Marlborough Energy and Environmental Taskforce (MEET)

Sustainability Action Plan 2008

Thinking Globally and Acting Locally

2-17-09

Acknowledgements

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Introduction to the Marlborough Action Plan

In 2007, Marlborough conducted the *2006 Energy and Environmental Inventory* and joined Cities for Climate Protection (CCP) which were important advancements for local environmental protection. Afterwards, at the invitation of the Mayor of Marlborough, Nancy Stevens, the first Marlborough Energy and Environmental Taskforce was formed. The Taskforce met six times between January and June 2008 to review and discuss an Action Plan that would establish proactive goals for a more environmentally sustainable community for ourselves and future generations in Marlborough.

This Action Plan also recognizes the importance of economic and social responsibility in our community. Each is vital to our community's health. For that reason this Action Plan focuses on environmental sustainability as well as money-saving actions that include energy efficiency, water conservation, and other important measures that support a strong economy as well as a healthy environment. Because this action plan recognizes the value of social responsibility, we invite all those who live and work in Marlborough to participate. By working together we can all make a difference.

The Marlborough Sustainability Action Plan is a work in progress. We welcome your feedback, suggestions and participation as we move forward to implement it. There are many ways to improve energy efficiency, water conservation, land use, waste management, and transportation. Each person can practice good stewardship and make a difference. If you would like to participate in the MEET taskforce efforts please contact the co-leaders. We would welcome and thank you for your support to make our community a healthy place for us all to live and work.

A special thank you to the leaders and communities who helped lead the way before us, especially John Bolduc, in Cambridge.

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Jen Boudrie
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Executive Summary

The goal of this Sustainability Action Plan 2008 is for Marlborough to be smarter and more resourceful about the manner in which its buildings use energy, people and goods are transported, and waste is managed. By undertaking the actions in the plan, Marlborough can reverse the trend of increasing Green House Gas (GHG) emissions. By doing so, the city will be part of the solution to curbing global warming at the local level. Marlborough is in a position to apply many existing technologies and approaches to address this problem and to take advantage of emerging trends and resources in energy, transportation, land use, and waste management that hold promise to change for the better the way our city works and the way we live.

In 2007, Marlborough conducted the *2006 Energy and Environmental Inventory* to determine what and where energy was being used throughout the city and the amount of greenhouse gas emissions emitted by the city as a whole through all its sectors, municipal, business and residential, including transportation.

In November of 2007 the Mayor joined with cities throughout Massachusetts, the country and the world by taking the "Cities for Climate Protection (CCP) pledge". Mayor Stevens pledged to move the city forward in reducing greenhouse gas emissions and established the Marlborough Energy and Environment Taskforce (MEET) to develop an Action Plan to establish goals and take action towards a more sustainable future. The plan before you is the plan developed by this taskforce.

The following action plan sets realistic short-term and long-term goals for all sectors of the city to help reach the goals set of 3% emissions reduction below 2006 levels by 2010 and 25% emissions reduction below 2006 levels by the year 2020 and 80% below 2006 levels by 2050

The good news is that all sectors have already made efforts in energy use reductions across the board. In most cases these actions have been driven by the need to reduce costs and increase efficiencies and by doing so we are already seeing emissions reductions. Examples include: All schools, working with the utility companies, have been retrofitted with energy-efficient lighting saving the city thousands of dollars a year. Companies such as Sepracor and Boston Scientific have each upgraded their facilities by updating the heating ventilation and cooling system and retrofitting buildings respectively, reducing electricity use and saving thousands of dollars a year as well. Payback on these investments have been less than a year. Green Marlborough, a citizens' group, has been actively promoting energy efficiency in homes and providing incentives through local retail stores by giving away compact fluorescent light bulbs. All of these steps collectively serve to reduce green house gas emissions and must continue. However, as outlined in the proposed actions there are additional short-term items that can be easily achieved and long-term items that should be planned for beginning now to reach our emissions reduction goals.

<u>Why Marlborough Should Address Global Climate Change</u>

The International Panel on Climate Change, a United Nations advisory body involving about 2,500 scientists around the world and the U.S. National Academy of Sciences, have both issued findings that global climate change is happening and that greenhouse gas emissions from human activities play a significant role. The debate over climate change is no longer about whether it is happening but about how fast it is happening, what the impacts will be, and what to do about it. The evidence of climate change is seen in the measured increase of carbon dioxide and other greenhouse gases in the atmosphere, rising average temperatures, and rising sea level.

While climate change is a worldwide phenomenon, the impacts will be felt locally. The New England Regional Assessment prepared by the federal government predicts that average temperatures in our region will increase from 6 to 10 degrees F within the next 100 years. At the lower level, our climate will shift to one more like Richmond, Virginia. At the upper level, it would be more like Atlanta, Georgia. The impact of climate change will involve more than higher temperatures. Among other effects, it will create habitats for disease-carrying insects that do not occur here now; change rain and snowfall patterns; affect water supplies, agriculture, and the frequency of flooding; cause changes in natural habitats that will eliminate some species from our area and introduce new ones; and cause sea-level rise and greater coastal storm damage. Local and state governments, businesses, institutions, and citizens will bear the brunt of adapting to these changes through payment for public works projects, insurance premiums, and disaster response.

Vision and Strategies

The vision of this plan is for Marlborough to be smarter and more resourceful about the manner in which its buildings use energy, people and goods are transported, and waste is managed. The plan proposes strategies based on increasing energy efficiency, switching to renewable energy sources, reducing vehicle miles traveled, and reducing the generation of solid waste. Some of the reductions are not in Marlborough's control and depend on action at the federal or state level; however, the City can play an advocacy role in these cases, for example to increase mass transit.

The following table summarizes the emissions reduction strategies outlined in the report. Estimates are largely based on projections from other sources.

Summary of GHG Reduction Strategies for the year 2010 and 2020 respectively

- **Improve efficiency of electricity use by 6%, 30%**
- **Reduce natural gas and fuel oil use by 3%, 15%**
- **Reduce emissions associated with electricity generation by 4%, 30%**
- **Purchase 10%, 30% of electricity from green power sources**
- **Increase average car fuel economy to 22 mpg, 40 mpg**
- **Reduce vehicle miles traveled by 2%, 20%**
- **Increase recycling rate to 30%, 60%**

While these strategies are focused on reducing greenhouse gas emissions, they will have added benefits including reduced conventional air pollution (i.e., smog), savings on utility and fuel bills, reduced traffic congestion, conservation of natural resources, fewer respiratory health issues, and other positive effects.

The strategies will be put into effect through actions on energy, water, transportation, land use, and waste reduction. The full plan describes the existing situation in each area, available tools and resources, and actions. The following is a summary.

Energy…

Marlborough relies on electricity, natural gas, and fuel oil for energy. Almost all of this energy is imported. Electricity comes from generating facilities throughout the Northeast and eastern Canada and is delivered to the city over a network or transmission grid. Natural gas and fuel oil are transported from an even wider area and delivered through pipelines and by independent dealers.

Improve Energy Efficiency. Institute an energy management system for municipal facilities; recruit businesses and institutions into the EPA Energy Star program; help residents carry out energy efficiency and other sustainability measures; utilize energy service companies and performance contracting; take greater advantage of utility energy conservation programs; implement purchasing policies to favor energy efficient equipment.

Green the Electricity Fuel Mix. Promote replacement of electric generating facilities fueled by coal and oil by supporting a federal and state renewable portfolio standard; support federal legislation to regulate carbon dioxide emissions from power plants.

Buy Green Power. Purchase green power for the municipal electric load and encourage green power purchasing by businesses, institutions, and households; install renewable energy systems and fuel cells to improve electric system reliability; reduce reliance on imported oil and encourage clean sources of energy; work to provide options to businesses, institutions, and residents to purchase green electricity through consumer aggregations.

Expand Natural Gas Lines. Increase use of cogeneration systems, and reduce use of oil and electricity to produce fewer GHG emissions in heating systems. Efforts should be made to extend these choices to customers.

Transportation…

Emissions from transportation come from vehicles that use gasoline and diesel. The amount of emissions is a function of the fuel economy of the vehicle and the number of miles traveled. The current trend is toward lower fuel economy and more vehicle miles traveled, which means more emissions of GHGs and other air pollutants. Car ownership is increasing at a faster rate than the population.

Reduce SOV commuting. Continue to expand measures to reduce commuting by single-occupancy vehicles (SOVs) and encourage alternative modes of transportation; create a traffic reduction ordinance; and create and enforce a Transportation Demand Management Ordinance.

Improve facilities for walking and cycling. Provide bicycle lanes and parking facilities on city streets; create and improve off-road paths including railroad rights-of-way; expand efforts to retrofit streets and intersections to better accommodate bicycles and pedestrians.

Reduce motor vehicle travel with promotion and education programs. Conduct information and promotion programs to encourage alternative transportation choices; establish a ride-share and bicycle program.

Reduce motor vehicle emissions. Acquire alternative fuel and hybrid vehicles; develop a municipal green fleet policy; install emission controls on heavy-duty vehicles; establish a compressed natural gas refueling station; prohibit idling.

Promote Transit Improvements. Support extension of the MWRTA, commuter rail lines, additional buses on Route 20, and additional bus routes for Marlborough.

Land Use…

Urban form—the layout of our streets and parcels, design of buildings, and distribution of open space—affects how much energy buildings use, how easy it is to use alternatives to cars, and other factors that influence GHG emissions.

Use zoning and incentives to foster mixed-used, transit-oriented development. Encourage denser development near transit stations; design durable buildings with flexible re-use options; use permitting and incentives to create more open space and plant more trees; create an open space committee and carry out open space recommendations to preserve green space.

Optimize building design and the use of vegetation to shade buildings and reduce the urban heat island effect. Use geographic information systems to map the city's tree canopy coverage and assess the environmental services provided by the urban forest; maximize the tree canopy cover, particularly over parking lots and air-conditioning units; install roofs with high reflectance or "green" landscaped roofs; incorporate reflectance and shading standards in designs for parking lots and building construction.

Encourage the use of the Leadership in Energy and Environmental Design (LEED) building standards. Provide information to developers and citizens to understand LEED design goals; encourage energy efficiency, water conservation, and reuse of materials from existing structures during renovation and redevelopment.

Work for transit-oriented regional land use planning. Work with public officials in other communities to create an effective regional land use plan; actively participate in regional land use planning processes.

Promote land preservation Preserve existing farmlands to protect local food production opportunities that reduce transportation costs of food.

Waste Management…

The disposal of waste results in the direct emission of greenhouse gases when it is burned in incinerators and when it degrades in landfills and produces methane. The manufacturing, processing, and transporting of new goods also create emissions. GHG emissions result from materials that are consumed and disposed of at landfills and incinerators.

Reduce waste. Implement waste reduction programs at the municipal, business, and institutional levels; increase the rate of recycling; increase food composting by commercial and institutional establishments; facilitate recycling of construction debris and waste.

Do environmentally preferable purchasing. Assess and improve existing municipal purchasing policies to increase the use of recycled paper and other products. Encourage business and residents to make similar choices.

Implementation…

Marlborough has a multitude of opportunities to reduce greenhouse gas emissions. The challenge is to marshal the people, resources, funds, and knowledge to act on this problem in a focused and sustained

way. This plan recognizes that reducing greenhouse gas emissions needs to be a community-wide process that involves all sectors—government, businesses, residents, and organizations.

The main elements of the plan's implementation strategy are to…

Provide City leadership. The City will undertake actions to reduce emissions by improving the energy efficiency of municipal buildings, installing renewable energy systems, purchasing green power, increasing the fuel economy of the City vehicle fleet, introducing sustainable practices into City operations, and reducing waste.

Undertake a citywide campaign. A campaign is needed to draw all sectors together in a common effort to reduce emissions. Such a campaign should engage all stakeholders in the community and could include a marketing campaign; a community organization to coordinate activities; publications and other informational material for each stakeholder group; public recognition of notable accomplishments; and a means for the community to see whether progress is being made. An Energy Program Manager should be hired to coordinate this effort.

Build on Existing Efforts. There are efforts already underway in Marlborough aimed at the goals of climate protection. A few businesses are constructing green buildings, installing renewable energy systems, participating in transportation demand management programs, and reducing waste. Municipal officials are installing energy-efficient equipment and have started a recycling campaign. A few local residents have launched efforts to educate the community about sustainable practices. Marlborough has joined other communities in Massachusetts, the United States, and abroad that are involved in Cities for Climate Protection and offer opportunities for learning and partnership.

Monitor Progress. Indicators such as energy use, transportation factors, and waste volumes should be tracked and reported monthly and annually to assess progress toward the emissions reduction target.

Establish a Sustainability Committee. The City should establish a standing committee or MEET Taskforce II to ensure progress and advise the City administration on implementation.

Conclusion:

By taking all of these steps the city as a whole will have taken the responsibility locally to reduce greenhouse gas emissions and in our own small way will have reduced some of the effects of global warming. The choices we make now in how we change current living and working conditions can have a profound impact on our future, and those of the next two generations. We need to take these steps now as outlined in the vision of this plan to do our part in Marlborough and join hundreds of other communities around the world taking these same steps. Collectively we may be able to curb the effects of global warming on our planet, and contribute to the benefits of cleaner air and water, and better management of resources.

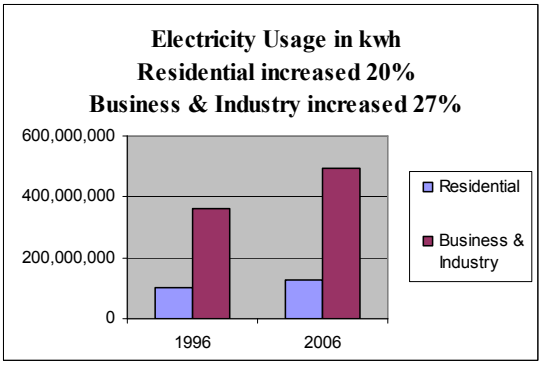
SECTION 1 Greenhouse Gas Emissions in Marlborough

The first step in reducing emissions is to conduct an energy inventory. In 2006 Marlborough conducted an inventory to benchmark and begin monitoring energy consumption. Data was collected from NStar, National Grid, and EIA/US Census.

The data indicated that energy consumption rose 25% during a ten-year period between 1996 and 2006.

Residential electricity increased 20% in ten years.
Business and industry increased 27% in ten years.

	1996	2006	Increase
Residential	99,197,175 kwh	124,830,375 kwh	20%
Bus/Industry	360,586,667 kwh	495,253,385 kwh	27%



Reasons for the increase include: population growth, business growth, and increased usage per building and per person.

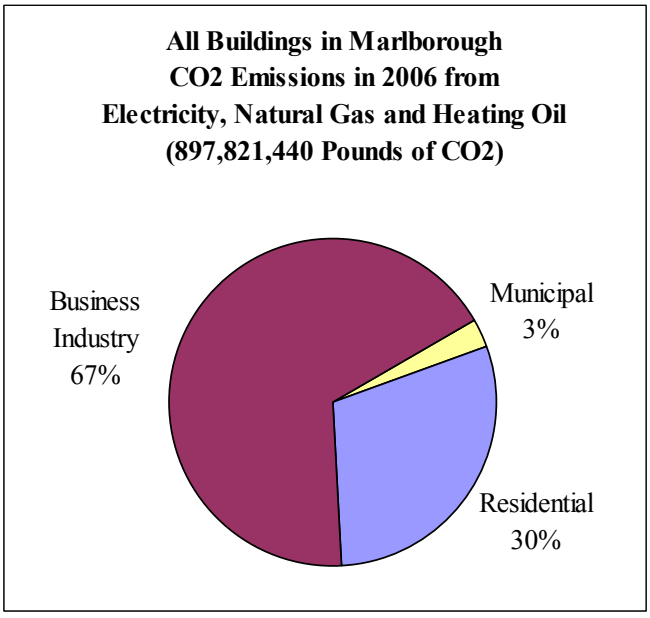
Electricity use accounted for about 2/3 of total CO2 emissions for buildings in Marlborough in 2006. The other 1/3 was from natural gas and oil.

Total CO2 Emissions for Marlborough Buildings from Electricity, Natural Gas, and Oil in 2006

These CO2 emissions for municipal, residential, and business/industry sectors were based on the electricity, natural gas, and oil usage for buildings only.

Buildings in Marlborough

Source	*Pounds of CO2*	
Municipal	23,873,597	3%
Residential	267,627,810	30%
Business/Ind	606,320,033	67%
TOTAL	897,821,440	



Buildings account for about 2/3 of total greenhouse gas emissions in Marlborough.

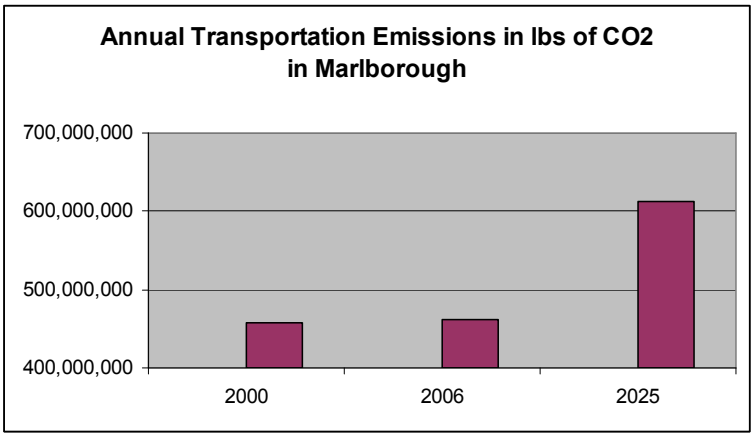
Transportation accounts for about 1/3.

Estimated CO2 Emissions for Marlborough Traffic

CO2 calculations are for transportation emissions in Marlborough city limits only.

Year	Pounds of CO2
2000	449,121,920
2006	453,063,936
2025	602,883,456

The projected estimate for 2025 includes planned development and revitalization along I-495 that is projected to take off after 2010. (Source: MAPC)



Comparisons

Comparing Marlborough's GHG emissions to those of other communities can provide some sense of how high our emissions are. Communities vary greatly in population, income levels, mix of economic activities, and land use patterns— all of which influence the rate of emissions. Compared to the national average, Marlborough's emissions are average. Marlborough has a large geographic area of 21 square miles with residential and business zoning, and has two interstate highways. However, compared to other countries, Marlborough's emissions are high. This is generally true of all American communities. The United States, with only about 5% of the world's population, emits about 25% of all the world's greenhouse gases; we are the single largest source of emissions.

Comparison of 1990 GHG Emissions

City	Population	Total Emissions *(Tons CO2)*	Per Capita Emissions *(Tons/person)*
Cambridge, MA	95,802	1,699,378	17.7
Burlington,VT	39,127	438,931	11.2
Fort Collins, CO	87,758	1,673,861	19.1
Newton, MA	82,585	1,973,540	23.9
Santa Fe, NM	55,859	1,418,819	25.4
Santa Cruz, CA	54,575	747,679	13.7
2006 GHG Emissions			
Marlborough	37,000	675,443	18.25

NOTE: 1990 energy data for Marlborough GHG emissions was not available.

Emissions Inventory and the Action Plan

The inventory shows that in order to reduce GHG emissions, Marlborough needs to address building energy use among businesses, residents, and government. This need reflects the mix of activities that is present in the city. In comparison, a "bedroom community" with primarily residential land uses would conclude that action needs to focus on household energy use and transportation.

The inventory can be used as a baseline to track progress and meet goals. It is recommended that the City conduct inventories annually to evaluate Marlborough's efforts to reduce GHG emissions.

The Action Plan should be used as a guide to help meet the city's emission reduction goals. The next five sections inform the reader and offer strategies. Actions are compiled in an easy check-off format in Appendix III.

SECTION 2 Energy

Principles
• Energy should take into consideration the community's wellbeing, cost-effectiveness, environmental impact, and social equity.
• Given that existing buildings consume the bulk of energy, retrofitting them should be a priority.
• Energy efficiency measures provide an immediate, cost-effective solution.
• Renewable energy provides a way to meet the community's longterm energy needs with few or no GHG emissions.
• Natural gas emits somewhat less GHG than other fossil fuels and may serve as a transition fuel.
• Efforts to promote energy efficiency and renewable energy are needed to compensate for market signals that do not reflect the actual environmental and societal costs of energy production and use.
• Since climate change is underway, future energy use should take into account the community's ability to adapt to changes and energy availability.

The Role of Energy in Marlborough's GHG Emissions
According to the 2006 Marlborough inventory, energy used in buildings (lighting, HVAC, and machines) produced 68% of Marlborough's GHG emissions. Energy used for transportation produced 32%.

Building energy usage was 67% commercial/industrial, 30% residential, and 3% municipal. To achieve the goals of this plan, this source of GHG emissions must be addressed. The commercial/industrial sector plays a relatively large role in energy use because the city contains a significant square footage of office buildings and commercial establishments.

How Energy is Used and Supplied in Marlborough
Marlborough consumes energy in the form of electricity, natural gas, and fuel oil. Each form of energy is distributed differently. Electricity is distributed by National Grid, which includes electricity generated from sources in the NorthEast and Canada. Electricity comes to Marlborough over a network, or grid, of overhead and underground transmission cables. It is generated by a variety of fuels, primarily coal, oil, natural gas, nuclear, and hydropower. The impact of the electricity fuel mix varies between regions. For example, a region that relies more on coal will emit more greenhouse gasses than a region that relies more on hydropower.

Marlborough has no generating facilities and imports all its electricity from outside sources. Marlborough has signed a municipal electricity aggregate contract with electricity supplier ConEdison Solutions for December 2008 to May 2010. The fuel-mix for electricity varies considerably from a small percentage of renewables to a large percentage of fossil fuels.

Natural gas is distributed by NSTAR. In New England, natural gas arrives via pipelines from Canada, the Gulf of Mexico, and Texas; and from overseas via CNG tanker facilities in Boston and Gloucester. A network of underground pipelines conveys the natural gas to buildings and other facilities around the city. Natural gas consists primarily of methane, which is a potent greenhouse gas, but it tends to release a bit less GHG than other fossil fuels. Switching to natural gas is a possible bridge to a non-fossil fuel economy that could be based primarily on renewable energy resources. Fuel oil is largely used in individual boilers and furnaces to heat buildings and large commercial boilers to generate steam in power plants.

In Marlborough, fuel oil is distributed by independent dealers, and it is difficult to determine with precision how much fuel oil is consumed here. For the inventory, fuel oil consumption was estimated using census figures and U.S. Department of Energy statistics.

Renewable energy is generally defined to include solar, wind, geothermal, low-emission biomass, and low-impact hydropower. Some types of renewable energy, such as large-scale hydropower, have significant negative environmental impacts that must be considered. In Massachusetts renewable energy also includes municipal solid waste, trash-to-energy, wood, biomass, and landfill gas.

Currently, renewable energy supplies less than 7% of New England's energy needs, but promises to become a growing sector. Technological advances and rapidly decreasing costs are making renewable energy competitive with conventional energy. An independent eco-label, called "Green-E," has been established to certify electricity based on environmental criteria.

Strategic Approaches

GHG emissions can be reduced by using less energy and by converting from fossil fuels to renewable energy. For the purposes of this plan, using less energy means energy efficiency -- accomplishing the same task with less energy.

