

EXECUTIVE SUMMARY

A Climate Action Plan (CAP) is a way to combat changes in the environment threatened by the continued release into the atmosphere of climate changing gases derived from the burning of fossil fuels. Scientists suggest that humanity still has the opportunity to mitigate at least the worst potential effects of climate change through aggressive reduction of carbon dioxide (CO₂) emissions. Predictions about climate change are becoming increasingly dire and the time is now for fundamental and meaningful action. The vast majority of climate scientists assert that reduction of CO₂ emissions to 20 percent by 2050 will be required to make a significant difference. We believe Belmont should adopt this goal, based on the community's 2007 emissions.

Beyond the issues and challenges climate change presents, there are other important reasons for switching to a more carbon-neutral lifestyle by reducing dependence on fossil fuels. Perhaps most important: our economy and way of life is threatened by the potential disruption of oil supplies from unreliable sources in nations that are politically unstable and/or openly hostile to the United States. Other compelling reasons include financial savings, limiting waste, reducing pollution, stimulating local economies, improving health, making cities and towns more livable, and engaging citizens in a common cause to build a more cohesive community.

The Climate Action Plan (CAP)

Climate Action Plans to reduce greenhouse gas emissions have been adopted by towns and cities, large and small, around the world. The key elements of a CAP include the completion of a greenhouse gas inventory for the community and assignment of emissions-reduction targets relative to the established baseline. A plan of action is designed and policies are established to address reduction targets. As implementation of CAP recommendations proceeds, assessment of the effectiveness of actions taken is ongoing.

A Unique Challenge

The looming threat of climate change will require the Town and its residents to engage in long-range planning supporting the best interests of the community. The implementation of a CAP presents a unique challenge—one, however, that the community of Belmont appears poised to accept. This past election (November 2008), included the ballot question 4:

“Should the representative from this district be instructed to vote for legislation that reduces greenhouse gas emissions in Massachusetts by 80% by 2020, and change the tax code to favor renewable energy, conservation, and sustainable agriculture?”

While the vote was nonbinding, 85% of the more than 13,700 people in our legislative district who chose to participate on election day voted on Question 4. Nearly 82% of those individuals voted yes in support of reducing greenhouse gas emissions (in Belmont, 70% voted yes in support, 15% voted against, and 15% did not vote on the question). The ten other legislative districts where Question 4 appeared on the ballot enjoyed similar landslides, ranging from 72% to 89% yes votes.

A 2007 Energy Conservation Study, conducted for the Belmont Municipal Light Department, included 400 interviews with BMLD customers. A full 98% of those surveyed reported conservation of electricity and energy efficiency as “very important” or “somewhat important.” When asked if there are things that could be done in their own household to use energy more efficiently, 87.5% agreed “very strongly” or “somewhat strongly.” Finally, 62% of those interviewed reported that they would either “strongly support” or “somewhat support” a decision by the BMLD to build wind power structures that could be as tall as 300–400 feet in height.

We cannot know with certainty what the best course of action will ultimately be. However, looking forward and choosing imaginative preparedness over inaction is critical. Belmont will require unprecedented leadership and public commitment over the next four decades to meet the goal of an 80 percent reduction in carbon emissions by 2050. We need to take the first steps now to move the community toward the goal. We must be focused and aggressive about implementing the strategies that are available today. We must be open to innovation and new opportunities as they evolve in the future. We must have faith and optimism that reaching the goal is possible.

Greenhouse Gas Inventory— Establishing a Baseline

A greenhouse gas inventory is a compilation of measures of emissions of greenhouse gases, primarily carbon dioxide, that result from activities in a city or town. Carbon dioxide emissions arise primarily from the burning of fossil fuels—natural gas, oil, and coal—to provide electrical energy, to heat buildings, and to drive transport vehicles. This report provides a comprehensive baseline for Belmont.

Almost all of Belmont’s carbon dioxide emissions result from the combustion of fossil fuels. Use of each kind of fuel releases carbon dioxide in exact proportion to the amount of fuel used. The conversions from quantities of energy used, to quantities of carbon dioxide produced include estimates of the “upstream” carbon dioxide emissions resulting from production and delivery of the fuel to its point of use.

