, the final decisions that are reflected in the current plan, including the addition of two new actions, were made.

The Future

New ideas for addressing climate change are continually being brought to our attention. This CAP will be [revised](#) in 2014, at which time new ideas will be incorporated. In addition, there are a small number of ideas that were brought to our attention too late to be developed fully in this CAP. These have been listed for future consideration in [Ideas for the Future \(Appendix H\)](#). If you are a Brookline resident who has an idea for an action that should be considered when this plan is revised in 2014, or if you have a suggestion as to how the planning or implementation

process could be improved, please go to [Ideas for the Future](#), and (using the [wiki](#) as you would to edit Wikipedia) edit that page to add your suggestion.

Actions to Reduce Emissions

Actions to Reduce Emissions that are currently being pursued as part of this plan are in six groups:

- [Energy Efficiency](#)
- [Renewable Energy](#)
- [Urban Form and Mobility](#)
- [Consumption and Solid Waste](#)
- [Food and Agriculture](#)
- [Community Coordination](#)

(To view all actions in a single list, click [here](#).)

Note: This plan focuses primarily on actions to reduce GHG emissions that can be taken by residents and businesses. The Town of Brookline, that is, Brookline's municipal government, has also committed to significant reductions in energy use in its *Town of Brookline Energy Reduction Plan* (May 2011, revised July 2011). Whenever possible, activities taking place under that plan and those under this CAP will be coordinated.

For each action, the following are generally specified by the Action Team:

- Description of the action, with reference number (reference to spreadsheet containing [over 150 possible actions](#), developed in 2011)
- Liaison (CAC member, partner or municipal staff)
- Action Team (organization or individuals)
- Implementation
- Current Activity
- Goal
- Unresolved Questions

As appropriate, the following may also be included:

- Potential GHG Emissions Reduction
- Quantitative Analysis
- Target Sector (municipal, business or residential)
- Time Frame for Implementation, including Benchmarks
- Cost and Benefits (including payback period, if applicable)
- Co-Benefits
- Barriers to Implementation and Equity Issues
- Other Stakeholders (individuals or groups other than the Action Team who are involved in or affected by implementation)

Implementation and Support of the Climate Action Plan

Because an effective response to climate change requires a broad range of actions by many people throughout the residential community, the business community and town government, systematized implementation and support of the Climate Action Plan is critical. In attempting to create an effective structure for implementation of a plan that includes non-governmental partners in addition to town staff, the CAC is, to a large extent, breaking new ground. Few climate action plans in other municipalities have detailed implementation plans, and those that do focus largely on municipal actions implemented by municipal staff. See, e.g., [Cincinnati's "Green Cincinnati Plan."](#)

Support and Coordination

The work of many individuals, groups and organizations will be needed to implement this plan. There are a number of existing groups already providing leadership and work on specific tasks, and the CAC hopes that this plan will support that work. For example, [Brookline Tomorrow](#) is a joint initiative of [CAB](#) and the CAC, and promotes climate action work of all sorts. Over one hundred organizations have joined Brookline Tomorrow as partners. There are other groups—both private organizations and groups related to municipal government—engaged in various other activities. And, in other areas, the CAC has identified additional Actions to Reduce Emissions for which leadership and participants must be recruited, either from its own ranks or from among town residents and staff.

The overall success of this plan will depend not only on individuals and groups taking responsibility for particular actions, but also on their receiving the support they need to be effective. To ensure that this happens, this plan calls for **Liaisons** for each Action and a **Support and Measurement Team (SMT)**.

Liaisons – To provide a conduit for information about climate action work and to assist the CAC in providing support to those doing the work, the CAC hopes to identify an individual to volunteer as Liaison for each action in the CAP. That person, ideally chosen by the group that is already working on the action to reduce emissions or, in some cases, designated by the CAC, provides appropriate coordination and in some cases leadership with regard to the action, and takes responsibility for reporting to the Support and Measurement Team (SMT).

Support and Measurement Team (SMT) – The SMT will work with individual Liaisons through a collaborative process both to support those working on individual actions and to provide accountability with regard to the plan by monitoring both overall progress and progress with regard to individual actions to reduce emissions. Because implementation of the CAP depends on the combined efforts of many independent segments of the Brookline community, the CAC's role is one of support and coordination, rather than control or supervision. Other work will be done by municipal staff, whose work is managed under the municipal management structure. But the CAC's necessary support and accountability function requires a more nimble mechanism for transmission of information than can be accomplished by the full fifteen-member CAC. Therefore, the SMT will consist of between three and five people. It will include at least one a member of the CAC and one staff member of the Brookline Planning Department and, if Climate Action Brookline (CAB) so desires, at least one Brookline resident chosen by the CAC in consultation with CAB.

The SMT will work with Liaisons on any issues with which they need help or support, but in particular will assist in determining what level of quantitative analysis of GHG emissions is appropriate and in identifying the elements of the action and metrics which will be used to estimate the action's GHG reduction potential and effectiveness.

In summary:

- The Support and Measurement Team (SMT) will provide day-to-day support of groups working on Actions to Reduce Emissions through people identified as Liaisons.
- Each action that is being actively pursued should have a designated Liaison.
- Liaisons may be CAC members, partners, other Brookline residents or Town staff.
- Each Liaison will typically help coordinate a working group of a size appropriate to the action, unless a group is already in existence.
- If a working group is already in existence, the group itself will normally designate the Liaison.
- Typically there will be a single Liaison for each action; if there are Co-Liaisons, it will be helpful if one is designated as the primary contact for the SMT.
- Typically, one person will not be Liaison for more than two actions.

Note: The SMT functions solely as a conduit of information between the CAC and groups of Brookline residents who are acting independently. The CAC will remain fully responsible for the CAP, and the SMT is not a subcommittee of the CAC. The SMT will take no votes, make no decisions, and will not advise or make recommendations to the CAC or any of its subcommittees. Although it is anticipated that it will conduct its activities as openly as possible, it is not a public body subject to the Massachusetts Open Meeting Law. See G.L. c. 30A, § 18. Similarly, any groups of Brookline residents formed to work on individual actions described in the CAP are not public bodies. On the other hand, it is expected that the CAC will form one or more subcommittees to work on individual actions described in the CAP, and any such subcommittees will be public bodies subject to the Open Meeting Law.

Liaison Meeting – Since the relationship between the Liaisons and the SMT is to be a collaborative one, the Liaisons will meet in September 2012 to discuss their roles and work. The SMT will convene the meeting. Suggestions concerning the tentative agenda may be made [here \(Appendix I\)](#).

New Actions

Since the CAP is a living, iterative document, new Actions to Reduce GHG Emissions can be added at any time. Any group or individual wishing to begin work on a new initiative or already engaged in climate action work that does not appear in the CAP, should contact the CAC via [the Brookline Planning Department](#).

Data and Measurement

The CAC, using the SMT as necessary as a conduit for information, will help Liaisons to assemble and analyze data and measure progress.

Overall Direction

The CAC will provide overall direction and be responsible for implementation of this CAP.

Budget and Staffing

The CAC co-chairs will work with the Brookline Planning Director and Town Administrator to ensure sufficient budgetary and staffing resources both for CAC activities and for actions identified in this plan that are the responsibility of town government.

Reporting

The Support and Measurement Team will prepare the following progress reports to the CAC:

Monthly – Oral Update by SMT (standing item on CAC monthly agenda)

April 1, 2013 – Semi-Annual Summary (written narrative summary)

October 1, 2013 – Annual Report (full narrative report)

April 1, 2014 – Semi-Annual Summary

October 1, 2014 – Annual Report

The annual reports will be distributed to the Board of Selectmen and distributed to all Town Meeting members at Fall Town Meeting.

Plan Revision

Though this plan includes long-term and mid-term strategies and goals, most of the actions included in it should be re-evaluated after two full years of activity. Though much of such a re-evaluation can be based upon the Annual Reports, in the spring of 2014, the CAC will organize a public process for evaluating overall progress under this plan. Both the annual reports and the complete re-evaluation will include an assessment of the effectiveness of preparing the plan in the form of a wiki. Soon after or as part of the 2014 Annual Report, a draft of a new two- or three-year climate action plan should be prepared and presented to the public, and then adopted by the CAC and Board of Selectmen in the fall of 2014.

Contact

To contact the CAC or for more information about this CAP, please contact Senior Planner Lara Curtis Hayes in the Brookline Planning Department by [email](#) or at 617-730-2618.

Notes

1. ↑ Evans, T., Greenhouse Gas Inventory and Forecast Report: Town of Brookline, Massachusetts, August, 2000.
2. ↑ Angus, B., et.al., Local Action Plan on Climate Change: Town of Brookline, Massachusetts, February 2002.
3. ↑ Leviton, A.E., Town of Brookline Massachusetts Greenhouse Gas Inventory Overview, May, 2010.
4. ↑ This joint initiative later became known as "Brookline Tomorrow: Climate Action Today."

Further Reading

- Spratt, David & Sutton, Phillip, *Climate Code Red: The Case for a Sustainability Emergency* (Friends of the Earth 2008)
- Emanuel, Kerry, *What We Know About Climate Change* (MIT Press 2007)

ACTIONS TO REDUCE EMISSIONS

Contents

Actions to Reduce Emissions that are currently being pursued as part of this plan are in **six groups**.

Energy Efficiency

- A-1 Commercial Buildings: Use the EPA's portfolio manager software to assess the 10 largest commercial properties to identify underperforming buildings and recommend appropriate energy improvements.
- A-2 Municipal Buildings: As outlined in the *Town of Brookline Energy Reduction Plan*, reduce energy use in Town Buildings by 20% by 2014, through a variety of efficiency techniques.
- A-3 LEED for Large Buildings: Zoning requirement for LEED certification for new medium and large commercial buildings.
- A-4 Lights Out at Night: Research potential for a Town-wide Light's Out at Night policy to reduce light pollution and save energy.
- A-5 Lighting Retrofits: Market NStar's lighting audit and subsidy program to large commercial and residential buildings.
- A-6 Energy Star: Develop an incentive program to encourage Energy Star appliance replacement.
- A-7 Oil to Gas: Develop a program to promote conversion from oil heat to natural gas, possibly using incentives including property tax or permit fee rebates.
- A-8 Green Homes Brookline: Continue and expand existing Green Homes Brookline program, which coordinates home energy assessments and improvements, including securing available utility rebates and offers financial assistance for qualified homeowners.
- A-9 Cool Flat Roofs: Voluntary program, incentives, or zoning requirement for green, white, or solar PV flat roofs on commercial and residential buildings.
- A-10 School Coordinators: Identify an individual at each school to promote energy saving changes to day-to-day activities.
- A-11 Business Campaign: Develop an outreach and incentive program to promote energy efficient business practices, possibly including a sustainable business award program.
- A-12 LED Street Lights: Replace existing streetlights with energy efficient LED lighting. Two test areas for LED streetlights have been installed by the Department of Public Works.

- A-13 Residential Loans: Develop a revolving, low or no interest loan program to offer financing options to Brookline residents for energy efficiency or renewable energy facilities.
- A-14 Public Housing Weatherization: Continue energy efficiency upgrades to Public Housing.

Renewable Energy

- A-15 Geothermal Task Force: Establish Task Force responsible for researching engineering, science, costs, financing and contractor availability of geothermal energy and publicize findings.
- A-16 Green Electricity: Continue CAB's NStar Green promotion and research other green energy generators.
- A-17 Residential Solar: Participate in Solarize Massachusetts, which markets, coordinates and provides bulk purchasing of solar panels. Research potential for revolving loan fund or property assessed clean energy financing.
- A-18 Solar Farm: Develop a ground solar farm on the Town-owned Single Tree Hill parcel.
- A-19 Municipal Roofs: Establish policy that all municipal roof replacements will include structural and electrical components to permit future solar panel installations and require panel installation by 2020.
- A-20 Zoning Incentives: Amend Zoning By-law to include incentives for provision of residential and commercial renewable energy facilities.

Urban Form and Mobility

- A-21 Bicycle Sharing: Brookline is joining the Hubway regional bike sharing network summer 2012. The network provides bikes for one-way rental for short trips throughout the system.
- A-22 Bicycle Routes: Continue implementing the Bicycle Network Plan, developed by the Bicycle Advisory Committee.
- A-23 Bicycle Parking: Amend Zoning By-law to require well designed bicycle parking spaces at the rate of one space for every two multi-family dwelling units and one space for every ten automobile parking spaces for commercial buildings.
- A-24 Zoning Parking Requirements: Amend Zoning By-law to reduce minimum parking requirements for residential and commercial properties within .5 miles of MBTA Green Line.
- A-25 Permeable Pavement: Incorporate permeable pavement where appropriate in Town Capital Improvement Projects. Change Town By-laws to require permeable pavement for new or refurbished paved surfaces where appropriate.
- A-26 Taxi Fuel Efficiency: Require taxi vehicles put into service in Brookline under the new Medallion system to be new vehicles that are on an approved list. The list will identify those makes and models that are more fuel efficient and offer other customer-friendly features.
- A-27 Idling: Promote systematic enforcement of M.G.L. 90 Section 16A, 310 CMR 7.11 which limits the maximum engine idling time to five minutes (except for emergency and some public safety vehicles).
- A-28 Trip Reduction: Through a collaborative effort between the Transportation Administrator and the Department of Planning and Community Development,

- publicize and promote employer participation in the NuRides on-line ride share matching and corporate T pass programs.
- A-29 Open Space Protection: Protect and preserve important privately-owned open space resources utilizing conservation restrictions or other means.
 - A-30 Urban Forest: Add 1,000 trees to Brookline's urban forest by 2022.
 - A-31 Pedestrian Advisory Committee: Create a Pedestrian Advisory Committee to advise Town and other Boards and Commissions on design and policy matters of import to pedestrians. The Committee would be a sub-committee of the Transportation Board.
 - A-32 Transit Oriented Development: Amend Zoning By-law to promote mixed-use, dense development near transit. Possible TOD amendments include reduced parking requirements, increased density and incentives for mixed-use.
 - A-33 Diesel Emissions: Reduce diesel emissions, including retrofitting town vehicles that use diesel fuel.

Consumption and Solid Waste

- A-34 Pay as You Throw: Implement some form of pay as you throw solid waste collection with the renewed FY 2014 solid waste contract.
- A-35 Buy Local: Create and implement a buy local program that promotes local businesses selling locally produced goods. Documentation of the environmental benefits of local buying would be developed and distributed.