Fortunately, myriad measures to increase energy efficiency are available, such as increasing building insulation; improving window glazing; installing more efficient heating, ventilation, and air conditioning (HVAC) equipment; and using more energy-efficient lighting, appliances, and equipment.

Energy efficiency measures require education and publicity about costs and benefits. Financial incentives could further encourage the public and businesses to adopt these measures.

Successful energy efficiency also requires education and outreach to change cultural values and behaviors.

Energy System Trends

Electric Utility Deregulation The energy marketplace is changing, especially in respect to electricity. In 1997, Massachusetts enacted the Electric Utility Restructuring Act, which changed the way the generation of electricity is regulated.

As a result, Marlborough entered into a Municipal Electric Aggregation agreement in June 2007 and in December 2008. Marlborough became the second municipal electric aggregation in Massachusetts and after Cape Light Compact. It provided the administrator, Colonial Power Group, in Marlborough an ability to possibly negotiate better rates and energy market choices.

• Many communities offer a green choice to consumers, either GreenStart through National Grid or New England Wind Fund through MassEnergy. Marlborough customers who select National Grid have both options. Consumers who participate in the City's municipal aggregation can choose New England Wind Fund.

• Beginning in 2003, 1% of the utilities' generation portfolio must be renewable energy. The proportion increases to 4% by 2009. This requirement is called the Renewable Portfolio Standard (RPS). It is estimated that by 2009, about 2 million megawatt-hours of electricity will be produced, which would double the electricity generated from renewable sources in New England.

• The act established the Renewable Energy Trust Fund. These regulatory changes have increased the pace of adding generation capacity in New England. About 21,500 megawatts of new generating capacity was proposed or under construction in New England as of the summer of 2000. All of the new plants are designed to run on cleaner burning natural gas. Combined cycle gas turbines are significantly more efficient than older generating facilities that run on coal, petroleum, and nuclear energy. Compared to coal and oil, they also emit less air pollution, including carbon dioxide, per unit of energy. It is expected that these new, more efficient generating facilities will out-compete and replace older facilities. If this happens, the emission of carbon dioxide associated with electricity consumption will decline.

Appliance Standards The federal government has raised energy efficiency standards for clothes washers, water heaters, commercial heating and cooling equipment, and residential central air conditioners and heat pumps. Central air conditioning and heat pumps must become 20% more efficient. Nationally, this will save the energy output equivalent to 37 power plants. The new clothes washer standard requires washers to be 22% more efficient by 2004 and 35% more efficient by 2007. The federal Department of Energy (DOE) estimates that the new standard will save over 7,000 gallons of water a year for the average consumer and $48 annually in utility bills for energy to heat water. Nationally, DOE estimates that the new standard will save the equivalent of the energy output of 12 new 400-megawatt power plants. The new water heater standard requires gas heaters to be 8% more efficient and electric heaters 4% more efficient. This will save the equivalent of the energy output of 37 new power plants.

Energy Demand Trends

Electricity
According to National Grid, the demand for electricity grew 25% between 1996 and 2006 in Marlborough. Business and Industry consumed 77% of the electricity in Marlborough in 2006.

Natural Gas
According to NStar residents consumed 53%, businesses 41% and government 6% of the natural gas in 2006. Data for other years was not provided.

Oil
Unlike electricity and natural gas, fuel oil is distributed by independent dealers, and no central organization meters its consumption. Fuel oil data used in this plan are derived from U.S. EIA (Energy Information Agency) and US Census statistics. It is estimated oil usage is 56% residential and 44% business.

Tools and Resources

Massachusetts Renewable Energy Trust Fund
Under the Electric Utility Restructuring Act of 1997, the legislature established the Renewable Energy Trust Fund, which is administered by the Massachusetts Technology Collaborative. The MTC is a quasi-state agency based in Westborough. The fund receives the proceeds of the system benefits charges paid by consumers and collected by utilities (0.00075 cents per kwh). As of 2002 about $150 million has been collected. Some of the funds are earmarked for one-time grants to communities tied by contract to purchase power generated by waste incineration. In 2008 Commonwealth Solar was created to support renewable energy project funding.

Energy Conservation Funds

Consumers contribute a portion of their electricity charges to activities to reduce or avoid electricity consumption. The current (2002) charge is 0.25 cents per kwh. In 1999, ratepayer-funded energy efficiency expenditures totaled $125 million and saved 272 million kwh in Massachusetts. The Massachusetts Division of Energy Resources estimates that energy efficiency programs were cost effective by a ratio of 1.5 to 1. In Marlborough, National Grid and NSTAR disburse the energy conservation funds through its demand-side management program. They offer a variety of conservation services to consumers including residential, commercial, and industrial energy audits and programs to improve the efficiency of lighting, heating and cooling, appliances, industrial processes, and other energy uses. Their websites provide up-to-date information about current programs and rebate offers.

Energy Star

The U.S. Environmental Protection Agency's Energy Star program provides a variety of tools to measure energy use in buildings and products and to recognize superior performance. The EPA evaluates products for their energy performance and awards the Energy Star label to those that meet its criteria. This provides consumers with a guide to compare products for their energy attributes. The EPA also awards the Energy Star label to commercial and industrial buildings that perform above the agency's criteria. The designation is contingent on use of the EPA's energy benchmarking tool and monitoring of actual energy consumption. Residences can be awarded an Energy Star Homes designation, which qualifies the owners for utility rebates on high-efficiency major appliances and high-efficiency natural gas heating and water heating equipment.

The Energy Star program provides a process for businesses and institutions and other organizations to become partners and make a commitment to the program's goals.

Energy Star

Energy Star for Homes is a joint program of US EPA and DOE which educates and rewards builders and renovators in energy efficient construction practices. Typically, a builder/renovator in the EnergyStar program receives the following from the program:

- The services of a HERS Rater to assist the builder/renovator in avoiding the common practices that adversely impact energy efficiency, and computer modeling for improving home design
- Monetary incentives if the home achieves EnergyStar program guidelines
- Additional incentives for EnergyStar high performance appliances and lighting
- Marketing support and the EnergyStar badge to display on the property

The Net Zero Energy contest run by the Massachusetts EnergyStar program is a powerful incentive to develop and adopt "best practices" in residential energy efficiency.

For more see http://www.zechallenge.com/

Competitions like this spur people to develop and advance their capabilities. When people see a zero net energy home (one with no energy bills) can be construction and sold for less than $200,000, they start to think that such a thing might be possible for them.

Since residential energy use is such a large percentage of the total, even municipalities such as Lowell are looking at contests for the deepest energy reduction in a home renovation.

DOE 1605(b) Voluntary GHG Reporting Program
The DOE maintains a system for businesses and institutions to report their voluntary reductions of GHG emissions. Congress created the 1605(b) voluntary GHG reporting program through the Energy Policy Act of 1992. Nationwide in 2000, 222 firms and organizations reported on 1,882 projects that reduced or sequestered 269 million tons of carbon dioxide. This reporting system can be coupled with the Energy Star program and other efforts to document emission reductions. If in the future a system for trading GHG emission credits is established, reporting emission reductions to DOE may become valuable to the participants. Some states, such as New Hampshire and California, have established GHG registries as well.

Energy Facilities Siting Board CO2 Offset Policy
New power plant projects in Massachusetts that will create or add 100 megawatts or more of electric generating capacity are required to obtain approval from the state Energy Facilities Siting Board (EFSB). The EFSB has established a policy to require project proponents to offset the emission of CO2 from their projects in one of several ways.

Energy Service Companies (ESCOs)
An ESCO is a business that audits energy performance in buildings and other facilities and develops, installs, monitors, and finances projects to improve energy efficiency and maintenance costs. Typically, an ESCO is involved with projects that take from a few months to ten years to pay off. The agreement between the building owner and the ESCO is the performance contract. For example, an ESCO might organize, install, and finance replacement of lighting in a large commercial building at no cost to the property owner. In exchange, the ESCO recovers its cost and makes a profit by recouping a portion of the energy savings over a period of time according to terms agreed upon with the owner. ESCOs also operate as contractors to utilities and other entities. A number of ESCOs are active in Massachusetts. Marlborough municipal buildings have begun to take advantage of ESCO services.

Federal and State Renewable Energy Tax Incentives
Several federal and state tax incentives are available to support renewable energy projects. For up-to-date incentives consult a variety of sources: NStar, National Grid, MTC, DOER, DSIREUSA. Here are two websites and more are listed in the last page of this document.
http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=MA&RE=1&EE=1
http://www.mass.gov/doer/programs/renew/renew.htm

These incentives are outdated but indicate the range available:

• The federal Renewable Energy Tax Credit of 1.5 cents per kwh; applicable to wind, solar photovoltaic, and biomass.
• The federal Modified Accelerated Cost Recovery System for wind, solar, and geothermal properties, which allows businesses to recover investments through depreciation deductions.
• A federal solar tax credit of 10% of purchase and installation costs.
• A Massachusetts 100% income tax deduction for solar energy systems on commercial and industrial properties.
• An exemption from Massachusetts excise taxes for solar energy systems on commercial and industrial properties.
• A 15% Massachusetts tax credit for residential renewable energy systems up to a maximum of $1,000.
• A Massachusetts sales tax exemption for residential renewable energy systems.
• Exemption of renewable energy systems from property taxes. In other words, installation of a renewable energy system does not increase the assessed value of a property.

Aggregation
Under the electric utility deregulation law, municipalities or groups of consumers can create aggregations to buy electricity. In addition to a lower price, aggregations can negotiate about the source of the power they buy. A contract between an aggregation and the power provider could specify that all or a portion of the power be generated by renewable energy sources.

The City contracted with ConEdison Solutions to provide electric power to participating consumers from December 2008 to May 2010.

ACTIONS TO REDUCE GHG EMISSIONS
Note: Actions are classified based on which sectors of the community would be directly involved:
B=Business community
G=City government
R=Residents

Proposed actions are listed by sector in Appendix III.

Strategy 1: Improve Energy Efficiency

Improvements in energy efficiency are the most cost-effective way to reduce GHG emissions. These include heating and cooling equipment upgrades, replacement of inefficient refrigerators, installation of heat pump systems, insulation, replacement of incandescent lights with compact fluorescents, energy management system controls, weatherizing doors and windows, and many other measures. Additional building insulation, upgrades to more efficient boilers and furnaces, and other measures reduce the use of natural gas and fuel oil. The largest savings and in many cases the easiest to implement is air sealing, not to be confused with weather stripping and caulking windows, which in reality save little but are important to occupant comfort. Air sealing offers savings and comfort.

Actions Already Taken: 2006-2007
• The City of Marlborough retrofitted some buildings with energy-efficient lighting.
• The City's Waste Water Treatment plants upgraded many of the old motors and electric items to more energy efficient items with the help of National Grid. They are also exploring renewable energy systems to be used at the plants. Including exploring the reuse of restaurant grease for fuel (solving two problems with one solution).
• $200,000 was requested in the capital budget for energy efficiency projects.
• Green Marlborough, a group of residents and businesses, is promoting energy efficiency from changing to Energy-saving lightbulbs (CFLs) to forming Low Carbon Diet residential groups to hosting an educational Earth Day Fair.
• www.GreenMarlborough.org offers energy-efficiency information
• Green Marlborough has a TV show on a local cable channel that features episodes on energy-efficiency
• National Grid and NStar offer energy efficiency programs that they take to all sectors to work on energy use reduction. Their program has been successful and they have been able to help achieve energy efficiency.

Proposed Actions

Short-term
• Establish a municipal working group on energy management with representatives from the public works, electrical, school, library, community development, and other departments to track energy use in

City buildings. Based on the use data, set a municipal goal on reducing energy use. Measure and verify annual progress.[G]
• Replace incandescent traffic signals with light emitting diode (LED) lights, which are 80 to 90 % more efficient and rated to last 100,000 hours compared to 8,000 hours for incandescents. Take advantage of available utility rebates. [G]
• Recruit businesses and organizations into the federal Energy Star program with the goal of reducing energy use. Utilize pledges, peer exchanges, and public recognition programs to sustain involvement. [G,B]
• Work with local stores to promote Energy Star products and educate consumers about the Energy Star label. [G,B]
• Organize "green teams" to promote household practices that reduce GHG emissions. [R,G]
• Organize "green teams" within City departments to promote more sustainable practices in municipal operations. [G]
• Assess the condition of existing buildings to understand the inefficiencies prevalent in the building stock and design appropriate programs to address them. [B, R, G]
• Publicize audited utility energy efficiency programs with demonstrated Return on Investment (ROI) [B,G]
• Promote the use of ESCOs and performance contracting, where appropriate, to facilitate energy efficiency improvements when initial financial costs are a barrier. [B, G]
• Implement a City purchasing policy favoring Energy Star products. [G]
• Explore options to increase the efficiency of City street lighting and garage lighting. [G]
• Promote energy efficiency and green energy choices on a website and in energy bills.
• Pursue renewable energy installations for city buildings which have first corrected energy efficiency issues.
• Integrate extensive energy efficiency upgrades and renewable energy into city planning such as wastewater treatment plant designs. This should be a contractual requirement and should look at lifecycle costs in addition to construction costs.
• Require Leadership in Energy and Environmental Design (LEED) standards be used in the design of all new municipal building construction and renovations, particularly with regard to use of existing building materials, and energy and water conservation.
• Investigate water conservation measures and retrofit all municipal buildings with low-flow devices.

Medium-term
• Implement an energy management program for municipal facilities to evaluate use patterns, identify opportunities for energy efficiency improvements and renewable energy installations, pursue utility and other outside funding sources, manage contract work, and evaluate options for the energy supply. Consider establishment of an energy management position that focuses on saving money and energy and reducing GHG. [G]
• Integrate energy efficiency upgrades and renewable energy installations into the City capital planning process. Planned, programmatic improvements have the best opportunity for implementation. [G]

Strategy 2: Promote Cleaner and Greener Electricity

While the City does not control how our electricity is made, we can have some influence by supporting local renewable energy installations and green power purchasing choices.

Both National Grid and Mass Energy Consumers Alliance offer green power purchasing choices to business, residential, and municipal consumers.

Actions Already Taken: 1990-2001
• Shaw Realty and Rohm Haas installed solar arrays in 2007.

• Approximately 100 residents have solar hot water panels, most installed in 1980.

Proposed Actions

Short-term
• Provide education on renewable energy choices for municipal, residential, and business sectors: solar hot water/air/electric, wind, hydro-electric, geothermal pumps, etc.
• Pursue funding of solar energy installations through Commonwealth Solar.
• Install solar energy systems on City facilities. [G]

Medium-term
• Develop one or more projects with schools to install solar energy systems and conduct associated classroom activities. [G]
• Support implementation of the Clean Air Act regulations on older power plants. Advocate for a federal renewable portfolio standards. [G,R]

Long-term
• Support federal action on lowering power plant emissions of CO2 and conventional air pollutants. [G,R]

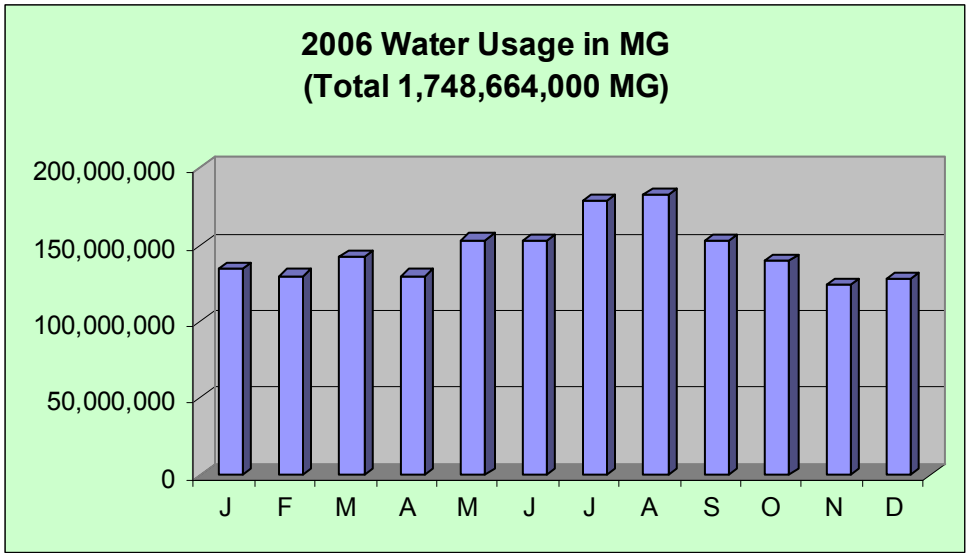
Strategy 3: Increase hydro-electric options.

Marlborough has one water filtration plant, a small section of the Assabet River, one dam, and a few small streams. The MWRA also has a facility in Marlborough. Inquiries can be made about the feasibility of hydro-electricity for these sites.

SECTION 3 Water

Principles of Water
• Watershed management and water conservation efforts should be part of city planning efforts.
• Water conservation measures provide immediate, cost-effective solutions.
• Efforts to study and manage water and wastewater management are essential.
• Since climate change is underway, understanding our water supply should better enable the community to adapt to impacts and changes in our water supply.
• A city incentive should be offered to conserve water, not promote consumption.

Water Resources in Marlborough
According to the GHG emissions inventory, water is supplied by the MWRA's Quabbin Reservoir, and local Lake Williams, and Millham Reservoir.



In 2006 the water usage in Marlborough was 1,748,664,000 gallons. (Source: DPW) Water use in July and August is high due to business parks and residential lawn watering systems.

Marlborough's drinking water is supplied by: 70% MWRA Water Treatment Plant (water sources are Quabbin and Wachusetts) and 28% Millham Water Treatment Plant (Marlborough water sources are Fort Meadow Reservoir, Lake Williams, and Millham Reservoir**)** and 2% private drinking water wells. The city draws on the Millham Water Treatment Plant first as it costs 25% of the MWRA water supply. Percentages vary depending on seasonal fluctuation. (Source: City of Marlborough's Open Space and Recreation Plan 2003-2008, pages 3-8)

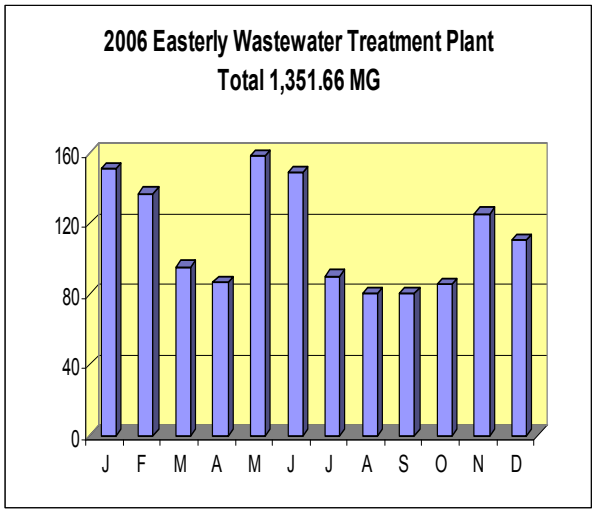
Water usage is directly connected to energy consumption. The Millham Water Treatment Plant energy consumption in 2006 was 1,486,800 kwh and 12,668 therms.

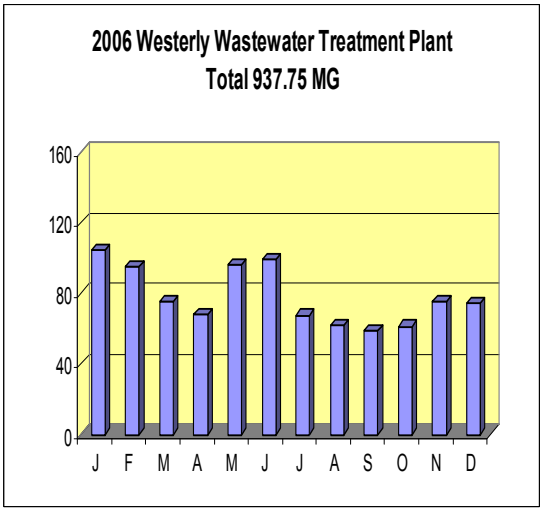
Wastewater in Marlborough
Marlborough has two wastewater treatment plants located on the east and west sides of Marlborough. The sewer service is used by all industrial and 90% of residential areas. The city plans to connect the remaining residences to the sewer system by 2023. (Source: 2003 Open Space Plan)

The wastewater plants are large energy users. In 2006 they used 2,984,400 kwh of electricity and 52,772 therms of natural gas.

The high amounts of wastewater in January and February are due to snow melt, and in May and June are due to heavy rainfall. Unfortunately this stormwater infiltrates or flows into (I & I) the sewer lines and

into the treatment plants thus requiring treatment. Efforts are currently being made to reduce the I & I flow into the system.





Strategic Approaches
Water conservation can reduce our impact on the environment, lower costs, and save energy.

Water conservation and management requires education and publicity.

Contacting businesses and residents, and providing incentives such as free water saving kits could further encourage them to adopt these measures.

Water Trends
• Stormwater runoff and flooding increase with development if not properly managed.
• Water supplies may be affected by warmer temperatures and drought brought on by climate change

Tools and Resources
Massachusetts Water Resource Authority
Water saving kits are readily available and free from the MWRA. They are mailed directly to homeowners.
Department of Fisheries and Wildlife
Training and support to survey streams is available through the Adopt-a-Stream program.
Stormwater Management and Limited Impact Development Resources
A number of resources such as University of New Hampshire provide information about Stormwater Management and Limited Impact Development. Littleton, MA has created a manual so that other communities can learn from their stormwater management practices.

Strategy 1: Improve Water Conservation
Provide free education and water saving devices to businesses and residents. These include low-flow faucet aerators, showerheads, and low-flow toilet devices; and dye tablets to detect leaks in toilets.

Actions already underway: 2007
• The City of Marlborough looked into water audits and water meters for municipal buildings
• The City of Marlborough is working on identifying infiltration and inflow into the sewer line and to fix these leaks
• Green Marlborough, provided free water-saving kit information to some residents

Proposed Actions

• Educate residents and businesses about possible water conservation measures.
• Inventory water consumption; have a working water meter in each building.
• Check for leaks.
• Install low flow devices and check for leaks and offer rain barrels.
• Organize stream teams to monitor health of watersheds and streams.
• Plant native, drought resistant plants that require no watering in public spaces, businesses, as well as encourage residents to do the same at their homes.

SECTION 4 Transportation

Principles of Transportation
• Focus on access, not mobility. A focus on access—being able to get to and use resources by means other than cars—means locating resources so they are convenient to people and offers other modes to get there - sidewalks, bike paths etc. However, a focus on mobility—being able to get from one place to another by car—promotes road building.
• As access by other means improves, motorists should pay more of the true costs—direct and indirect—of driving. Currently, motor vehicle travel is heavily subsidized.
• Travel by single-occupancy vehicle should be a last resort.
• Motorists should use an alternative-fuel vehicle and/or one that is fuel-efficient.

Role of Transportation in Marlborough
According to the city's 2006 GHG emissions inventory, transportation is responsible for about 33% of the GHG emissions in Marlborough.

Several factors contribute to our transportation GHG emissions:
• Marlborough is a suburban community with few non-driving alternatives.
• Trips tend to be relatively long because the residential zones are separated from commercial zones and people need to travel more than a mile to buy groceries or go to a movie.
• A small percentage of people walk or bike in Marlborough and there are limited public transportation systems that provide easy access to destinations.