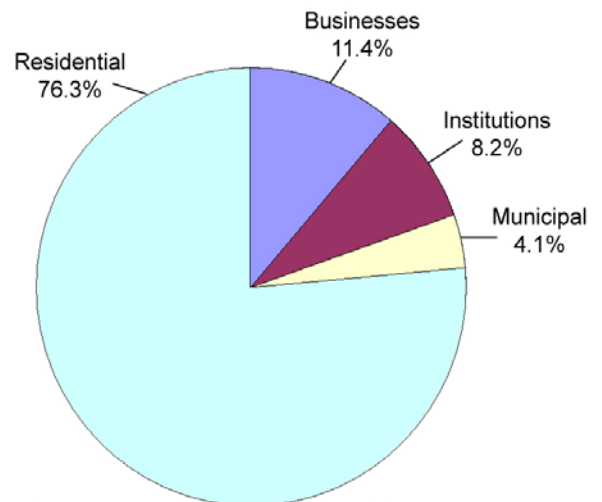
For the inventory of Belmont emissions, the baseline year was chosen to be 2007, the year for which the most extensive and complete data could be assembled. For discussion of trends in emissions generation, data for the years 2001 through 2007 were used. It proved convenient to gather data for four categories of energy users: residential households, businesses, institutions (houses of worship, private schools, clubs, and hospitals), and municipal departments, including the public schools. Some of these data were easy to obtain, especially those for electricity

consumption from the Belmont Municipal Light Department.

Reliable data on gas and fuel oil use, petroleum products consumed for transportation, and quantities of waste were more difficult to gather. Methodologies utilized in the data gathering process and in calculating carbon emissions are explained in the full CAP report. To fill the gap in data from public records, Sustainable Belmont conducted two surveys. Town employees were surveyed to obtain data about their commuting habits. Also, a sample of managers of town businesses and institutions was interviewed for information about energy use in their operations and their employee’s commuting, and quantities and means of disposal for waste materials generated.

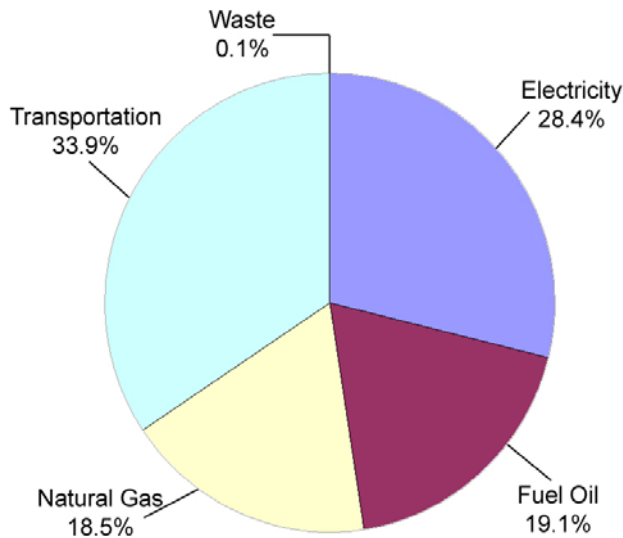
Two pie charts summarize the data collected. Figure ES-1 shows the percentage of carbon emissions contributed by each sector of use: residential, business, institutional and municipal. The values shown include emissions from vehicle use associated with each sector. Figure ES-2 shows the percentage of carbon emissions from each source: electricity, natural gas, fuel oil, transportation, and waste. All fuels used to power transport vehicles, except for trucks that transport waste, are included in “transportation.” The bar chart shows carbon dioxide emissions in tons by sector and source.

Figure ES-1. Belmont Carbon Dioxide Emissions by Sector



Note: Based on data collected from 2005 to 2007.

Figure ES-2. Belmont Carbon Dioxide Emissions by Source



Note: Based on data collected from 2005 to 2007.

Key Recommendations

The Belmont greenhouse gas inventory shows where work needs to be done to reduce carbon emissions. The three principles stated below can be applied in all sectors of energy use in town, and lead to the recommendations summarized below for each of the four major sectors of energy use. The overarching goal is to reduce total carbon emissions by 80 percent by 2050, a goal that can be accomplished by achieving an average annual reduction of four percent in each sector. The recommendations give actions that will take us toward the goal.