Food and Agriculture

- A-36 Meatless Diet Days: Implement a town-wide education campaign on the health and environmental benefits of eating less meat, with the goal of reducing the amount of meat consumed in Brookline.

Community Coordination

- A-37 Institutionalize Education and Outreach: Continue education and awareness programs such as Climate Week and Brookline Tomorrow. Expand involvement, outreach and coordination with community partner organizations.
- A-38 Formalize Town Hall Staff Function: Expand Town Staff allocated to climate change functions to at least 1.0 Full Time Equivalent.
- A-39 Public Progress Symbol: Create a publically visible symbol depicting progress towards reducing community greenhouse gas emissions.

Commercial Buildings

(Action no. 17)

Liaison

Jon Cody Haines

Action Team

(name of organization or individuals working on this Action)

Description

Portfolio Manager is an online interactive energy management tool for tracking and assessing building energy and water consumption. Portfolio Manager can help set investment priorities, identify under-performing buildings, verify efficiency improvements, and receive EPA recognition for superior energy performance. The objective of this action is to have the owners of Brookline's ten largest commercial properties use Portfolio Manager to assess building performance.

Implementation

Work with Kara Brewton, Charlie Simmons, and Brookline Chamber of Commerce to determine candidate properties by 4/31/2012.

Reach agreement with owners of 10 large commercial buildings to participate by 6/30/2012.

Complete Portfolio Manager assessment for 10 large commercial buildings (with assistance from Charlie Simmons/CAC) by 9/30/2012.

Develop cost-effective plan to remediate deficiencies identified by Portfolio Manager for properties receiving scores less than XX by 3/31/2013.

Current Activity

(Description of any work currently under way on this action)

Goal

Work completed on cost-effective remediation of deficiencies identified by Portfolio Manager for properties receiving scores less than XX.

Unresolved Questions

Need to define what is meant by “cost-effective.” One possible definition is maximum seven-year payback.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

MUNICIPAL BUILDINGS

(Action no. 11)

Liaison

Town Staff

Action Team

(name of organization or individuals working on this Action)

Description

To reduce the overall energy usage (MMBTUs) in Town operations by 20% compared to FY2009 through a combination of reductions in the consumption of electricity, heating oil, natural gas, gasoline and diesel fuel.

Implementation

The [*Town of Brookline Energy Reduction Plan*](#) (May 2011) describes the plan to reduce Town of Brookline energy consumption by the end of FY2014

Current Activity

(Description of any work currently under way on this action)

Goal

The [*Town of Brookline Energy Reduction Plan*](#) (May 2011) describes in detail the goals for an overall 20% reduction in energy consumption by FY2014. Savings include energy efficiency measures for Town buildings, vehicles, street lights, traffic lights, and park lights.

Unresolved Questions

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

LEED FOR LARGE BUILDINGS

(Action no. 33)

Liaison

Tommy Vitolo

Action Team

(name of organization or individuals working on this Action)

Description

Establish zoning law requiring LEED certification for new medium and large commercial buildings. LEED Certification has been part of Boston's zoning laws since 2007. The LEED Green Building Rating System is a building rating system that evaluates energy and environmental performance from a whole-building perspective.

Implementation

Town Council to determine if requiring LEED certification is consistent with applicable laws and regulations by 6/30/2012.

Town Planner's Office to determine how many new buildings may be subject to this proposal by 6/30/2012.

Town Building Department and Zoning Board to assess incremental value of LEED Certification over and above Stretch Energy Code by 9/30/2012.

Contingent on finding sufficient value in Zoning change requiring LEED Certification:

Work with zoning board, commercial property owners/builders, and planning department to prepare warrant article by 3/30/2013.

Warrant article considered at Spring Town Meeting by 5/2013.

Current Activity

(Description of any work currently under way on this action)

Goal

Warrant article passed requiring LEED certification of new medium and large commercial buildings. This goal is contingent on a finding that LEED certification is of sufficient value.

Unresolved Questions

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

LIGHTS OUT AT NIGHT

(Action no. 20)

Liaison

Not yet determined

Action Team

(name of organization or individuals working on this action)

Description

Establish a “Lights-Out-at-Night” program. This could be very modest or very broad: from town buildings only, to commercial and residential, or even including street lights.

Implementation

1. Research precedents in other communities.
2. Decide on initial scope, presumably starting with municipal buildings, and growing to commercial buildings and eventually residences.
3. Consider reductions in outdoor lighting.
4. Consider making some aspects mandatory by bylaw.

Current Activity

None

Goal

A specific goal for the total percentage of all “unnecessary” Brookline light use should be set. Once it is set, it will be easy to calculate emissions reductions, which might be significant.

Unresolved Questions

1. What is a reasonable goal?
2. Who will the Action Coordinator be?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

LIGHTING RETROFITS

(Action no. 24)

Liaison

Not yet determined.

Action Team

(name of organization or individuals working on this Action)

Description

Electricity usage can be significantly reduced by replacing incandescent light bulbs with fluorescents and LEDs. Many fluorescent fixtures, even those just a few years old, can be replaced with more energy efficient fixtures. NSTAR will perform a free audit of large residential and commercial buildings and will pay 70% of the cost to replace inefficient light bulbs and fixtures. The payback on the 30% portion paid by the building owner is typically less than one year.

The objective of this action is to develop and carry out a marketing plan targeting owners of Brookline's large residential and commercial buildings promoting NSTAR's audit/retrofit program.

Implementation

Work with Town Assessor's Office to identify the owners of large residential and commercial buildings by 4/31/2012.

Research and summarize procedures for NSTAR audit/rebate program for large residential commercial buildings by 6/30/2012.

Develop marketing plan jointly with NSTAR and Board of Selectmen (including success metrics from NSTAR) by 6/30/2012.

Begin marketing campaign by 9/30/2012.

Current Activity

(Description of any work currently under way on this action)

Goal

Audits and retrofits completed for 25% of large residential and commercial buildings by 9/30/2013.

Audits and retrofits completed for 50% (cumulative) of large residential and commercial buildings by 9/30/2014.

Audits and retrofits completed for 75% (cumulative) of large residential and commercial buildings by 9/30/2015.

Unresolved Questions

Need definition of large residential building and large commercial building.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

Energy Star

(Action no. 13)

Liaison

Not yet determined.

Action Team

(name of organization or individuals working on this Action)

Description

According to the U.S. EPA, appliances account for about 13% of all home energy usage. Energy Star qualified appliances incorporate advanced technologies that use 10-50% less energy and water than standard models.

This action has four specific objectives:

1. To provide one-time real estate tax rebates, when conventional appliances/furnaces are replaced with Energy Star units.
2. To waive building permit fees when conventional furnaces are replaced with Energy Star units.
3. To encourage the Commonwealth of Massachusetts to amend the Stretch Energy code to require installation of Energy Star furnaces when existing furnaces are replaced in residential and commercial buildings.
4. To promote existing incentive/rebate programs such as Mass Save.

Implementation

Work with Town officials to reach consensus on tax/permit waiver plans by 7/31/2012.

Identify funding, e.g. NSTAR and Green Community Grants, to offset lost taxes and building permit fees by 7/31/2012.

Develop marketing plan and roll-out Energy Star Incentives initiative by 12/31/2012.

Town officials/CAC to partner with Representative Smizak's office to propose amendment to Stretch Energy Code by 12/31/2012.

Current Activity

(Description of any work currently under way on this action)

Goal

Incentive plans have been implemented and stretch energy code has been modified.

Unresolved Questions

Do Federal laws allow States to require installation of Energy Star furnaces as part of State law?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

OIL TO GAS

(Action no. 18)

Liaison

Not yet determined.

Action Team

(name of organization or individuals working on this Action)

Description

Burning gas produces 27% less CO₂ than oil in furnaces of equivalent efficiency, even more if an old oil furnace is replaced with an Energy Star gas furnace. According to U.S. Census, a third of Brookline homes have oil heat. The objective of this action is to promote conversion from oil heat to gas heat, preferably upgrading to an Energy Star furnace as part of the oil to gas conversion.--[Aleviton](#) 10:04, 8 April 2012 (EDT)

In addition to encouraging and promoting National Grid programs for conversion from oil to gas, this action is intended to provide incentives such as one-time real estate tax rebates and waiver of building permit fees for replacing oil furnaces/boilers with gas furnaces/boilers.--[Aleviton](#) 10:03, 8 April 2012 (EDT)

Implementation

Identify National Grid rebate programs/procedures for conversion from oil to gas heat by 6/30/2012.

Work with Town officials to reach consensus on tax/permit waiver plans by 7/31/2012.

Identify funding, e.g. Green Community Grants, to offset lost taxes and building permit fees by 7/31/2012.

Develop marketing plan and roll-out conversion to gas initiative by 12/31/2012.

Current Activity

(Description of any work currently under way on this action)

Goal

Incentive programs have been established and 35% of all residential oil heat users have converted to gas heat by 2020 and 70% of all residential oil heat users have been converted to gas heat by 2050. --[Aleviton](#) 10:32, 8 April 2012 (EDT)

Unresolved Questions

Serious environmental concerns exist regarding use of fracking to extract natural gas. These concerns must be considered and balanced against the potential reduction in CO2 emissions associated with the conversion from oil to gas as a home heating fuel.--[Aleviton](#) 10:02, 8 April 2012 (EDT)

Natural gas is mostly methane. Methane is a far more potent greenhouse gas than the carbon dioxide produced when natural gas is burned as a home heating fuel. The adverse effect of fugitive emissions of methane associated with natural gas exploration, extraction, and delivery must be evaluated.--[Aleviton](#) 10:02, 8 April 2012 (EDT)

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
	9,049	20,338

--[Aleviton](#) 10:15, 8 April 2012 (EDT)

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

GREEN HOMES BROOKLINE

(Action no. 19)

Liaisons

Lara Curtis Hayes (Planning Department); Four Family and Smaller Residences – Priscilla Wren (Climate Action Brookline); Large Residential Buildings – Alan Leviton (Climate Action Brookline)

Action Team

Climate Action Brookline and Climate Action Committee

Description

Green Homes Brookline is a Town-led initiative that helps Brookline residents save energy and money by making their homes more energy efficient. The objective of this action is to continue the current Green Homes Brookline program and to expand the program, first to large multi-family apartment buildings and then to large multi-family condominiums.

Implementation

Single- to Four-Family Program: Continue to market the assessments and incentives available under the Mass Save program, with additional incentives available from town funding for income-eligible families. Determine new sources of funding.

Multi-family Program:

- More analysis on how to coordinate multi-family assessments with utility programs is needed.
- Work with Kara Brewton and Brookline Chamber of Commerce to identify the owners of large apartment buildings.
- Reach agreement with owners of five large apartment buildings to participate.
- Research and summarize procedures for obtaining rebates from National Grid and other sources for commercial buildings.
- Complete Portfolio Manager assessment for five large apartment buildings (with assistance from Charlie Simmons/CAC).
- Develop cost-effective plan to remediate deficiencies identified by Portfolio Manager for properties receiving scores less than XX.

Current Activity

As over 70% of Brookline's carbon footprint is from residences, significant outreach has been devoted to canvassing, tabling and workshops to reach this group of property owners and tenants. The goal is to reach as many homes as possible. The program builds on partnerships between the town, Climate Action Brookline and weatherization company Next Step Living to market energy assessments and insulation and air sealing incentives. As of September 30, 2012, 1,224 Brookline homes received energy assessments, and 258 were weatherized.

Additional outreach measures have included town-wide letters, newspaper publications and targeted mailings to those of moderate income. Workshops reviewing the program's details and available incentives have also been held, and outreach at other community events has helped market the program to various sectors of the town's population.

Goal

The original Green Homes Brookline goal was to reach at least 1,000 homes. This goal was surpassed in 2012.

For multi-family buildings, the goal will be work completed on cost-effective remediation of deficiencies identified by Portfolio Manager for properties receiving scores less than XX.

Unresolved Questions

Need to define what is meant by “cost-effective.” One possible definition is maximum seven-year payback.

Need to determine a way to either find additional funding or determine a different structure for the program so that it is self-financing (i.e. loans instead of rebates).

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

COOL FLAT ROOFS

(Action no. 31)

Liaison

Werner Lohe (werner.lohe@gmail.com, 617-739-0892)

Action Team

Rick Ames, Dixon Bain, Blake Cady, Lea Cohen, Paul Harris, Werner Lohe, John Randle, Harold Simansky, Amanda Treat

Information on past and future **meetings**: [minutes](#); [next meeting](#).

Description

Our undertaking is to convert the great majority of Brookline's commercial and residential flat roofs into "cool flat roofs." Our current focus is to encourage the installation of PV (photovoltaic) panels where possible, and white (reflective) roofs nearly everywhere. We support green roofs, but see them as a lower priority.

Current Activity

- **Werner** – Continue to pursue contacts with Stop and Shop to suggest joint publicity venture to encourage solar based upon a solar installation on their building.
- **Lea** – Contact one or two of Coolidge Corner's major landlords (Richard Tuck and Greg Stoller) to discuss our work. Depending on the nature of the conversation, she could invite one of them to come to our next meeting from 7:00 until 7:30.
- **Blake** – Research and begin a rough draft of a warrant article for Town Meeting that would require owners with flat roofs to have a solar assessment prior to pulling a building permit for a new roof. This might apply only to roofs larger than a certain size. It might require the Town to provide the assessment for free. It would certainly require a mechanism to notify owners well in advance (perhaps on the model that Director of Public Health Alan Balsam has used to alert restaurants to trans-fats and similar prohibitions) since contractors normally want to (and are entitled to) begin work immediately after the permit is issued.
- **Rick** – Investigate mapping/assessment technology, perhaps contacting John Bolduc or someone else in Cambridge or elsewhere to see what results they have had.

- **Amanda and Rick** – If the opportunity presents itself, informally explore with their contacts at Next Step Living (Robin Swift and Clayton Schuler, respectively) the possibility of partnering on solar installations using the Solarize/Green Homes Brookline model.

Long-Term Implementation

(Consider timeline, possible funding, and possible partners)

1. Conduct preliminary research, including estimate of total area of flat roofs in Brookline and average size, and an assessment of which roofs are most suitable for conversion to Cool Flat Roofs.

