

# CITY OF MEDFORD



## CLIMATE ACTION PLAN

OCTOBER 2001

# CITY OF MEDFORD CLIMATE ACTION PLAN

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# CLIMATE ACTION PLAN CITY OF MEDFORD, MA

## **Objective:**

The ultimate goal of this Climate Action Plan is to initiate programs and policies within the City of Medford that aim to reduce greenhouse gas emissions. Nearly every facet of the municipal government contributes to the increased levels of greenhouse gases in the atmosphere. Additionally, the community as a whole has an even greater impact on those levels. Ideally, the programs and policies proposed in this plan will stimulate behavioral changes within the community, creating a sustainable Medford which respects the environment and the people within it, thus ensuring the health of future generations.

As one of the first Massachusetts communities to join the Cities for Climate Protection Campaign, Medford eagerly assumes a leadership role for the campaign and hopes to demonstrate its commitment towards the cause by following through all of its commitments in a timely fashion. Currently, no City in Massachusetts has an approved Climate Action Plan. Medford is eager to lead the way for all communities in this area.

## **Section I** **INTRODUCTION**

The earth's climate is predicted to change because human activities are altering the chemical composition of the atmosphere through the buildup of greenhouse gases—primarily carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrogen oxides (NO<sub>x</sub>), and fluorocarbons. The heat trapping property of these gases create a natural greenhouse effect.<sup>1</sup>

The greenhouse effect refers to the phenomenon by which the Earth's atmosphere traps solar radiation, or heat (refer to Chart 1). Gases in the atmosphere make the greenhouse effect work, with the gases operating like a greenhouse's glass panels that let electromagnetic radiation (light) through, but trap thermal radiation (heat). This natural greenhouse effect helps keep the Earth's average temperature at around 59° Fahrenheit (F). Without the greenhouse effect, the Earth's temperature would be about 0°F and the planet would be largely uninhabitable. Natural sources of greenhouse gases include respiration and fire (CO<sub>2</sub>), along with decaying organic matter and animal waste (CH<sub>4</sub>). Of a far greater magnitude than these natural sources, billions of tons of heat-trapping gases are released every year into the atmosphere from human activities, including:

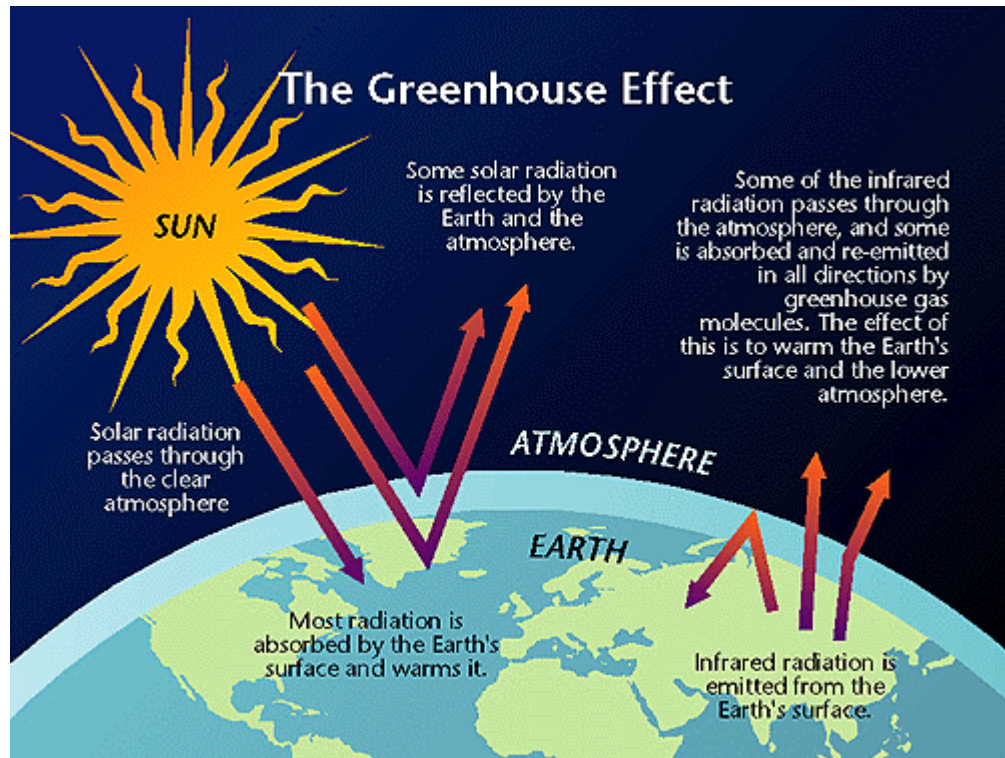
**CO<sub>2</sub>** from the burning of fossil fuels for transportation and industrial operations, and from the destruction of carbon-sequestering forests;  
**CH<sub>4</sub>** from landfills, fuel production, livestock production, and farming;