Principles: Ways to Reduce Carbon Emissions

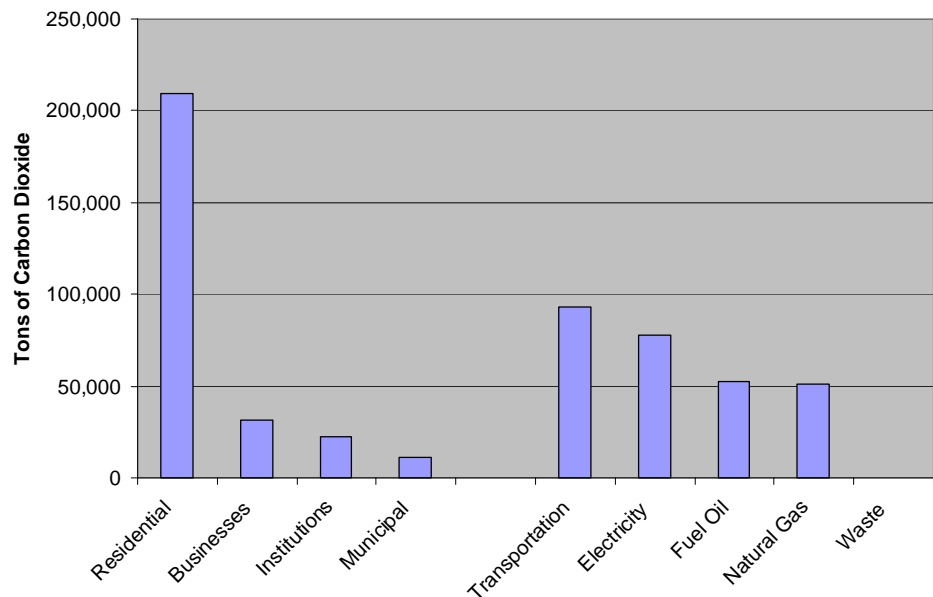
The first reductions of carbon dioxide will be realized across all sectors largely through energy conservation and improvements in energy efficiency.

Energy Conservation: Conservation means using less fossil fuels and by doing so producing less carbon dioxide. Conservation often requires no additional costs to implement and it has immediate financial benefits but it often requires a change in behavior.

Improved Energy Efficiency: Additional reductions of carbon dioxide can be made through improved efficiency. Improving efficiency has a price tag, but the costs can often be offset over time by savings in amounts of fuel used. Initial higher upfront costs may also be offset by rebates offered by the Belmont Municipal Light Department (BMLD) and other utilities for certain appliances.

Alternative Energy: In 2008, the BMLD began to offer its customers the option to purchase Renewable Energy Certificates (RECs), a program that promotes renewable energy alternatives that do not produce carbon dioxide, thus expanding carbon dioxide reduction opportunities available in town and for its residents and businesses. The BMLD is committed to bringing more electricity from renewable sources to the community as it becomes available. Over time, new technologies and growth in the renewable

Figure ES-3. Belmont Emissions by Sector and Source



Note: Based on data collected from 2005 to 2007.

sector should provide additional opportunities for Belmont to reduce the carbon footprint in the areas of transportation as well as heating and cooling.

Energy conservation, improved efficiency, and the purchase of RECs are strategies available to all sectors of the community today.

Key Recommendations by Sector

In keeping with the format of the overall CAP draft report, this executive summary offers a list of key recommendations by sector.

Residential Sector

The residential sector produces nearly 80% of the carbon dioxide the town emits. This sector offers both the greatest opportunities for and the greatest challenges to change. We believe that inspiring individuals to do their part empowers a community to work collaboratively toward the common goal.