2. Identify and address possible stakeholders and issues

If necessary, reconnect with the Preservation Commission after preliminary discussions indicated likely support.

Other stakeholders?

3. Decide which of the three options to pursue, since presumably it will not be practical to pursue all three.

4. Research experience in other communities with zoning mandate vs. voluntary program.

Consider "Solarize Massachusetts" as a model.

5. Draft zoning bylaw or develop voluntary program.

- At the outset, candidates for solar roofs or green roofs may be identified by contacting owners of buildings with tar-and-gravel roofs, on the assumption that they are old and in need of replacement or (though this may be less productive since timing may be too difficult) by working with the Building Department to learn when building permits are pulled for roof replacements or major renovations.
- The possibility of a fixed Building Permit cost should be explored.

Incentives:

State law prohibits higher property value assessment as the result of installation of solar PV.

In 2013, the Planning Department should consider whether this action might be augmented by applying for a grant under the [Solarize Massachusetts, Phase 2](#) program. (The Town applied for this grant in 2012, but was not one of the communities that received it.)

Goal

(What success means for this action)

Ultimate goal is that the vast majority of flat roofs in Brookline be solar, white, or green roofs.

1. If White Roofs are pursued, 10% of flat roof area will be white (or green or solar) by 2020 and 100% by 2050, based upon the schedule below.

Bylaw could be passed 12 months after project is initiated.

2. If Green Roofs are pursued, 1% of flat roof area will be green by 2020 and 20% by 2050. Assume this will not be done by bylaw, but by a voluntary incentive program.
3. If Solar Roofs are pursued, 10% of flat roof area will be solar by 2020 and 90% by 2050. Assume this will not be done by bylaw, but by a voluntary incentive program.

Schedule (% of all flat roof area)			
	Green	White	Solar
2012	-	-	-
2013	-	1%	1%
2014	0.1%	2%	2%
2015	0.2%	3%	3%
2016	0.3%	4%	4%
2017	0.4%	5%	5%
2018	0.6%	6%	6%
2019	0,8%	8%	8%
2020	1.0%	10%	10%
2050	20%	100%	90%

Unresolved Questions

1. What are the relative benefits of the three options, as discussed above?
2. Could/should white roofs (via zoning requirement?) and solar roofs (by voluntary or incentive program) be pursued simultaneously?
3. What is a reasonable schedule if a voluntary program is pursued?

Potential GHG Emissions Reduction

Based on the goals above, the relative GHG Emissions reductions for the three different approaches are as follows:^[1]

GHG Emissions Reduction (Tons CO₂e)			
	Green	White	Solar
2020	24	241	2,045
2050	489	2,415	18,403

Quantitative Analysis

Buildings with Flat Roofs (non-condo) - 1,042 buildings - 4,962,000 sq.ft. of roof area

Beacon and Harvard Streets only - 265 buildings - 1,347,000 sq.ft.

Beacon and Harvard Streets >10,000 sq.ft. - 36 buildings - 608,000 sq.ft.

Buildings with Flat Roofs (condo) - 520 buildings - 2,000,000 sq.ft. (est.)

TOTAL Buildings with Flat Roofs - 1,562 buildings - 7,000,000 sq.ft. of roof area

Roof area is based upon data in the Assessor's database. The area of individual buildings' roofs is assumed to be the same as the building base size in the Assessor's database. Data is available only for non-condo buildings. The area of condo buildings is estimated by assuming that average area of each building roof is 20% less than of non-condo buildings

Notes

1. [↑](#) Leviton, Alan, spreadsheet, Feb. 26, 2012.

SCHOOL COORDINATORS

(Action no. 16)

Liaison

Not yet determined.

Action Team

Not yet determined.

Description

Create a system-wide Brookline Schools energy reduction plan and implementation strategy. Build on work so far in each school. (See current activity below.) Ideas include a school energy efficiency Summit meeting and possible series of workshops on day-to-day activities such as copying, bottled water, coffee mugs, and other activities to address climate change at each school. Where possible encourage coordination among participants at different schools.

Implementation

Implementation Plan, including funding availability, proposed timeline, and likely partners, needs to be developed.

Current Activity

As of June 18, 2012:

For the past three years Climate Action Brookline has helped cultivate and coordinate elementary school Green Team actions. Each elementary school has a designated Green Team representative. Green Team reps meet periodically throughout the year. Each school's green team actions have varied depending upon the availability of parent/teacher volunteers and the support of the Principal and staff. Some green teams have focused on encouraging a Walk to School Day each month. Others have held school lunch zero waste days or educational Earth Day celebrations or promoted energy saving ideas in school newsletters and displays.

The Brookline High School Green Team was active for several years with a number of teachers involved and worked toward recycling paper and lunch waste and educational initiatives. Student groups including The Environmental Club, YMore, and SAJE have been involved with their own climate action initiatives within and outside the schools.

Brookline Tomorrow partner groups such as the Public Health Department and Brookline Schools Food Services have contributed to Car Free Day and the addition of new, plant based lunch offerings. The town Building Department assists with building energy efficiency, such as motion detector lights and new energy efficiency boilers, as budgeted in the Capital Improvement Plan (CIP). The town Solid Waste Advisory Committee helped establish designated Recycling Coordinators in each of the schools several years ago.

Goal

(What success means for this action)

Goals need to be clarified and set.

Unresolved Questions

How best to continue to develop various Green Team and other group and town initiatives? Question of budget for school building energy efficiency retrofits? How to evaluate program efficacy?

Potential GHG Emissions Reduction

Possible to quantify building department improvements. Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

BUSINESS CAMPAIGN

(Action no. 3)

Liaison

No one liaison has been identified. However, some potential liaisons are: Economic Development Director Kara Brewton, Coolidge Corner Merchants Association, Brookline Chamber of Commerce, and Jim Solomon, owner Fireplace Restaurant.

Action Team

(name of organization or individuals working on this Action)

Description

The business campaign is a comprehensive outreach, marketing and incentive campaign to encourage and reward steps taken by businesses or commercial property owners that will decrease the carbon footprint of Brookline businesses. Such efforts could include: 1) energy efficiency improvements to buildings; 2) reduction of solid waste generated; 3) changing purchasing practices to emphasize local and/or environmentally friendly products; or 4) energy management of operations. Some possible incentives could be designation of “sustainable businesses” through compliance to a set of criteria, which would result in visible recognition for compliant businesses. Also, the CarrotMob technique of driving business to stores who pledge to donate some portion of their proceeds towards energy improvements via social media flash mob could be employed. See [\[1\]](#). The Green Restaurant Association could be employed to work with Brookline restaurants to improve environmental performance and grant official designation for compliant restaurants.

Implementation

(Implementation Plan, including funding availability, proposed timeline, and likely partners)

Current Activity

(Description of any work currently under way on this action)

Goal

(What success means for this action)

Unresolved Questions

Energy improvements to commercial buildings are difficult in the context of the landlord/lessee relationship. Most Brookline business owners rent space from property owners who may or may not have the same goals when it comes to energy efficient operations or how to fund such improvements. Business practices, such as energy use by employees, hours and operations, and purchasing decisions may be more easily affected by this campaign.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

LED STREET LIGHTS

(Action no. 9)

Liaison

Lara Curtis Hayes

Action Team

Department of Public Works, Peter Ditto and Todd Kirrane

Description

Replace current high-pressure sodium streetlights with LED fixtures town wide. This may be done either by replacing the entire pole and fixture (rare, used for decorative lighting situations such as on Harvard Street) or by replacing/converting existing cobra head fixtures (much more common).

Implementation

The town has begun converting to LED street lights on a neighborhood-by-neighborhood basis, largely based on funding availability. The Department of Public Works will oversee and determine which streetlights are appropriate for LED conversions, and in some cases, town staff provides the needed labor.

Current Activity

The town used a portion of its EECBG funding to replace exiting cobra head light poles on Harvard Street in Brookline Village with decorative light poles and LED fixtures, as well as converted a number of cobra head light fixtures to LEDs in South Brookline. The town plans to use additional EECBG funding to continue converting cobra heads to LEDs in a North Brookline neighborhood in the summer of 2012. The town may use a portion of its Green Communities grant to perform additional conversions.

Goal

The complete conversion of all of the town's streetlights to LEDs.

Unresolved Questions

1. Locating available funding will be a continual struggle; town staff may need to apply for competitive grants in order to continue with conversions.
2. Negotiating a lower rate with Nstar for those lights that have been converted is necessary. Until a lower rate is negotiated, the town does not see any financial savings from the conversions.
3. Streetlights in historic districts will need to be converted as well – whether to convert these in a manner similar to other town neighborhoods, or to consider other historic factors, will need to be determined.
4. Background information concerning LED lights is available in the U.S. Department of Energy’s 2012 [“Life-Cycle Assessment of Energy and Environmental Impacts of LED Lighting Products.”](#)

Potential GHG Emissions Reduction

The town has approximately 3,979 streetlights, which span a range of wattage levels, typically 100w or 150w high pressure sodium bulbs. The town replaced/converted approximately 75 of them to LEDs in 2011. Approximately 40 more will be replaced in 2012.

Based on the goals above, different approaches/implementation options could be used. Option 1: Dedicate \$25,000 to convert 40 streetlights to LEDs on an annual basis. This approach would take 99 years to convert all the streetlights. (Assumption: 2,143w reduction, 4,200 night hours/year) Option 2: Hire an ESCO and replace all of the streetlights at once. Option 3: Replace streetlights as funding becomes available, likely through outside grants. This option is the most likely, yet least consistent option, especially until a lower rate for replaced/converted streetlights is negotiated with the utility.

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
option 1	81,041	304,601
option 2	741,288	
option 3		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

RESIDENTIAL LOANS

(Action no. 12)

Liaison

Not yet determined.

Action Team

(name of organization or individuals working on this Action)

Description

Electricity, natural gas and heating oil use in residential buildings accounts for 45% of all greenhouse gas emissions in Brookline. Many measures can be applied to existing buildings to improve their energy efficiency, including using efficient light bulbs and fixtures, replacing appliances with more efficient ones, increasing insulation, replacing windows and upgrading HVAC systems. Brookline home owners, condo owners and owners of apartment buildings are eligible for seven-year interest-free loans for energy efficiency improvements through the Mass Save Heat Loan program.

Implementation

Continue promoting Heat Loans through the Green Homes Brookline program.

Current Activity

Interest free loans are currently available to owners of residential properties in Brookline through the Green Homes Brookline and Mass Save programs. For example, homeowners are eligible for seven-year interest free loans up to \$25,000.

Goal

(What success means for this action)

Unresolved Questions

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

PUBLIC HOUSING WEATHERIZATION

(Action no. 14)

Liaison

Not yet determined.

Action Team

Brookline Housing Authority, with assistance from Department of Planning & Community Development staff

Description

Arrange for comprehensive energy assessments of Brookline Housing Authority properties, and based on those assessments, develop a program for weatherization and other energy efficiency measures in public housing, incorporated into the one-year and five-year capital plans. Additionally, funding and staff to manage the projects need to be located.

Implementation

Locate funding or low-cost services to have energy assessments of all Brookline Housing Authority properties. Based on those assessments, incorporate weatherization improvements into the one-year and five-year capital plans. Outside funding for improvements and new staff will need to be determined, though there are likely state and federal resources available. Such funding sources typically require extensive staff time and expertise to meet grant requirements.

Proposed timeline: Begin searching for available funding in fall 2012.

Likely partners: The Department of Planning and Community Development, non-profit organizations that assist with weatherization of affordable housing.

Current Activity

CDBG and CDBG-R funding has been used within the past two years to install new heating systems, windows and roofs in three to four Brookline Housing Authority properties.

Goal

Effectively weatherize 50 percent of Brookline Housing Authority properties by 2050.

Unresolved Questions

Until an analysis of all BHA properties' energy performance is conducted, a plan for implementing weatherization improvements will be difficult to put together or implement. Such a plan must include specific recommendations for obtaining outside funding and staff resources. The BHA's budget and staff resources are already limited; therefore the Housing Authority's focus has been primarily on property maintenance rather than weatherization.

Potential GHG Emissions Reduction

Not yet determined.

The Brookline Housing Authority manages 891 federally- and state-funded public housing units in 9 developments (source: brooklinehousing.org).

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

GEOTHERMAL TASK FORCE

(Action no. 35)

Liaison

Don Weitzman

Action Team

(name of organization or individuals working on this Action)

Description

Creation of a Task Force that is responsible for researching geothermal energy as a source of building heat for residential, commercial, and municipal structures, and then publicizing and making available the information so developed. Information should include the underlying science, the engineering options, range of costs, availability of local and regional contractors, and a range of metrics including expected payback periods and greenhouse gas (GHG) reductions.

Implementation

1. Formation of the Task Force (TF). Ideally, TF would include members with expertise in the science, engineering, finance and contracting of residential and commercial geothermal projects, as well as representatives from the CAC and other relevant bodies (CAB, Building Dept., Planning Dept., etc.) April-June 2012.
2. TF organizes itself, sets goals and timeline.
3. TF engages in appropriate research, data gathering, and professional networking. June-Sept. 2012.
4. TF creates and executes publicity drive to inform Brookline property owners of the resources available to them through the work of the TF re installation of a geothermal heating system.

Potential partners include CAB and local/regional architects, contractors, and related professionals.

Current Activity

None

Goal

Minimum success entails the existence of a well-publicized, user friendly information resource by means of which Brookline building owners can become informed on all aspects of geothermal heating as an option for their properties.

Desired success entails actual geothermal installations in Brookline buildings, either new or existing.

(Eventually, a specific number of geothermal installations will be specified as a goal.)

Unresolved Questions

1. Under whose auspices would the TF be created, e.g., Selectmen, Town Meeting (Moderator's Committee), or the CAC?

(Working hypothesis: the TF will be under the auspices of the CAC.)

2. Who will staff the Task Force? (Possibly someone from Planning or Building Depts?)

3. How many geothermal installations as a result of this initiative will be considered a successful implementation, and according to what timeline?

4. What will be the source of funding for the expenses of the TF, including staff time, publication expenses, etc.?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

GREEN ELECTRICITY

(Action no. 40)

Liaison

Action Team

Climate Action Brookline

Description

Increase use of electricity generated from renewable sources. Continue CAB's NSTAR Green initiative (green pricing) and consider green marketing options (competing green energy generators in the deregulated market).