Contributing to the GHG emissions are the high traffic corridors of Interstates 495 and 290. Commuter traffic on Route 20 is heavy at peak morning and afternoon hours. Cut through traffic in many neighborhoods is steadily increasing and a concern for many residents.

Given current zoning and lack of public transportation many people do not currently have convenient alternatives to driving. Given an increase in bicycle routes and interconnected walking and biking trails, this could change.

Trends
• The MAPC estimates a 25% increase in transportation GHG emissions by 2025. Planned development and revitalization in Marlborough and along Interstate 495 are projected to take off after 2010.
• Car registration in Marlborough has steadily increased over the past few years.
• Regional data shows that while the population of Massachusetts increased by about 5% between 1990 and 2000, the annual vehicle miles driven increased nearly 20%.
• As a nation we are driving vehicles that are less fuel efficient. The EPA reports that from 1988 to 2000 new light vehicle fuel economy has declined 1.9 miles per gallon. The average fuel economy for a 2000 model vehicle is 24.0 mpg, as low as it has been any year since 1980.

Ownership of large vehicles (SUVs, vans, minivans, and pickup trucks) has risen steadily for the past 20 years; they now make up 46% of the U.S. light vehicle market.

Strategic Approaches to Reduce GHG Emissions from Transportation
Increased traffic in the city has become a widespread community concern.

There are two strategic approaches to reducing GHG emissions related to transportation: reducing the vehicle miles traveled (VMT) and reducing the GHG emissions per mile of travel. Promoting use of

transit is an example of the first approach; replacing conventional vehicles with electric-powered vehicles is an example of the second approach.

In weighing approaches, it is important to remember that reducing VMT has many benefits. In the United States, motor vehicles caused an estimated 41,800 deaths and 3,236,000 injuries in 2000 from collisions and 2,000 deaths from air pollution.

They affect the livability of a community and the ability of children to play outside independently or travel on their own. The quantity of paving required for cars makes cities hotter, cuts down on the availability of space for planting trees, increases storm water runoff, and is aesthetically unpleasing. Motor vehicles are noisy and pollute soil and water, as well as the air. In addition, they make sprawl possible, which has many deleterious social and environmental effects. Motor vehicle traffic causes many direct problems for communities and profound indirect effects, including increased GHG emissions.

The City of Marlborough does not have a comprehensive program to reduce VMT or reduce GHG emissions of vehicles on the road. It is more likely to contribute to the national trend toward less efficient vehicles that dwarf potential environmental gains from programs to reduce VMT and GHG.

Kinds of measures
To date, the City has few positive transportation incentives for using means other than driving alone. In general, there is strong public support for taking action to reduce traffic.

Success in achieving a mode shift is likely to come when there is a cultural shift -- when using modes other than single-occupancy vehicles is seen as desirable, rather than the fate of those who don't have access to a car. This is why emphasizing the benefits of other modes—e.g., the health benefits of walking, the convenience of transit—is important. It is also why measures that involve high-profile people may be especially important, e.g., removing special parking privileges for executives and creating prime parking spaces for hybrids

Positive solutions that can be explored include free commuter parking for carpools and bus transit.

Tools and Resources

Tools to Reduce Vehicle Miles Traveled (VMT)

Vehicle Trip Reduction Ordinance
It is possible to pass a Vehicle Trip Reduction Ordinance, which mandates bicycle and pedestrian programs and other measures to reduce motor vehicle travel. While it is impossible to calculate emissions benefits from these measures, they may eventually add up to a shift in the city's culture.

Marlborough bicycle and pedestrian committees
These committees could give input into City bicycle and pedestrian projects and policies, review new development, and promote cycling and walking. They could continue to build on the Assabet Rail to Trail (ARRT) goals to connect neighborhoods to the bike trail.

Transportation Demand Management Ordinance
Develop a policy then the City Council could pass a Transportation Demand Management (TDM) Ordinance, which mandates that whoever wants to build non-residential parking facilities (with some exceptions for small projects), or expand existing facilities, must develop a TDM plan. The plan is a

commitment to take specific actions to minimize the number of trips made by car to the site. The City must approve the plan before the project can receive necessary permits to proceed. The ordinance also mandates monitoring to ensure that the TDM plans are being implemented and goals are being met. The City's TDM Officer would administer and enforce the ordinance.

Zoning

Zoning is an important tool for transportation management. It determines what kinds of land uses and densities are allowed. Zoning that allows for higher density around transit, that allows for housing, commercial, and institutional uses in the same area, and that places limits or other requirements on parking helps reduce automobile travel.

The city council could pass comprehensive new zoning measures, including some designed to reduce the traffic impacts of new development. These include reducing parking at new developments, counting parking garage floors when determining a building's height, and requiring traffic impact mitigations for new development. It is estimated that these measures will cut in half the otherwise anticipated number of trips from new development by 2020.

Public transportation

Marlborough is not well-served by public transportation. While the City does not have direct control over the transit system, staff could work with the MWRTA to improve bus services. The City could look into optimizing bus service corridors and commuter parking.

Shuttles

The City's shuttle service for elderly people, AVCOA, and The Ride, for people with disabilities, serve portions of the Marlborough community. It is possible to interconnect two or three sites in Marlborough with the nearest commuter rail station via shuttles.

State and federal funding

Much of the funding for roadway construction comes from the state and federal governments. Federal funds are channeled through the state. The Transportation Equity Act for the 21st Century, known as TEA-21, is the federal authorizing legislation for surface transportation. It is a six-year authorization, signed in June 1998. The funds are allocated and administered through the states. Under TEA-21, funds can be spent on pedestrian and bicycle facilities and on public transportation. TEA-21 also includes some programs that fund projects to provide clean air benefits.(Is there a more current TEA-21 we should reference?)

The major programs are:

• The Congestion Mitigation and Air Quality Improvement (CMAQ) program, which funds projects to help meet the requirements of the Clean Air Act, e.g., transit improvements and public fleet conversion to cleaner fuels.
• The Transportation Enhancement Program, which can pay for bicycle, pedestrian, and transit facilities and improvements.
• In Massachusetts, Chapter 90E, Section 2A of the General Laws requires the commissioner of the Massachusetts Highway Department to "make all reasonable provisions for the accommodation of bicycle and pedestrian traffic in the planning, design, and construction, reconstruction or maintenance of any project undertaken by the department."

Tools to Reduce Vehicle Emissions

Clean Cities Program
Under this federal program, municipalities can be reimbursed for the cost difference between a conventional and an alternative fuel vehicle. The program is administered in Massachusetts by the state Division of Energy Resources (DOER). DOER offers $2,000 grants to offset the incremental cost of alternative fuel vehicles. The program also provides assistance for creating the infrastructure needed for alternative fuel vehicles. DOER is working with other agencies and private entities to expand the network of compressed natural gas refueling stations.

State Contracts for Vehicle Acquisition
The City can use existing state contracts for products and services to purchase fuel-efficient and alternative fuel vehicles. This allows the City to benefit from the stronger negotiating position of the Commonwealth. Several state contracts are in place for alternative fuel and hybrid vehicles.

Federal Tax Incentives
The federal government offers an income tax deduction to individuals and businesses for the incremental cost to purchase or convert qualified clean fuel vehicles. The deduction varies based on vehicle weight and ranges between $2,000 and $50,000. For electric vehicles, a tax credit of 10%, up to $4,000, of the purchase price is available. This tax credit declines by 25% a year until 2004, when it phases out.

Please check state, federal and other incentives for any changes.

ACTIONS TO REDUCE GREENHOUSE GAS EMISSIONS

Note: Actions are classified based on which sectors of the community would be directly involved:
B=Business community
G=City government
R=Residents

Proposed actions are listed by sector in Appendix III.

Strategy 1: Reduce Commuting by Single-Occupancy Vehicles

Commuting accounts for many motor vehicle trips in Marlborough. Traffic generated by new commercial development has been a particular concern of residents, and reducing commuter trips has been a major focus for some businesses.

Actions: 2000-2006
• The ARRT bike trail is a significant addition to the Marlborough community. Studies have shown that it is being used by commuters as well as people seeking recreation.

Proposed Actions

Short-term
• Expand City outreach to other businesses to increase participation in voluntary TDM programs. [G]
• Expand incentives and increase participation in the City TDM program for municipal employees. [G]
• Undertake aggressive TDM measures and monitor the results. [B]
• If driving alone to work, discuss with employer ways to make it easier to ride-share, take transit, walk, or bike. [R]

Medium-term
• Monitor results of TDM program and investigate increasing the requirements. [G]
• Investigate lowering further the minimum parking standards for new development. [G]

Long-term
• Continue aggressive TDM measures and monitoring. [G, B]

Strategy 2: Improve Facilities for Walking and Cycling

For an American city, Marlborough has exceptionally few pedestrian and bicycle facilities. For pedestrians, it has sidewalks on one side of most streets, and none on several. Most people do not live within walking distance of shopping, work or recreational destinations. Making sidewalks safe and comfortable for pedestrians and making the pedestrian environment appealing, through urban design, short blocks, vegetation, and other means are vital for encouraging people to walk. Ensuring that sidewalks are kept free of snow and ice is important to make sidewalks accessible to everyone throughout the year.

Examples of pedestrian facility standards and conditions are available from other cities. The City can undertake major roadway projects to improve both pedestrian and bicycle access, often in conjunction with other projects. If a road is being torn up to install new water and sewer lines, for example, the City can take the opportunity to look for ways to put the road back so it works better for pedestrians and cyclists and/or to slow down traffic, if speeding is an issue.

Most people do not walk in Marlborough as their primary mode of getting around and many fewer ride bicycles. Marlborough has excellent potential to increase cycling because many roads are flat and there are many destinations worth biking to and there is a large residential population. The City could make a policy to make all streets bicycle-friendly and designate some as bicycle routes. The City could install bicycle lanes on roads where there is enough space for them. Where there is less space, the City can install guidelines, which direct motor vehicle traffic toward the center of the street, leaving more room for cyclists. Off-road bicycle paths can be used both for recreation and as transportation facilities.

The ARRT is one of the newest bike trails in the commonwealth and is actively used by bikers. It connects Marlborough to Hudson and is over 5 miles long (so far, it will be 12 miles long when completed through to Acton).

It is possible to measure the benefits of bicycle improvements. Experience elsewhere indicates that a community can increase the number of people who choose to cycle by improving facilities and visibility for cyclists and through community education. According to the League of American Bicyclists, if every resident in a city of 100,000 replaced a car trip with a bicycle trip once a month, CO2 emissions would drop by 3,764 tons a year. Free bike and bike-sharing programs have been successful in some cities. Typically they involve either non-profit groups providing a fleet of bicycles that are either available on the street for anyone to use or are available to fee-paying members only.

Police enforcement is also an important safety education tool. Efforts by the police include handing out warning citations and tickets to cyclists for traffic violation and to motorists who endanger cyclists.

Actions already accomplished: 1990-2006
Pedestrian improvements at various sites throughout the city have included:
• Improving the sidewalk during street repair/construction
• Starting a Walking School Bus program for elementary school children in 2008

Bicycle facility improvements have included:
• A new bike trail

Major roadway projects featuring facility improvements for pedestrians and cyclists include:
• Preserving trees on Main Street to provide shade for pedestrians

Proposed Actions

Short-term
• Expand the pedestrian program to further improve intersections and increase year-round sidewalk maintenance, provide public restroom access and benches, and make aesthetic improvements, e.g., trees, flowers, buildings with windows, fences that are low and transparent. [G, B, R]
• Install additional bicycle parking and look for new opportunities to install bicycle lanes or guidelines and improve intersections for cyclists. This is helpful to those seeking to use their bicycles. [G]
• Expand Marlborough's successful Walking Schoolbus Program which is supported by Mass Ride's Safe Routes to Schools Initiative

Medium-term
• Create and improve off-road bicycle and pedestrian paths, e.g., improve walkways and streets that lead to ARRT. [G]
• Consider creating a bicycle commuter station at the head of the ARRT or in some neighborhoods near the ARRT. ARRT makes a good core route. It is possible to extend/branch in different directions. [B]

Long-term
• Connect ARRT to downtown Marlborough
• Continue pedestrian and bicycle programs [G]
• Investigate possible shared-use very low-speed neighborhood streets [G]

Strategy 3: Reduce the Amount of Motor Vehicle Travel through Parking Incentives and Restrictions, Car-Sharing, Promotion, and Education

To promote energy efficient cars, the Marlborough excise tax could be reduced for energy-efficient vehicles.

Studies indicate that parking restrictions are by far the most effective way to reduce driving, but they tend to be unpopular and therefore difficult to implement. Marlborough residents have easy access to parking and there are very few restrictions on parking.

A possible approach to reducing driving is car sharing, an increasingly popular alternative for people who need a car occasionally but don't use one for most of their transportation. People who opt for car sharing instead of owning a car may make many travel decisions differently; the cost of using a car is based on mileage, rather than largely based on its purchase price. Zipcar, a car-sharing company has attracted many members. This could be introduced to condominium and apartment complexes, and other high-density neighborhoods. Initially, the GHG emissions reductions from car sharing will probably be small, as subscribers are likely to be people who do not own cars and who may actually drive more after joining a car-sharing program. Eventually, however, emission reductions may increase as people opt for car sharing instead of replacing their cars.

The City could undertake a number of promotional and educational efforts to encourage people to walk, cycle, carpool, or take transit. These have tended to focus on the community and environmental benefits of car-free travel. Recent efforts have also featured the health benefits of walking and cycling. It seems clear that convenience and cost are not the only factors that affect people's decisions about what travel mode to use. For example, for some people, riding the bus is a low-status activity, while for others, it's a convenient way to avoid the hassles of parking. For some people, walking—even a relatively short distance—seems like too much effort; for others, it's welcome exercise. In Holland or Denmark, most people cycle, regardless of their age, for transportation as well as recreation; to many Americans, cycling is only a recreational activity for young people. Promotion—making alternatives appear attractive and socially acceptable—is an important component of a GHG reduction program. Marlborough can organize a Walking or Liveable Streets coalition. This coalition could include the Newcomers, Main Streets, Marlborough Wellness group, the public schools, the community development corporation, community groups, and others interested in promoting walking for health. It can be organized for a variety of successful promotional events.

Action already accomplished: 2008
• In 2008 the Wellness Committee initiated the Walking Schoolbus. On Wednesdays children were encouraged to walk to school instead of taking the school bus. The program was a real success. See www.SafeRoutesInfo.org
• Wayside Fitness club coordinates walking and running events in the community.

Proposed Actions

Short-term
• Install signs with schedule and route information at bus stops in Marlborough. [G]
• Install shelters or benches at busy bus stops where there is room on the sidewalk. [G]
• Investigate traffic measures to expedite bus travel. [G]
• Continue to develop and distribute promotional material and hold promotional events. [G]
• Continue the Walking Schoolbus and include more days than Wednesday. [G,B]
• Work with community groups to promote walking and biking for health. [G, R]

Medium-term
• Investigate measures to expedite bus travel. [G]
• Publicize proximity to transit as a reason to shop in local stores, offer discounts to cyclists. [B]

Long-term [B]
• Increase car-free celebrations in Marlborough, such as the Heritage Fair. [B,R]

Strategy 4: Reduce Motor Vehicle Emissions

In the United States, motor vehicle fuel efficiency has decreased because of the proliferation of sport utility vehicles (SUVs) and light trucks. Locally, this can be countered primarily by buying alternative fuel vehicles and by using the most fuel-efficient vehicle possible to complete the task. The way that vehicles are driven affects emissions. Driving speed, tire pressure, and braking habits all affect mileage. Idling is a significant source of GHG emissions as well as local air pollution. Installing emission controls on heavy-duty trucks and construction vehicles is an inexpensive measure that removes significant amounts of air pollutants.

The federal corporate average fuel economy (CAFE) standards were last raised in 1975 and implemented in 1985. Attempts to raise them again have been unsuccessful to date, largely because the

automobile and petroleum industries have claimed that increasing fuel efficiency standards would place an economic burden on society. As the economic burdens to society of not raising the standards become more evident, this argument will probably carry less weight in the future.

If new standards of 50 MPG for cars and 35 MPG for light trucks were adopted, and 50% of the vehicles in Marlborough met improved standards in 2010, the CO2 savings would be 46%, compared to 50% of the vehicles meeting only the current standards of 28 MPG for cars and 21 MPG for trucks. Changing the CAFE standards is the single most important measure the nation can take to curtail GHG emissions from motor vehicles.

Actions already taken: 2000-2008
• Marlborough's city fleet includes two hybrids: one Prius and one SUV.

Proposed Actions

Short-term
• Adopt a City green fleets policy that incorporates energy efficiency criteria for acquiring municipal vehicles, including sizing of vehicles appropriate to their tasks and giving preferences to alternative fuels and hybrid vehicles where possible and promotion of using the smallest vehicle necessary for jobs (including City bikes). [G]
• Switch to alternative fuel and minimum-sized vehicles. [R]
• Provide a program on driving and maintenance practices that reduce fuel use and emissions for employees who use City vehicles and for the community. [G]
• Publicize the health and environmental costs of motor vehicle emissions. [G,I]

Medium-term
• Undertake an anti-idling campaign. Do education about idling through signs, targeted mailings to schools, parents, bus companies, shipping destinations; follow up with enforcement. [G,R]
• Make sure vehicles engaged in business do not idle unnecessarily. [B,I]
• Work with the city's congressional delegation to advocate for higher CAFE standards. [G,R]
• Work with state agencies to develop a system to more closely tie vehicle insurance costs to vehicle miles traveled. [G,R]
• Develop stickers on tire pressure for optimum energy efficiency for service station air pumps. Mandate all gas sales stations must give free tire air to make it easy for people to do the right thing, for both efficiency and safety reasons. This is very little burden to the station and a large, positive societal benefit. [G,B]

Long-term
• Establish infrastructure for AFVs, including a CNG fueling station for City vehicles, free public access refueling stations, partly solar-powered, for electric vehicles; and reserved spaces for zero and super low-emission vehicles in municipal garages and parking lots. [G,B]
• Install emission controls on heavy-duty City trucks and construction vehicles; investigate requiring emissions mechanicals on trucks doing business with the City. Check out incentives/grants with DOER or DEP. [G]
• Investigate possible programs to encourage fleets to switch to CNG or other alternative fuels. [G,B]
• Link excise taxes to engine size. Increase excise taxes for second, third cars. [G]

Strategy 5: Promote Local and Regional Transit Improvements

Actions already taken: 2000-2007

• The City has taken a leadership role in regional transportation planning efforts and switched to the MetroWest Regional Transit Authority (MWRTA)

Proposed Actions 2002-2010

Short and medium-term

• Advocate for additional federal and state transit funding. [G,B,R]
• Work with other communities to create new transit services, including bus lines to the T and commuter rail lines. [G,B,I,R]
• Advocate for low-emissions buses and increased service on Route 20 to South Station or the T. The nearest commuter rail station could be very good when timed with trains. [G,B,R]
• Advocate for a bike route to the nearest commuter rail. [G,B,R]
• As the federal transportation funding reauthorization process unfolds, advocate with state and federal elected officials to shift federal funds from highways to transit. [G,B,R]

Long-term

• Advocate that federal and state officials begin planning an interstate transportation system that does not include large trucks on roadways other than limited access highways. [G,B,R]

SECTION 5 Land Use, Buildings, & Vegetation Management

Principles

• Maintaining a socially, economically, ethnically, racially, and culturally diverse population is important for Marlborough.
• A mixture of land uses makes the city healthier, more livable, and more economically sustainable.
• Planting native and water-efficient plant species improves the city's climate and reduces energy use.
• Life-cycle costs and benefits of buildings, landscaping, and infrastructure should be considered when planning, building, or renovating. Life-cycle costs are the costs associated with producing a product, transporting it, using it, and disposing of it.
• It is important to think regionally about land use; regional sprawl affects Marlborough.

Role of Land Use and Vegetation in Marlborough

Marlborough has 37,500 residents and many businesses in 21 square miles. An increasingly higher percentage of land paved for roads and parking with dwindling green spaces means that the character of our community is changing from a treed landscape with abundant open space to an urban landscape. Reduced green space and tree canopy and increased paved and roofed areas in many neighborhoods, means that the city will experience higher air temperatures during the summer, which in turn increases the use of air conditioning. It impairs air quality and affects people's health.

The challenge is to create a city that benefits from its density, reduces its environmental impact, and remains livable. Land use planning and vegetation management play an important role in meeting this challenge and can affect both emissions of greenhouse gases and the removal of CO2 from the atmosphere (sequestration). Environmental justice considerations include ensuring the proximity of the less affluent neighborhoods and residents to employment, public services, stores, and safe and pleasant green space.

Vegetation, especially trees, cools the city in summer both by shading buildings, cars, parking lots, sidewalks, and streets, and through transpiration (i.e., giving off water vapor). It also removes a small amount of CO2 from the atmosphere, storing it in roots, stems, and leaves. Effective vegetation management, which requires good on-site water management, will also help mitigate some of the anticipated changes in the weather due to climate change -- more extreme storms, floods, and droughts. Both flooding and drought-induced water shortages can be reduced by re-using on-site water and maintaining healthy vegetation that increases water infiltration and absorption. Well-maintained trees are less likely to suffer or inflict damage due to high winds or snowfall. As the climate warms, it becomes ever more important to reduce the urban heat island effect and create cool natural outdoor spaces for people to enjoy in the summer.

Trends

Land use trends: Marlborough is a desirable location for housing, businesses, and industries. The city includes a major transportation intersection of Interstates I-495 and 290 and is near Interstate 90. The high demand for commercial, industrial, and residential building has made possible both new construction and extensive renovation of existing buildings. These competing uses create more pressure on existing open space-as well as higher demand for it.

Demographic trends: The number of people per housing unit is decreasing, which means that each person is taking up more space.

Tree cover/vegetation trends: Marlborough tree coverage is about 40%. The percentage of tree coverage vulnerable to planned development is unknown. Trees help to absorb carbon dioxide as well and they are integral to CO2 reduction strategies.

Open space trends: Open space is decreasing.

Regional trends: Sprawl continues to dominate regional land use changes, resulting in more traffic, lower regional air quality, less access to open space, and loss of farmland and natural habitats. From 1972 to 1996 developed land in Massachusetts increased by 59%, while the population grew by only 6%. Sprawl undermines urban environments and increases the number of people who commute to or through Marlborough, adding noise, air pollution, and traffic congestion. With sprawl has come a dramatic increase in vehicle miles traveled.

Tools and Resources

Zoning

The Marlborough Zoning Ordinance could govern how land and buildings may be used. It is a local law, adopted by the City Council, that can conform to state zoning laws. The zoning ordinance can cover four areas: how land may be used; the intensity of activity and size and location of buildings on a piece of land; the amount of parking required for each type of land use; and special regulations for activities and land uses that would not be sufficiently regulated under the first three areas.

An ordinance has two parts, a map and the text. The map shows the boundaries of the city's complex zoning districts, which can include the kinds of residential, office, business, industrial, special, and special overlay districts. The text can list the regulations for each class of district and the procedures for enforcing and administering the regulations.

An ordinance can be amended. The City Council can adopt extensive, comprehensive rezoning packages to encourage more housing, including affordable housing, especially in areas where other uses have dominated; limit future density and traffic growth; and provide additional opportunities for public review of large projects, and decide how much open space can be preserved.