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<sup>1</sup> United States Environmental Protection Agency. 1997. Climate Change and Massachusetts. September.

**NO<sub>x</sub>** from fertilizers; and **Fluorocarbons** from refrigerants and other industrial products. (Fluorocarbons are 10,000 times more effective than CO<sub>2</sub> at trapping heat and accelerating the greenhouse effect).<sup>2</sup>

## CHART 1



Evidence from recent studies indicates that the Earth's climate is warming at an unprecedented rate and that the future impact from this warming may be more severe and sudden than predicted. In 1998, a team of researchers directed by the National Center for Scientific Research in Grenoble, France, extracted the longest ice core record of the Earth's weather history from an Antarctic ice sheet. This record shows that the four previous ice ages all have been followed by temperature increases and corresponding increases in CO<sub>2</sub> and methane. What is significant about the record is that current greenhouse gas levels are unprecedented compared to the previous 420,000 years CO<sub>2</sub> levels are 25 percent higher and methane 220 percent higher. According to the National Geophysical Data Center in Boulder, Colorado, this is well beyond the range of natural variation and offers convincing evidence that humans are making large changes to the Earth's climate system.<sup>3</sup>

<sup>2</sup> Excerpt from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

<sup>3</sup> Stauffer, Bernhard. 1999. Cornucopia of ice core results. Nature, Vol. 399, 3 June 1999, from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

An international team of researchers using computer simulations of normal changes in the area of the Arctic ice cap have found that there is only a 2-percent chance that the rate of melting over the last 19 years is a result of natural climate changes, and only a 0.1-percent chance that the melting over the last 46 years is natural. Study participants included the University of Maryland, Rutgers University, the National Oceanic and Atmospheric Administration (NOAA), the University of Illinois, the National Aeronautics and Space Administration (NASA), the Hadley Center in Great Britain, and the Arctic and Antarctic Research Institute in Russia.<sup>4</sup>

NOAA recently completed an analysis indicating that the Earth's climate is warming at an unprecedented rate. Records indicate that, on average, warming throughout the 1900s occurred at a rate of less than 1°F per century. Since 1976, the warming has occurred at a rate of nearly 4°F per century. According to government scientists, this increase could prove evidence of a "change point"- a period when the Earth's climate begins warming at a faster rate. Pointing to the all-time global high temperature records in 1997 and 1998, NOAA scientists contend that the temperatures are far higher than could be explained by natural events, including El Niño.<sup>5</sup>

### **EFFECTS OF GLOBAL CLIMATE CHANGE**

If the rate of emission of greenhouse gases is not reduced, it is predicted that average global temperatures could rise substantially in the next 100 years. While the effects of such changes are difficult to predict, rising global temperatures are expected to raise the sea level and change precipitation and other local climate conditions.<sup>6</sup> In Massachusetts, specifically, the average annual temperature has increased by 2°F and precipitation has increased by nearly 20% over the last century. The United States Environmental Protection Agency has stated that these climactic changes could alter forests, crop yields, and water supplies. Rising sea levels will have a significant impact on coastal areas, such as the Massachusetts coastline, which has over 1,500 miles of shoreline. These changes could also threaten human health, harm fish, and wildlife, and affect many types of ecosystems.<sup>7</sup>