Implementation

(Implementation Plan, including funding availability, proposed timeline and likely partners)

1. Continue CAB's NSTAR Green initiative.
2. Research green marketing options.
3. Investigate state-wide legislative or regulatory options to increase the availability and lower the price of green electricity.
4. Develop new outreach options
5. Consider expansion to municipal and commercial purchasers

Current Activity

CAB already has an extensive canvassing program to market NSTAR Green.

Goal

A specific goal for the total percentage of all Brookline energy use should be set. Once it is set, it will be easy to calculate emissions reductions, which will be very significant.

Unresolved Questions

1. What is a reasonable goal?
2. Who will the Liaison be? (Ed Loechler? Paul Harris?)

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

RESIDENTIAL SOLAR

(Action no. 45)

Liaison

Action Team

(name of organization or individuals working on this Action)

Description

Establish a residential solar energy program. Loans or tax incentives might be established to help homeowners buy PV panels. Bulk purchasing (including purchases with other communities) might be explored.

Implementation

1. Research precedents in other communities.
2. Estimate potential sites for panels.
3. Decide on the most effective mechanisms (loans, tax incentives or other) to use and outreach methods.

Current Activity

None

Goal

A specific goal for the total percentage of all residential sites in Brookline should be set. Once it is set, it will be easy to calculate emissions reductions, which might be significant.

Unresolved Questions

1. What is a reasonable goal?
2. Should solar thermal energy be included?
3. Who will the Liaison be?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

SOLAR FARM

(Action no. 48)

Liaison

Lara Curtis Hayes

Action Team

(name of organization or individuals working on this Action)

Description

Develop a solar farm on the Town-owned land on the top of Singletree Hill that has been zoned for solar energy generation.

Implementation

1. Engage an “owner's agent” to help create a selection process to choose a third party to develop the site.
2. Organize a campaign to gain the support of Town Meeting to enter into a long-term lease of the property.

Current Activity

Lara Curtis Hayes along with other town staff has begun to determine next steps for moving forward, specifically determination of an owner’s agent. The town will likely combine development of the Singletree Hill Reservoir site with the development of solar on municipal building roofs.

Goal

The goal is construction of a solar farm. It will be easy to calculate emissions reductions, which may be significant.

Unresolved Questions

1. What is a reasonable time frame?

2. How will the business arrangement be structured to maximize benefit to municipal government?
3. How much revenue could be generated for the municipal budget, and how should it be spent?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

MUNICIPAL ROOFS

(Action no. 50)

Liaison

Tommy Vitolo

Action Team

(name of organization or individuals working on this Action)

Description

Install solar collectors (PV panels) on municipal buildings by first (2014) establishing a policy that all municipal roof replacements include structural and electrical components to permit future solar installations, and then (2020) requiring installations on all new roofs.

Implementation

1. Develop policy in conjunction with municipal staff.

Current Activity

None

Goal

The goal is to have solar energy collectors on all municipal buildings. It will be easy to calculate emissions reductions, which may be significant.

Unresolved Questions

1. Is the time frame reasonable?
2. What will the costs be?
3. Exactly which components would be required in the first phase?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

ZONING INCENTIVES

(Action no. 55)

Liaison

Action Team

No Action Team has yet been identified.

Description

Amend the Zoning By-law or create other incentives for residents and businesses to install renewable energy generation facilities.

Implementation

This Action will require close coordination with the Brookline Zoning By-law Review Committee, and support of the Planning Board and the Town Meeting Green Caucus.

Current Activity

None

Goal

Enactment of a zoning by-law and possible other measures that would encourage residents and business to install renewable energy generation facilities.

Unresolved Questions

1. What is the potential for renewable energy facilities in Brookline?
2. Are there currently zoning obstacles to installation of renewable energy facilities in Brookline?
3. Are there models to follow in other (primarily Massachusetts) communities?
4. How much impact would zoning changes have, and might there be more effective ways to encourage installation of renewable energy facilities.

Potential GHG Emissions Reduction

Possible reductions still need to be quantified, e.g., something like:

Based on the goals above, different approaches/options could be used (citing studies, [\[1\]](#), if possible).

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

To be determined with help of the Support and Measurement Team.

BICYCLE SHARING

(Action no. 61)

Liaison

Jesse Mermell

Action Team

(name of organization or individuals working on this Action)

Description

Transportation is a leading source of climate pollution. There have been steady increases in vehicle use, which if continued, will negate improvements in fuel efficiency of vehicles. Short trips under three miles represent nearly half of all car use. The Hubway is a bike sharing system that was launched in Boston on July 28, 2011. It allows the rental of bicycles for short trips. During the first four months of use in Boston, Hubway was a resounding success, recording 140,000 station-to-station rides. Brookline opened three stations in the spring of 2012.

Implementation

1. Grant funding will cover 4 kiosks in Brookline for three years after which alternative funding from other revenue sources will be required.
2. Sites have not been determined although several sites have been proposed.
3. Likely partners include the Brookline Public Health Department, Police Department for safety education, the Brookline Bicycle Advisory Committee, as well as municipal departments including Planning and Transportation.

Current Activity

Hubway Bicycles opened 3 kiosks in Brookline in the Spring of 2012. These will join the 60 which exist in Boston as well as 20 new stations in Cambridge and 8 in Somerville.

Goal

1. Fewer car trips resulting in a reduction of GHG emissions.
2. Improved health of users due to increased physical activity.

- 3. Improved health of all residents due to improved air quality and less traffic.
- 4. Improved bicycle infrastructure due to increased public demand.

Unresolved Questions

- 1. Difficult to measure impact on GHG emissions.
- 2. Locations of stations. There are limitations as to where the kiosks can be located, parking spaces cannot be used.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

BICYCLE ROUTES

(Action no. 62)

Liaison

Cynthia Snow

Action Team

Bicycle Advisory Committee; other organizations or individuals working on this Action

Description

Private automobiles are responsible for 62% of transportation-related greenhouse gas emissions in the U.S. (EPA 2006). Given this context, non-polluting forms of transportation such as biking and walking represent an important strategy for reducing GHG emissions. Bicycling is an attractive and efficient mode of transportation for trips whose distance is in the range of 0.75 to 5 miles. A large fraction of Brookline residents make trips in this range, including local errands and commutes to work and school. Yet bicycling in Brookline is below potential. Safe bicycle routes with low traffic stress would encourage bicycle riding, in turn reducing GHG emissions, improving public health and decreasing traffic congestion and parking demand.

Implementation

1. The Brookline Transportation Board accepted the latest revision of the Bicycle Advisory Committee's Green Routes Bicycle Network Plan, which has the goal of increasing safe and pleasant transportation, commuter and recreational biking routes.
2. Stakeholders will review the Green Routes plan and advocate for feasible projects.
3. Stakeholders will investigate possible funding sources for approved projects.
4. Likely partners include the Bicycle Advisory Committee, Transportation Board, municipal departments of planning, transportation, public works, and parking, Brookline Recreation, public and private schools, the police department and CAB.

Current Activity

Since 2009, a number of bicycle accommodations from the Bicycle Network Plan have been reviewed, approved, funded and implemented, including bicycle parking racks, contraflow lanes on Netherlands and Parkway Roads, bike lanes and shared lanes on Longwood Avenue and parts

of Washington Street. Other accommodations have been approved and funded but are not yet in place. Some of these are expected to be completed in the spring of 2012, and others are currently being considered for funding in the 2013 CIP budget.

Goal

1. Increase in bicycle use due to improved safety.
2. Decrease in traffic and corresponding GHG emissions.
3. Increase in walking and public transportation.
4. Improved public health.

Unresolved Questions

1. Funding will be necessary.

Potential GHG Emissions Reduction

Based on the goals above, different approaches/options could be used, dependent of Bicycle Advisory Committee or Transportation Board Priorities:^[1]

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

BICYCLE PARKING

(Action no. 63)

Liaison

Not yet determined

Action Team

(name of organization or individuals working on this Action)

Description

Bicycle parking standards are intended to encourage bicycling, walking and transit use in lieu of automobiles. For multi-family residences there will be one bicycle space or locker for each two dwelling units or portion thereof. There will be one bicycle parking space for each ten automobile parking spaces for commercial buildings, although this may vary due to building use. Each bicycle parking space will be sufficient to accommodate a bicycle at least six feet in length and two feet wide, and will be provided with a stable frame permanently anchored to a foundation, reasonably secure from theft and vandalism. When automobile parking spaces are provided in a structure, all required bicycle spaces will be located inside that structure or in other areas protected from the weather. Well-designed bike parking is important and has been well detailed in Cambridge's zoning requirements. Having detailed zoning laws prevents poor design.

Implementation

1. Stakeholders will review Cambridge's bicycle parking zoning requirements and draft zoning requirements suitable to Brookline. Stakeholders will include the Brookline Bicycle Advisory Committee and town departments such as Zoning, Parking, Transportation, Planning and others.
2. The proposed requirements will be reviewed by relevant town departments.

Current Activity

The Parking Committee is reviewing parking in Brookline but has not addressed bike parking. Perhaps this could be included in their considerations.

Goal

1. Increase in bicycle use due to improved bike parking and storage. Increased biking has been shown to increase walking and public transportation use as well.

- 2. Decrease in CO2 emissions due to transportation not involving automobiles.
- 3. Improved bicycle routes due to increased demand.

Unresolved Questions

- 1. This initiative has long term pay off rather than immediate effects in decreased CO2 emissions.
- 2. Can zoning requirements be extended to include established businesses and commercial areas?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

ZONING PARKING REQUIREMENTS

(Action no. 87)

Liaison

Not yet determined

Action Team

(name of organization or individuals working on this Action)

Description

Reduce the minimum number of on-site parking spaces required for residential and commercial properties within 0.5 miles of MBTA light rail lines. Brookline's current parking requirements do not differentiate between areas near transit and elsewhere. Appropriate parking requirements will be designated that reflect current land use development patterns and travel behavior.

Implementation

There is currently a Moderator's Parking Committee investigating the appropriateness of lowering residential parking requirements near transit. A previous Selectman's Parking Committee investigated lowering both residential and commercial parking requirements and published a comprehensive report, with some recommendations for new parking requirements. These sources shall be consulted as well as the Planning Department and Zoning By-law Committee to develop an appropriate By-law amendment. This by-law amendment is likely to be brought to Town Meeting within the next 1 to 2 years.

Current Activity

Moderator's Parking Committee investigating possibly lowering of residential parking requirements. The Green Caucus of Town Meeting Members is interested in pursuing and/or supporting a warrant article to reduce parking requirements.

Goal

Significant reduction (approximately 50%) of required on-site parking for both residential and commercial land uses within 0.5 miles of T. Alternatively, parking minimums could be eliminated and replaced with parking maximums. Greater flexibility and encouragement of greater use of shared parking resources will also reduce demand for new parking.

Unresolved Questions

Is lowering minimum requirements adequate, or do we need to eliminate minimums? Some citizens are afraid that lowering the parking requirements will have the unintended consequence of encouraging new or larger developments.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

PERMEABLE PAVEMENT

(Action no. 141)

Liaison

Janey Gilman

Action Team

The Green Caucus of Town Meeting Members is interested in possible by-law amendments that would institute a permeable pavement requirement. The Advisory Committee's Capital Subcommittee is researching the possibility of incorporating permeable pavement in municipal pavement projects. The Engineering Department of the Department of Public Works is key to implementation.

Description

Amend Town By-law to require permeable pavement in parking lots and sidewalks where appropriate and incorporate permeable pavement in municipal paving projects. Permeable pavement allows rain water and snow melt to infiltrate through it to be filtered and recharged into the ground as groundwater. Permeable pavement is asphalt or concrete mixed with fewer fine particles to create more air space which allows water to permeate. Permeable pavement is ideal for use in parking lots, walkways and low traffic roadways. Areas that are paved with traditional, non-permeable pavement are a significant source of polluted stormwater runoff. The benefits of permeable pavement include: reducing stormwater runoff volume, flow rate and temperature; increasing groundwater infiltration and recharge; local flood control; improving local surface water quality; reducing soil erosion; reducing need for typical stormwater infrastructure, thereby reducing project costs; extending life of paved areas in northern climates; reducing need for sand and salt during winter.

Permeable pavement is typically designed to infiltrate runoff from at least a two year storm, in which case, runoff from such a storm would be reduced by 100%.

Implementation

Interested parties, in conjunction with the Department of Public Works, will research the applicability, engineering, cost, etc. of currently available permeable pavement options. Working with the Advisory Committee's Capital Subcommittee, a municipal test site will be selected to implement the Town's first permeable pavement application. This is being planned for FY 2013. Working with the Department of Planning and Community Development and the Town's Zoning By-law Review Committee, a workable by-law amendment will be developed. This process is likely to take 1 to 2 years.

Current Activity

The Advisory Committee Subcommittee is recommending that a portion of the Fuller St. public parking lot, which is slated for re-surfacing in FY 2013, be surfaced with permeable pavement.

The Brookline Zoning By-law Committee (chaired by Dick Benka) may consider permeable pavement requirements.^[1]

The Green Caucus of Town Meeting Members is considering proposing a By-law amendment to require permeable pavement in certain situations.

The Department of Planning and Community Development staff is working with the Brookline Green Space Alliance on amendments to the Zoning By-law's treatment of open space. Requiring or incentivizing permeable pavement as a part of the zoning amendment is under consideration.

Goal

(What success means for this action)

Unresolved Questions

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[2], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

Notes

1. ↑ See passing reference in the minutes (unapproved) of the January 24, 2012 meeting of the Brookline Conservation Commission.
2. ↑ Author, name, Title (date)

TAXI FUEL EFFICIENCY

(Action no. 99)

Liaison

Action Team

(name of organization or individuals working on this Action)

Description

Brookline will include two provisions in the regulations that will govern the taxi industry once we move to a medallion system. First, all taxis put into service under the medallion system will have to be new vehicles. Second, a list of approved vehicles will be included in the regulations, which will include a mix of conventionally powered vehicles and hybrids. One possible vehicle to be included on the list is the Nissan NV200, which has been selected by New York City as its required standard taxi starting at the end of 2013. The NV200 was selected by New York for its design, safety and features and it gets 25 MPG on city streets. (See <http://www.nyc.gov/html/media/totweb/taxioftomorrow.html>).