Toward a Sustainable Marlborough

A Sustainable Marlborough plan could complement Community Development plans to help advocate the many directions and strategies that would be congruent with a Climate Protection Plan or Energy and Environmental Action Plan. While attending to energy and environment are important, the comprehensive approach to sustainability can have multiple benefits. A growth policy document should have extensive citizen involvement to help guide policy decisions and balance all the communities needs.

Open Space Committee

Marlborough has an Open Space Committee. For information see the Marlborough Conservation Commission.

Community Preservation Act

Marlborough has not yet adopted the Community Preservation Act (CPA). This act allows the community to assess a small tax from less than 1% to no more than 3% onto the property bills. This money is to be used for housing, historic preservation and open space protection. Funds raised by a community are matched by state funding generated from real estate sales. Many neighboring communities have benefited from this act and have been able to protect open space.

Citizen groups, boards, and committees
Marlborough has organizations that support community and environmental efforts: Green Marlborough, Marlborough Recycling Committee, Marlborough Litter League, Community Development Corporation, Colonial Garden Club, and several other organizations. Marlborough also has a Conservation Commission.

Regional planning organizations
The Metropolitan Area Planning Council (MAPC), based in Boston, is the regional planning organization for the area's 101 cities and towns. While it is advisory, without much clout for regional land use planning, its staff and other resources can provide valuable modeling and other services. The Metropolitan Planning Organization does regional transportation planning and approves allocations of some roadway funds.

LEED
A growing trend in architecture and development is to design buildings in an environmentally holistic manner so that site choice, energy performance, indoor air quality, resource efficiency, water consumption, and waste management are optimized in terms of environmental values. The U.S. Green Building Council (USGBC) developed the Leadership in Energy and Environmental Design (LEED) rating system to provide a process and guidelines by which to evaluate buildings for their environmental and energy performance.

The LEED rating system provides a standard that can be used as a reference in design and construction documents, government policies, and laws and regulations. It is being widely adopted as a guideline across the nation. In Marlborough, five projects have been registered as having been designed using the LEED standards.

One objective calls for developments to minimize environmental impact from resource use and cites LEED as a means to document these impacts. The Planning Board can take this objective into account when it reviews applications for special permits. It is essential that LEED standards be used rather than LEED requirements to achieve intended goals to avoid green-washing.

There is also a growing trend to promote Limited Impact Design (LID) in communities to help manage storm water run off, recharge our aquifers, increase useful vegetation and improve aesthetics in communities.

The Green Roundtable
This Boston area non-profit organization, which is a USGBC affiliate, includes architects, engineers, developers, environmentalists, government agency staff, and other interested people. It provides education and training programs and technical assistance and also advocates for policies that promote green buildings.

Northeast Center for Urban and Community Forestry
This office, based at the University of Massachusetts at Amherst, is a partnership of the U.S. Forest Service, private and state forestry concerns, and the university. It provides information and assistance in planning and conducting urban forestry activities.

Massachusetts DEM Urban Forestry Program

The state Department of Environmental Management helps communities and nonprofit groups build long-term management programs and develop support for urban forest management. Grants are offered for urban forest planning and education and for tree plantings.

Actions to Reduce GHG Emissions from Land Use Activities
Note: Actions are classified based on which sectors of the community would be directly involved:
B=Business community
G=City government
R=Residents

Proposed actions are listed by sector in Appendix III.

Strategy 1: Foster Mixed Use, Transit-Oriented Development and Redevelopment and Public Open Space through Zoning and Incentives

Life-cycle analysis of buildings shows significant energy savings and reduced environmental impact when existing structures are reused or rehabilitated rather than replaced. Compact mixed-use development lowers energy use within buildings, promotes less automobile travel, and helps make the city livelier and more livable.

Unpaved open space offers opportunities to grow vegetation that can serve as a CO2 sink and reduce the heat island effect. Opportunities to protect open space exist in Marlborough, because much land has not been built on. Buying and converting property to green space is very expensive and the chance to preserve it should be taken. Opportunities for new green space include converting small spaces to vegetated miniparks, establishing a multi-use path along rail lines, developing rooftop gardens, and redesigning lawns around office and residential buildings in densely habitated areas to include more varied vegetation, low water consumption and maintenance vegetation and public access.

The Open Space Committee can provide a blueprint for open space preservation and acquisition. In addition, existing natural areas should be conserved, and restored where damaged. Open space should maximize tree canopy cover compatible with proposed uses and be maintained with energy- and water-efficient practices and vegetation.

Having access to wilder nature—woods, fields, and beaches—is also important for people who live in the city. If access is difficult, it encourages more out-of-town travel and, for those who can afford them, second homes, creating a negative spiral of more sprawl, less access, more desire for vacation homes, etc.

Actions already taken: 2000-2008
• Two former manufacturing buildings have been renovated to house high-end condominiums: Design Pak and Renaissance Lofts. This renovation of existing buildings has reduced the need to develop open space.

Proposed Actions

Ongoing
• Use zoning to continue to encourage pedestrian-scaled mixed-use development, with residential infill throughout the city. Strengthen orientation toward denser development near public transportation. [G]
• Design and construct durable buildings with flexible re-use options. [G,B,R]

• Conduct consistent open space review during the permitting process for development projects to incorporate public open space into project design. [G]
• Provide incentives for planting trees and creating additional green space open to the public as part of new development and major renovations. [G]
• Carry out the recommendations in the Open Space and Recreation Committee. [G]
• Create appealing small-scale public gathering spaces with well-adapted vegetation as part of development and redevelopment projects. [B,I]

Strategy 2: Optimize Use of Vegetation to Shade Buildings and Reduce the Urban Heat Island Effect

The tree canopy reduces the urban heat island effect, sequesters carbon, reduces gasoline evaporation from parked motor vehicles, and makes the city more visually attractive. Preserving existing trees is the key to increasing the canopy since mature trees provide significantly more canopy than recently-planted ones. Trees grow slowly, and typically it takes many years for a tree to reach its full growth and capacity to sequester carbon. Vines and arbors can also be used in constrained spaces. Removal of CO2 from one tree is on the order of 1 ton or more in its lifetime.

Conditions for trees are more difficult than they used to be, so it is important to boost maintenance of old trees, as well as to add trees wherever possible. For trees and other vegetation, sufficient water and good soil, with the proper nutrients and drainage, are crucial. Selection of species adapted to the local environment, and minimizing lawns, keep maintenance and energy costs low. There are multiple benefits to good vegetation maintenance and on-site water management, including avoidance of costs of storm damage and loss of vegetation from droughts, energy savings for building owners, and a pleasant summer environment.

Trees actually have a significant impact on buildings, both shielding them from wind and shading in the summer. But they can prohibit PV installations. Both aspects should be considered.

Actions already taken: 2000-2008
• The City has a street tree maintenance, replacement and replanting program that is ongoing.

Proposed Actions

Short-term
• Use GIS or other computer imaging, such as the CITYgreen software developed by American Forests, to accurately determine current canopy cover, assess environmental benefits, and plan plantings. [G]
• Educate the public about the benefits of trees. Trees reduce stormwater runoff and sequester carbon. They also provide shade and reduce the need for AC in summer. Trees improve air and water quality.
• Increase public education on the proper planting and care of trees. [G,R]

Medium and Long-term
• Develop and carry out policies and programs to maximize the canopy cover, with special attention to parking lots and other heat-absorbing locations and to shading air-conditioning units. This should include attention to soils, water retention, and appropriate species. [G, B,R]

Strategy 3: Reduce the Urban Heat Island Effect through Design of the Built Environment

The less incoming solar radiation buildings, streets, and other surfaces absorb, the cooler the city becomes. There are two main ways to reduce the absorption of heat: increase transpiration and shading

by vegetation and increase the albedo (reflectance) of surfaces. There are many low-cost ways to make surfaces more reflective. It can be as simple as selecting light-colored asphalt shingles instead of black shingles when re-roofing a building. Green roofs are also a viable choice as they reduce stormwater runoff and cool buildings.

Actions already taken: 2000-2007
• Some city officials have discussed green roofs.

Proposed Actions

Short-term
• Provide developers and property owners with information about using green roofs or high reflectance roofs on buildings and other reflectance and shading techniques. [G]
• Provide developers and property owners with information about reflectance and shading for parking lots. [G]

Medium and long-term
• Provide incentives for new construction and renovations to meet LEED standards for reflectance and shading. [G]
• Incorporate LEED standards for reflectance and shading in all City and private parking lots and in new construction and major renovations. [G,B,R]

Strategy 4: Promote the Design and Construction of Green Buildings

Designing green buildings involves different approaches and techniques than conventional design. It explicitly considers factors such as the energy efficiency of a structure and the level of air quality that will result. It requires tools such as energy modeling to support the design process. The aim of the green building approach is to construct buildings that are more durable, are sited optimally, use less energy, provide a safe and comfortable indoor environment, and conserve natural resources—in other words, to minimize the environmental footprint of our built environment. On July 1, 2001, a new energy code for commercial and high-rise residential buildings took effect in Massachusetts. The code affects the construction of new buildings and is projected to save 27 trillion BTUs of power generation. It is estimated that statewide the new code requirements will reduce annual emissions of CO2 by about 2.4 million tons, sulfur dioxide by about 14,500 tons, and nitrogen oxides by about 3,500 tons. The new code does not affect existing buildings, which outnumber new buildings, except when they undergo major renovations.

Actions already taken: 2000-2007
• A handful of Marlborough projects have been constructed as green buildings. Boston Scientific and Raytheon have LEED buildings. The Hillside School is constructing a LEED building.

Proposed Actions

Short-term
• Advise developers on the merits of using LEED standards.
• Ask developers to build using LEED standards.
• Provide developers, citizens, and City staff with information to assist them in applying LEED standards. [G]
• Develop green standards for renovation of City-owned properties. Utilize the City energy management workgroup to coordinate department implementation. [G]

Medium-term
• Strengthen zoning incentives to include LEED in project review and planned unit development (PUD) processes. [G]
• Reuse materials from existing structures during renovation or redevelopment projects. [G,B,R]

Strategy 5: Work towards Transit-Oriented Regional Land Use Planning

Currently, the mechanisms for doing regional land use planning in the greater Boston area are weak. The metropolitan area includes 101 cities and towns, many of them quite small geographically. The Metropolitan Area Planning Council is advisory, and there is no governing regional body.

Sprawl is becoming evident within Marlborough, which is rapidly developing, and it directly affects the city in important ways as it promotes increased traffic to and from the city. In addition, the loss of open space in Marlborough is a loss to Marlborough residents who seek access to forests, fields, other natural areas, and farms.

Regional concerns may sometimes conflict with local concerns: People looking at transportation issues in the region may want to concentrate new jobs near places easily reached by public transportation in Marlborough, while many Marlborough residents, concerned about traffic on their streets, may not.

In addition, new jobs draw people to Marlborough at the same time that the high cost of housing makes it impossible for many of them to live in or near the city, which induces further sprawl and more driving.

It is important to the entire greater Boston area that there be a regional land-use plan that includes powerful incentives to stop sprawl and shift to in-fill development. While there is growing agreement among planners that in-fill development is often preferable to sprawl, there seems to be a lack of consensus on what kind of in-fill development is desirable or on how to make it happen.

Actions already taken: 2000-2007

• Through participation in the Metropolitan Area Planning Council and other regional and statewide organizations, the City is becoming more aware of a regional approach to land use.

Proposed Actions

Ongoing
• Increase support for and involvement in regional land use planning activities. [R]
• Work with legislators and other public officials toward creating a regional land use plan with teeth. For example, dropping the HERS rating as a requirement for residential property sold in Massachusetts was dropped from the Green Communities Act. Imagine what the equivalent of an "MPG" sticker on each house would do for market awareness of residential energy use? It would provide an investment grade metric for comparison by the consumer, much as EnergyStar does for appliances. You get to see what you are buying objectively compared to other products on the market. This would drive the new home market as well as the renovation business to greater energy efficiency by using the power of the market.
[G,R,B]

SECTION 6 Waste Management

Principles
• Source reduction, or the avoidance of generating waste, is the most effective way to reduce GHG emissions associated with waste.
• Because energy is needed to transport and process wastes, recycling reduces but does not eliminate GHG emissions associated with wastes.
• Environmental purchasing is key to establishing and supporting the demand for recycled materials in products.

Role of Waste Generation and Management in Marlborough
The typical municipal solid waste stream consists of a variety of materials including paper products, metal, glass, plastics, food scraps, and landscape trimmings. These are collected by the Department of Public Works or by private disposal firms and sent to compost facilities, landfills and incinerators located [inside and] outside Marlborough. Other types of waste including construction debris and appliances are also recycled. Hazardous wastes are handled by special facilities.

Waste materials are related to GHG emissions in the following ways:
• The unmanaged decomposition of organic material (e.g., food scraps, landscape trimmings, paper, cardboard) in landfills releases methane, a powerful GHG (20 times more potent than CO2). Increasingly, scientists are finding that the release of methane is a major component of global climate change.
• Incineration of solid waste results in the emission of CO2 and other pollutants.
• Industrial composting (WeCare) of solid waste results in the emission of CO2 and other pollutants.
• Energy, usually in the form of fossil fuels such as gasoline and diesel, is used in the collection, transport, and handling of waste materials, which in turn releases CO2.
• Some wastes, when landfilled, sequester or store carbon because they do not decompose. This keeps CO2 out of the atmosphere.

In Marlborough, the City collects most residential waste. About 80% of households are served by the City's recycling program whether they are on City trash service or not. Some multi-residential dwellings use private waste contractors. The City collects recyclable materials, including paper, cardboard, metal, yard waste, and plastic from residences and City government buildings and schools.

Currently, Marlborough recycles about 13% of its residents solid waste. Businesses are not required to participate in recycling. Marlborough does not have a recycling ordinance. In order for one to be in place, it would have to be adopted by the City Council and Mayor. The City's curbside recycling contractor services residences only. All businesses utilize private contractors. Marlborough's rubbish collection and recycling program is only open to Marlborough residents.

In November 2008, the city of Marlborough decided to begin enforcing the Massachusetts Department Environmental Protection (DEP) waste ban and now prohibits cardboard in the waste stream and requires residents to recycle it. This is an important step in a city-wide effort to increase the recycling rate.

Actions that prevent or reduce the generation of waste—efficient use of resources, reuse, composting, and recycling—also prevent or reduce the emission of greenhouse gases. In this plan, preventing the emission of greenhouse gases at landfills and incinerators and the sequestration of carbon in landfills are considered. While not counted in this plan, waste minimization and prevention also prevent and reduce

the use of energy in mining, transportation of raw materials to mills, production of goods, and transportation of goods to consumers. Preservation of forests, by reducing the demand for wood products, allows trees to continue removing CO2 from the atmosphere and storing it in a process called carbon sequestration.

Trends

The establishment of the Marlborough recycling program, has achieved reductions in GHG emissions from waste. Since 2000, Marlborough has collected 11,787 tons of recycled paper, glass, plastic, and aluminum. The table below summarizes trends in residential solid waste generation and recycling since 2000. It is difficult to develop a full picture of solid waste management in Marlborough because there is not a unified system for the collection, recycling, and disposal of all waste. While the City collects most residential waste, some is collected by private contractors. We can have relative confidence in the figure for the total volume of material that residents in private homes recycle, but we do not have a handle on how much material businesses, condominium and apartment owners recycle. Therefore it is not possible to calculate the total volume of material that is recycled in Marlborough.

Browning Ferris Industries / City of Marlborough / Tonnage Report by Commodity (Amounts are in tons)

FY July-June	Commingled (aluminum, plastic, glass)	Paper	Trash	Abitibi Paper	TOTAL	Recycling Rate
2000	349	843	12,932		14,124	8%
2001	303	1,085	13,290		14,678	9%
2002	535	1,313	12,178		14,027	13%
2003*	483	1,176	11,452		13,111	13%
2004	484	1,303	12,956		14,743	12%
2005	586	1,424	12,946		14,956	13%
2006	569	1,344	12,880	31	14,824	13%
	Tons 3299	Tons 8488				

* June data is missing

Relationship between Waste and GHG Emissions

After products and materials have served their useful life, they are sent to landfills and incinerators for disposal. At landfills, wastes with organic constituents give off methane, a powerful GHG, as they decompose. At incinerators, burning of some kinds of waste produces CO2, among other pollutants.

Strategies to Reduce GHG Emissions from Waste

Waste Minimization and Prevention The generation of waste can be minimized and prevented by using materials more efficiently and by extending the length of use to avoid replacement. Even small steps, like making two-sided copies, can add up when a lot of people take them.

Reuse of Products Reusing products and materials extends the usefulness of these items and prevents sending them to landfills and incinerators. Examples include recovery and reuse of building materials such as windows, wood beams, doors, and cabinets in construction.

Recycling of Materials Recovering materials to reuse in the production of new goods—recycling — prevents disposal in landfills and incinerators. Some materials that the recycling program collects, such

as glass or metal, do not generate greenhouse gases if they are disposed of in a landfill or incinerator, but recycling them prevents the use of energy in mining virgin materials and producing and transporting products. Recycling of paper products does prevent the emission of greenhouse gases, because they would generate methane if they decomposed in a landfill or CO2 if incinerated.

Composting Composting food scraps, instead of sending them to landfills, results in a net reduction of greenhouse gases. Composting in backyards or in central facilities does not produce methane. In a landfill, food scraps will degrade and produce methane. Composting of yard trimmings also does not produce methane. In landfills, yard trimmings tend not to decompose and the carbon contained is sequestered, but they use up limited landfill capacity, and their potential for improving soil is lost.

Environmentally Preferable Purchasing Practices
The Commonwealth of Massachusetts defines environmentally preferable products as having less negative effect on human health and the environment than competing products or services that serve the same purpose. Such products or services may include, but are not limited to, those that contain recycled content, minimize waste, conserve energy or water, or reduce the amount of toxics disposed or consumed. Purchasing products with recycled content is necessary to support the collection of recyclable materials. Without environmentally preferable purchasing, the recycled materials would simply accumulate and would ultimately require conventional disposal.

Tools and Resources

Massachusetts Solid Waste Master Plan
The state Department of Environmental Protection is required by law to develop and maintain a statewide master plan for solid waste management. The first plan was issued in 1990 and the most recent plan was issued in December 2000. It lays out goals and mechanisms to minimize the disposal of solid waste in landfills and incinerators, using a mix of regulatory requirements, incentives, and educational programs. The basic strategy of the plan is to reduce the amount of solid waste produced, recycle the maximum amount that is produced, and dispose of the remaining portion as a last resort in an environmentally sensitive manner. The plan calls for a 70% reduction of municipal solid waste and construction and demolition debris (60% MSW reduction and 88% C&D waste reduction). DEP proposes to achieve this milestone through

• expanding source reduction programs especially targeted at businesses;
• launching new initiatives with manufacturers to take responsibility for managing the wastes associated with their products;
• making recycling more accessible to multi-family units;
• banning the disposal of unprocessed construction and demolition waste in 2003;
• enhancing enforcement of waste bans;
• requiring recycling facilities to implement recycling benefits plans

Department of Environmental Protection/Bureau of Waste Prevention
DEP is responsible for state waste management policy. Various regulations, education programs, and incentives are used to reduce the generation and disposal of waste in Massachusetts. DEP offers a range of technical assistance programs to municipalities, businesses, and institutions and a variety of grants to support the recycling industry and municipal waste management programs.

Recycling Ordinance
The City of Marlborough does not have a recycling ordinance.
• Marlborough established the curbside recycling program for Marlborough residents in 2000 and

voluntarily allows each occupant in one to three-family residences to recycle materials.
• All City-owned buildings including schools incorporated recycling programs in 2008.

DPW Recycling Program
The recycling division of the Department of Public Works coordinates administration of the City's recycling program. The division works with contractors to provide recycling services to residents. A DPW representative sits on the volunteer Marlborough Recycling Committee.

WasteCap
WasteCap of Massachusetts is a nonprofit organization that provides services to businesses across the state on recycling, source reduction, reuse of materials, and buying recycled products. Services include site visits to develop waste reduction and recycling strategies, a surplus inventory donation program, recycling cooperatives, buying recycled technical services, and a recycled paper purchasing cooperative.

Boston Building Materials Cooperative
The BBMC is a private, nonprofit consumer cooperative that takes good-quality used and surplus building materials and distributes them to low and moderate income homeowners, schools, nonprofit organizations, and churches. The value of materials donated to BBMC is tax-deductible.

MassRecycle.org and Earth911.org
These two websites provide information to people who want to recycle.

Institution Recycling Network
The network, based in Concord, New Hampshire, works to improve the financing and operations of recycling programs at New England institutions such as universities, hospitals, nursing homes, and private schools. Services provided to institutions include help in finding markets for recycled materials, arranging transportation, setting up "milk runs" for collection and marketing of small quantities of materials generated at several locations, assuring compliance with health and safety standards, and coordinating group purchases of recycling-related supplies and equipment. Their web link can be found at http://www.ir-network.com/

ACTIONS TO REDUCE GHG EMISSIONS FROM WASTE
Note: Actions are classified based on which sectors of the community would be directly involved:
B=Business community
G=City government
R=Residents

Proposed actions are listed by sector in Appendix III.

Strategy 1: Prevent Waste
The most effective way to reduce greenhouse gases from waste is to prevent the generation of waste in the first place. Not only are the impacts of disposal prevented, but the cost and impacts of producing and transporting products and transporting materials for recycling are also avoided.

Proposed Actions

Short-term
• Implement a waste prevention program for City government. [G]

Medium and Long-term
• Promote waste prevention measures in the commercial and industrial sector, after having implemented a waste prevention program in City government.
• Promote residential waste prevention. [B,G]

Strategy 2: Increase Recycling

The Commonwealth has raised the goal for recycling. To meet these goals, Marlborough—the City, businesses, and residents—will need to consider new initiatives to increase the rate of recycling.

Actions already taken: 2000-2007
• Since 2000, the Department of Public Works Recycling Program has provided curbside recycling, a drop-off recycling center, and distribution of recycling bins. Between 2000-2006, 11,787 tons of material was recycled.

Proposed Actions

Short-term
• Carry out projects to increase participation in existing recycling programs --such as Pay-As-You-Throw or Mandatory Recycling --using community-based social marketing techniques.
• The State has already adopted the Construction and Demolition (C&D) bans in 2003. As such, all C&D waste must be specially handled per state regulations and doesn't need additional Marlborough building permit requirements. [G]
• Carry out the enforcement of DEP waste bans
• Expand electronics recycling to include printers and other computer peripherals, as well as old phones, VCRs, stereos, TVs and other electronic equipment. [G,B]

Medium-term
• Conduct waste composition studies every year to develop information about which new portions of the waste stream to target for recycling or reduction and to evaluate the success of the current program. The study should examine the waste streams from residences, City government buildings, schools, and the commercial sector across all the seasons of the year. [G]

Long-term
• Develop a program to ensure that commercial waste paper is being recycled. Since many of Marlborough's businesses provide professional and business services, commercial waste paper is undoubtedly the largest portion of the commercial waste stream. The program should be based on a monitoring program and application of a Recycling Ordinance requirement. [G,B]
• Increase commercial food waste collection. This would help Marlborough businesses and institutions prepare for a state ban on food waste disposal that should go into effect soon under the Solid Waste Master Plan. Large institutions with food services have opportunities to efficiently divert food waste to composting facilities. [G,B]
• Conduct a thorough composition study of the residential waste stream to assess the feasibility of a residential food waste collection program. Picking up food waste, yard waste, and cardboard in the same packer trucks should be considered. [G]
• Develop a program to pick up used clothing for recycling at the curb. Used clothing can comprise up to 6% of the waste stream. Marlborough may benefit from more clothing dropoff sites. [G]

Strategy 3: Implement Environmentally Preferable Purchasing

Purchasing products with recycled content is essential to support a market for recycled waste material.