### **RESPONSES TO GLOBAL CLIMATE CHANGE**

Scientific evidence indicates that the accelerated emission of greenhouse gases is altering the global climate. In response, organizations at international, national, and local levels have initiated actions to reduce these emissions.<sup>8</sup>

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<sup>4</sup> Vinnikov, Konstantin Y.; Robock, Alan; Stouffer, Ronald J.; et al. 1999. Global warming and northern hemisphere sea ice extent. *Science*, Vol. 286, 3 December 1999, from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

<sup>5</sup> Karl, Thomas R.; Knight, Richard W.; Baker, Bruce. 2000. The record breaking global temperatures of 1997 and 1998: evidence for an increase in the rate of global warming? *Geophysical Research Letters*, Vol. 27, No. 5, 1 March 2000, from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

<sup>6</sup> Excerpt from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

<sup>7</sup> United States Environmental Protection Agency. 1997. *Climate Change and Massachusetts*.

<sup>8</sup> Excerpt from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

International efforts have been coordinated primarily by the United Nations and have included:

□ The Intergovernmental Panel on Climate Change (IPCC)

In 1988, the United Nations Environment Programme and the World Meteorological Organization created the IPCC to conduct studies on global warming. Efforts undertaken include identifying emission sources, assessing possible consequences, and developing mitigation strategies.<sup>9</sup>

□ United Nations Conference on Environment and Development (UNCED)

The United States and 153 other nations signed the United Nations Framework Convention on Climate Change (UNFCCC) on June 12, 1992, at UNCED (the Earth Summit) in Rio de Janeiro. This Convention contains a legal framework that commits the world's governments to voluntary reductions of greenhouse gases or other actions (such as enhancements of greenhouse gas sinks) aimed at stabilizing atmospheric concentrations of greenhouse gases at 1990 levels. To facilitate this, the Convention requires that all parties to the UNFCCC develop, periodically update, and make available to the Conference of the Parties (COP) national inventories of all anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol (addressing chlorofluorocarbons [CFCs]). In October 1992, the United States became the first industrialized nation to ratify the Climate Change Treaty, which took effect on March 21, 1994.<sup>10</sup>

□ 1997 Third Conference of the Parties

After COP-1 and COP-2 developed draft proposals for new, legally binding reduction targets and strategies for both industrialized and developing countries, COP-3 met in December 1997 in Kyoto, Japan, where the parties agreed to an historic protocol to reduce global greenhouse gas emissions and set binding targets for developed nations (For example, the binding emission target for the United States is 7 percent below 1990 emission levels). The Kyoto Protocol, which remains to be ratified, seeks to achieve targets on all four major greenhouse gases by 2008-2012, with international emissions trading included as a compliance option. The United States backed out of these negotiations in 2001.<sup>11</sup>

National efforts initiated by the United States to address climate change, include scientific and economic research, policy analysis, and program development. These actions culminated in the release of the Climate Change Action Plan (CCAP) by the Clinton Administration in October 1993. The CCAP presented the U.S. strategy for reducing greenhouse gas emissions to 1990 levels by the year 2000. Although this goal was not achieved, the measures initiated in 1993 and subsequent years should result in a reduction of 76 million metric tons of carbon equivalent, or 70 percent of the reduction goal.<sup>12</sup>

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<sup>9</sup> Excerpt from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

In 1994, the U.S. Department of Energy (DOE) adopted the Climate Challenge Program, a joint voluntary effort of the DOE and the electric utility industry to report industry reductions of greenhouse gas emissions and fixation of carbon (carbon sequestering) achieved through any measure.<sup>13</sup>

The DOE also sponsors a number of other programs. Rebuild America is a program that emphasizes energy-efficient retrofits of existing buildings, energy-efficient design of new buildings, renewable energy, and energy education. The Energy Star® program- a voluntary partnership between the DOE, the U.S. Environmental Protection Agency (EPA), manufacturers, utilities and retailers- promotes efficient products by labeling them with the Energy Star® logo and educating consumers about the unique benefits of energy-efficient items. In addition, the Energy Star Buildings and Greenlights Program encourages investment by U.S. businesses and government agencies in energy-efficient lighting, heating and ventilation, and cooling technologies for buildings.<sup>14</sup>