Other vehicles that might be included on Brookline's list of approved vehicles are the Ford Edge and the Toyota Camry Hybrid. The selected vehicles will offer good passenger comfort, luggage capacity and maneuverability in an urban environment. Vehicles that fit those criteria are likely to be smaller and lighter than Ford Crown Victorias, which are currently the standard vehicle used for taxis.

Implementation

The Transportation Board and the Board of Selectmen have authority over taxi operations in Brookline. Specific vehicle makes and models would be identified as the only vehicles taxi operators would be allowed to use in Brookline, and the license application process would enforce this mandate. This measure requires no funding. This measure is expected to be implemented within a year, however, turn-over of existing licenses will take time.

Current Activity

There is a working Taxi Medallion Committee with representatives of the Transportation Board and Board of Selectmen who are working to establish price, procedures and regulations for taxi medallions, which grant the owner the right to sell leasing rights to taxi operators. This committee is committed to securing fuel-efficient vehicles for Brookline's taxi fleet.

Goal

All taxi vehicles operating in Brookline will be as efficient as the vehicles allowed for town purchase under the Green Communities fuel-efficient vehicle policy.

Unresolved Questions

Desired taxi vehicles may have certain functional requirements that would prohibit achieving the fuel-efficiency standards identified by the Green Communities standard.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

There are 185 licensed taxis in Brookline, and we anticipate changing them over to medallions over a 9 to 18 month period starting in the fall of 2012. Today, almost all of these vehicles are Ford Crown Victorias that were originally police cruisers. Taxi companies buy these for \$5,000 to \$6,000 each, and they get about 12 MPG. A typical Brookline cab puts on about 20,800 fare miles a year and an estimated additional 10,400 non-fare miles. Therefore, the fleet's fuel consumption is approximately 481,000 gallons of gasoline.

The target date for full implementation is 2014. When the changeover to the medallion system is complete, the average vehicle in the fleet will get 20 MPG. Therefore fuel consumption will decrease to approximately 289,000 gallons per year. Therefore, the amount of gasoline consumed by taxi's operating in Brookline will decrease by 192,000 gallons, resulting in a reduction of 1,869 tons of CO₂ per year.

IDLING

(Action no. 74)

Liaison

Action Team

(name of organization or individuals working on this Action)

Description

Massachusetts law imposes a maximum legal limit of 5 minutes idling time for all motor vehicles (M.G.L. Chapter 90, Section 16A, 310 CMR 7.11). Violators may be fined (\$100 - \$25,000) Enforcement of this law by the Board of Health and/or police and through Town wide policy would reduce air pollution and GHG emissions from idling vehicles.

Implementation

Education and enforcement is needed through-out School and Town departments, specifically targeted private contractors, business owners and the general public. Police enforcement would be increased through department-wide education and policy. Economic Development Department could assist with business outreach. The Department of Public Health could disseminate educational materials on air quality and disease. The Board of Health could enforce the law. Phased implementation would first identify problem, repeat violation locations, such as commercial loading areas or delivery vehicles, school and MBTA station drop-off areas, and then expand to general education campaigns and broader enforcement.

Current Activity

The Department of Environmental Protection provided a small grant and technical assistance to a group of Pierce School parents to implement a multi-faceted anti-idling campaign. The Town's Department of Public Works has instituted a policy encouraging reduced idling in compliance with the law. The [*Town of Brookline Energy Reduction Plan*](#), adopted by the Board of Selectmen, includes an employee energy awareness initiative which includes vehicle idling reduction.

Goal

All motor vehicles in Brookline (except specific exemptions, such as certain public safety situations) would comply with the 5 minute idling limit.

Unresolved Questions

Increased Board of Health and police enforcement and additional educational efforts may require additional funding. Federal and State grants may be available for this purpose. The Town may wish to adopt a Town-wide anti-idling policy to increase awareness.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

TRIP REDUCTION

(Action no. 109)

Liaison

Linda Olson Pehlke

Action Team

(name of organization or individuals working on this Action)

Description

A town-wide campaign aimed at reducing the number of single-occupancy vehicle trips. Employers and employees will be encouraged to sign-up for NuRide.com, a free web-based service that provides ride share matching and commute alternative information, with business partner incentives for participants. Measure may also include corporate T pass program for municipal employees and Safe Routes to School initiative.

Implementation

Town Health, Planning and Economic Development departments will partner with local business organizations and schools to incentivize employee NuRides membership. Potential for institutionalizing corporate T passes for municipal and school employees will be explored with Town management, Selectmen's Office and union representatives. School Department, in partnership with Transportation Board and Health Department will be encouraged to apply to WalkBoston for Safe Routes to School pilot program. This action would be implemented in parts over a period of one to two years.

Current Activity

Town's Human Resources Department advertises and encourages participation in Green Streets Initiative, a voluntary program that encourages active/alternative transportation to work/school on the fourth Friday of every month.

Goal

An initial goal of shifting 10% employee drive-alone trips to carpool, transit, walk or bike by 2020.

Unresolved Questions

To be successful, local businesses must be willing to participate in incentive program. (i.e. offering discounts or special services to NuRide members). Corporate T pass program would be more successful if discount T passes were offered, which may require Town funding.

Potential GHG Emissions Reduction

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
10% Reduction in single-occupancy trips	4,279	

Quantitative Analysis

The % of persons commuting to Brookline via single-occupancy vehicle will be reduced gradually, reaching a 10% reduction by 2020. No assumptions have been made about further reductions beyond 2020. Also, there has been no accounting for the emissions impact of persons shifting to bus or transit.

Currently, there are 20,794 individuals working in Brookline. (Source American Community Survey 2008-2010).

There are approximately 264 work-days per year. Therefore: $(20,794 \times 2) = 41,588$ person trips per workday. $264 \times 41,588 = 10,979,232$ person trips per year.

55.6% of the work trips to Brookline are drive-alone (Source: American Community Survey 2008-2010). Therefore $.556 \times 10,979,232 = 6,104,453$ drive-alone person trips.

The average work trip length to Brookline is 9 miles (Central Transportation Planning Staff). Therefore: $9 \times 6,104,453 = 54,940,887$ Vehicle Miles Traveled per year.

A 10% reduction in worker drive-alone trips (drive-alone mode share becomes 45.6%) is represented by $6,104,453 - (.456 \times 10,979,232) = 1,097,923$ fewer drive alone person trips per year.

9 (average trip length) \times $1,097,923$ person trips = $9,881,307$ fewer Vehicle Miles Traveled per year.

Estimated annual VMT Reduction by 2020 = 9,881,307

The VMT reduction is rounded to $9,900,000 \times 393$ gms CO₂ per mile (Source EPA), assuming combined emissions for 2009 model year and average emissions for a fleet of 1/2 light vehicles and 1/2 passenger cars.

This results in a yearly reduction of 4,279 tons of CO₂ in 2020. The cumulative reduction for years 2013 - 2020 would be 19,899 tons of CO₂ with implementation of this measure.

OPEN SPACE PROTECTION

(Action no. 138)

Liaison

Arlene Mattison, President of the Brookline GreenSpace Alliance

Action Team

BGSA Board of Directors, Tom Brady, Town of Brookline Conservation Commissioner, and Brookline Conservation Commission

Description

Open space within dense urban areas, such as Brookline, is a valuable adaptation strategy in the face of climate change. Undeveloped and vegetated lands mitigate rising air temperatures, provide for potential local food production, preserve wildlife habitat, sequester carbon emissions and other air pollutants and provide for storm water retention and ground water recharge. Undeveloped lands represent a greenhouse gas emission reduction compared to developed land. There are significant tracts of undeveloped land that are privately owned that are currently vulnerable to strong development pressures. A process and practice for identifying these parcels and soliciting conservation restrictions from owners would be established, following the suggestions outlined in the Open Space plan.

Implementation

Brookline GreenSpace Alliance Board members or officers would liaison with Town Conservation staff and Conservation Commission members to form an open space protection task force. This task force would identify priority parcels, seek conservation restrictions where appropriate and/or recommend and facilitate alternative strategies for open space protection, such as purchase of development rights, bargain sales, land donation, charitable remainder trusts, etc. Information about available open space protection strategies will be communicated through outreach and education.

Current Activity

In 2008 the Brookline Conservation Commission, Board of Selectmen and Board of Assessors adopted the Brookline Conservation Restriction Policy. This policy establishes criteria for identifying potential conservation lands that further the public's interest in protecting lands that contribute substantial environmental benefits. The Conservation Restriction Policy also establishes clear guidance regarding the tax assessment consequences of granting conservation

restrictions. The Conservation Committee and the Town of Brookline have also adopted the 2010 Open Space Plan. Section 9 of this plan is the Five-year action plan, which identifies a series of actions regarding protection of open space. Objective 6 and 7 recommend outreach to property owners to secure conservation restrictions. There is an independent non-profit Brookline Land Trust which holds some conservation restrictions. The Brookline GreenSpace Alliance, as a well-established environmental advocacy non-profit, currently holds the conservation restriction on the Fisher Hill Reservoir site and could also negotiate and hold additional conservation restrictions.

Goal

The goal of this action is to identify and protect environmentally significant open space from development. The Open Space plan identifies 11 parcels that are 5 acres or larger that are privately owned and potentially threatened by development. The goal of this measure is to secure protection for at least 5 of these parcels by 2020.

Schedule			
2012			
2013			
2014			
2015			
2016			
2017			
2018			
2019			
2020			
2050			

Unresolved Questions

The Town has not established a funding source for land acquisition, thereby diminishing the Town's potential for proactive land acquisition. It is unclear what role non-profit organizations other than the Town could fulfill in the process of securing conservation restrictions.

Potential GHG Emissions Reduction

GHG Emissions Reduction (Tons CO ₂ e)			
2020			
2050			

Quantitative Analysis

Is there an inventory of endangered open space? How can climate-change-related advantages of preserving that open space be quantified? Presumably specific parcels of open land must be identified...?

Notes

1. [↑](#) For more detail, see Leviton, Alan, spreadsheet (or title of similar document, Sep. __, 2012.

URBAN FOREST

(Action no. 145)

Liaison

Don Weitzman

Action Team

(name of organization or individuals working on this Action)

Description

Add 1,000 trees to Brookline's urban forest by 2021.

The environmental value of trees in the city is described in a short video produced by the American Society of Landscape Architects entitled "[Urban Forests = Cleaner, Cooler Air](#)". Further research is needed on the amount of reduction in GHG emissions resulting from increasing the number of trees in Brookline.

Implementation

1. Coordinate goals with Brookline's Tree Planting Committee (TPC), the DPW, and the Town Arborist.
2. Determine additional costs involved, and secure funding.

Current Activity

The Brookline Conservation Commission, in its most recent open space plan ([Open Space 2010: Open Space and Recreation Plan for the Town of Brookline](#)), has included five separate [objectives](#) relating to the Urban Forest.

Goal

The actual planting of 1,000 (net) trees in Brookline by 2021.

Unresolved Questions

1. Is this goal compatible with the goals of the TPC?

2. What additional funding would be necessary?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

PEDESTRIAN ADVISORY COMMITTEE

(Action no. 91)

Liaison

Not yet determined.

Action Team

(name of organization or individuals working on this Action)

Description

The Transportation Board currently administers two special mode-specific Advisory Committees: the Bicycle Advisory Committee and the Public Transportation Advisory Committee. The purpose of these standing advisory committees is to allow greater focus and concentration on planning, researching, problem solving and advocating for needed improvements and actions regarding their particular travel mode. This action would create a similar committee to focus on pedestrian infrastructure and accommodation across the range of applications, such as traffic, street and sidewalk planning and design, as well as making recommendations for pedestrian accommodation within the land use development review process.

Implementation

Petition the Transportation Board for the creation of a Pedestrian Advisory Committee. Appropriate members would be identified who have particular knowledge and interest in planning pedestrian infrastructure and accommodation. Could be implemented by action of the Transportation Board within a 6 to 12 month period.

Current Activity

Regionally, several advocacy groups with specialized interest and expertise in pedestrian accommodation already exist, namely WalkBoston and Livable Streets Alliance. However, these groups are not Brookline specific and they do not function as an official Town sanctioned Advisor.

Goal

The establishment of a Pedestrian Advisory Committee that proposes plans for pedestrian infrastructure and makes recommendations for changes in design or function of existing or proposed infrastructure to better accommodate pedestrians.

Unresolved Questions

It is unclear how such a group could consistently provide pedestrian relevant commentary within Brookline's existing infrastructure and development planning, design and review procedures.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

TRANSIT ORIENTED DEVELOPMENT

(Action no. 93)

Liaison

Not yet determined.

Action Team

(name of organization or individuals working on this Action)

Description

Reinforce Brookline's historic transit oriented development (TOD) patterns by allowing mixed-use dense development near transit facilities. Advantageous zoning changes would include parking requirement reduction and incentives for mixed uses. Mixed-use transit oriented development supports reduced private vehicle travel.

Implementation

A detailed analysis of existing zoning is needed to identify the current impediments to transit oriented development and to identify possible changes that would encourage or incentivize mixed use TOD land use. The Planning Department, Zoning By-law Review Committee and Town Meeting members are likely partners. If Planning Department hired an outside consultant or intern, there would be associated costs.

Current Activity

Several TOD style development proposals have prompted project-specific zoning changes to allow development. The zoning changes made include reduced parking requirements and additional allowable density. These cases can be used as examples for drafting potential by-law changes. There is a Moderator's Parking Committee that is investigating reducing residential parking requirements.

Goal

Town Meeting passes necessary Zoning By-law amendments, such as: reduction or elimination of residential and commercial parking requirements near transit, density bonuses for mixed use or commercial developments that increase job or retail base. These changes would ultimately lead to a reduction in vehicle miles traveled within Brookline.

Unresolved Questions

The Town remains ambivalent towards parking reform and shows a preference for development specific zoning changes.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

TOWN ADMINISTRATOR'S DIESEL EMISSIONS TASK FORCE

(New Action)

Liaison

Not yet determined.

Action Team

Town Administrator's Diesel Task Force: Pema Doma (YMORE), Alan Balsam (Brookline Dept. of Public Health), Patricia Maher (Advisory Council on Public Health), Andrew Pappastergion (Brookline Dept. of Public Works), Mel Kleckner (Brookline Town Administrator), (others TBA)

Description

During the May 2012 Town Meeting, Brookline Town Meeting members voted unanimously to support a resolution advanced by Brookline High School Students to reduce diesel emissions in town, including retrofitting town vehicles that use diesel fuel. This committee is charged with proposing a plan to meet this goal, recognizing the negative health effects and climate impacts of diesel emissions.