Actions already taken: 2000-2006
• City officials has green purchasing policies to buy paper and other products made from recycled materials.

Proposed Actions

Short-term
• Reevaluate the City's system for tracking recycled and non-recycled paper and plastic purchases to ensure accurate recording of the quantities purchased and set goals for increasing the percentage. Work with the school department to accomplish the same steps. [G]
• Work with stores to develop and use point-of-sale reminders to customers to purchase recycled products. [G, B]

SECTION 7 Implementation

The Need for an Implementation Process
This plan does not prescribe actions that specific stakeholders must implement. That would require additional research and much more community involvement. At this point all sectors of the community— City government, including individual agencies; businesses; industries; organizations; and individuals—need to become engaged in the process of making a commitment to carrying out the effort to reduce Marlborough's GHG emissions. For us to reach our 25% reduction target by 2020, all sectors of the community will need to embrace the goal and develop actions to attain it.

Developing a community consensus on the need to reduce GHG emissions and gaining active participation by stakeholders are feasible for the following reasons:

• Climate change will directly affect Marlborough.
• The actions needed to reduce the buildup of greenhouse gases have many additional benefits, including increased energy reliability and security, cost savings, cleaner air and water, and a higher quality of life.
• Opportunities exist for economic development and job creation.
• Many resources are already available to support actions that reduce GHG emissions.
• Actions to reduce GHG emissions are already taking place in Marlborough.

Environmental Justice Considerations
While opportunities to counter climate change abound, some may have different impacts on different social groups. To ensure equity and to sustain community support for the actions, it is important to be aware of unintended effects. For example, energy efficiency upgrades in a building may involve initial costs that are recouped over time. Lower-income households may not be able to afford to make the initial investment. To protect against inequitable outcomes, the implementation process should be inclusive and provide for genuine dialog. Reaching out to a wide segment of the community and conducting the process openly will foster better ideas, greater commitment, and more effective action. For example, identifying obstacles that low-income households face in implementing energy efficiency measures can and should lead to solutions.

Strategies
A community-wide outreach is a large undertaking. To be successful a campaign must be able to marshal resources and build community support. It makes sense to start with projects that have tangible goals and will generate positive results that can build upon one another. The elements of the implementation process should include the following:

• Use City leadership by example to help catalyze community action.
• Develop a citywide campaign that involves all sectors of the community, using community-based social marketing tools.
• Build on existing efforts in the community.
• Engage the schools.
• Network with other communities and organizations that are already successfully engaging in local climate protection campaigns to learn from their programs and experience.
• Monitor progress and report the results.
• Establish a committee or other entity to coordinate action.

Provide City Leadership
There are many opportunities for the City to reduce GHG emissions by improving the energy efficiency of its buildings and vehicle fleet, installing renewable energy or energy generation systems in the city, training staff to adopt more sustainable practices in the workplace, and reducing waste. By carrying out such actions and publicizing the results, the City can show that it is willing to do what it asks others to do.

It is difficult to conceive of an entity other than the City that could carry out a community-wide campaign. This plan does not suggest that the City be responsible for the entire effort, but it can act as an initiator, convener, and leader. Ultimately, it will be necessary for people in each sector of the community to take these roles.

Create a Citywide Campaign
All sectors of the community—the City, businesses, organizations, and individuals—will have to participate in this effort if it is to succeed. To reduce GHG emissions, all stakeholders will have to examine the practices that affect energy use, transportation, land use, and waste management and make changes.

Burlington, Vermont, with a population size similar to Marlborough's offers one potential model to use in motivating the entire community to get involved. Burlington's 10 Percent Challenge campaign asked everyone to pledge to reduce their emissions by 10% by 2005. The link to this program is at http://www.burlingtonelectric.com/SpecialTopics/climate.htm. The Alliance for Climate Action, a group of local stakeholder organizations, was formed to coordinate the campaign. The project includes a website on which people can report and track GHG reductions, assistance with identifying reduction opportunities, and a recognition program for participants. Marlborough, UK has a similar tool.

Community-based social marketing provides a model that has had promising results in achieving actual behavior change. It uses the results of social science research to promote behavior change. This research indicates that in general, providing information to people by itself does not affect behavior. Personal contact is required. Careful identification of barriers and benefits to change is the first step in the process. The next step is to select appropriate tools.

The tools, which are typically used in combination with one another, include:
• Commitment
• Prompts
• Norms
• Communication
• Incentives
• Removing external barriers

Once a campaign is developed, it is tested; the results are evaluated before a large-scale campaign is launched. Monitoring results is a key part of every CBSM project. *1

An individualized marketing program developed in Germany and based on similar principles, has successfully changed personal travel behavior through direct contact with households. The program which offers personalized travel information and incentives to use transit, walk, or bicycle, has had remarkable success in Europe and Australia. *2

*1. See Doug McKenzie-Mohr and William Smith, *Fostering Sustainable Behavior: An Introduction to*

Community-Based Social Marketing (Gabriola Island, BC, Canada: New Society Publishers, 1999) or www.cbsm.com.
*2. See www.sustrans.co.uk.

Build on Existing Efforts
Efforts already underway in Marlborough and the Greater Boston area can serve as the foundation for a community-wide climate protection campaign. These existing projects and activities offer ways to establish and build partnerships and to link stakeholders across different sectors.

Businesses
Many Marlborough businesses have an interest in environmental sustainability. A number of new developments are using green building designs, which will be highly energy efficient. New developments such as Renaissance Lofts have made commitments to environmental responsibility as evidenced in their local projects. These and other projects offer a model to other developers.

Businesses also have an inherent interest in energy efficiency. Efficiency upgrades reduce operating costs. While energy efficiency may not be the largest area of potential cost savings for some businesses, it is a cost-effective way for companies to demonstrate an environmental commitment. Companies such as Sepracor have made extensive energy efficiency upgrades throughout their facility.

Many businesses and institutions are members of the Transportation Management Association, through which they fund and support programs to reduce single occupancy vehicle trips.

The Faith Community
Many of the religious denominations in the United States have taken a position of concern about climate change and moral obligation for environmental stewardship. Some have undertaken action to express their faith. The Massachusetts Episcopal Diocese has formed Massachusetts Interfaith Power and Light (MIPL) to foster energy efficiency and support renewable energy among places of worship. MIPL has engaged Conservation Services Group (CSG), an energy services company, to provide energy audit services to congregations, plan for conservation investments, facilitate utility conservation program payments, plan for the purchase of renewable energy, develop a discount heating oil program, and provide a heating and cooling system maintenance plan. CSG will provide similar services to individual congregation members. The program is open to the entire Massachusetts faith community.

The Committee on Environment and Jewish Life (COEJL) actively works to promote more sustainable practices in synagogues and among their members. The Greater Boston Chapter of COEJL sponsored "Eight Days, Eight Actions" in 2001, which urged members to take an energy saving action on each day of Hanukkah to save energy and slow global climate change. COEJL also sponsors Jewish Ecoteams (based on the Global Action Plan process); partnered with Solar Boston to bring technical assistance on solar energy projects to the Jewish community; joined the Green Building Coalition, which is advocating a state green building tax credit; and organized a campaign to urge President Bush to deal with climate change.

The U.S. Council of Catholic Bishops issued a statement on June 15, 2001 called "Global Climate Change: A Plea for Dialogue, Prudence, and the Common Good," which calls for immediate action to mitigate the effects of global climate change. The bishops approved the statement unanimously.

Community Interest Groups
Green Marlborough is a citizen group that is part of the Massachusetts Climate Action Network (MCAN). In 2007, Green Marlborough organized events around energy and environmental education and supported municipal efforts in energy efficiency.

Network with Other Communities and Organizations
Currently Marlborough is one of 900 U.S. cities that have joined Cities for Climate Protection. More than 31 Massachusetts cities and towns belong to Cities for Climate Protection. Staff from many communities have formed an ad hoc group that meets bi-monthly to share information and collaborate on projects.

ICLEI organizes national and regional meetings and maintains a list serve. Through the City's association with ICLEI, staff are able to communicate with local government staff in other parts of the country and learn about environmental initiatives. ICLEI is also organizing a "twinning" project to build relationships between local governments in developed and developing countries. Participation in this project would provide a way for Marlborough to magnify its climate protection work.

Numerous organizations and agencies in the Boston area are working on climate change, including the Massachusetts Energy Consumers Alliance, Union of Concerned Scientists, Conservation Law Foundation, Northeast States Coordinating for Air Use Management (NESCAUM), and the Metropolitan Area Planning Commission. These organizations can provide technical assistance and opportunities to partner.

Monitor Progress
To sustain this effort, a program is needed to monitor trends in community-wide GHG emissions in the areas of energy, transportation, land, water, and waste. It is relatively easy to collect some community-wide data on an annual basis.

In addition, it is important to compile the results of actions taken. A reporting format could be used based on forms ICLEI has developed for local governments. The City could serve as a repository for these reports. With this information, the City could produce an annual report on trends and actions. The report would provide a way for stakeholders to put their actions into context and for the community to judge the effectiveness of the effort.

Establish a Coordinating Committee
A standing committee, appointed by the mayor or organized as a collaboration between the City and community stakeholders, will be important for carrying out the plan. A standing committee should include interested residents, people with technical expertise, and members of the business and institutional communities. The committee would provide a forum to discuss progress, advise on needed actions and changes in approach, assess progress, be a liaison with the community, and conduct outreach. Without such a committee, the effort would likely lose its focus. While carrying out the plan will be the responsibility of every segment of the community, the City has a key role. It can provide information, incentives and rewards; convene groups; initiate projects; and, by reducing its own GHG emissions, serve as a role model.

Staffing requirements include an Energy Program Manager to carry out community outreach and to monitor energy use and carry out energy efficiency projects related to City wide operations in all three sectors. The position is likely to pay for itself in direct and indirect savings to the City. Some funding for materials, for creating a campaign, and for special projects will also be needed.

PROPOSED IMPLEMENTATION ACTIONS

Outreach to Businesses and Institutions

• Develop a flyer for businesses listing the most important things they can do and distribute it widely. Feature brief descriptions of successful efforts by local businesses. Follow up with personal contact.
• Involve the largest employers by requesting voluntary pledges to take action through the EPA Energy Star Program or a local climate protection program. Develop technical assistance programs and information on financial assistance.
• Recognize local institutions' best practices on the City website and during Go Green events.
• Work with National Grid and NSTAR to develop an effective outreach to businesses and residents.
• Explore a City contract with an energy services company to facilitate services to commercial buildings.
• Develop a free or inexpensive consulting program for local businesses.
• Develop a pilot program focused on a representative block of small businesses to introduce more sustainable practices in waste management, energy efficiency, and transportation. The program would take advantage of opportunities for cooperation and economies of scale.

Outreach to City Departments

• Form a permanent staff committee to develop policies and action priorities for the City and to coordinate work.
• Do outreach to citizen regulatory boards.
• Develop City government policies to guide purchasing decisions, construction practices, waste management, vehicle use, and other activities with the aim of reducing energy use, vehicle miles traveled and fuel consumption, and waste disposal.
• Develop a mechanism to inform City employees about climate protection activities and resources and a recognition program for outstanding employee efforts.
• Work with the public schools to incorporate environmental principles into the curriculum at all levels and to develop student projects that help carry out some of the actions in the plan

APPENDICES

Appendix I

City of Marlborough

140 Main Street
Marlborough, Massachusetts 01752

PRESS RELEASE

For Immediate Release
Thursday, November 15th
3:00 PM
Mayors Conference Room
City Hall, Marlborough

Karen Kisty, Mayors Aide
508-460-3770
Priscilla Ryder
Conservation Officer
508-460-3768

Mayor Signs Pledge to Reduce Greenhouse Gas Emissions in Marlborough

"It is now widely accepted that greenhouse gas emissions are contributing to extreme climate change. Emissions are also having detrimental impact on our health, and as a nation, we are becoming increasingly aware of energy security, too. Therefore, as the Mayor of this City and understanding that the responsibility to control global climate change lies with each and every one of us, I have decided to join the more than 800+ cities world wide and join the 40 Massachusetts Communities such as Ayer, Belmont, Devens, Waltham and Worcester, in making sure that Marlborough is doing its part," Mayor Stevens stated. By signing this pledge the Mayor is making a commitment that going forward the City will focus on implementing energy and environmental changes to reduce the effects of greenhouse gas emissions throughout the City of Marlborough.

Jennifer Boudrie, a local resident and advocate, wrote the 2006 Energy and Environment Inventory for the city to benchmark energy consumption for the entire city. The report is now complete and is available today and will be the starting point for this new initiative. The inventory is available at http://www.greenmarlborough.org/2006INVENTORY.htm. The data represents overall municipal, residential, and commercial use of electricity, natural gas, oil and gasoline, and transportation. She calculated that in 2006 the entire city generated 900 million pounds of CO2 into our atmosphere.

The Mayor, by signing the pledge, will endorse the “U.S. Mayors Climate Protection Agreement” to ensure that the city will strive to meet goals such as ensure smart growth, open space preservation, improve transportation options that are cleaner and more efficient, make energy efficiency a priority in existing and new municipal buildings and encourage others to follow suit, maintain healthy urban forests, educate children, adults and businesses alike about the need to make personal choices to help reduce global warming pollution.

The Mayor will soon be announcing the Marlborough Energy and Environmental Taskforce whose task will be to:

- Set a greenhouse gas emissions reduction target;
- Develop an action plan with both existing and future actions which when implemented will meet the local greenhouse gas reduction target;
- Implement the action plan; and
- Monitor and report progress

Based on the inventory produced by Jennifer Boudrie, Marlborough has already implemented some energy saving features in city buildings, such as energy saving light bulbs, and has one Toyota Prius in its municipal fleet, which is a great start, but Marlborough has a long way to go.

“Over the course of writing the report I have come to the conclusion that our city has the talent, community support and interest in making a difference locally,” said Jennifer Boudrie, “today is the big step forward and I am proud of our Mayor for taking this very important pledge!”.

END # #

ENDORSING THE U.S. MAYORS CLIMATE PROTECTION AGREEMENT

WHEREAS, the U.S. Conference of Mayors has previously adopted strong policy resolutions calling for cities, communities and the federal government to take actions to reduce global warming pollution; and

WHEREAS, the Inter-Governmental Panel on Climate Change (IPCC), the international community's most respected assemblage of scientists, has found that climate disruption is a reality and that human activities are largely responsible for increasing concentrations of global warming pollution; and

WHEREAS, recent, well-documented impacts of climate disruption include average global sea level increases of four to eight inches during the 20th century; a 40 percent decline in Arctic sea-ice thickness; and nine of the ten hottest years on record occurring in the past decade; and

WHEREAS, climate disruption of the magnitude now predicted by the scientific community will cause extremely costly disruption of human and natural systems throughout the world including: increased risk of floods or droughts; sea-level rises that interact with coastal storms to erode beaches, inundate land, and damage structures; more frequent and extreme heat waves; more frequent and greater concentrations of smog; and

WHEREAS, on February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, went into effect in the 141 countries that have ratified it to date; 38 of those countries are now legally required to reduce greenhouse gas emissions on average 5.2 percent below 1990 levels by 2012; and

WHEREAS, the United States of America, with less than five percent of the world's population, is responsible for producing approximately 25 percent of the world's global warming pollutants; and

WHEREAS, the Kyoto Protocol emissions reduction target for the U.S. would have been 7 percent below 1990 levels by 2012; and

WHEREAS, many leading US companies that have adopted greenhouse gas reduction programs to demonstrate corporate social responsibility have also publicly expressed preference for the US to adopt precise and mandatory emissions targets and timetables as a means by which to remain competitive in the international marketplace, to mitigate financial risk and to promote sound investment decisions; and

WHEREAS, state and local governments throughout the United States are adopting emission reduction targets and programs and that this leadership is bipartisan, coming from Republican and Democratic governors and mayors alike; and

WHEREAS, many cities throughout the nation, both large and small, are reducing global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy technologies; and

WHEREAS, mayors from around the nation have signed the U.S. Mayors Climate Protection Agreement which, as amended at the 73rd Annual U.S. Conference of Mayors meeting, reads:

The U.S. Mayors Climate Protection Agreement

A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;

B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that includes 1) clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; and

C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as: 1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan. 2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities; 3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit; 4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology; 5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money; 6. Purchase only Energy Star equipment and appliances for City use; 7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system; 8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;
9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; 10. Increase recycling rates in City operations and in the community; 11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO2; and 12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

NOW, THEREFORE, BE IT RESOLVED that The U.S. Conference of Mayors endorses the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting and urges mayors from around the nation to join this effort.

BE IT FURTHER RESOLVED, The U.S. Conference of Mayors will work in conjunction with ICLEI-Local Governments for Sustainability (ICLEI) and other appropriate organizations to track progress and implementation of the U.S. Mayors Climate Protection Agreement as amended by the 73rd annual U.S. Conference of Mayors meeting.

BE IT FINALLY RESOLVED that the **City of Marlborough, MA** will work towards the five milestones to reduce both greenhouse gas and air pollution emissions throughout the community, and specifically:

- Conduct a greenhouse gas emissions inventory and forecast to determine the source and quantity of greenhouse gas emissions in the jurisdiction;
- Establish a Marlborough Energy and Environment Taskforce;
- Establish a greenhouse gas emissions reduction target;
- Develop an action plan with both existing and future actions which when implemented will meet the local greenhouse gas reduction target;
- Implement the action plan; and
- Monitor and report progress

Signed by:

Nancy E. Stevens
Mayor
November 15, 2007

Appendix II: Marlborough Energy and Environmental Task Force Purpose and Goals

The purpose and goals of the Marlborough Energy and Environmental Task Force were drafted at the outset.

- Acknowledge the affects that global warming, peak oil and energy use will have on the city's economy, physical infrastructure and community health
- Enable the city to identify these potential affects and take actions to reduce them
- Convene members from municipal, residential, business, energy and transportation sectors of Marlborough
- Review Marlborough Inventory and Sample Action Plans
- Set a Greenhouse Gas Reduction Target
- Provide informed input each month
- Draft Marlborough's Action Plan
- Focus on Municipal, Residential, Business, Transportation, Energy, and Sustainability
- Present findings to mayor, city council, public
- Recommend/Invite Task Force II Participants for Implementation

Climate Protection Task Force Guiding Principles

The work of the Marlborough Energy and Environmental Taskforce is conducted under a set of guiding principles. These principles are adopted from the Marlborough Action Plan guidelines which were drafted at the outset of the Task Force's work. The Principles serve three main functions:

1) ***Common framework***—as a common framework within which the Task Force and each of its subcommittees conducts their work;
2) ***Linkage to other community goals and efforts***—as an imperative for the Task Force to link any proposed action to reduce the city's greenhouse gas emissions with other goals and strategies previously identified to maintain and enhance the quality of life in Marlborough; and
3) ***Guide for readers***—as a guide for the readers of the action plan to better understand the choices, preferences and priorities given to various actions and strategies from among a broader set of possible choices.

Reduce Greenhouse Gas Emissions and Fossil Fuel Use

1. ***Create immediate results***—To begin reducing greenhouse gas (GHG) emissions quickly, give priority actions likely to yield the most immediate results. By harvesting the "low-hanging fruit" first, the community and its various sectors can begin to achieve successes and build a foundation for more complex actions.
2. ***Biggest polluters first***—To achieve the greatest reductions, sectors and actions producing the greatest amount of GHG shall be given priority when examining reduction opportunities for the community.
3. ***Short-term feasibility***—To increase the acceptability and to facilitate the implementation of measures, those actions with the greatest short-term feasibility shall be given priority without diminishing the need to pursue measures that require long-term effort.
4. ***Public-private partnerships***—Public-private partnerships shall be sought to accomplish emission reduction goals wherever possible and useful.
5. ***Wider application of best practices***—In other communities, including ICLEI participants, a range of "best practices" are already being implemented that reduce greenhouse gas emissions. These best practices, measures and programs shall be adapted for Marlborough wherever feasible. Existing best

practices in Marlborough which provide greenhouse gas reduction benefits shall be assessed for broader application.
6. ***Incentive-based approaches***—To increase the feasibility, acceptability, and adoption of proposed actions, incentive-based approaches shall be given preference over rule-based approaches (including possible changes to the city building code, zoning ordinance, land use plan, etc.); although neither approach shall be excluded from consideration.
7. ***Assurance of accountability***—To assure implementation of measures, actions that can be monitored and accounted for shall be given preference. Suggested actions and strategies should include a specification of indicators or measures of success to facilitate accountability.
8. ***Behavior change***—To truly reduce Marlborough's total GHG emissions, everyone in the community needs to be involved in the emission reduction effort. Awareness raising and education that every person's behavior has an impact shall be integral to the suite of proposed actions.

Strive for equitable outcomes

1. ***Affordability***—To improve the political and financial feasibility of measures, proposed actions shall be examined as to their economic affordability across sectors and socioeconomic classes. Costs and benefits for various sectors/parties/individuals shall be quantified to the extent possible.
2. ***Reduce social disparities***—To avoid creation or enhancement of inequity throughout our community, actions likely to reduce existing social disparities shall be given preference. At the very least, no proposed action shall entrench social inequities further.

Create and assure multiple benefits

1. ***Quality of life***—To increase the acceptability of proposed measures, actions enhancing the quality of life in Marlborough shall be given preference.
2. ***Avoid negative environmental consequences***—To avoid or hedge against unintended consequences, any proposed action shall be examined for potential negative environmental consequences. The Task Force will seek to achieve multiple environmental goals (e.g., air quality enhancement, water conservation, water quality improvement, habitat creation, waste reduction).
3. ***Avoid negative social consequences***—To avoid unintended social consequences, any proposed action shall be examined for potential negative social, cultural, or aesthetic consequences, and preferably achieve multiple social goals (e.g., improve neighborhood image, produce public meeting places, assure public safety and health).
4. ***Enhanced coping ability***—Based on the scientifically supported understanding that some climate change is inevitable even if worldwide GHG emissions were to be reduced immediately, the actions proposed to mitigate climate change (i.e., reduce GHG emissions) should be examined as to their feasibility under changed climate conditions. Those actions that also provide benefits in light of adaptation (coping with climate changes), shall be given preference. Mitigation actions taken should not hinder the city's ability to cope with future climate changes.
5. ***Sustainable development and growth***—The Task Force aims to promote environmentally and socially sustainable development, and thus, to redefine the meaning of development and growth for Marlborough.

Engage in a participatory process

1. ***Stakeholder involvement***—Experience shows that programs built on a broad base of supporters are more successful than exclusively top-down approaches. To begin building this broad support, the Task Force and its subcommittees will involve stakeholders, i.e., key leaders from the community, key players in various sectors/industries, and all city departments, in its work.