## **Section II** **CITIES FOR CLIMATE PROTECTION CAMPAIGN**

On August 10, 1999, the Medford City Council adopted a resolution in support of the International Council on Local Environmental Initiatives' (ICLEI) Cities for Climate Protection (CCP) Campaign (*Council File No. 99-615*). "ICLEI is the international environmental agency for local governments. Its mission is to build and serve a worldwide movement of local governments to achieve tangible improvements in global environmental and sustainable development conditions through cumulative local actions."<sup>15</sup>

ICLEI's CCP Campaign began in 1993 and is a global campaign to reduce the emissions that cause global warming and air pollution. By 1999, the campaign had engaged more than 350 local governments in this effort, which jointly accounted for approximately 7 percent of global greenhouse gas emissions. The Campaign now boasts over 470 local governments worldwide.

The CCP Campaign consists of five milestones which each City commits to completing. The five milestones are:

- Milestone One: Conduct a Baseline Emissions Inventory for all municipal operations and the entire community
- Milestone Two: Set an Emissions Reduction Target
- Milestone Three: Develop an Action Plan which describes initiatives the City intends to take in order to reach its emissions reductions target
- Milestone Four: Implement the initiatives in the Action Plan
- Milestone Five: Monitor Emission Reductions

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<sup>13</sup> Ibid.

<sup>14</sup> Excerpt from City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

<sup>15</sup> International Council for Local Environmental Initiatives, from <http://www.iclei.org/about.htm>

The City of Medford has completed Milestones One and Two. Medford conducted a greenhouse gas emissions inventory for the baseline year 1995, with an interim year of 1998 and a forecast of 2010. The emissions inventory focuses on two categories: Municipal Emissions and Community Emissions. Municipal Emissions measure those emissions that are a product of municipal operations only. For example, emissions from municipally owned buildings such as City hall and schools or from the municipal fleet such as the police and fire vehicles. Community Emissions refer to the community of Medford as a whole. All heating oil, natural gas, and electricity used by the residents and commercial and industrial businesses are estimated for this section of the inventory. The Community Emissions section also includes municipal emissions. Refer to Section III of this report for further details regarding the Emissions Inventory.

After the completion of the Emissions Inventory, the City of Medford set an Emissions Reduction Target. The City selected a reduction target for Municipal Emissions of 20% below 1998 levels by the year 2010. The Community Emissions Reduction target has been set at 10% below 1998 levels by 2010.

This report is the Climate Action Plan for Medford and signifies the completion of Milestone Three. The proposed initiatives listed in this report are programs that the City believes to be the most effective way to reduce emissions and to meet reduction targets. The approval of this report by the Medford City Council demonstrates the commitment of the City to reduce its greenhouse gases through implementation of various programs described in Sections IV-VII of this report.

### **Section III**

## **GREENHOUSE GAS EMISSIONS INVENTORY-DETAILS**

The Emissions Inventory uses electric, gas, and oil utility bills to determine the level of energy usage for each building. This information is inputted into the CCP software and converted from its unit of measure, such as kilowatt hour of electricity, therms of gas, or gallons of oil, into million British Thermal Units (MMBTU) and tons of equivalent carbon dioxide (eCO<sub>2</sub>).

The City of Medford completed a Greenhouse Gas Emissions Inventory in 1999. Data was collected for a base year of 1995, with an interim year of 1998 and a forecast year of 2010. The Greenhouse Gas Emissions Inventory provides a baseline of emissions for the City to analyze and create a reduction target from. Based on the results of the Emissions Inventory, the City of Medford established the following reduction targets:

### **Municipal Emissions Reduction Target = 20% below 1998 emission levels**

This reduction target equates to a goal of reducing total municipal emissions by 3,911.6 tons of eCO<sub>2</sub> by 2010.