Implementation

The committee will meet periodically and prepare a recommended plan of action to Town Meeting in May.

Current Activity

(see above)

Goal

(to be determined)

Unresolved Questions

How much will this cost?

How quickly can we implement the retrofit?

Potential GHG Emissions Reduction

Not yet determined.

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

PAY AS YOU THROW

(Action no. 117)

Liaison

Member of the Brookline Solid Waste Advisory Committee (SWAC)

Action Team

Brookline Solid Waste Advisory Committee (SWAC) and other organizations/individuals interested in climate action

Description

Zero waste is a philosophy that encompasses a holistic approach to minimizing and ultimately eliminating waste.

Achieving a zero waste community will require numerous initiatives that can be implemented by residents, town officials and business owners. This section of the CAP will focus on solid waste programs that should be adopted at town wide level.

Pay-as-You-Throw (PAYT) is a solid waste management program that holds waste generators financially responsible for their trash by volume.

PAYT methods:

Hybrid - Households pay for volume beyond the amount set by the town. A fixed bill covers the first bag or tote and the resident is responsible for the cost of additional waste.

Sticker/Bag - Households purchase town-approved stickers/bags. The price of stickers/bags covers the cost of disposal.

Variable Tote - Households request a specific size tote and pay a fixed bill for the collection. The larger the tote, the higher the bill.

Curbside organics is the process of collecting residential organic material. In 2010, roughly 14% or 35M tons of the country's municipal solid waste was organic material. [\[1\]](#)

Implementation

SWAC has determined that a Hybrid, PAYT program is most suitable for Brookline. The Hybrid program would require residents to have 35Gal collection totes to hold generated waste. Should a resident exceed the capacity of the tote, he or she would need to purchase a bag for remaining waste.

The DPW in conjunction with SWAC would need to develop a rollout plan similar to one used during the single stream phase. The plan would entail tote distribution and educational tools for residents.

Implementing a curbside organics collection program would mirror the PAYT rollout. Residents would receive a collection tote to divert organics for collection purposes. The major component to this initiative would be the resident education/familiarization.

Current Activity

The Board of Selectmen has appointed Moderator’s Committee to evaluate the feasibility of a PAYT program. A conclusion has not been reached by the committee.

SWAC is currently pursuing an organics drop-off pilot program. At this time, the group has not been successful in identifying an approved drop-off location. The committee hosted a collection day in 2011 that diverted food waste from the town’s waste stream and allowed the team to gauge interest in residential organics diversion.

Goal

To reduce GHG emissions through the pursuit of zero waste.

Unresolved Questions

1. Is a curbside organics program right for Brookline? Would a drop-off system be more effective?
2. Who will be the Liaison? (A member of SWAC?)

Potential GHG Emissions Reduction

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
PAYT Jan. 1, 2013 start ^[2]	70,000 MTCE	370,000 MTCE

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

Notes

1. [↑](#) EPA, *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2010*
2. [↑](#) EPA, *Solid Waste Management and Greenhouse Gases*, 2002 Second Ed.

BUY LOCAL

(Action no. 126)

Liaison

Not yet determined

Action Team

Description

In a “Buy Local” Campaign, Brookline residents would be encouraged to purchase local goods that have a lower carbon footprint than non-local alternatives. Local businesses would be encouraged to carry more of these items and would be publicly recognized for doing so.

Implementation

It would be wise to focus initially on one Brookline neighborhood. The best candidates seem to be Washington Square, where multiple CAC members own businesses or live, and an active association is already planning “buy local” events for spring 2012, or Coolidge Corner, where another group may be forming. The biggest challenge for businesses is to make customers aware that they are nearby, they offer desirable, green products, and that it is important to buy these products when given a choice. Therefore, a community outreach campaign is advised that could include: a creative walking tour at local businesses that highlights low-carbon practices and features free products; creation of a designated “buy local” day or week that occurs one or more times throughout the month or year; distribution of a “walkshed” map that shows walkable businesses to nearby residents and highlights low-carbon practices; and a welcome packet for just-moved-in residents modeled after those created by the Beacon Hill Civic Association that highlights these businesses and encourages residents to “go green.” Documentation should be created that outlines why buying local is important and how it relates to combating climate change.

Current Activity

Many associations of business owners already exist in Brookline, including the Coolidge Corner Merchant’s Association, the Chamber of Commerce, and the Washington Square Association, and they are variously engaged in encouraging Brookline residents to “buy local.” Therefore, attempting to create a new green group of business owners does not seem advisable, given that there is already worry about group overlap.

Goal

- a pilot neighborhood is chosen
- the applicable business associations and merchants are contacted regarding the proposed campaign, and many, if not all, of them offer to help by hosting an event, providing coupons for participation, offering to help distribute flyers and market other businesses, etc.
- community members from the neighborhood are also recruited to help with the campaign and take on leadership of various tasks
- a walkshed map of the neighborhood is created, which is received in all residents' mailboxes and is available online
- designated 'buy local' times are created and business increases during those times which is well-attended and results in greater business
- volunteers take on the role of checking who has moved in to the neighborhood and distributing welcome packets that highlight local businesses and their low-carbon practices
- this pilot neighborhood inspires the creation of other "buy local" neighborhoods in Brookline and beyond

Unresolved Questions

Is it possible to measure before and after economic and environmental data to try and measure the effects of a "buy local" campaign? Is there a way to get data to prove how many cents on a dollar stay in the community with one type of store vs. another type of store?

Some local businesses do not necessarily sell "environmentally sound" products; should we still encourage people to utilize these businesses?

A great deal of vagueness exists about what it means to be a "green" business. How can we create a way that a restaurant, for example, that is energy efficient, sources local food, and recycles is not judged the same as a business that only does one of these things?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

MEATLESS DIET DAYS

(Action no. 136)

Liaison

Pat Maher

Action Team

Mary Dewart, Climate Action Brookline, Sonya Elder, Brookline Public Schools, Sue Levy, Savory Living, Lynne Karsten, Brookline Public Health.

Description

In 2006 a U.N. report concluded that livestock farming generated 18% of the planet's greenhouse gas emissions. Eating less meat would decrease deforestation, lower CO2 emissions, cut down on manure that generates nitrous oxide and methane, and decrease chemical waste from feedlots. Diets with less meat would improve health and reduce the incidence of obesity, cancer and heart disease. This initiative proposes a town-wide educational program to encourage eating less meat in an effort to move the public towards a more plant-based diet. We hope to enlist 15% of town residents in eating meatless at least one day a week.

Resources

- [The American Carbon Footprint: Understanding and Reducing Your Food's Impact on Climate Change](#)
- [Reducing Short-Lived Climate Forcers through Dietary Change](#)

Implementation

1. Stakeholders will gather at least twice a year to build on current initiatives and develop new ones such as the winter market, vegetarian cooking classes, etc.
2. Stakeholders include Climate Action Brookline, Brookline schools, Brookline Public Health and Savory Living. We hope to involve grocery stores, restaurants, the farmers' market, Brookline Center for Adult and Community Education and others.

Current Activity

A current public health grant is supporting efforts to increase awareness of the intersections of public health and climate change. The public schools have a meatless day weekly, which is saving approximately 27 metric tons of CO₂ a year in K-8 program alone.

Goal

1. Continuation of one meatless day a week or more at public schools.
2. Adoption of weekly meatless day by 15% of Brookline households.
3. Increase in vegetarian options at schools and restaurants.
4. Expansion of farmer's market to year round with the formation of a winter market.
5. Improved public health through lower rates of obesity and chronic disease.
6. Improved public knowledge regarding nutrition.
7. A decrease in GHG emissions due to lower rates of meat intake.

Unresolved Questions

It is difficult to collect and measure resulting decreases in GHG emissions.

Potential GHG Emissions Reduction

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible).

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

INSTITUTIONALIZE EDUCATION AND OUTREACH

(Action no. 127)

Liaison

Mary Dewart and Pat Maher

Action Team

Brookline Tomorrow: Climate Action Today.

Description

A well-integrated community wide education and outreach program is essential to promote a reduction in Brookline's greenhouse gas emissions. Residents generate approximately 74% percent of GHG emissions, with the town, nonprofits, schools and businesses making up the remainder. In order to reach the goal of a 25% reduction in GHG emissions by 2020, the community would benefit from education and strategies aimed at energy efficiency.

Implementation

1. Keep stakeholders updated on programs, incentives, and actions to reduce GHG emissions.
2. Stakeholders include Brookline residents and organizations including Climate Action Brookline, Selectman's Climate Action Committee, Brookline Public Health, Brookline Schools, Brookline Community and Adult Education, Brookline Recreation, Bountiful Brookline and over 100 Brookline Tomorrow partners that include businesses and organizations.

Current Activity

Brookline Tomorrow: Climate Action Today, a joint initiative of the Selectmen's Climate Action Committee and Climate Action Brookline, is helping to raise community awareness that leads to action towards the goal of reduction of GHG emissions. Climate Week occurred in 2011 and 2012. Climate Week 2012 included over 40 events and displays

Goal

1. Increase knowledge of residents and Brookline Tomorrow partners about climate change and methods to reduce GHG emissions.

2. Provide information and recognition for actions taken by residents and Brookline Tomorrow partners.
3. Improve energy conservation by households and Brookline Tomorrow partners.
4. Improve public health due to an increase in physical activity and emphasis on a local sourced plant based diet.

Unresolved Questions

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

FORMALIZE TOWN STAFF FUNCTION

(Action no. 130)

Liaison

Town staff (Planning Department), if and when this is feasible

Action Team

(name of organization or individuals working on this Action)

Description

Expand staff resources allocated to climate action coordination in Town Hall, maintaining Climate Change coordination presence in Planning Department and either expanding it there or adding capability in other departments. Ideally, *direct* staffing of climate change activities would be committed at the level of at least one “full-time-equivalent.” Because this must be accomplished within budget limitations, there will be no changes immediately, but instead, Town staff will be alert for opportunities to move this action forward. Ultimately, this may be accomplished within the municipal budget, or more likely by identifying outside funding sources, or even by enacting a bylaw to create a revenue stream. Should a group of town residents decide to pursue enactment of a bylaw to formalize CO2 reduction targets and to make the Climate Action Committee a permanent committee, those residents should be aware of this Action and take it into consideration in any plans.

Implementation

1. Research funding mechanisms in other communities, e.g. Boulder, CO carbon fee.
2. Develop long-term plan.

Current Activity

None

Goal

The goal is tighter focus and better coordination of municipal activities that reduce emissions or adapt to climate change. Success would mean an increase in outside resources for use to address climate change, and a stronger, more coordinated response both within municipal government and in the town generally.

Unresolved Questions

1. Although it appears at the moment that the staff function should remain located primarily in the Planning Department (the Public Health Department is the only other logical place for it), care should be taken to continue to support the substantial efforts to address climate change and energy efficiency that are already under way in other departments. Organization of this work should continually be reevaluated.

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

PUBLIC PROGRESS SYMBOL

(Action no. 139)

Liaison

Not yet determined

Action Team

(name of organization or individuals working on this Action)

Description

Almost 80% of greenhouse gas emissions in Brookline are generated by residents. In order to decrease emissions by 25% by 2020 the community must make individual and collective changes in energy use, conservation, transportation and life style. Because the sources of global warming are invisible and therefore progress is also invisible, a visual symbol of the community's advancements towards this goal would provide increased public awareness and motivation.

Implementation

1. Public artists will be asked to submit proposals.
2. Funding will be sought to cover the costs of artist materials and remuneration, analysis of metrics, and upkeep and updating of the symbol.
3. A metric committee will be formed for ongoing data measurements and updating of the symbol.
4. Likely partners will include the Brookline Arts Center, New England Institute of Art, Mass Art, Brookline Community Foundation, CAB, and town agencies involved in planning and open space.

Current Activity

None.

Goal

1. Make the invisible (reduction of GHG emissions through town-wide involvement in conservation) visible through a public symbol/art.

2. Engage the community in a town-wide effort to decrease GHG emissions.
3. Disseminate information and feedback to the community about their energy use.

Unresolved Questions

1. There is currently no funding.
2. There are questions regarding metrics, i.e., how to measure progress with some precision.
3. Could this be a project for students in one of the art schools?

Potential GHG Emissions Reduction

(Quantification of possible reductions, e.g., something like:)

Based on the goals above, different approaches/options could be used.... (cite a study^[1], if possible.)

GHG Emission Reduction by 2020, Tons CO ₂ e	by 2020	by 2050
(option 1)		
(option 2)		
(option 3)		

Quantitative Analysis

(TBD with help of CAC Goals and Measurements Subcommittee)

SELECTMEN'S CLIMATE ACTION COMMITTEE

RESPONSIBILITIES

The Selectmen's Climate Action Committee has the following responsibilities:

1. Recommend programs that reduce the net production of greenhouse gases in Brookline, such as energy efficiency measures, green energy sources, and additional greenspace.
2. Monitor, measure, and assess efforts of the Town to reduce net greenhouse gas emissions.
3. Monitor promising relevant programs in other municipalities.
4. Monitor relevant technological developments.
5. Serve as liaison between the Town and the public with regard to information and programs related to reducing net production of greenhouse gases.
6. Report annually to the Annual Town Meeting and to report from time to time to the Board of Selectmen, the Town Administrator, and the public.

Read the Climate Action Committee's [Report to Fall Town Meeting 2012](#) for a summary of the committee's recent activities.

MEMBERSHIP

- **Dan Bennett** – Building Commission designee; Building Commissioner, Town of Brookline.
- **Ben Chang** – School Committee designee.
- **Mary Dewart** – Owner, Dewart Design, a landscape design/build practice; founding member and current board member of Brookline GreenSpace Alliance; town meeting member, Precinct 3; served on Brookline Parks and Recreation Commission and the Brookline Community Foundation; lectures and symposia, Massachusetts Horticultural Society; video producer, Isabel's Gift, The Story of Larz Anderson Park.
- **Jon Cody Haines** – Citizen representative to the Climate Action Committee; incTank Ventures, focusing on Sustainable Energy Start-ups; B.S., Mechanical Engineering, University of New Hampshire; M.S., Engineering Management, Northeastern University.
- **Keske Toyofuku** – Citizen representative to the Climate Action Committee.
- **Alan Leviton** – Climate Change Action Brookline designee; BS Chemical Engineering, Purdue University; MS Chemical Engineering, University of Illinois; retired from Rohm and Haas Company with experience in the design, construction, and operation of chemical plants; currently a chemical industry consultant.
- **Werner Lohe** – Conservation Commission designee.
- **Jesse Mermell** – Committee co-chair and Member of the Board of Selectmen.