2. ***Community-wide implementation***—The implementation of the action plan should involve the entire community. The reduction of GHG emissions should become a community-wide project integral to everything else the city and its residents do.
3. ***Diversity***—During the planning and implementation processes, all members of the community shall be engaged to assure participation from people of different faiths, race, lifestyle, gender, class etc.
4. ***Building on strengths***—Bank on the institutional and professional strengths and skills available throughout the community (e.g., existing neighborhood groups, churches etc.).

Nourish and leverage leadership

1. ***Promotion of individual leaders***—The Task Force understands that leadership is critical to achieving its goals. Existing programs and actions producing GHG emission reductions and the people who initiate or execute them shall be championed as models to the community, and wherever the potential exists, novel leadership shall be promoted in the action plan.
2. ***Opportunities and constraints assessment***—The Task Force will look beyond the boundaries of the City for opportunities and constraints on the action plan (e.g., in state or federal programs and legislation). All actions should be strategically examined in the broader context of programs or institutions that may affect their adoption.
3. ***Become a model community***—Through the combined efforts of this Task Force, Marlborough's community leaders and its residents, we strive to make Marlborough a model community and leader on GHG reductions and sustainable, livable community design in the state.

Develop a long-term commitment

1. ***Recognition of long-term problem***—Climate change is a long-term global problem and cannot be solved by one community alone, nor through any short-term action plan. The nature of the problem demands a longterm commitment on behalf of the city government, the business community, educational institutions, and individuals.
2. ***Adaptive, learning-oriented approach***—Measures and actions to be adopted should be designed in such a way to be flexible and adaptable as new knowledge, needs or opportunities arise. An explicitly adaptive and learning-oriented process (which includes periodic review of outcomes and adjustments if necessary) will increase the likelihood that problems are identified in the early stages, and appropriate changes are made in a timely and effective manner. An adaptive approach also helps to address unforeseen and unintended consequences, should they manifest at some point.
3. ***Commitment of city leaders and departments***—The community leadership and city departments will be most effective as leaders and models to the rest of the community, if they commit through words and actions to a long-term engagement on the climate problem. GHG emission abatement should become a normal consideration in all of the community's decisions and operations.
4. ***Commitment of educational institutions***—To build support for climate mitigation actions, the City's diverse educational institutions have a special responsibility to facilitate a greater understanding for the complex impacts our everyday activities have on the local and global environment. Programs and actions that promote education at all levels about climate change and its connections to other environmental challenges and community activities shall be promoted through this action plan.
5. ***Public outreach and constituency building***—While it is beyond the scope and abilities of the Task Force to launch a major public relations campaign in support of the city's commitment to climate mitigation, some public outreach and constituency building during and after the work of the Task Force on issues related to climate change and sustainable development is essential. The development of the action plan, as well as its acceptability once finished, is likely to be much enhanced through some degree of public involvement.

Appendix III

Actions Already Taken

At the first MEET meeting in January 2008, members listed things that have been accomplished in Marlborough:

Residential

1. Green Marlborough was created to educate the public and publicize events. See their web site at www. Greenmarlborough . org
2. Green Marlborough has a local TV show
3. The CDC committee does monthly cleanups and is building community
4. Green Marlborough is promoting environmentally friendly practices: using Energy-saving lightbulbs (CFLs) and reusable shopping bags, Low Carbon Diet residential groups, the annual Earth Day Fair.

Municipal

1. Marlborough is thinking about getting a MWRA grant that would provide a water audit to help identify uses and direct education to change uses
2. The Waste Water Treatment plants are upgrading many of the old motors and electric items to more energy efficient items with the help of National Grid. They are also exploring renewable energy systems to be used at the plants, including exploring the reuse of restaurant grease for fuel (solving two problems with one solution).
3. The High School is looking into getting solar panels with the help of Green Marlborough
4. $200,000 has been requested in the city's capital budget for energy efficiency projects.
5. A DEP grant was awarded to change traffic lights to LED lights for more energy efficiency. The lights were changed to LEDs in June 2008.
6. There was a larger list but these are the highlights.

Business/Industrial/Energy/Utilities/Transportation

1. National Grid – has an energy efficiency program that is available to residents, businesses, and municipalities. This taskforce may help spur more involvement.
2. Transportation- There is a lot of discussion on the state and regional level about transportation improvements, but one of the items that has been pointed out is that good efficient transportation follows good zoning choices that make public transportation more effective. Limited Impact Developments which include clustering business and residential sectors can then lead to better transportation options. The regional planning agency has been working on this over the years, and there are some recommendations that might fit well into this action plan.
3. Energy Use – The city as a whole needs to look at more long-term procurement and renewable energy options for electricity supplies.

Business Sustainability Efforts
Rohm and Haas, a 1000-employee company in Marlborough

2008-2009 Goal
Reduce greenhouse emissions by 1 million pounds

Energy
Started programs to hand out CFL lightbulbs and let employees borrow Kill-a-watt meters
Have a quarterly energy fair in the lunch cafe to show ways to save
Installed solar panel system on ATC building which has produced 8,411 kwh of electricity saving 14,250 lb of CO2

Recycling
Current recycling rate up to 62%

- Recycling cardboard, metal, plastic across all divisions
- Reusing packing materials from received goods
- Placing recycling bins by all desks and conference rooms

Water
Installed closed system chilled water supply for R&D and reduced water usage by 5%

Appendix IV

The 2008 Action Plan

The purpose of the action plan is to articulate steps that would benefit the city.

The Action Plan includes three sectors:

- Municipal
- Business
- Residential

Each sector includes six categories:

- Energy
- Water
- Land Use
- Transportation
- Waste
- Purchasing/Pollution prevention

Actions across all sectors include:

Communication
Coordinate groups to share ideas
Make information available to all municipal, residential and business sectors
Connect key people who can move projects ahead

Education
All internal and public media
Topics: Energy, Water, Land Use, Transportation, Waste, Purchasing/Pollution prevention

Eco-Economic Development
Job creation and job training
Energy managers, auditors
Plumbers, Electricians
Water and energy-efficient installations
Renewable Energy
Organic/sustainable products
Waste management

Attract green R&D, manufacturing, construction, developers, real estate

Resources: Education and Training, Green Contractors/Vendors, Incentives

Municipal

Energy

Action	Status	Benefits	Co-Benefits
- Meet criteria for the Massachusetts Green Communities program (See Appendix V) -Apply for Green Community participation in 2009 - For information go to www.mass.gov/doer Click on " Upcoming Green Communities-related Events " Click on appropriate headings	Proposed	Collaborate with state departments to achieve local goals	
-Hire an Energy Manager to track energy use or a Sustainability Director to plan and implement sustainable practices. -Identify where we are now and where we want to go to set short and long term goals to track energy use in city buildings and the city fleet. -Conduct annual reviews to update data and gauge progress.	Proposed In Progress In Progress	Analyze city energy use to identify potential energy savings	Boost local, green economy Reduce air pollution
Provide outreach/training/tools to municipal employees, both on recycling and energy reduction	In Progress	Reduce waste	Education, Reduce waste
Provide resources to teachers for curriculum that includes recycling and energy efficiency			
Replace city-owned traffic lights with LEDs which are 90% more efficient. $12K DEP grant rec'd 2/08.	Completed	Save $30,000 a year in electricity costs	Reduce maintenance time required
Organize an Energy and Environmental Task Force to review Action Plan and encourage cross-pollination of ideas and actions from residential, business, municipal, energy, and transportation sectors	In Progress	Reduce city-wide energy and environmental costs	Build leadership
Organize "green teams" within city departments to promote sustainable actions. Fire Department doing a good job.	Proposed	Energy $avings	
Publicize energy efficiency and green energy choices on aggregation website and in municipal aggregate electric bills. Brian Murphy	Proposed	Reduce GHG emissions	Educates the public
Promote ESCOs (Energy Service Companies) and performance contracting with local vendors to improve energy efficiency and reduce obstacles caused by up front capital costs.	In Progress	Reduce energy costs and improve facilities	
Assess condition of current city buildings and seek energy star status	Proposed	Energy $avings	Become a role model
Purchase green electricity	Proposed	Reduce pollution	
Pursue solar energy and other renewable energy installations on city buildings	In Progress 2kw solar	Save energy, reduce pollution	Public education
Integrate extensive energy efficiency upgrades and renewable energy into city planning (e.g. wastewater treatment plant design plans)	In progress	Energy $avings, Pollution prevention	
Use LEED guidelines for all new municipal building construction and renovations	Proposed	Reduce longterm energy costs	Healthier buildings

Investigate water conservation measures and retrofit with low-flow devices in all municipal buildings	In progress	Reduce water and wastewater costs	Conserve precious water
Reduce hot water temperature to 120 degrees F	Proposed	Save energy	Health

Municipal

Water

Action	Status	Benefits	Co-Benefits
Install water meters on all municipal buildings	Proposed	Ability to monitor water use	Measure savings
Monitor water bills annually when the meters are installed and the policy is implemented	Proposed	Helps identify areas for savings	Good habits
Conduct annual water audits in all municipal buildings. Check all plumbing fixtures for leaks. Replace fixtures (faucet aerators, toilets, shower heads, spray nozzles) with low-flow devices	Proposed	Reduce city water and wastewater costs Energy $avings	Conserve precious water during droughts
Provide free water-saving kits to residents. This needs to be promoted more.	In progress	Water and Wastewater Energy $avings	Good habits
Educate residents about watershed and storm water drainage	In progress	Preserve health of water supply	Reduce costs associated with pollution
Conduct annual cleanups	Done annually	Reduce pollution	Improve aesthetics
Educate businesses about water conservation	Proposed	Water and wastewater $avings	Build community relations with business
Educate businesses about wastewater reduction. Ask them to reduce chemicals (e.g. soap phosphates) and to seek non-toxic alternatives. Check with Roland G.	Proposed	Wastewater $avings	Pollution prevention
Organize stream teams to monitor health of neighborhood watersheds and streams pouring into local reservoirs	In Progress	Educate public about watershed protection	Pollution prevention Good habits

Municipal

Land Use

Action	Status	Benefits	Co-Benefits
Change zoning to include pedestrian-scale mixed-use development with residential. Aim for urban density near public transportation. Approach the planning board.	Proposed	Reduce transportation energy and environmental costs	Reduce traffic burden Improve routes /connectivity in the city
Request/require LEED guidelines be used on all new developments /renovations in the city. Check with Building Inspector.	Proposed	Energy $avings Healthy building	Good habits
Create green standards and green building practices for renovating municipal properties.	Proposed	Energy Savings Healthy building	
Conduct open space reviews that require open space in project designs.	Proposed	Improve air quality	Increase community aesthetics
Create additional public green space and plant trees as part of new renovations/developments.	Proposed	Improve air quality	Increase community aesthetics
Limit/Expand development to green development only.	Proposed	Future $avings Future health benefits	
Promote farmers market	Proposed	Protects open space Healthy food	Longterm sustainability
Work with conservation commission to save Marlborough's last farm	Proposed	Protect local sustainability	Reduce impact on city infrastructure
Implement municipal "green codes" --see Worcester, Boston, other cities for example. Look into this with Building Inspector.	Proposed	Provide easy guidelines	Longterm sustainability
Approve wind turbine zoning/ordinance	Proposed	Promote clean energy	Reduce pollution

Municipal

Transportation

Action	Status	Benefits	Co-Benefits
Employ a green city fleet policy to require hybrids and alternative fuel purchases.	Proposed	Reduce gasoline costs	Reduce pollution
Support a "Walking Bus" health and wellness program for school children	In progress	Improve health, reduce pollution	Improve walking routes
Extend bicycle paths in the city to connect ARRT, neighborhoods and workplaces.	Proposed	Reduce GHG emissions	Improve health
Create bicycle lanes on Route 20 and city roadways	Proposed	Reduce GHG emissions	Improve health
Maintain and create major pedestrian walkways. Ensure they are well-marked, clean, and safe. Plant trees to improve aesthetics and provide shade for walkers.	Proposed	Reduce GHG emissions	Improve health, air quality
Look into expanding public bus and train options and associated parking to reduce traffic. Extend shuttle to nearest train station.	Proposed	Reduce GHG emissions	Reduce traffic congestion
Promote education on driving and maintaining public vehicles to reduce emissions. Include information about personal health and environmental benefits.	Proposed	An educated public is more likely to make the right choice	Creates good lines of communication
Offer incentives to municipal employees who use hybrids and alternative transportation.	Proposed	Reduces energy and enviro costs	Sets a good example
Install emission controls on city trucks and construction vehicles.	Proposed	Reduce air pollution	Reduces noise pollution
Implement no idling policy. Retrofit municipal vehicles to ban idling. Enforce anti-idling measures. Especially by schools.	Proposed	Improve health of students, employees	Prevent pollution
Ask for federal and state public transportation funding for local public transit	Proposed	Reduce burden on city	Prevent pollution
Coordinate public transportation options with surrounding communities and MAPC	Proposed	Reduces time and costs for city	
Reserve garage and public parking spaces for hybrids.	Proposed	Public reward for energy efficiency	
Ask federal and state officials to ban large trucks on roadways except for limited access highways.	Proposed	Reduce pollution	
Change excise tax to benefit high mpg and low mileage vehicles.	Proposed	Reduce air pollution	
Create vanpools (Federal tax benefits)	Proposed	Reduce pollution	
Modify traffic signals (short cycles or blinking during non-rush hours)	Proposed	Reduce traffic congestion	Reduce idling, pollution
Make Main Street/Granger Blvd one way (Reduce traffic lights, fewer left-hand turns, reduce idling. Increase parking on north side, possibly on Granger Blvd.)	Proposed	Reduce traffic congestion	Reduce idling, pollution Improve health
Mixed zoning/New town center	Proposed	Reduce traffic	Reduce pollution

Add commuter rail (Industrial park rail line)	Proposed	Save time	Reduce pollution
Add shuttle service to Southborough station	Proposed	"	"
Support, promote, expand RTA service	Proposed	Save energy	"
Install smart traffic signals (GPS controlled)	Proposed	"	"
Control access to major highways to avoid highway breakdown	Proposed	"	"
Expand freight rail. Avoid 8,000 trail trucks/day on Mass Pike and Routes 290/495	Proposed	"	" Improve safety
Increase capacity of Worcester to Boston rail line. Connect industrial park to rail stations at Southborough and Westborough.	Proposed	"	"

Municipal

Waste

Action	Status	Benefits	Co-Benefits
Implement waste prevention in all departments.	In progress	Reduce recycling costs	Leadership
Educate employees about recycling: What and when, needs/benefits	In progress	Empowers good actions	Good habits
Provide recycle bins (paper, plastic) in all departments. Establish pickup schedule.	In progress	Creates infrastructure	
Increase recycling program through Mandatory or Pay-As-You-Throw (PAYT) program	Proposed	Save money	Save energy
Enforce waste bans (no paper in trash)	Proposed	Save money	Save energy Pollution prevention
Conduct audits to ensure proper waste and recycling practices.	Proposed	Measure progress	
Create commercial recycling program that follows commercial recycling ordinances.	Proposed	Obeys the city laws	
Institute green purchasing policy for all departments. Buy products made from recycled products, e.g. recycled paper, recycled toner cartridges…	Proposed	Reduce pollution	Reduce waste

Municipal

Purchasing/Pollution prevention

Action	Status	Benefits	Co-Benefits
Purchase fuel efficient vehicles only	Proposed	Reduce pollution	
Purchase energy star or energy efficient appliances only	Proposed	Energy $avings	Reduce pollution
Purchase biodiesel and retrofit vehicles as needed (consult with Steve Russell, Keene NH and Ed Burke of Burke Oil who are longtime experts on biodiesel)	Proposed	Reduce pollution	
Purchase office supplies with recycled content (paper, plastic, toner cartridges)	Proposed	Increase use of recycled products	Pollution prevention
Purchase green cleaning chemicals only; require contractors to use green cleaning chemicals only	Proposed	Reduce indoor pollution	Improve health
Remove toxic chemicals from schools (see DEP grant opp for support) and all other municipal buildings	Proposed	Reduce indoor pollution	Improve student and employee health
Purchase organic landscaping chemicals	Proposed	Reduce pollution	Improve health

Business

Energy

Action	Status	Benefits	Co-Benefits
Create Marlborough business group to share transportation and building solutions	Proposed	Reduce traffic jams Reduce air pollution	Invest in social capital
Promote annual energy audits, energy efficiency programs, and incentives	Proposed	Energy $avings	Build relations with providers
Use benchmarking to decide where to allocate resources for energy efficiency	Proposed	Knowledge, planning tool, measures progress	Educates users
Reach out to largest businesses to participate in voluntary benchmarking program	Proposed	Energy $avings	Builds community relations
Promote utility rebates/incentives	Proposed	Energy $avings	Education
Hire energy manager or sustainability director.	Proposed	Energy $avings	
Train staff about reduced- waste practices.	Proposed	Energy $avings	
Provide business with self checklist for energy conservation	Proposed	Energy $avings	
Pursue funding through Renewable Energy Trust for renewable energy installation.	Proposed	Consumer education	
Calculate carbon footprints for: Energy, Waste, Water, and Transportation	Proposed	Knowledge, planning, measure progress	
Create green business organizations	Proposed	Builds community	Creates solutions
Find ways to reduce server energy use	Proposed	Energy $avings	
Use LEED building guidelines	Proposed	Longterm $avings	Healthy building
Start green teams or Low Carbon Diet groups in each department.	Proposed	Educate consumers	$avings Builds community
Create educational forum for developers, contractors, real estate professional on energy-efficient building	Proposed	Educate the workforce	Better building practices
Provide list of approved local ESCOs for retrofits	Proposed	Educate the consumer	Energy $avings

Business

Water

Action	Status	Benefits	Co-Benefits

Inventory and monitor water bills	Proposed	Knowledge, Planning, measures progress	Educates consumer
Conduct an annual water audit. Check for and fix leaks on all plumbing fixtures. Retrofit fixtures with low flow (faucet aerators 1.5gpm, toilets 1.1-1.6gpf, 0-1gpf urinals, hose nozzles, shower heads 2.5gpm)	Proposed	Reduce energy use at wastewater treatment plants Conserves water	
Plant low-maintenance landscapes with native, drought resistant plants that require no watering	Proposed	$avings	Healthier

Business

Land

Action	Status	Benefits	Co-Benefits
Plant trees	Proposed	Reduce need for electricity and A/C	Improve air quality
Plant low maintenance landscapes with native, drought resistant plants that require no watering	Proposed	$avings	Increase air and water quality
Plant trees in parking lots	Proposed	Reduce heat island effect in parking lots	Increase air quality

Business

Transportation

Action	Status	Benefits	Co-Benefits
Promote TDM (Travel Demand Management)	Proposed	Reduce pollution $avings	Ease traffic flow
Request walking and biking opportunities on city roadways for local employees commuting to work.	Proposed	Reduce traffic Improve health	
Request public transportation in the city.	Proposed	“	
Promote transportation options at work (public transportation, carpool incentives…)	Proposed	“	
Provide special hybrid and carpool parking spaces	Proposed	Promote transportation alternatives	
Create a community business transportation group to discuss better transportation choices	Proposed	Build leadership to create solutions	
Encourage telecommuting to reduce travel	Proposed	Saves time, money, reduces traffic flow	

Plant trees in parking lots	Proposed	Reduces heat island affect of parking lot	Improve air quality
Adopt a no-idling policy for all company vehicles and all employee vehicles at work. Retrofit company vehicles with no/low idling devices	Proposed	Reduce pollution	
Analyze upstream and downstream transportation costs of products purchased or made/distributed. Make/create choices that reduce transportation energy costs.	Proposed	Energy $avings	Supports local economy when buying locally made products
Employ a Employee Transportation Coordinator to help employees	Proposed	Employee/Energy savings	Employee retention
Provide transit schedules, commuter choices, free services	Proposed	Employee/Energy savings	Employee retention
Offer telecommuting opps	Proposed	"	"
Hire locally	Proposed	"	"
Help staff find local housing	Proposed	"	"

Business

Waste

Action	Status	Benefits	Co-Benefits
Promote and implement company waste prevention and recycling measures	Proposed	Pollution prevention	
Implement green purchasing policies	Proposed	Pollution prevention	
Adopt a commercial recycling program	Proposed	$avings	Good habits

Business

Purchasing/Pollution prevention

Action	Status	Benefits	Co-Benefits
Purchase "green" materials/products (non-toxic chemicals, locally-made products to reduce transportation burden, products made of recycled or renewable materials…)	Proposed	Pollution reduction	Improved health Builds green economy
Make green products and offer green services to prevent pollution	Proposed	Pollution reduction	
Ask vendors for green products/services	Proposed	Builds green economy	
Make a list of green vendors	Proposed	Builds green economy	
Look into EPP…green purchasing practices	Proposed	Pollution prevention Builds green economy	
Actively seek a downtown "green store"		Improves local access to sustainable choices	

Residents

Energy

Action	Status	Benefits	Co-Benefits
Coordinate "Low Carbon Diet" groups to reduce GHG emissions. (Residents, churches, orgs)	In progress	Educates public $avings	Builds community
Promote green power purchasing through Green Start (National Grid) or New England Wind Fund (Colonial Power Group) through electric bill.	Proposed	Clean energy Long term solution	Educates consumer
Promote www.MassSave.com and free energy audits	In progress	$avings	Educates consumer
Promote home renewable energy incentives	Proposed	Longterm solution	Educates consumer
Ask for LEED standards of all new residential construction	In progress	Long term solution	Healthier building
Offer information on energy rebates on city and GM websites	Proposed	Educate consumer	
Provide educational forums for residents: library, church groups	In progress	Educates, Builds community	
Provide support for apartment and condo owners on energy audit opps and incentives	Proposed	$avings	
Promote Solar Hot Water Systems	Proposed	$avings	

Residents

Water

Action	Status	Benefits	Co-Benefits
Ask volunteers to join Stream Team to monitor neighborhood watersheds and stream health	In progress	Healthy Community	Builds community
Provide water conservation education to all residents	Proposed	Educates public	Reduce waste
Ask garden club to provide landscaping tips to reduce water use (drought-resistant plants, rain barrels …)	Proposed	Engages community	"
Educate residents to do annual water audits	Proposed	$avings	"
Ask residents to check all plumbing fixtures for leaks	Proposed	$avings	"
Ask residents to install water-saving devices (free from MWRA and DPW)	Proposed	$avings	"

Ask residents to install "Water Sense" and Energy Star appliances	Proposed	$avings	"
Conduct a reusable water bottle campaign	Proposed	Education	"
Create a TV show on water conservation	Proposed	Education	"
Stop washing cars in driveways with hoses. Use a bucket or go to a car wash.	Proposed	Conserve precious water	Reduce pollution in streams. Improve quality of drinking water.