Electricity: Lowering residential electricity use and the associated carbon dioxide emissions can be accomplished in a variety of ways. Initial reductions can result from changes in behavior. While behavior changes may seem to be the easiest and least expensive approaches to employ, they are also the most difficult to commit to and sustain. Becoming more mindful of shutting off lights and appliances when not in use or reducing the loss of “phantom” energy by installing devices with standby modes are important but will not suffice. Therefore, we also recommend purchasing energy efficient appliances such as air conditioners, refrigerators, freezers, dehumidifiers, and clothes dryers and, as a first step, the installation of compact fluorescent lights. Solar panels could be utilized on many houses to produce a portion of electricity needs. Exploiting the principles of passive solar heating and shade cooling would reduce electricity required to operate heaters and air conditioners. Finally, purchase of Renewable Energy Certificates is a viable way to help renewable energy producers to grow and to offset the carbon produced from non-renewable sources.

Waste: The waste sector is challenging to evaluate from a carbon production standpoint. What is certain is less waste means less carbon emissions. Perhaps the most effective ways to deal with this sector is to encourage purchases that involve less waste to throw away, and recycling a higher percentage of the waste that is put out for collection. Both of these actions improve energy and carbon savings. For example, reprocessing recycled aluminum uses 1/20th the energy required to produce a comparable product from ore. Yard waste should be composted on site, when feasible, thereby lessening the need to bag it and transport it elsewhere. Transfer to others of still useful materials such as clothes and household goods and materials could be encouraged through a “Freecycle” program established in the town (see www.freecycle.org). Overall, less waste left along the curbside and increased recycling would reduce the costs to the community of trash pickup. In 2008, the Solid Waste and Recycling Advisory Committee found that if Belmont increased its recycling rate from its current 40% to 58% (which is the recycling rate of Lexington), it would cut the Town’s disposal fee by about \$190,000 per year.

Home Heating—Fuel Oil and Natural Gas:

Residents could benefit financially by taking advantage of increased energy efficiency obtainable from programmable thermostats, improved insulation, replacement of old windows, purchase of a high-efficiency furnace, and other home improvements. These investments also reduce carbon dioxide production. Participation in the free home energy audit program offered by the BMLD can produce an analysis that predicts the payback period of actions contemplated, allowing homeowners to pursue an improvement or renovation with confidence. Educating residents about the pros and cons of installing a geothermal system or solar collectors to produce hot water may also prove useful to consumers. Finally, the community needs to be informed about the advantages of passive solar heating and cooling, and their likely impact on household energy consumption and expenses.

Food’s Role in Greenhouse Gas Emissions: The food that we choose to eat has a direct bearing on our carbon footprint. The burning of fossil fuels during food production as well as transport of that food and the greenhouse gas emissions associated with livestock farming and animal waste contribute to climate change. A 2006 report from the United Nations found that worldwide the production of animal products for food consumption ultimately accounts for 18 percent of greenhouse gas emissions. The National Sustainable Agriculture Information Service (funded by the U.S. Department of Agriculture) recommends several actions that individuals can take, including eating less meat, buying locally grown foods, planting a garden, and eating foods that are minimally packaged and processed and “in season.”

Transportation Sector

The transportation sector is responsible for 35 percent of total carbon dioxide emissions. Reduction of emissions from this sector can be accomplished in a variety of ways and across all users—municipal, residential, commercial and institutional—through both behavioral changes and purchasing commitments. Creating a community culture that favors walking and bicycling over driving, when practical, could have a positive effect and help to ease traffic congestion. Neighborhood-by-neighborhood programming to encourage children to walk to school has been effective in many other communities. Car pooling and improved ridership on public transportation are also possible and could have a significant impact on carbon emissions. Expanded use of bicycles and road and bicycle path improvements that facilitate their use should also be encouraged. At a given time, many residents may not be able to afford the price of a new hybrid or fuel-efficient automobile. But as they replace their vehicles, their purchasing decisions could become powerful statements of their commitment to lower their carbon dioxide emissions.

Businesses and Institutions

Our analyses of the potential for CO₂ emissions reductions in the commercial and institutional sector are based, in part, on a survey we con-

ducted of local businesses and non-profits, such as houses of worship, private schools, and private clubs. It is recommended that the business and institutional communities collaborate to solve common challenges, such as disposal of wastes and collection of recyclable material. Cooperation may reveal opportunities to improve upon efforts directed toward energy conservation and energy efficiency. All businesses and institutions should be encouraged to commission energy audits a portion of which may be subsidized by the BMLD. Large institutions with multiple buildings could consider developing an ESCo-type project to reduce energy use. Some businesses, particularly those who rent from the same landlord, are encouraged to work collaboratively to bring energy-saving improvements to their sites.