- **Patricia Maher** – Advisory Council on Public Health designee; nurse practitioner, Cambridge Health Alliance; Board Member, Brookline-Quezalguaque Sister City Project.
- **Linda Olson Pehlke** – Brookline Neighborhood Alliance designee; freelance writer and historian (2001-present); former urban and transportation planner; former member of the (Massachusetts) Governor's Air Quality Task Force; founder and president, Friends of the Minot Rose Garden.
- **Jim Solomon** – Citizen representative to the Climate Action Committee; chef/owner, The Fireplace Restaurant, the first Green Certified Restaurant by the Green Restaurant Association; member of the Board of Directors, Boston Green Tourism; Board of Directors Vice President, Brookline Chamber of Commerce; Board of Directors, The Terezin Chamber Music Foundation; Board of Directors, Boston Children's Theatre; active member of Seeds of Peace, a non-profit organization working to secure peace in the Middle East and other regions of conflict.
- **Ali Tali** – Transportation Board designee.
- **Don Weitzman** – Committee co-chair and Advisory Committee designee; retired, former teacher and teaching consultant, private investor, Town Meeting Member (1994-present); founding member, Neighbors Building Brookline (precinct 12 TM slate); Advisory Committee member (1996-1997, 2006-present); former Selectman (1997-2000); founding member and past co-chair, Town Meeting Members Association; founding member and former treasurer, Brookline Neighborhood Alliance; board member, Brookline PAX; board member, Fisher Hill Association; board member, Brookline GreenSpace Alliance; associate member, Brookline Democratic Town Committee; host, Brookline Beat, Brookline Access Television; founding member, past co-chair, and current treasurer, Climate Change Action Brookline (CCAB). Sponsored and co-authored Article 29 (May 2008 TM) that established Selectmen's Climate Action Committee.
- **Mark Zarrillo** – Planning Board designee.

TOWN MEETING ARTICLE CREATING CLIMATE ACTION COMMITTEE

ARTICLE 29: CLIMATE ACTION COMMITTEE

VOTED in Brookline Town Meeting, May 29, 2008:

That the Selectmen establish a committee, the purpose of which is to reduce the total emission of greenhouse gases by the Brookline community, including Town government.

The name of the committee shall be the Selectmen's Climate Action Committee.

The responsibilities of the committee shall include:

1. to recommend programs that reduce the net production of greenhouse gases in Brookline, such as energy efficiency measures, green energy sources, and additional greenspace;
2. to monitor, measure, and assess efforts of the Town to reduce net greenhouse gas emissions;
3. to monitor promising relevant programs in other municipalities;
4. to monitor relevant technological developments;
5. to serve as liaison between the Town and the public with regard to information and programs related to reducing net production of greenhouse gases;
6. to report annually to the Annual Town Meeting and to report from time to time to the Board of Selectmen, the Town Administrator, and the public; and
7. such other responsibilities as may be determined from time to time by the Board of Selectmen.

The committee shall consist of the following members appointed by the Board of Selectmen:

1. a member of the Board of Selectmen
2. the Chair of the Advisory Committee or her/his nominee
3. the Chair of the School Committee or her/his nominee
4. the Chair of the Transportation Board or her/his nominee
5. the Chair of the Conservation Commission, or her/his nominee
6. the Chair of the Planning Board, or her/his nominee
7. the Chair of the Building Commission, or her/his nominee
8. the Chair of the Advisory Council on Public Health, or her/his nominee

9. a Co-Chair of Climate Change Action Brookline, or their nominee
10. the President of the Brookline GreenSpace Alliance, or her/his nominee
11. a Co-Chair of the Brookline Neighborhood Alliance, or their nominee
12. the President of the Brookline Chamber of Commerce, or her/his nominee
13. three members at large with special consideration given to people with the following skills:
 - Relevant scientific and/or academic expertise
 - Relevant engineering expertise
 - Knowledge of and/or experience with green businesses
 - Relevant public health expertise.

All members shall serve three-year terms, which may be renewed. Initial appointments shall be for terms of one, two, and three years so that terms will expire at staggered intervals. No member shall be disqualified because she or he is not a resident of the Town.

The committee shall have two co-chairpersons, one of whom shall be the selectman member and one of whom shall be elected annually by the committee.

The staffing of the committee shall be determined by the Selectmen and the Town Administrator. The committee shall be established by November 30, 2008, and shall be evaluated by the Board of Selectmen before December 31, 2011, to determine whether it should be made permanent or dissolved.

TOWN OF BROOKLINE WEBPAGE – “CLIMATE CHANGE”

Appendix D

[Click HERE](#) to return to the Town of Brookline website [Click HERE](#) to return to the Department of Public Works website



ABOUT US THE PARKS & OPEN SPACE SYSTEM PARKS & RECREATION CONSERVATION FORESTRY CEMETERY CONTACT US

Conservation

- [Overview](#)
- [Open Space Plans](#)
- [Wetlands Bylaw & Regulations](#)
- [Wetland Protection Act](#)
- [Nature Sanctuaries](#)
- [Rules & Regulations](#)
- [Donation Guidelines](#)
- [Living With Wildlife](#)
- [Conservation Tools](#)
- [Invasive Plant Species](#)
- [Plan on Climate Change](#)
- [Sustainability Inventory](#)

Climate Change

The Parks and Open Space Division supports climate change initiatives and the reduction of greenhouse gas emissions that contribute to regional and global climate change. This webpage provides information and links to the Town's Plan on Climate Change, Town and local climate change organizations and activities, and other useful sources of up-to-date information on climate change.

Climate Change and Open Space

Open space is critical for minimizing, mitigating, and adapting to climate change. Trees and vegetation cool the air through evapotranspiration, shading and other methods, and plants capture carbon in their tissues through photosynthesis, keeping significant amount of heat-trapping carbon dioxide gas out of the atmosphere. Open space mitigates flooding, droughts and other extreme weather events that are likely to be exacerbated by climate change. The open space system provides habitat and resources for wildlife and plants, which may be threatened by climate change. In addition, use of local parks and open spaces can be a low- or no-carbon recreation activity, and using the open space system for walking and biking can decrease vehicle emissions. The Town's Open Space and Recreation Plan provides more details on climate change and open space, and includes many goals and objectives related to addressing climate change.

[Click here to go to the Open Space Plan website.](#)

Local Action Plan on Climate Change

In February 2002, the Town of Brookline completed its first Local Action Plan on Climate Change. This plan followed a Resolution passed by the Board of Selectmen in April 2000 for the Town to participate in the Cities for Climate Protection (CCP) Campaign through the International Council for Local Environmental Initiatives (ICLEI). The Town subsequently completed a greenhouse gas emissions inventory and report, set an emissions reduction target, and completed the Local Action Plan. The Town's Climate Action Committee is currently in the process of updating the plan and associated information.

[Click here to download the Plan on Climate Change.](#)

Selectmen's Climate Action Committee

In 2008, the Board of Selectmen established the Selectmen's Climate Action Committee (CAC) in conjunction with a Resolution passed by Town Meeting that May. A member of the Conservation Commission serves on this standing Committee. Their website includes information on the Committee's

http://www.brooklinema.gov/index.php?option=com_content&view=article&id=721&Itemid=1062

responsibilities, members, and reports of their recent activities, accomplishments, and work plans for the future.

[Click here to visit the Climate Action Committee website.](#)

Climate Change Action Brookline

Climate Change Action Brookline (CCAB) is a local group of volunteer activists committed to the vision of Brookline evolving from an energy-consuming community to an energy-conserving community. CCAB is a member of the Massachusetts Climate Action Network (MCAN), a network of local and statewide groups dedicated to halting the threat of global climate change. CCAB's website includes ways to cut carbon, an events calendar, success stories, ways to get involved, and other resources.

[Click here to visit the Climate Change Action Brookline website.](#)

Brookline Tomorrow: Climate Action Today

Brookline Tomorrow is an initiative co-sponsored by Climate Change Action Brookline and the Selectmen's Climate Action Committee. The challenge is designed to raise awareness about the importance of reducing the carbon footprint of our community. Everyone, from individual residents to organizations and businesses, can help address the national challenge of climate change by taking action at the local level here in Brookline. You can find out more and sign up to become a Brookline Tomorrow partner on their website.

[Click here to visit the Brookline Tomorrow website.](#)

OTHER LINKS

For scientific information on global warming and climate change, click on the following links:

[Intergovernmental Panel on Climate Change \(IPCC\)](#)

[United States Climate Change Science Program & United States Global Change Research Program](#)

[Union of Concerned Scientists](#)

For ways to minimize climate change, reduce energy consumption, etc., click on the following links:

[Climate Change Action Brookline Resources](#) (comprehensive list of websites)

[Climate Change Action Brookline Carbon Calculator](#)

[Green Homes Brookline](#) (Town-led initiative for free home energy assessments)

[Green Streets Initiative](#)

For information and activities for kids, click on the following links:

[U.S. EPA Student's Guide to Global Climate Change](#)

[Center for Climate and Energy Solutions Kids Corner](#)

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CLIMATE ACTION PLAN SUBCOMMITTEE

The **Climate Action Plan Subcommittee (CAPS)** of the CAC consisted of:

Werner Lohe, convener

Alan Leviton

Patricia Maher

Linda Olson Pehlke

Donald Weitzman

It was assisted by Intern Ninya Loeppky and Senior Planner Lara Curtis Hayes. It met at least monthly beginning in February 2011. Its last meeting was May 10, 2012. Its work is described in the section of the climate action plan concerning the [Planning Process](#).

Appendix F

CAP ACTIONS COMPREHENSIVE WORKING LIST

CAP Actions

Additional Sources:
SM = Survey Monkey survey
PW = Public Workshop

Sources: CAG, 2002 CAP,
and
ICLEI (CAPP)

3/30/11, 7/14/11,
9/21/11
Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Develop Program for Replacement of All or Some of these Mechanicals: Refrigerators, Dishwashers, Clothes Washers, Clothes Dryers, Air Conditioners, Computers, Monitors, Printers, Copiers, Water Coolers, Vending Machines, Water Heaters, Boilers, Chillers, HVAC Fans	Energy Efficiency/ Conservation		
Heating - Convert from Oil to Gas Heat (all sectors) - CAC 4/25/11 (9/9)	Energy Efficiency/ Conservation		
Promote EE through targeted business campaigns	Energy Efficiency/ Conservation		
Require Energy Upgrades of Buildings at Sale	Energy Efficiency/ Conservation		
Roofs - Green Roof Initiative - SM#9	Energy Efficiency/ Conservation		
Water Conservation Program - Conservation Bylaw; Rate Restructuring; Low- Flow Faucets, Shower Heads, Toilets; Irrigation Management, Drought-Resistant Landscaping	Energy Efficiency/ Conservation		
Install occupancy sensors	Energy Efficiency/ Conservation		
Lights - Install LED exit signs	Energy Efficiency/ Conservation	Yes	
Lights - Install LED street lights	Energy Efficiency/ Conservation	Yes	

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPPA)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Retro-Commissioning	Energy Efficiency/ Conservation		
Increase Energy Efficiency in Municipal Buildings - CAC 4/25/11 (9/9)	Energy Efficiency/ Conservation		
Loans to Residents for EE Upgrades	Energy Efficiency/ Conservation		
Stretch Energy Code for Buildings	Energy Efficiency/ Conservation	Yes	
Weatherization and EE for Low-Income and Public Housing	Energy Efficiency/ Conservation		
Perform EE Retrofits of Existing Facilities	Energy Efficiency/ Conservation	Yes	Yes
Coordinator/leader in each school, municipal office, etc. to lead workshop on day-to-day activities such as copying, bottled water, coffee mugs, etc. - Bambi Good SM#4	Energy Efficiency/ Conservation		
Enlist owners of 10 of 20 largest commercial buildings to rate their buildings using DOE/EP Portfolio Manager - Stephen Burrington SM #11	Energy Efficiency/ Conservation		
Heating - Convert from Oil (or Electric) to Gas Heating Systems - CAC 4/25/11 (9/9)	Energy Efficiency/ Conservation		
Increase Energy Efficiency in Residential Buildings, building on Green Homes Brookline - CAC 4/25/11 (9/9)	Energy Efficiency/ Conservation	Yes	Yes
Install a lights-out-at-night policy	Energy Efficiency/ Conservation		
Lights - Conversion of Incandescent to compact fluorescent in residences - '02 Plan	Energy Efficiency/ Conservation		
Lights - Decrease Average Daily Use of Street Lights	Energy Efficiency/ Conservation		

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPPA)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Lights - LED holiday lights	Energy Efficiency/ Conservation		
Lights - Retrofits	Energy Efficiency/ Conservation		
Mandatory energy audit on sale of home - PW	Energy Efficiency/ Conservation		
Mandatory energy audit related to tax assessment - Ginny Willcox SM#3	Energy Efficiency/ Conservation		
Municipally Owned Demonstration Home - CAC 4/25/11 (2/9); '02 Plan	Energy Efficiency/ Conservation		
New Construction - Renewable and Regional Materials, Durability Assessment Prior to Construction	Energy Efficiency/ Conservation		
Promote green building through incentive/assistance programs	Energy Efficiency/ Conservation		
Provide daily water usage data online on all meters to find leaks and change habits - Marc Cooper SM#5	Energy Efficiency/ Conservation		
Roofs - Zoning Requirement of White Roofs for M and Commercial Buildings by 2017 - Tommy Vitolo SM#7	Energy Efficiency/ Conservation		
Window Renovation/Replacement - '02 Plan	Energy Efficiency/ Conservation		
Zoning requirement that all building <25,000 sq.ft. be LEED certified Tommy Vitolo SM#7	Energy Efficiency/ Conservation		
Subsidize Green Restaurant association membership for local restaurants - PW	Energy Efficiency/ Conservation		
Heating - Form Geothermal Task Force - CAC 4/25/11 (4/9)	Energy Generation		
Heating - Geothermal demonstration project - Jeff Cook SM#16	Energy Generation		