Residents

Land

Action	Status	Benefits	Co-Benefits
Ask for open space protection of existing undeveloped properties.	Proposed	Healthier Community	Longterm $avings
Promote healthy landscaping: -organic landscaping -water conservation -composting -native, drought resistant plants -shade trees	Proposed	Educate residents	Longterm Savings Healthier Home, Community
Promote low impact lawn equipment	Proposed	Air pollution prevention	
Plant trees	Proposed	Improve air quality	
Adopt a space	Proposed	Community building	Aesthetics
Create community gardens	Proposed	Community building	Local food production
Conduct community cleanups	In Progress	Improved aesthetics	Pollution prevention

Residents

Transportation

Action	Status	Benefits	Co-Benefits
Ask for public transportation options (buses and trains), bus stops with schedules, and adequate parking.	Proposed	Energy $avings Traffic reduction Pollution prevention	
Promote bus schedules	Proposed	"	
Ask for low-emission busses	Proposed	"	
Ask for bike lanes and bike paths.	Proposed	"	
Develop a GoLoCo and other organized local carpooling groups	Proposed	"	
Ask for safe walking and bicycling crosswalks, sidewalks, and bike lanes	Proposed	"	
www.fhwa.dot.gov/TEA21/sumenvir.htm	Proposed	"	
Support condo/apt owners and coordinate alternate/public transportation options	Proposed	"	
Educate about basic energy efficiency for	Proposed		Educate consumer

current car			
Encourage buying a hybrid next	Proposed		Long term solution
Ask for lower excise tax for hybrids and low mpg vehicles	Proposed	"	
Walking bus for school children	In Progress	"	
Look into Zip Car option	Proposed	"	
Create bike lanes	Proposed	"	
Look at Walk Boston models – ways to reduce vehicle miles traveled	Proposed Proposed	"	

Residents

Waste

Action	Status	Benefits	Co-Benefits
Educate residents about how to recycle and its benefits	In progress	$avings	Good longterm practices
Work with recycling committee to increase recycling rates	In progress	$avings	Pollution prevention
Work with local stores to promote reusable bags	Proposed	"	Pollution Prevention
Conduct a Junk Mail reduction campaign	Proposed	"	"
Provide recycling support to apartment/condo owners	Proposed	"	"
Get/make compost bins for backyards	Proposed	"	"
Advocate for bottle bill to recycle water bottles		"	"
Continue Community clean ups			" , Builds community
Ask for littering fines and DEP grant for littering hot spots		"	"
Promote FreeCycle, green material, and green design materials for residents (Media, website…)	Proposed	"	" , Educates consumers,

Residential

Purchasing/Pollution prevention

Action	Status	Benefits	Co-Benefits
Purchase from local business owners to protect local economy, promote community and enviro-sustainability	Proposed	Economic Environmental Social	Community building
Create green home webpage to provide resources to homeowners and homebuyers (Example: Stores: Pure Home in Holliston, Green Source in Braintree; Look for MDCD and USB certified products; engage real estate in	Proposed	Educate consumer	Green economy

energy efficiency and green renovation promotion)			
Purchase “green” materials/products (non-toxic chemicals, locally made to reduce transportation burden, made of recycled or renewable materials…) to reduce pollution	Proposed	Pollution prevention	
Read the label….is it local? Organic?	Proposed	Educate consumer	Green, local economy
Ask stores for green products/services	Proposed	Educate consumer / bus.	Green economy

Appendix V

JBoudrie NOTE: This excellent summary is by Rob Garrity, President of MCAN, February 2009

Green Communities Act Summary

Purpose of the Legislation: The Green Communities Act (GCA) is intended to hold down electricity costs, promote the development of renewable energy, and stimulate the clean energy industry in Massachusetts.

Overview of the Act

- The GCA was passed in July 2008 by the Massachusetts Legislature.
- The official title of the GCA is "Chapter 169 of the Acts of 2008: An Act Relative to Green Communities."
- The requirements of the GCA fall into two main categories: energy efficiency and the development of renewable energy.
    - By 2020, at least 25% of the Commonwealth's electric load is to be met with demand-side resources
    - By 2020, at least 20% of the Commonwealth's electric load is to be met through new, renewable and alternative energy generation
    - By 2020, achieve 10% reduction (from 2007 levels) in the use of fossil fuel in buildings, through increased efficiency of both equipment and building envelopes
    - By 2017, achieve 10% reduction in total energy consumption in the Commonwealth.

Energy efficiency

- Energy supply will have to compete with energy efficiency in utility company procurement. Utility companies (NSTAR, National Grid, Western Mass. Electric, etc.) will have to *first* make all available energy efficiency improvements that cost less than generating new power, ultimately saving money on consumers' electricity bills. Utility companies will offer rebates and other incentives for customers to upgrade lighting, air conditioning, and industrial equipment to more efficient models, whenever those incentives cost less than generating the electricity it would take to power their older, less-efficient equipment.
- Customers who take advantage of these incentives will save money as they reduce how much energy they use. The incentives will encourage more efficient energy use, lowering the overall demand on the system and reducing greenhouse gas emissions.

*Renewable energy***:**

- The law requires utility companies to enter into 10- to 15-year contracts with renewable energy developers to help them obtain financing to build their projects. The agreements will target Massachusetts-based projects.
- The law also makes it easier for organizations and individuals to develop renewable resources and sell their excess electricity into the grid ("net-metering") at favorable rates, for installations of up to 2 megawatts (up from 60 kilowatts currently).
- The law streamlines the permitting process for building renewable and alternative energy generating facilities.
- The law enables utility companies to own solar electric installations – a practice that was previously prohibited – up to 50 MW apiece after two years.

- The law also requires the State Board of Building Regulations and Standards to adopt, (as its minimum standard) the latest edition of the International Energy Conservation Code as part of the State Building Code. This will keep Massachusetts building standards at the highest international levels of energy efficiency.
- The law doubles the rate of increase in the Renewable Portfolio Standard from 0.5 percent per year to 1 percent per year, with no cap. As a result, utilities and other electricity suppliers will be required to obtain renewable power equal to 4 percent of sales in 2009 – rising to 15 percent in 2020 and 25 percent in 2030, and more thereafter.

Other:

- All Regional Greenhouse Gas Initiative permits must be sold at auction; none can be given away for free.
- Information about benefits of home energy audits must be given to buyers of single-family and small multiunit homes at the time of closing.

Key Features of the Law for MCAN Local Groups

- The Green Communities Division will provide tools to help cities and towns take advantage of the new law, including:
    - Access to the online and powerful Energy Information Report System, which benchmarks the energy performance of all municipal buildings, street lights, and vehicles.
    - Access to auditors to help municipalities benchmark buildings, conduct energy audits, and recommend energy efficiency measures and estimated savings that will be generated.
    - Help in setting up Energy Management Services contracts, which can help implement energy efficiency and conservation programs, which are paid for with guaranteed savings, thus avoiding upfront costs.
    - Technical assistance, including training for facilities managers
    - Grants and loans for energy efficiency projects (up to $10 million/year).

Preliminary Guidelines for Green Community Act Qualification

Overview

- Tracks legislation faithfully
- Qualification awarded via a point system
- Allows for *alternatives* to criteria, not complete waivers of provisions
- Bonus points available for regionalization and other non-GCA activities

Six Criteria for Becoming a Green Community

- File application
- As-of-right siting for renewables / alternatives
- Expedited process for siting (<1 year)
- Energy baseline with plans for 20% reduction
- Commit to purchasing only fuel efficient vehicles
- Communities must take steps to minimize life-cycle costs of large residential and commercial development.

As-of-Right Siting

- Must provide non-permit path for renewable/alternative energy generation, research, and/or development.
  - Non-permit means no Variances, no Special Permits
- As-of-right for generation gets bonus points.
- May "spot zone" – not really, but kind of…
- May build performance criteria in Site Plan Review
- May choose one kind of renewable or alternative technology to zone for:
  - On-shore wind (600kw or above)
  - Off-shore wind (2.5mw or above)
  - Solar PV (250kw – ground mounted)
  - Biomass (10mw)
  - Combined Heat and Power (5mw)
  - Ocean, Wave or Tidal – any size

Expedited Permitting

- May be for only those facilities allowed under the as-of-right process
- Requires no more than 1 year from initial application to final permit

Energy Baseline and 20% reduction

- Baseline for all municipal uses (streetlights, buildings, vehicles, etc)
- Processes up to 24 months old may be cited
- They are recommending:
  - EPA's Portfolio Manager software
  - ICLEI's software, or
  - DOER's Energy Information Reporting System

Purchase only Energy-Efficient Vehicles

- Heavy-duty (many DPW, fire and ambulance) exempt.
- (Police cars, which were not mentioned in the draft guidance are likely to be exempt in the final guidance.)
- Communities without exempt vehicles in their fleets will have to meet this standard with an alternative plan – municipal carpooling, for example (seems to make small towns do more than big cities)
- They will promulgate standards and a list of vehicles which meet these requirements

Minimize life-cycle cost of certain private construction

- All new residential over 3,000 ft2 and all new commercial must minimize life cycle cost of energy and water.
- State building code people (BBRS) are developing a "stretch code" which will satisfy this requirement and be a local option
- In the interim communities may adopt "incentive programs" to meet this requirement
  - Incentives for reaching Energy Star (residential) or New Building Institutes Core Performance (commercial)

For more information:
Governor Patrick's office, press release on GCA:
http://www.mass.gov/?pageID=gov3pressrelease&L=1&L0=Home&sid=Agov3&b=pressrelease&f=080702_bill_energy_clean&csid=Agov3
The complete text of the Act:
http://www.mass.gov/legis/laws/seslaw08/sl080169.htm
Green Communities Division of DOER (MA Department of Energy Resources)
http://www.mass.gov/?pageID=eoeeaterminal&L=5&L0=Home&L1=Energy%2C+Utilities+%26+Clean+Technologies&L2=Renewable+Energy&L3=Renewable+Portfolio+Standard&L4=Green+Communities+Act&sid=Eoeea&b=terminalcontent&f=doer_rps_gc_green_comm_div&csid=Eoeea
Draft Guidelines for Qualifying as a Green Community
http://www.mass.gov/Eoeea/docs/doer/gca/gc-requirements-public-comment.pdf
Mass DOER website
www.mass.gov/doer
Mass Municipal Association
www.mma.org Look under "resources" for Energy

JBoudrie NOTES: **As of 2/13/09 it looks like Marlborough's ability to meet criteria for being a Green Community are as follows:**

- Renewable Energy Trust (RET) participation
    - NOTE: Although Marlborough is now a Municipal Electric Aggregate and has a contract with ConEdison Solutions from December 2008 to May 2010 it is our understanding that Marlborough still participates in RET
- Zoning – "As of right" zoning/siting/for renewable energy in business district (could include R&D, manufacturing, generation facility) The goals for local energy generation, green economy, green jobs all align with state goals.
    - NOTE: Check whether Marlborough zoning code speaks specifically to renewable energy or renewable energy businesses.
- Permitting – Streamlined permitting (bldg) process no more than 12 months
    - NOTE: Marlborough has agreed to do expedited permitting for some sites in Marlborough. Several are already permitted and ready to go…just waiting for buyers. So it is possible that Marlborough has met this criteria.
- Energy use reduction – Baseline inventory and 5-year Action Plan… Buildings, vehicles, streetlights, etc.
    - NOTE: Marlborough has a baseline inventory and this Action Plan. Not sure what baseline year will meet the Green Communities criteria.
- Municipal vehicles must be energy efficient for the task it is doing
    - NOTE: The State is making a list of fuel efficient vehicles.
- New construction – residential 3K square feet or more and all commercial buildings must minimize life cycle energy cost of the facility
    - NOTE Unless this is part of the State building code, this may not be included in Marlborough's zoning or building requirements.

Green Communities Act Energy Efficiency requirements….

NOTES, dated October 2008. Thanks to Mike Duclos for his research and these notes.

The following passages from the Green Communities Act are of interest to our community. Several focus on the need for energy efficiency in our buildings and transportation.

(b) The division shall establish a green communities program. The purpose of the program shall be to provide technical and financial assistance, in the form of grants and loans, to municipalities and other local governmental bodies that qualify as green communities under this section. These loans and grants shall be used to finance all or a portion of the costs of studying, designing, constructing and implementing energy efficiency activities, including but not limited to, energy conservation measures and projects; procurement of energy management services; installation of energy management systems; adoption of demand side reduction initiatives; and the adoption of energy efficiency policies. They shall also be used to finance the siting and construction of renewable and alternative energy projects on municipally-owned land.

(4) establish an energy use baseline inventory for municipal buildings, vehicles and street and traffic lighting, and put in place a comprehensive program designed to reduce this baseline by 20 per cent within 5 years of initial participation in the program;

When purchasing new motor vehicles, the commonwealth shall purchase hybrid or alternative fuel vehicles,

Minimize building life cycle-cost of energy and water when renovating.

In calculating life-cycle costs, a state agency shall include the value of avoiding carbon emissions, creating renewable energy certificates and other environmental and associated benefits created from the utilization of alternate technologies, as applicable.

…shall develop requirements and adopt regulations to require documents to be provided to a buyer of a single-family residential dwelling or a multiple-family residential dwelling with less than 5 dwelling units, or a condominium unit at the time of closing, outlining the procedures and benefits of a home energy audit

Section 19. (a) The department shall require a mandatory charge of 2.5 mills per kilowatt-hour for all consumers, except those served by a municipal lighting plant, to fund energy efficiency programs including, but not limited to, demand side management programs. The programs shall be administered by the electric distribution companies and by municipal aggregators with energy plans certified by the department under subsection (b) of section 134 of chapter 164.

(b) The department may approve and fund gas energy efficiency programs proposed by gas distribution companies including, but not limited to, demand side management programs. Energy efficiency activities eligible for funding under this section shall include combined heat and power and geothermal heating and cooling projects. Funding may be supplemented by funds authorized by section 21. The programs shall be administered by the gas distribution companies.

Section 20. (a) The department shall require a mandatory charge of 0.5 mill per kilowatt-hour for all electricity consumers, except those served by a municipal lighting plant which does not supply generation service outside its own service territory or does not open its service territory to competition at

the retail level, to support the development and promotion of renewable energy projects. All revenues generated by the mandatory charge shall be deposited into the Massachusetts Renewable Energy Trust Fund, established under section 4E of chapter 40J.

Section 21. (a) To mitigate capacity and energy costs for all customers, the department shall ensure that, subject to subsection (c) of section 19, electric and natural gas resource needs shall first be met through all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply.

(b)(1) Every 3 years, on or before April 30, the electric distribution companies and municipal aggregators with certified efficiency plans shall jointly prepare an electric efficiency investment plan and the natural gas distribution companies shall jointly prepare a natural gas efficiency investment plan. Each plan shall provide for the acquisition of all available energy efficiency and demand reduction resources that are cost effective or less expensive than supply and shall be prepared in coordination with the energy efficiency advisory council established by section 22

(3) A program included in the plan shall be screened through cost-effectiveness testing which compares the value of program benefits to the program costs to ensure that the program is designed to obtain energy savings and system benefits with value greater than the costs of the program.

If the utility company or aggregator does not meet its burden, the department may levy a fine of not more than the product of $0.05 per kilowatt-hour or $1 per therm times the shortfall of kilowatt-hours saved or therms saved, as applicable, depending upon the facts and circumstances and degree of fault, which shall be paid to the Massachusetts Technology Park Corporation within 60 days after the end of the year in which the department levies the fine.

Section 22. (a) The department shall appoint and convene an energy efficiency advisory council which shall consist of 11 members, including 1 person representing each of the following: (1) residential consumers, (2) the low-income weatherization and fuel assistance program network, (3) the environmental community, (4) businesses, including large C&I end-users, (5) the manufacturing industry, (6) energy efficiency experts, (7) organized labor, (8) the department of environmental protection, (9) the attorney general, (10) the executive office of housing and economic development, and (11) the department of energy resources. Interested parties shall apply to the department for designation as members.

(b) The council shall, as part of the approval process by the department, seek to maximize net economic benefits through energy efficiency and load management resources and to achieve energy, capacity, climate and environmental goals through a sustained and integrated statewide energy efficiency effort.

(c) The council may retain expert consultants; provided, however, that such consultants shall not have any contractual relationship with an electric or natural gas distribution company doing business in the commonwealth or any affiliate of such company.

(d) The electric and natural gas distribution companies and municipal aggregators shall provide quarterly reports to the council on the implementation of their respective plans.

Section 1. There shall be within the executive office of energy and environmental affairs a department called the department of energy resources, under the supervision of a commissioner of energy resources, hereinafter the commissioner.

There shall be within the department 3 divisions: (i) a division of energy efficiency, which shall work with the department of public utilities regarding energy efficiency programs;

"Energy audit", a determination of the energy consumption characteristics of a building or facility which: (a) identifies the type, size and rate of energy consumption of such building or facility and the major energy using systems of such building or facility; (b) determines appropriate energy conservation maintenance and operating procedures; and (c) indicates the need, if any, for the acquisition and installation of energy conservation measures or alternative energy property.

Section 10. (a) The division of green communities shall assist the commonwealth's municipalities and other local governmental bodies to: reduce energy consumption and costs, reduce pollution, facilitate the development of renewable and alternative energy resources, and create local jobs related to the building of renewable and alternative energy facilities and the installation of energy-efficient equipment.

(b) The division shall establish a green communities program. The purpose of the program shall be to provide technical and financial assistance, in the form of grants and loans, to municipalities and other local governmental bodies that qualify as green communities under this section. These loans and grants shall be used to finance all or a portion of the costs of studying, designing, constructing and implementing energy efficiency activities, including but not limited to, energy conservation measures and projects; procurement of energy management services; installation of energy management systems; adoption of demand side reduction initiatives; and the adoption of energy efficiency policies. They shall also be used to finance the siting and construction of renewable and alternative energy projects on municipally-owned land.

(4) establish an energy use baseline inventory for municipal buildings, vehicles and street and traffic lighting, and put in place a comprehensive program designed to reduce this baseline by 20 per cent within 5 years of initial participation in the program;

Section 11C. (a) A state agency or building authority may, in the manner provided by this section, contract for the procurement of energy management services.

(b) A local governmental body may, in the manner provided in this subsection, contract for the procurement of energy management services.

(c) The state agency, building authority or local governmental body may cancel a request for proposals or may reject in whole or in part any and all proposals when the state agency, building authority or local governmental body determines that cancellation or rejection serves the best interests of the state agency, building authority or local governmental body.

Section 11F. (a) The department shall establish a renewable energy portfolio standard for all retail electricity suppliers selling electricity to end-use customers in the commonwealth.

SECTION 55. Said section 94 of said chapter 143, as amended by section 1 of chapter 78 of the acts of 2008, is hereby further amended by adding the following 4 clauses:-

(o) To adopt and fully integrate the latest International Energy Conservation Code as part of the state building code, together with any more stringent energy-efficiency provisions that the board, in consultation with the department of energy resources, concludes are warranted. The energy provisions of the state building code shall be updated within 1 year of any revision to the International Energy Conservation Code.

(p) In consultation with the department of energy resources, to develop requirements and promulgate regulations as part of the state building code for the training and certification of city and town inspectors of buildings, building commissioners and local inspectors regarding the energy provisions of the state building code, and to require that all new construction and any major reconstruction, alteration or repair of residential and non-residential buildings pass inspection by inspectors who have been trained and certified, demonstrating full compliance with the energy provisions of the state building code.

Class I, II or III net metering facility

SECTION 84. The secretary of energy and environmental affairs shall, in conjunction with the department of public utilities, implement an "energy pay and save", hereinafter referred to as EPS, pilot program, allowing electric utility customers to purchase and install energy efficient or renewable energy products in their residences or commercial facilities by paying the cost of the system over time through an additional charge on the customer's electricity bill. The cost of the products purchased under the pilot program shall be added to the electric utility customer’s utility bills in a form approved by the department, as a monthly EPS tariff, and shall be paid until the cost of purchase and installation of the products is paid off.

SECTION 85. On or before April 1, 2009, each electric distribution company shall file a proposed plan with the department of public utilities to establish a smart grid pilot program. Each such pilot program shall utilize advanced technology to operate an integrated grid network communication system in a limited geographic area. Each pilot program shall include, but not be limited to advanced ("smart") meters that provide real time measurement and communication of energy consumption, automated load management systems embedded within current demand-side management programs and remote status detection and operation of distribution system equipment.

for the purpose of making an investigation and study relative to the burning of construction and demolition waste as it relates to the renewable energy portfolio standard program established by section 11F of chapter 25A of the General Laws.

SECTION 88. There shall be a green building plan commission to examine the environmental and economic impact of establishing a green building plan for the commonwealth.

SECTION 89. There shall be a commission which shall study the siting of energy facilities in the commonwealth.

SECTION 90. The department of energy resources shall establish a pilot program to assist consumers with the purchase of energy efficient items for residential home modifications, hereinafter referred to as the HEAT Loan Program.

For the purposes of this section, a qualified lending institution shall include a lending institution that is certified by the executive office of energy and environmental affairs and which shall offer zero and low interest loans for the purpose of enhancing the energy efficiency of a residential dwelling.

The department shall make such loans available for purchases made on or after January 1, 2009, but not later than December 31, 2009.

SECTION 97. On or before December 31, 2009, the energy advisory council appointed under section 22 of chapter 25 of the General Laws shall undertake, using third party experts, a study which examines the

energy efficiency and demand response programs in the commonwealth, including all public and private funding sources.

SECTION 108. (a) On or before October 1, 2009, the department of energy resources shall collaborate with the University of Massachusetts at Boston to establish an educational outreach pilot program designed for communities to further the goals set forth in this section. The pilot program shall include educational programs provided at the University of Massachusetts at Boston, community colleges and community centers. The pilot program shall include short courses designed for presentation at convenient times for communities, including evenings and weekends.

SECTION 116. (a) It is hereby established that the commonwealth's renewable and alternative energy and energy efficiency goals are as follows:-

(1) meet at least 25 per cent of the commonwealth's electric load, including both capacity and energy, by the year 2020 with demand side resources including: energy efficiency, load management, demand response and generation that is located behind a customer's meter including a combined heat and power system with an annual efficiency of 60 per cent or greater with the goal of 80 per cent annual efficiency for combined heat and power systems by 2020;

(4) develop a plan to reduce total energy consumption in the commonwealth by at least 10 per cent by 2017

(4) the use of investment tax credits and tax policy generally to encourage investment in energy efficiency and renewable and alternative technologies;

(5) increased generation and use of renewable and alternative energy;

Appendix VI

Smart Growth – City Center Concept

"Mixing uses…to attract employees by creating a town center near the office where they can live, shop, eat, relax, and run errands during lunch…makes good environmental sense."

"National studies show that people who work in locations that provide a wide range of services within walking distance of the office are more likely to consider car pooling, van pooling, and mass transit[1]. The mixed-use town center will let workers choose how they get to work and how they run errands, reducing congestion and pollution during the morning, lunch, and evening rush hours."

Source: http://www.epa.gov/dced/case/legacy.htm

Walter Bonin wrote this thoughtful and historically sensitive article in June 2008 when MEET was discussing its vision of a sustainable future for Marlborough.

The City Center Concept
By Walter Bonin

To appreciate the city center concept we have to go back in time because the concept is not new except to those who do not remember what the centers of cities and towns were. It was energy efficient, since walking or the trolley were the primary means of transportation locally. Locally, downtown Marlborough had two (2) commuter rail stations (one on Main Street), and freight was brought in by rail and distributed by wagon or truck. There were no trailer trucks, since the interstate highway system had not been built. We had compact cities or towns separated from each other by open space, farms or forests. Travel between towns was by rail or trolley. You could take one to Worcester or Boston since it ran down Route 9, which connected locally. Trolleys were later replaced by a comprehensive bus system that covered many communities. Most ran profitably for many years without government subsidy. The buses were successful because ridership was high and destinations were condensed, or what we now call, high density or Smart Growth.