Municipal Sector

While the municipal sector’s contribution of carbon emissions is small compared to other sectors in the community, the Town has a unique role to play in the ultimate success of the Climate Action Plan. The recommendations in the CAP relating to the municipal sector reflect our view of the leadership potential of the Town Government in the effort to reduce carbon emissions and to inspire the changes required of others in the community.

The CAP recommends that an Energy Manager position be created to oversee, monitor, and report on the municipality’s efforts at reducing the carbon footprint of the entire community. The Energy Manager would work with a newly created town committee toward implementation of appropriate carbon reduction actions across all sectors. An initial focus could be energy audits of town buildings and analyses of other Town practices, aimed at maximizing conservation and energy efficiency efforts in buildings not already analyzed in the ESCo project. The engagement of town employees in the effort to save energy and reduce carbon emissions will be required. The Energy Manager and the new committee will also need to promote the use of geothermal and solar options by residents and businesses, encourage smart site and growth planning near public transportation, and otherwise

help to promote a variety of education, outreach, and advocacy programs to build participation and collaboration across the community.

Key Recommendations: The Belmont Municipal Light Department (BMLD)

A significant opportunity exists to provide energy conservation incentives to customers of the BMLD through electricity rate restructuring. Charging higher rates for residential customers who consume larger amounts of electric energy would send a powerful signal to consumers to use energy wisely and conserve. The BMLD is also encouraged to take strong measures to educate and inform the public about peak usage and its overall impact on the electric rates. Metering that sets higher rates during periods of peak demand would discourage inefficient use of the distribution network. Implementing net metering would encourage customers who might install alternative energy systems. Implementation of a reverse 911 system would be the most efficient means of alerting the public to a peak event.

As renewable alternatives become more available, a commitment from the BMLD to increase the amount of green energy in its portfolio should be expected. Until such time, active promotion of the purchase of Renewable Energy Certificates is strongly encouraged and expansion of the BMLD's education and outreach efforts on this issue and others is recommended. Finally, improvement and expansion of the energy audits offered to residents and businesses should be undertaken. It is probable that more detailed cost and payback analyses of suggested efficiency options and of the sequencing of actions to be taken by consumers would increase the latter's confidence in the likely effectiveness of the recommendations. We hope that the BMLD will continue to work with the general government and schools to find additional ways of reducing energy use. The recent effort to lower the Town's electric bill by installing more efficient street lights is a good start.

Key Recommendations: Town Policy

The Town not only has a unique role to play in the promotion of the recommendations of the CAP

but it also has built-in opportunities for town-wide change not available to other sectors. Crafting and adopting new town policies that make explicit our commitment to improved energy efficiency, energy conservation, and use of alternative technologies present significant opportunities to the Town. Such policies can be implemented through by-laws, mandates, new standards, and regulations. Town-wide planning, including development of a new Comprehensive Master Plan, can address community challenges that impact our shared emissions. New building design standards, both for municipal and private construction that are codified and adopted, are an appropriate and necessary step, following the adoption of the Sustainable Building Design Policy statement (the Select Board, March 5, 2007).

We recommend that the Town use incentives wisely to encourage increased commercial and residential sustainable development and the development of new energy facilities in our town. Pursuing purchasing practices that favor green/sustainable options whenever possible, including the negotiation of future contracts, has significant potential for reducing carbon dioxide emissions, particularly if enhanced through strategic alliances with other communities or institutions. The Town can pursue creative approaches to conducting town business and provide services that reduce energy use and therefore carbon emissions. Following up on financing options, like those utilized to underwrite the ESCo project, and applying for grants to develop and implement sustainable policies, are also recommended. The Town should also carefully evaluate the possibility of the BMLD joining the Renewable Energy Trust in order to qualify for grants under the Green Communities Act legislation passed in 2007.

The Municipal Sector Must Take the Lead!

Many of the recommendations in the CAP to reduce carbon dioxide are applicable across the municipal, commercial, institutional, and residential sectors. Nevertheless, the municipal sector must take the primary leadership position on this initiative and model the changes sought in other

sectors. The Town has a great opportunity to set the tone for the community and unique roles to play in facilitating change and conducting education, outreach, and advocacy. It can also monitor carbon dioxide reduction and keep abreast of new technological innovations and other opportunities for change.