**Community Emissions Reduction Target = 10% below 1998 emission levels**

This reduction target equates to a goal of reducing total community emissions by 72,579.5 tons of eCO<sub>2</sub> by 2010.

The results of the Emissions Inventory indicated the top three sources of emissions from municipal operations as buildings at 80.8%, lighting at 10.5%, and fleet at 8.5%. The following tables summarize the results of the emissions inventory for both municipal and community emissions each year calculated. Please note that it is not possible to calculate the cost for community emissions as that would entail reviewing utility bills for all residents and businesses within Medford.

**Table 1  
Inventory Results-Municipal Emissions**

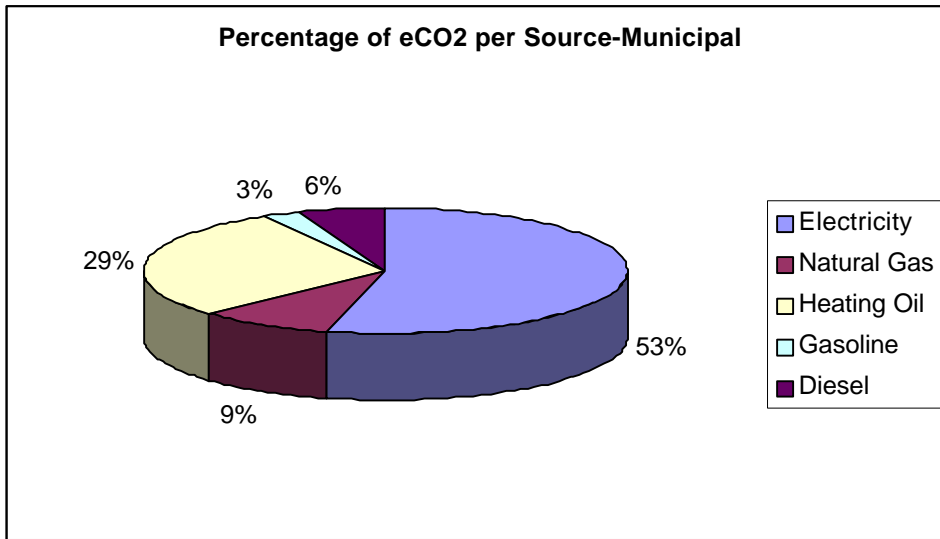
<b>Year</b>	<b>Total eCO<sub>2</sub> (Tons)</b>	<b>Energy Use (MMBTU)</b>	<b>Cost</b>
1995	19,154	168,716	\$1,658,332
1998	19,558	170,509	\$2,070,733
2010 (forecast)	19,883	165,405	\$2,317,983

**Table 2  
Inventory Results-Community Emissions**

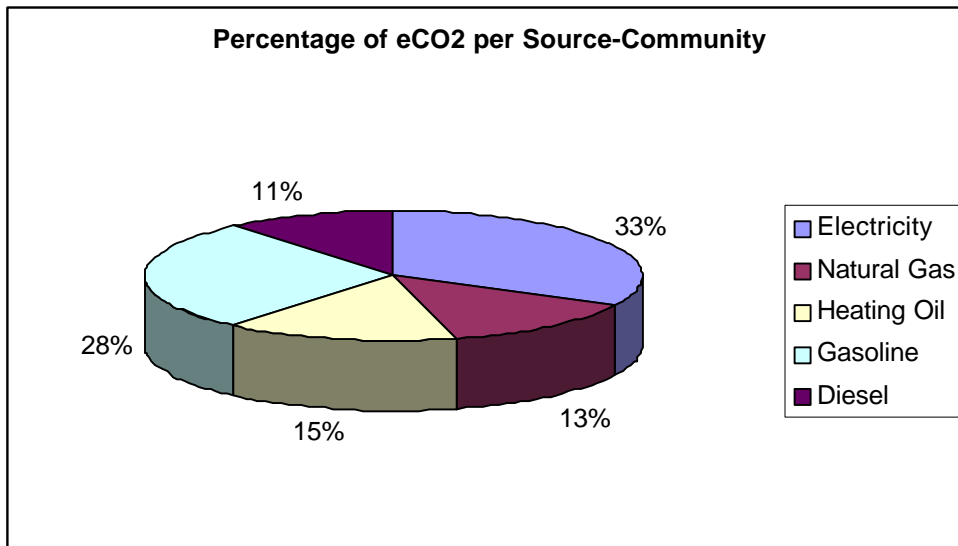
<b>Year</b>	<b>Total eCO<sub>2</sub> (Tons)</b>	<b>Energy Use (MMBTU)</b>
1995	696,112	7,139,666
1998	725,795	7,384,567
2010 (forecast)	805,729	8,039,635