In Marlborough, approximately 10,000 people lived within one mile of Main Street and about ½ worked within a one half mile radius. Most people walked to work or took the trolley. Marlborough generated its own electricity in a plant on Maple Street. It was coal fired and the fuel was brought in by rail across an overpass over Maple Street. The granite wall that supported one end of the overpass is still there. I always wondered what it was since it seemed so out of place.

Communities were separated from each other by farms, forests and open spaces. Transportation between them was by rail. Freight also came in and out of town by rail.

This design utilized land in the most efficient manner. It was very energy efficient and most of the destinations, be they work, shopping, schools, entertainment, etc., were within walking distance or you took the trolley or later the bus. The cost of living then was considerably lower than today's model (making allowance for lower incomes then).

If we could redesign communities, I suspect given what we know today, we would readopt the central city concept where people lived, worked and shopped etc. within walking distance or a short bus or auto ride. This is the essence of the New Center Concept.

Going from the old model to what we have today was relatively easy. There was lots of open space to fill with brand new shopping malls, industrial parks, and residential development on what used to be farms etc. New highways were built that had little traffic providing convenient travel in inexpensive autos running on cheap gas. The new interstate highway system made this possible (the maintenance xcosts would come later). This contrasted with the center-oriented towns and cities. The factories got old and run down. Summer noise emanating from the machines within open windowed factories was objected to by neighbors. Smoke from chimneys soiled clothes hanging on lines. Manufacturing businesses declined along with wages and employment. People moved out to jobs along new Route 128. People close to Boston moved to suburbs in new houses away from run down cities. It was a new world. But something went wrong!

People now must travel 20-30 miles in congested traffic with fuel costs rising above $4.00/gallon and projected to go much higher. This in addition to the cost of wear and tear on the auto. The U.S. transportation system and infrastructure is the most expensive and inefficient in the world. Businesses must build huge parking lots that consume land that could be put to more effective and valuable uses. State and local governments face greater expense building and maintaining our highway system. In fact the state backlog to repair the state's roads and bridges is $20 billion. In addition the sprawl that this concept has created have added considerably to local communities infrastructure budgets

The New Center Concept

Essentially this concept's objective is to recapture the model in the past which worked so well. It recognizes that continuing in the current direction is unsustainable. We lack the resources, land, money and energy to continue. This model would be applied to those areas undergoing growth but have room to include these features. It could also be applied to areas undergoing redevelopment and existing central communities which could add the features the concept espouses. What is required is some careful thought, a bit of imagination and enough effort to succeed.

Benefits to Communities

- Efficient use of land and facilities.
- Increase city's revenue and decrease expenses.
- Today's industrial parks often require employees to commute large distances increasing traffic congestion and excessive fuel use.
- Employees could walk to work or use short distance shuttles.
- The large amount of land available would allow the location of trade show facilities, conference centers, recreational facilities, colleges, etc.
- This would restore the concept of people living, working and shopping in a center.
- It has access to major highways and potential passenger and freight rail service within the area.
- Facilities, such as parking and parking garages could be shared. Business needs them during the day and residential/commercial at night and weekends, periods when they are empty and not utilized.
- Density would allow the efficient bus services, which requires density to work most efficiently.

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In “old” Marlborough within a one-mile radius or so there was:

1. Extensive bus service with a bus terminal
2. Commuter rail with two (2) stations
3. Many restaurants
4. Heavy population density with mixed use in downtown
5. Many stores, some specialty
6. Employment for several thousand employees
7. A police and two fire stations
8. Courthouse
9. Five “super” markets
10. Several furniture stores
11. Many social halls
12. Several large recreational fields (Ward Park and Kelleher Field, Farrell Field)
13. Two high schools
14. One small college
15. Two bakeries
16. Two theaters
17. One bowling alley

Appendix VII Vision & Strategy

Notes from the May 19, 2008 MEET Taskforce meeting. MEET members articulated their vision of Marlborough in 2020.

Green Jobs will increase to become the highest employment growth sector in new job creation.

Current examples in the renewable energy industry are Evergreen Solar and Brookfield, two companies in Marlborough. Additional jobs at companies will be created to meet demands for green building, transportation, energy, and waste management. Existing job descriptions will be rewritten to include sustainability tasks as 5+% of total workload.

Business to Business connections will attract and retain businesses.

The business production and supply chain will be closer together. A current example is the physical proximity of Rohm and Haas which supplies chemicals to Evergreen in Marlborough. Massachusetts tax incentives favor the purchase of renewable energy products, such as Evergreen solar panels, manufactured in the state.

Mass Transit and Regional Transit have expanded significantly.

Coordinated rail and bus services for Marlborough and surrounding communities reduce the need for driving cars.

Green Zoning has transformed communities.

Planning

Downtown will be a vibrant economic and transportation center
Industrial Parks will have transportation and housing
Theatre/Sports will add evening and weekend use of commercial spaces
Residential/Commercial zoning will integrate community needs
Public Transportation will connect sectors more efficiently
Rail way choices and bike lanes will be transportation alternatives

Open Space is identified and protected on a macro and micro-community scale

Farmland will be protected
Each resident will be within a 5-10 minute walk to a park.

Mixed use space for commercial and residential use

Transportation

Passengers
Light rail

Waste
Products

Clean, renewable, affordable energy choices for customers will have contributed to local and regional efforts. The Marlborough/Colonial Power municipal electric aggregate contract will be a model in the state, like Cape Cod Compact, to support renewable energy and energy efficiency in the community.

Green Buildings are the norm

New construction/renovations follow LEED guidelines
Existing and older buildings are retrofitted to be more energy efficient
Major commercial, rental, hotel sectors are green

Incentive programs are created, found, known, and used.

Shared savings, current energy-efficiency-saving pools create "bank" for future energy efficiency projects
Utility incentives are common knowledge and have been widely used by the city, businesses and residents

Buildings and Open Space….there is a balance
Bike trails, walking paths are integrated into the community. Safe bike lanes, sidewalks, and walking paths connect the east and west sides of Marlborough.
Each person is five-minutes walking distance from a public park or conservation land.

Marlborough is a Regional Leader and actively participates in these….
USGBC – US Green Building Council
TMA – Transportation Management Authority
Metro West Growth Management
MAPC – Metropolitan Area Planning Commission
ARC – 495 Arc of Innovation
UMass – Study of Marlborough, limited impact and green upgrade study

A Sustainability Commission is proactively planning and informing decision-making processes (PRIORITY)
Has a master plan to guide Marlborough's future.
Is a leader for surrounding communities

Clean Energy has increased 20 percent.
Learned from best practices in other communities
A current example is Marshfield's 12% energy from solar for residents via NSTAR

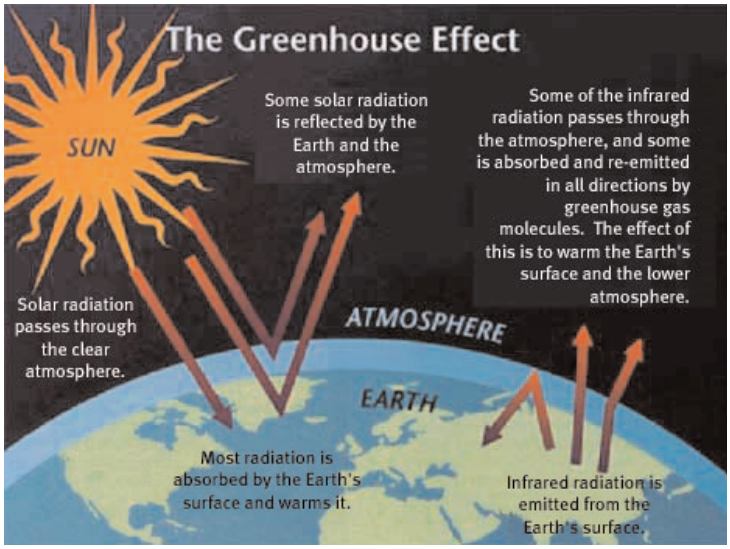
Waste Reduction is a model infrastructure in the community.
Waste is Reduced, Reused, Recycled, and Composted ….30 to 100 %

Leadership invests in sustainable concepts and seeks sustainable solutions.
Leaders, businesses, and residents embrace a healthy community and a green economy.
Leaders present the expectation that renovations and development will be LEED

Appendix VIII

Climate Change and Greenhouse Gas Emissions

Climate change and greenhouse gas emissions are ultimately a local problem. Their causes lie in the daily activities that take place in our workplaces and homes, in our schools and universities, at our places of worship, and on our roads. Its effects will be felt in our community. And while local action alone can't solve the problem, we are well-positioned at the local level to reduce our contribution to climate change.



Climate Change and Greenhouse Gases

The buildup of greenhouse gases in the atmosphere is a major contributor to the increase in global temperatures. Carbon dioxide is the main greenhouse gas; methane, nitrous oxide, and certain man-made gases (chlorofluorocarbons, sulfur fluoride compounds) are also significant contributors. Soot and the level of solar activity also influence temperatures. The loss of forests reduces the planet's capacity to store or sequester carbon.

The concentration of carbon dioxide in the atmosphere has been rising since the beginning of the Industrial Revolution, when fossil fuels like coal and oil began to be burned in large quantities. As carbon dioxide concentrations increased, temperatures rose too.

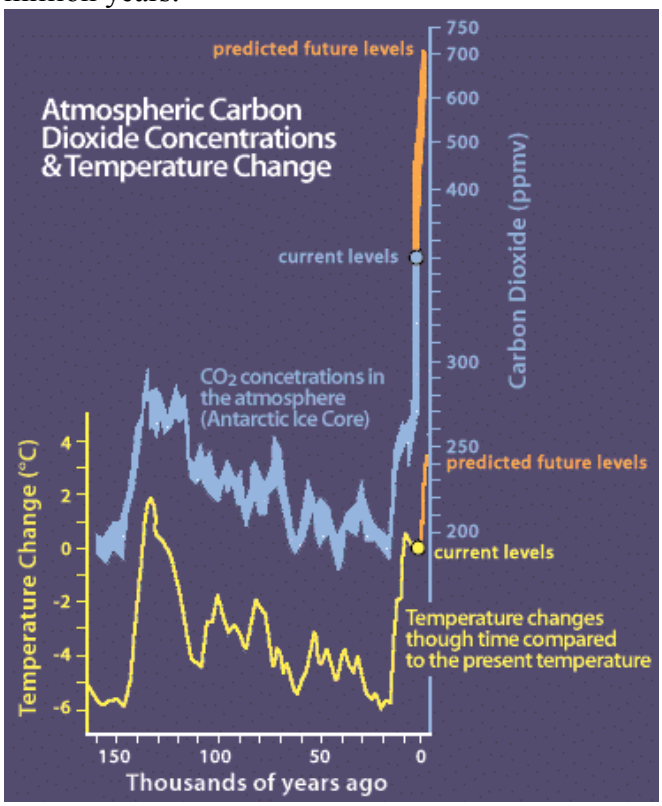
The climate change problem has developed as human activities have added growing amounts of carbon dioxide and other greenhouse gases to the atmosphere, thereby increasing the natural greenhouse effect. The more greenhouse gases increase, the more heat is trapped. If the trend in increasing emissions continues through this century, CO2 concentration will rise to levels not seen on Earth for 50 million years.

What Are the Signs?

• Temperatures are in fact rising. Over the twentieth century, average global surface air temperature has warmed between 0.7 and 1.5 degrees F.

• Sea level has been rising by an average of 0.1 to 0.2 meters during the twentieth century. This is mostly attributed to heat expansion of global waters.

• Concentrations of carbon dioxide in the atmosphere have increased 31% since 1750. The present CO2 concentration has not been exceeded during the past 420,000 years and probably not during the past 20 million years.



Climate Change Impacts

Warming of air temperatures is just the first step in climate change. Rising temperatures lead to changes in rainfall and snowfall patterns, soil moisture, and sea level, which in turn cause physical changes in the landscape, modifications in the ranges of plants, animals, and other living organisms, and impacts on human structures and systems.

The federal government commissioned the New England Regional Assessment (NERA) to evaluate potential impacts on our region. Based on climate models, NERA projects that average temperatures in New England may increase by 6 to10 degrees F by 2090. While this may not seem like a large difference, consider that there was only a 10 to 12 degree F difference between the peak of the last glacial period, when New England was under two miles of ice, and now. NERA provides another perspective; a six-degree increase would cause Boston's climate to become more like that of Richmond, Virginia. A ten-degree increase would make our climate more like that of Atlanta, Georgia.

Possible impacts that could affect our region include the following:

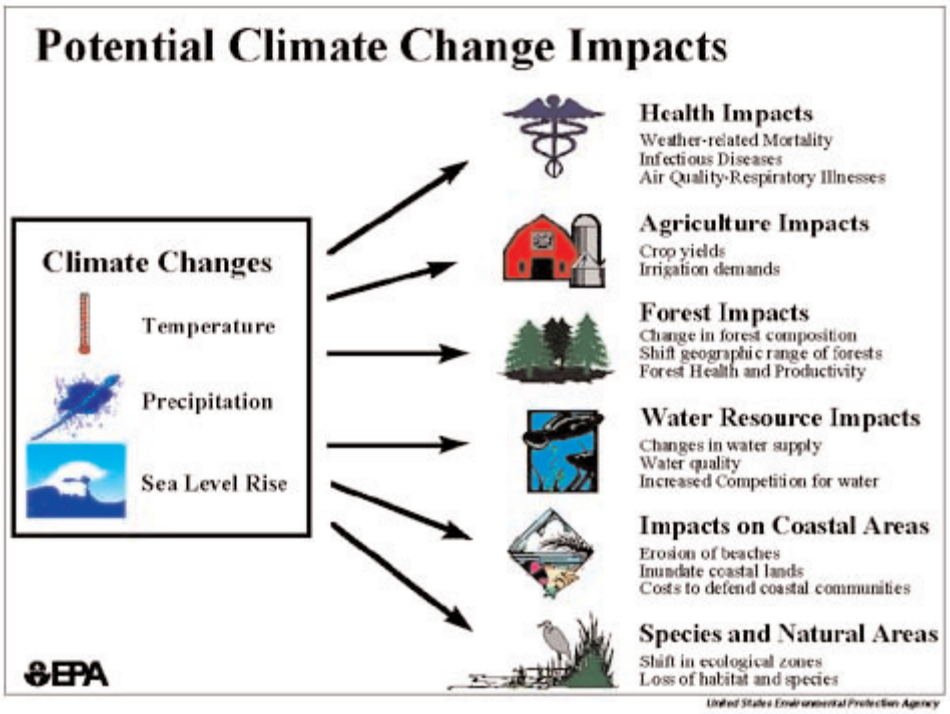
• Extreme weather events such as heavy rainfall, ice storms, floods, droughts, and heat waves are likely to become more frequent. Increased damage to public and private property and more insurance claims would be the result.

• Summer temperatures will likely increase, causing more 90 degree days. Smog levels would increase and more frequent unhealthy air quality days would damage public health.

• Conditions may become more favorable for disease-carrying organisms such as mosquitoes.

• Droughts may affect water supplies as runoff decreases and evaporation increases.

Outside Marlborough, other impacts will indirectly affect the city as the United States and other countries cope with the impacts of climate change.



Why Waiting is not an Option

Because climate systems are complex and we can't predict the nature and extent of the impacts with certainty, some people advocate delaying action. Unfortunately, waiting to resolve the scientific uncertainties in predicting climate could be disastrous.

To slow and eventually reverse global warming, we must lower the concentration or total amount of greenhouse gases in the atmosphere. This means that not only do we have to lower the rate of greenhouse gas emissions, but we have to reduce the total quantity of emissions until they are lower than the rate at which nature removes carbon from the air. Otherwise, the concentration of carbon dioxide and other GHGs will continue to rise as will temperatures. Currently, the rate of human-made GHG emissions is roughly double the rate of removal. Consequently, emissions must fall by at least half to stabilize GHG concentrations at current levels, and even more to lower the concentration. Scientists indicate that ultimately emissions need to fall to 75 to 85% of current levels. Waiting to take action is dangerous because of the nature of GHGs. When carbon dioxide emitted by a motor vehicle, building furnace, or power plant enters the atmosphere, it will stay there for a long time—50 to 200 years. This means the warming trend cannot be reversed quickly. The longer the wait, the worse the problem becomes. While uncertainties in predicting how climate will change in the future may cause scientists to overestimate the impact, there are also uncertainties that may cause them to underestimate the impact. For example, it is unlikely that nature will continue to absorb carbon dioxide at current rates; the latest science suggests it will absorb less as natural systems become saturated, and that several factors limit the ability of plants to take up more CO2.

This plan proposes that rather than gamble that the scientific community is wrong about climate change, Marlborough take action to reduce emissions by taking advantage of existing technology and resources.

Appendix IX

Massachusetts Incentives for Renewables and Efficiency

Free Energy Audit: www.MassSave.com

Below, source: http://www.dsireusa.org/library/includes/map2.cfm?CurrentPageID=1&State=MA&RE=1&EE=1

See Federal Incentives
See All Summaries
See Homeowner Incentive Summaries Only

Financial Incentives

Corporate Deduction

- Alternative Energy and Energy Conservation Patent Exemption (Corporate)
- Excise Tax Deduction for Solar or Wind-Powered Systems

Corporate Exemption

- Excise Tax Exemption for Solar or Wind Powered Systems

Industry Recruitment/Support

- MTC - Business Expansion Initiative
- MTC - Sustainable Energy Economic Development (SEED) Initiative

Personal Deduction

- Alternative Energy and Energy Conservation Patent Exemption (Personal)

Personal Tax Credit

- Residential Renewable Energy Income Tax Credit

Production Incentive

- Mass Energy - Renewable Energy Certificate Incentive

Property Tax Exemption

- Renewable Energy Property Tax Exemption

Sales Tax Exemption

- Renewable Energy Equipment Sales Tax Exemption

State Grant Program

- MTC - Clean Energy Pre-Development Financing Initiative (Grants)
- MTC - Large Onsite Renewables Initiative (LORI) Grants
- MTC - Massachusetts Green Communities™ Grant
- MTC - Matching Grants for Communities

State Loan Program

- Boston Community Capital - Energy Advantage Program
- MTC - Clean Energy Pre-Development Financing Initiative (Loans)
- MTC - Massachusetts Green Communities™ Loan

State Rebate Program

- MTC - Commonwealth Solar Rebates
- MTC - Small Renewables Initiative (SRI) Rebates

Utility Grant Program

- KeySpan Energy Delivery - Building Practices and Demonstration Program

Utility Loan Program

- Berkshire Gas - Residential Energy Efficiency Loan Program
- Holyoke Gas & Electric - Commercial Energy Efficiency Loan Program
- Holyoke Gas & Electric - Residential Energy Efficiency Loan Program
- MassSAVE - Statewide HEAT Loan Program
- National Grid (Mass Electric) - Small Business Energy Efficiency Program
- National Grid (Nantucket) - Small Business Energy Efficiency Program

Utility Rebate Program

- Bay State Gas - Commercial Energy Efficiency Program
- Bay State Gas - Residential Energy Efficiency Programs
- Belmont Municipal Light Department - Residential Energy Efficiency Rebate Program
- Berkshire Gas - Residential Energy Efficiency Program
- Chicopee Electric Light - Residential Energy Efficiency Rebate Program
- Concord Municipal Light Plant - Energy-Efficient Lighting Rebate Program
- Concord Municipal Light Plant - Residential Energy Efficiency Rebate Program

- KeySpan Energy Delivery - Commercial Energy Efficiency Programs
- KeySpan Energy Delivery - Residential Energy Efficiency Programs
- KeySpan Energy Delivery - Solar Thermal Rebate Program
- Mansfield Municipal Electric Department - Residential Energy Efficiency Rebate Program
- Marblehead Light Department - Residential Energy Efficiency Rebate Program
- National Grid (Mass Electric) - Commercial Energy Efficiency Incentive Programs
- National Grid (Mass Electric) - Residential Energy Efficiency Incentive Programs
- National Grid (Nantucket) - Commercial Energy Efficiency Incentive Programs
- National Grid (Nantucket) - Residential Energy Efficiency Incentive Programs
- New England Gas Company - Energy Saving Rebate Programs
- NSTAR - Commercial Energy Efficiency Rebate Programs
- NSTAR - Commercial Energy Solutions Programs
- NSTAR - Residential Energy Efficiency Programs
- Reading Municipal Light Department - Business Lighting Rebate Program
- Reading Municipal Light Department - ENERGY STAR Appliance Rebate Program
- Shrewsbury Electric - Residential Energy Efficiency Rebate Program
- Unitil - Commercial and Industrial Energy Efficiency Programs
- Unitil - Residential Energy Efficiency Programs
- Wakefield Municipal Gas & Light Department - Residential Conservation Services Program

Alternative Fuel and Vehicle Incentives

- U.S. Department of Energy's Alternative Fuels Data Center

Rules, Regulations & Policies

Appliance/Equipment Efficiency Standards

- Appliance Efficiency Standards

Building Energy Code

- Massachusetts State Building Code

Energy Standards for Public Buildings

- State Buildings Energy Reduction Plan

Generation Disclosure

- Fuel Source and Emissions Disclosure

Green Power Purchasing/Aggregation

- Boston - Green Power Purchasing
- Cape Cod & Martha's Vineyard - Green Power Purchasing

Interconnection

- Interconnection Standards

Net Metering Rules

- Massachusetts - Net Metering

Public Benefits Fund

- Energy Efficiency Fund
- Renewable Energy Trust Fund

Renewables Portfolio Standard

- Renewable Portfolio Standard

Solar Access Law/Guideline

- Solar Access Laws

Solar/Wind Permitting Standards

- Model Ordinance for Special Permitting of Wind Facilities

Alternative Fuel and Vehicle Policies

- U.S. Department of Energy's Alternative Fuels Data Center

Related Programs & Initiatives

- **Green Power Network: Buying Green Power in Your State**
  The U.S. Department of Energy's Green Power Network provides news and information on green power markets and related activities. This site provides state-by-state information on Green Power Marketing in Competitive Electricity Markets and Utility Green Pricing Programs.
  In addition, the site lists marketers of Renewable Energy Certificates (RECs)(also known as green tags or tradable renewable certificates), which represent the environmental attributes of the power produced from a renewable energy project. Whether or not consumers have access to green power through their local utility or a competitive electricity marketer, consumers can purchase RECs without having to switch electricity suppliers.
- **Wind Powering America**
  The U.S. Department of Energy's Wind Powering America site provides state-by-state wind project information, including validated wind maps, anemometer loan programs, small wind guides, legislative briefings, wind working groups, and state-specific news.

Appendix X

Marlborough Energy and Environment Taskforce

Name		Affiliation
Jennifer Boudrie	co-chair	Green Marlborough
Michael P. Manning		Resident
Susanne Cerni-Price		Resident
Paul Gedutis		NSTAR
Brian Murphy		Colonial Power Group
Walter Bonin		Resident Transportation representative
Brian Palmer		Marlborough CDC
Don Robinson		National Grid
John Riordan		Marlborough 2010
Diana Cobb		Fidelity Real Estate
Brian Daigle		Fidelity, Sustainability
Priscilla Ryder	co-chair	Marlborough Conservation Officer
Doran Crouse		Assistant Commissioner of Utilities
John Ghiloni		Director of Public Facilities