Sustainable Belmont hopes to play a continuing role in community education, outreach, and advocacy efforts in support of the CAP. It is important, as well, that the Town itself provide support and resources to maximize the effectiveness of these activities in order to reach the goal four decades in the future.

Getting Started

Should the Selectmen and Town Meeting approve a resolution supporting the goals of this Climate Action Plan, it is recommended that an energy manager be hired and an energy committee be appointed that would include representatives of the major stakeholder groups in town, and that the initial effort be a combination of energy conservation and improved efficiency initiatives that

could be implemented immediately. Initial success in the municipal sector will likely inspire others in the community to action and help reduce the Town's energy costs and provide relief to the Town budget.

Creating new social norms that support change is a major challenge that will take years to cultivate. Yet even modest changes can produce the targeted four percent average annual reduction in the near term.

Reaching the ultimate goal of an 80 percent reduction of carbon dioxide by 2050 is not a challenge that requires the community to have all the solutions today. Belmont simply needs to commit to the challenge and get started. New and additional strategies to meet the goal will present themselves over time.

Sustaining the vision, the leadership, and the will to change may be the greatest challenge of all. Success cannot be guaranteed, but let it be written in history that Belmont was a community that summoned the courage to try.

Belmont Climate Action Plan Recommendations Summary

Below is the list of recommendations included in the Belmont Climate Action Plan (under Part III, “Recommendations”). Following each recommendation is the page number from the full report where you can find additional information.

Residents

1. Reduce residential heat loss. (45)
2. Increase heating system efficiency. (46)
3. Use heating/cooling only where and when it is needed. (47)
4. Use energy-efficient appliances and lighting. (48)
5. Employ alternative energy sources where feasible. (50)

Transportation

1. Practice conservation and energy-efficiency in your choice and use of personal vehicles. (53)
2. Walk or bicycle whenever feasible. (53)
3. Reduce your use of a private automobile. (53)
4. Use shared transportation: car pools, vans and public transit. (53)
5. Consider CO₂ emissions in planning personal travel. (53)
6. Consider production and transportation CO₂ emissions in food purchases. (53)

Businesses and Institutions

1. Get an energy audit of the building(s). (56)
2. Take advantage of as many no-cost energy-savings practices as possible. (56)
3. Emphasizing conservation and improved efficiency, take all reasonable and appropriate steps to reduce energy use. (57)
4. Educate employees about energy-saving behaviors at work. (57)
5. Select and operate business vehicles and equipment for conservation and efficiency. (57)
6. Encourage energy-conscious commuting choices for employees. (57)
7. Offer flexible hours and encourage telecommuting. (57)
8. Comply with the State’s anti-idling law and encourage others to do so as well. (57)
9. Consider adopting a policy that all bids and contracts will include language that requires or encourages vendors to adopt sustainable, energy saving practices. (58)
10. Organize a trash-collection and recycling program for businesses and institutions in Belmont, either through the Town or as a separate organizational entity. (58)
11. Provide incentives to landlords to take energy-saving measures. (58)
12. Organize informational meetings and workshops for businesses in Belmont to share the results of the business survey, discuss options, and learn more about ways to increase energy conservation and efficiency. (58)
13. Purchase local foods; compost appropriate organic waste where feasible. (9)
14. For multi-building complexes, consider an ESCo-type program in lieu of a standard energy audit. (See Appendix A of report.) Such a program enables the financing and implementation of multiple energy-saving steps all at once, thereby ensuring that the loan is paid back from cost savings in a systematic manner. (59)
15. Provide shuttle buses or van pools for transportation from hubs. (59)
16. Houses of worship are encouraged to join Massachusetts Interfaith Power and Light. (59)