The main sources of greenhouse gas emissions calculated for this inventory are electricity, natural gas, heating oil, gasoline, and diesel. The following charts summarize the percent contribution of each source to municipal and community emissions in the City of Medford, respectively.

**Chart 2**



**Chart 3**



**Municipal Emissions**

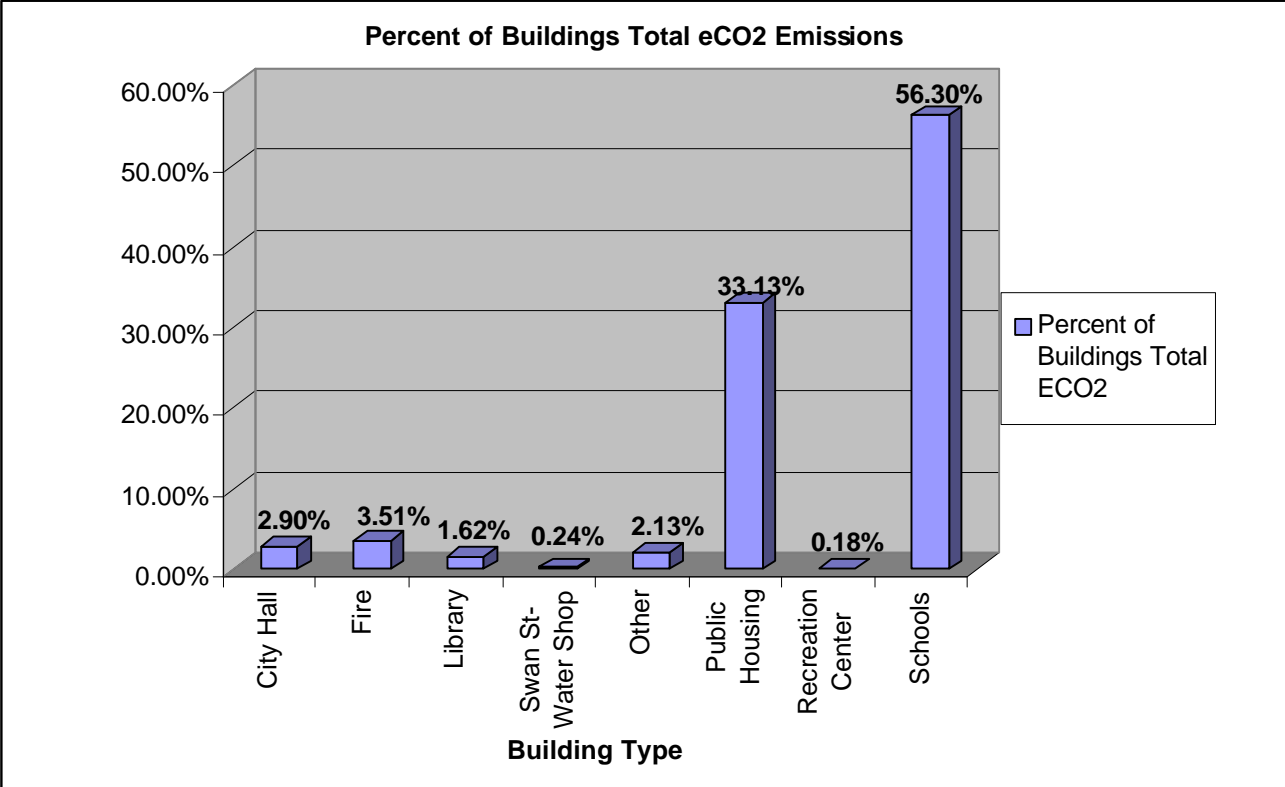
Please note that this report utilizes data for the interim year 1998, instead of the base year 1995, due to technical problems retrieving all of the data from 1995.