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPP)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Bulk Purchase Program (with other communities?) for PV Panels - PW	Energy Generation		
Form Community Coalition to Lobby for Decoupling of Wind Energy Pricing - CAC 4/25/11 (4/9)	Energy Generation		
Green Electricity Renewable Portfolio Std (Municipal purchase) - '02 Plan	Energy Generation		
Green Electricity Renewable Portfolio Std (Residential purchases, e.g., NSTAR Green)	Energy Generation		
Lobby for increased Renewable Portfolio Standard - '02 Plan	Energy Generation		
Neighborhood hydrogen fuel cell power station - PW	Energy Generation		
Purchase Green Electricity via the Grid from various sources	Energy Generation	Yes	
Purchase Green Tags/Renewable Energy Certificates	Energy Generation		
Residential solar panel program - Lili Allen SM#10	Energy Generation		
Residential use of solar hot water heating - '02 Plan	Energy Generation		
Solar - Low-interest or interest-free municipal loans or tax incentives for residential solar and wind installations - Judy Mabel SM#6; PW; CAC 4/25/11 (9/9)	Energy Generation		
Solar - Third-Party PV Solar Farm on Municipal Land on Single Tree Hill - PW; CAC 4/25/11 (8/9)	Energy Generation		
Solar -Install Municipal PV Panels - CAC 4/25/11 (9/9)	Energy Generation		

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPPA)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Solar on Municipal Buildings - Policy by 2015 that municipal building and roof replacements include structural and electrical hook-ups for solar; by 2020 require actual PV - Tommy Vitolo SM#7	Energy Generation		
Solar Photovoltaic Panels	Energy Generation	Yes	
Solar Water Heaters	Energy Generation		
Solar Water Heating at Swimming Pools	Energy Generation		
Wind Turbines	Energy Generation		
Zoning Relief/Incentives for Renewable Energy - CAC 4/25/11 (7/9)	Energy Generation		
Safe Routes to School Program - CAC 4/25/11 (7/9)	Transportation	Yes	Yes
Double bicycle trips by 2015 (using Bicycle Adv. Comm and other benchmarks) - Cynthia Snow SM#19	Transportation		
Bicycle education - '02 Plan	Transportation		
Bicycle Infrastructure - CAC 4/25/11 (9/9)	Transportation	Yes	
Bicycle Police Program	Transportation	Yes	Yes
Bicycle Sharing - CAC 4/25/11 (9/9)	Transportation		
Bicycle Sharing - CAC 4/25/11 (9/9)	Transportation		
Bicycles - 7.5 mi. of bike lanes by 2015 - Tommy Vitolo SM#7	Transportation		
Bicycles - Higher zoning requirements for bike parking in new buildings a la Cambridge - Tommy Vitolo SM#7	Transportation		
Bicycles - Improve bicycling conditions, especially on commuter routes - Michael Sandman SM#2	Transportation		

CAP Actions

Additional Sources:
SM = Survey Monkey survey
PW = Public Workshop

Sources: CAG, 2002 CAP,
and
ICLEI (CAPP)

3/30/11, 7/14/11,
9/21/11
Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Bicycles on trains/buses	Transportation		
Build Electric Vehicle Charging Stations in new facilities	Transportation		
Car-free Sunday mornings (a la Mem.Dr.) on Beacon Street - Jennifer Barber SM#12	Transportation		
Car-Sharing	Transportation	Yes	
Conversion to Biodiesel	Transportation	Yes	
Conversion to Electric Vehicles	Transportation	Yes	
Conversion to Non-Com-Based Ethanol Transportation	Transportation		
Eliminate Right on Red" - PW	Transportation		
Enforce Idling Rules on Brookline Municipal Vehicles	Transportation		
Enforce Idling Rules on taxis, charter buses, trucks (Michael Sandman SM#2)	Transportation		
Excise tax incentives for high-efficiency vehicles - Cathy Lurie SM#13; PW	Transportation		
Hybrid Vehicles	Transportation		
Implement bus rapid transit or shuttling programs	Transportation		
Implement parking cash-out program	Transportation	Yes	
Improve/expand pedestrian infrastructure	Transportation		
Improvements to MBTA Green Line	Transportation		
Increase tele-commuting	Transportation	Yes	
Institute NuRides.com Transportation Incentive Program - CAC 4/25/11 (9/9)	Transportation		
Limit Idling of Heavy Equipment Vehicles	Transportation		
Lobby for increased CAFE standards (Corporate Average Fuel Economy) - '02 Plan	Transportation		

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPP)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
MBTA Passes for Municipal Employees - CAC 4/25/11 (9/9); '02 Plan	Transportation		
Parking - Improve Public Parking Signage to reduce "cruising" - Michael Sandman SM#2	Transportation		
Parking - Reduce Parking Requirements in Zoning Bylaw near Transit - CAC 4/25/11 (9/9)	Transportation		
Parking - Zoning Incentives for Shared Parking - Michael Sandman SM#2	Transportation		
Parking Incentives for Hybrid and Electric Vehicles	Transportation		
Parking Spaces for Scooters - PW	Transportation		
Pedestrian Advisory Committee - CAC 4/25/11 (3/9)	Transportation		
Procurement of smaller fleet vehicles	Transportation		
Promote Mixed Use and TOO - '02 Plan	Transportation		
Provide HS students with free bus passes	Transportation		
Reduce Municipal fleet size	Transportation		
Review major intersection for signal timing, etc. to reduce queuing- Michael Sandman SV#2; Ginny Willcox SM#3	Transportation		
Ride-Sharing (carpools)	Transportation		
Support for Urban Ring Project (T circle route) - '02 Plan	Transportation		
Taxi regulations to encourage fuel efficient vehicles - Michael Sandman SM#2	Transportation		
Taxi Study (expand number of taxi permits) - '02 Plan	Transportation		
Traffic Calming - '02 Plan	Transportation		
Traffic Calming - CAC 4/25/11 (2/9)	Transportation		

CAP Actions

Additional Sources:
SM = Survey Monkey survey
PW = Public Workshop

Sources: CAG, 2002 CAP,
and
ICLEI (CAPP)

3/30/11, 7/14/11,
9/21/11
Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Traffic Calming - Close streets to traffic a la Europe - Peggy Ueda 6/30/11 email to Jesse	Transportation		
Transit - Double Bus Use from South Brookline by 2020 - Tommy Vitolo SM#7	Transportation		
Transit - Increase bus ridership	Transportation	Yes	
Transit - Increase Green Line ridership	Transportation	Yes	
Transit - Signal priority for C-Line - Tommy Vitolo SM#7	Transportation		
Transit oriented development	Transportation		
Trip Reduction Program with Community-wide Goal of 35% Non-Car Trips (a la Boulder, CO) - Stephen Burrington SM #11	Transportation		
Transit - Bus Rapid Transit on Harvard Ave., right-of-way priority, etc. - PW	Transportation		
Walk to school and work days weekly - Bambi Good SM#4	Transportation		
Ban Styrofoam and plastic bags - PW	Waste		
Bylaw Requiring Mandatory Private Recycling - '02 Plan	Waste		
Encourage sports teams to phase out disposable water bottles - PW	Waste		
Establish/Expand Curbside Recycling Programs	Waste	Yes	Yes
Establish/Expand Recycling Programs	Waste	Yes	Yes
Implement "Pay as You Throw" Program - CAC 4/25/11 (9/9)	Waste		
Mandate Commercial Recycling; - Jennifer Barber SM#12; CAC 4/25/11 (9/9)	Waste	Yes	Yes
Methane Flaring at Local Landfills	Waste		
Organics Composting - Ginny Willcox SM#3; CAC 4/25/11 (9/9)	Waste	Yes	

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPPA)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Recycling or Reuse of Construction and Demolition Materials; CAC 4/25/11 (9/9)	Waste		
Recycling of Mid-Size Materials/Objects - PW; CAC 4/25/11 (8/9)	Waste		
Reuse facilities/programs to foster solid waste reduction	Waste		
Yard waste collection and composting	Waste	Yes	Yes
Zero Waste policy - PW	Waste		
Water - Greywater Harvesting	Water		
Buy Local campaign	z Other		
Clarify Goals (Reduction Percentage) and Timeline for CAP - CAC 4/25/11 (9/9)	z Other		
Climate Change Outreach and Education - '02 Plan	z Other		
Community Gardens - PW; CAC 4/25/11 (6/9)	z Other		
Create Energy Advisory Committee - '02 Plan?	z Other		
Establish Full-Time Municipal Energy/Climate Change Coordinator Position - CAC 4/25 (8/9); '02 Plan	z Other		
Farmers Market expansion to year-round - PW	z Other		
Gasoline lawnmower/snowblower/leafblower replacement	z Other		
Implement Carbon Tax	z Other		
Make CAC Permanent (by bylaw?) - PW	z Other		
Make explicit links between open space preservation and climate change - Edward Hsieh SM#14	z Other		
Meatless Diet Days - CAC 4/25/11 (6/9)	z Other		

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPPA)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Prepare cost analysis of business-as-usual scenario - PW	z Other		
Public art installation to record progress toward a particular conservation goal - Pat Maher SM#18	z Other		
Public visual symbol to record progress (reverse thermometer) - PW; CAC 4/25/11 (7/9)	z Other		
Publish CAP in Ongoing, Iterative Form on Website - WL	z Other		
Require permeable parking lots and sidewalks - PW	z Other		
Sustainable Business Awards Program - '02 Plan	z Other		
Tree Planting for carbon storage and heat island mitigation	z Other		Yes
Tree Planting to Shade Buildings	z Other		Yes
Trees - Add 1,000 trees to urban forest by 2021 - Tommy Vitolo SM#7	z Other		
Use low-VOC cleaning products	z Other		
Use low-VOG paints	z Other		
Use non-asphalt pavements	z Other		
Warrant article to formalize CO2 reduction targets - PW	z Other		
Not Suitable for Brookline - (The actions below were screened out entirely as so irrelevant to Brookline or outdated that we need not even retain a record that they were considered.)	x		
EPA Certified Wood Stoves	x Energy Efficiency/ Conservation		
Distribute free CFL bulbs/fixtures to Residents	x Energy Efficiency/ Conservation		

CAP Actions

Additional Sources:
 SM = Survey Monkey survey
 PW = Public Workshop

Sources: CAG, 2002 CAP,
 and
 ICLEI (CAPPA)

3/30/11, 7/14/11,
 9/21/11
 Cw/CAC CAPS actions v

Action	Category	In 2002 Climate Action Plan?	Done in Brookline?
Install non-LED EE street lights (id sodium)	x Energy Efficiency/ Conservation		
Create HOV lanes	x Transportation		
Retrofit School Buses with particulate traps	x Transportation		
Retrofit School Buses with oxydation catalyts	x Transportation		
Utilize Fuel Efficient Vehicles for parking enforcement	x Transportation		
Portable gas can replacements	x Other		
Implement methane flaring at WW treatment facility	x Other		
Install anaerobic digestor at WW treatment facility	x Other		

PARAMETERS

To decide which actions to include in the plan, CAPS recommends the following decision making criteria and process:

- i. Screening for Suitability - Actions not suitable for Brookline will be discarded.
E.g., “creating HOV lanes” is not suitable since Brookline has no limited access highways.
- ii. Rating Criteria - Each action will be rated from 1 to 5 (a score of 5 indicating characteristics which make it a high priority action) with regard to five separate criteria:
 - a. CO₂ Savings (total savings by 2020 resulting from implementation)
 - b. Feasibility (Is there the existing capacity to implement the action or can the capacity be developed easily? If applicable, is there political support for the action? Can the action be completed within a reasonable time period?)
 - c. Co-Benefits (Will incidental environmental, social, or economic benefits result from the action?)
 - d. Community Support/Public Acceptance/Stake-Holder Acceptance
 - e. Cost
- iii. Weighted Score - Each action’s final score will be the sum of the five weighted ratings. The five ratings assigned to each action (above) will be multiplied by the following (or similar) weighting factors (which total 1.0).
 - a. CO₂ Savings - .35
 - b. Feasibility - .20
 - c. Co-Benefits - .15
 - d. Community Support/Public Acceptance/Stake-Holder Acceptance - .10
 - e. Cost - .20

Source: CAPS "August 22, 2011 Update."

IDEAS FOR THE FUTURE

In developing the 2012 CAP, the CAC looked to a variety of sources, and considered a large number of possible actions to reduce GHG emissions. Please review the [Planning Process and Methodology](#) and the list of [over 150 actions considered](#). (The raw data used in evaluating these actions is contained in an electronic spreadsheet maintained by the Brookline Planning Department.) If you have additional suggestions, please feel free to edit this page.

Future Actions to Reduce Emissions

Below are actions that are not included among the more than 150 “All Actions Considered” in the CAP that should be considered for the next CAP:

1. (add action here)

Unanticipated Actions to Reduce Emissions

Below are unusual opportunities of which we were not aware when the CAP was prepared that should be pursued now, even though they are not in the plan:

1. (add action here)

Planning Suggestions

Below are suggestions for improving the planning process for the next CAP:

1. Include a *Consumption-Based Inventory* to supplement the traditional inventory approach. See, e.g., [Consumption-Based GHG Emissions Inventory for Oregon – 2005](#).
2. (add suggestion here)

AGENDA FOR FIRST MEETING OF LIAISONS

(Liaisons (aka ACs) are encouraged to make suggestions for changes or additions to this agenda. Simple changes may be made by simply editing this page. Major changes or comments may be better made on the "Talk/Discussion" page related to this page: click on the "Discussion" button.)

(September 2012 or earlier)

1. Update by each AC on Action under way (20 minutes)
2. What do the ACs feel is the ideal relationship between themselves and the SMT? (10 minutes)
3. Can the ACs and the SMT decide together the basis on which the CAP (that is, the wiki) should be regularly updated? (20 minutes)
 1. What information should be entered? Progress? Plans? Data? etc.?
 2. Who should enter updating information into the CAP?
 3. Should the format be standardized? How much?
 4. When might we shut the wiki down if there is insufficient participation?
4. Are there common obstacles or solutions that can be discussed in profitably in this setting? (20 minutes)
5. Other concerns raised by ACs? (10 minutes)
6. Should meetings of ACs be held regularly? How often? (10 minutes)

Total: 90 minutes

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