Town Government

1. Hire an Energy Manager. (560)
2. Establish an Energy Committee. (61)
3. Inform and engage Town employees by conducting mandatory in-service programs. (61)
4. Take aggressive steps to reduce heat loss and energy efficiency in Town-owned buildings through conservation and improved heating and cooling systems. (61)
5. Establish a policy that new municipal buildings, additions and major renovations be built to meet eligibility criteria for LEED certification at the silver level or higher. (62)
6. Formally adopt a commitment to the “total life-cycle” concept of building construction, in new building and site design, and in major additions and renovations. (62)
7. In demolition necessary to make way for new construction of municipal buildings, mandate disposal of waste debris in ways that are environmentally sound. (63)
8. Reduce the Town’s use of electricity. (63)
9. Restore and maintain funding for the Town’s shade tree planting program. (63)
10. Reduce the carbon emissions generated by the municipal fleet in the conduct of town business. (64)
11. Reduce the carbon emissions generated by town employees in commuting to work and in their conduct of Town business. (64)
12. Help residents and Town employees reduce carbon emissions from private automobile use. (64)
13. Adopt a policy requiring that all paved driveways, sidewalks, alleys, and parking lots be made of pervious material. (65)
14. Provide information and examples to encourage environmentally aware choices and behavior. (65)
15. Teach by example, through direct instruction and by collaborative investigation, the understandings and behavioral changes that all people alike must acquire to mitigate and adapt to climate change. (66)

Town Policy

1. Ensure that the new Comprehensive Master Plan for Belmont will promote low-carbon living and mobility. (66)
2. Give priority to needs of public transport, pedestrians and cyclists in road design planning and related issues. (67)
3. Evaluate the U.S. Green Building Council’s LEED Guidelines for Neighborhood Development. (67)
4. Incorporate the State’s zoning exemptions for renewable energy into the local zoning codes. (67)
5. The Sustainable Building Design Policy, coupled with new building standards, should apply both to municipal and private sector development. (68)
6. Adopt a policy that all new residential construction and substantial renovation projects over 1,000 square feet and all new commercial and industrial real estate construction minimize, to the extent feasible, the life-cycle cost of the facility by utilizing energy conservation and efficiency, water conservation and alternative energy technologies. (68)
7. Adopt a policy that provides incentives for developers to build to standards that exceed conservation and energy efficiency code requirements. (68)
8. Consider adopting the goal of being designated a “Green Community” under the Green Communities Act, and, if yes, take whatever steps are necessary to achieve that goal in a timely manner. (69)
9. Consider whether the Municipal Light Department should join the Massachusetts Renewable Energy Trust. (69)
10. Adopt a policy for all new construction and substantial renovation projects, both municipal and private, that requires the planting of trees in close proximity to the new structures and strategically located to maximize their shade effect. (69)
11. Adopt a policy that requires a builder of private property (new or substantial renovation) to replace any tree whose removal is required by the construction with a newly planted tree, either on the same property or at a municipal location. (69)

12. Ensure that all Town bids and contracts include language that requires or encourages vendors to adopt sustainable, energy saving practices. (69)
13. Direct the Energy Manager to seek grant and funding opportunities to facilitate the implementation of the goals and recommendations of this Climate Action Plan. (70)

Belmont Municipal Light Department

1. Implement a rate structure that discourages electricity consumption during periods of peak demand. (70)
2. Extend load shedding in an emergency to residential customers by means of a “reverse 911” signaling system. (71)
3. Work toward utilizing renewable energy sources. (71)
4. Provide incentives and rewards for BMLD staff to work toward reduced greenhouse emissions in Belmont. (73)
5. Improve the BMLD’s dissemination of information to the community Reduce consumption and increase reuse. (74)

Waste recommendations:

1. Reduce organic material in the town waste stream by composting food and yard waste. (75)
2. Facilitate exchange of items for reuse. (75)
3. Provide for reuse or proper disposal of electronic junk. (75)
4. Keep toxic materials from the environment. (75)
5. Facilitate disposal of materials not presently considered recyclable. (76)
6. Regulate disposal of debris from construction and remodeling projects. (76)
7. Provide incentives for environmentally sensitive disposal of waste. (77)
8. Provide information about disposal and recycling of unwanted items. (77)
9. Encourage businesses to organize shared services for waste disposal and recycling. (77)
10. Explore opportunities for regional cooperation. (77)
11. Encourage and facilitate composting of vegetable waste at all Belmont Schools. (77)