**Buildings**

The Emissions Inventory breaks down emissions from all buildings into electricity, natural gas, and heating oil use. Each energy source creates a different amount of eCO<sub>2</sub>, which the CCP software calculates based on the annual usage levels.

According to the Emissions Inventory, municipal buildings are the greatest source of municipal emissions. For the interim year 1998, buildings accounted for nearly 81% of all carbon dioxide emissions. Schools were by far the largest emitters of greenhouse gases within the Buildings category, accounting for over 56% of total municipal emissions. Additionally, Medford public schools used the most energy and cost the City the most money in 1998. The Medford Housing Authority units accounted for the second largest emitters within the Buildings category, accounting for over 33% of total eCO<sub>2</sub> emissions. Chart 4 summarizes the percent of total eCO<sub>2</sub> emissions for all buildings included in the Emissions Inventory.

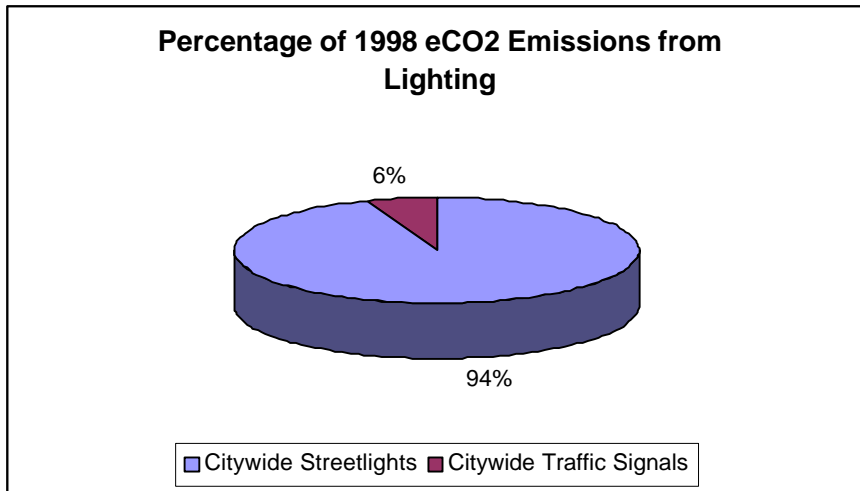
**Chart 4**



**Lighting**

The Emissions Inventory calculated emissions data for the streetlights, traffic lights, and recreational lights within Medford. According to the Emissions Inventory, public lighting accounted for 10.5% of Medford’s total eCO<sub>2</sub> emissions in 1998, making it the second largest contributor of eCO<sub>2</sub> for the City. This usage cost the City \$483,014 for that year. Emissions from lighting are calculated through the electricity use. Streetlights are clearly the largest emitter within this category, mostly because there are simply more of them than any other type of lighting in the City. The following chart summarizes the percentage breakdown of eCO<sub>2</sub> emissions for all public lights in the City.

**Chart 5**



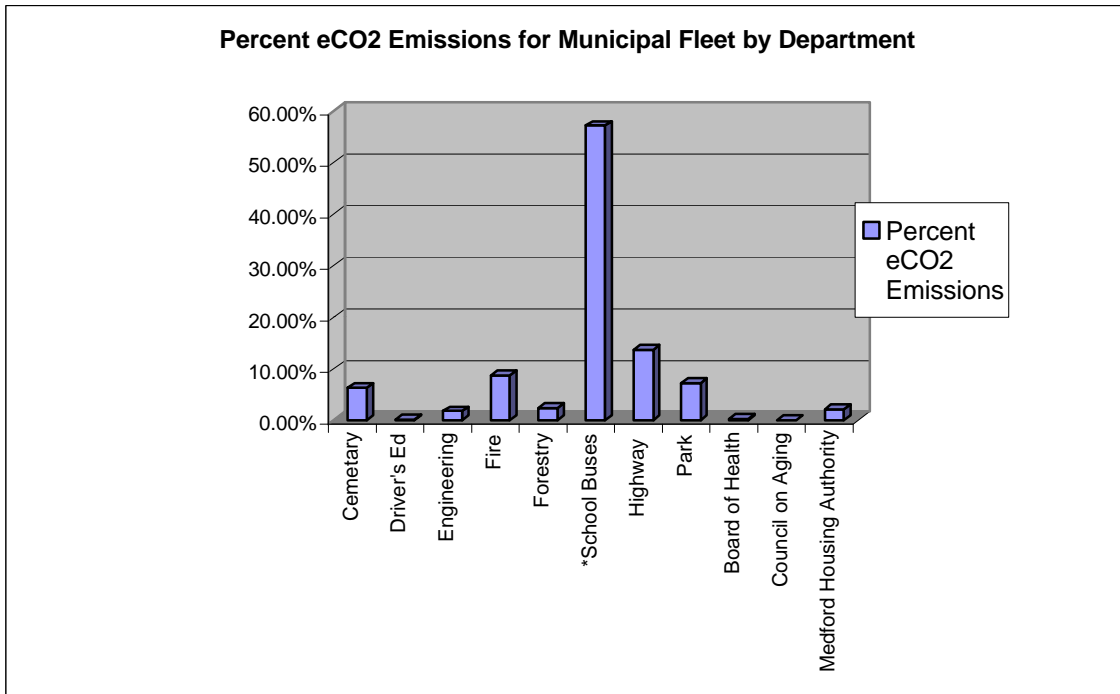
## **Fleet**

The 1998 data from the Emissions Inventory determined the municipal fleet as the third largest contributor of greenhouse gas emissions in the City of Medford. Please note that at the time of the Inventory, data for the police department was not calculated. Based on data from 2000 and 2001, it is believed that the inclusion of the police department would generate an increase in fleet emissions significant enough to place Municipal Fleet as the second highest emission source for the City of Medford and placing lighting as third. As of 2001, the City of Medford maintained 120 vehicles for municipal operations, excluding police vehicles.

For the Fleet section, the Inventory was broken down into diesel and gasoline use. According to the Inventory, the school buses generated the most greenhouse gas emissions from a diesel source as well as overall. The school buses accounted for 81.93% of emissions from diesel and 57.14% of total eCO<sub>2</sub> emissions in the Fleet category. The highway department was the highest emitter from gasoline at 37.15%, while the fire and parks department followed closely behind at 18.01% and 14.82% respectively.

The following chart depicts the breakdown by percentage of 1998 eCO<sub>2</sub> emissions from both diesel and gasoline sources by municipal department.

**Chart 6**



\* The School Buses are owned and operated by Joseph's Transportation

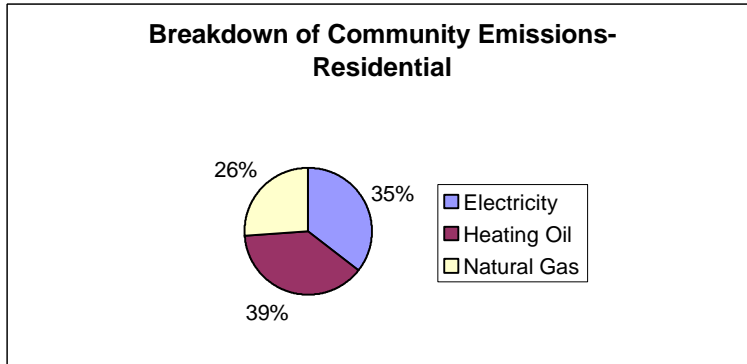
## **Community Emissions**

For the purposes of the Inventory, community emissions were divided into six categories: Residential, Commercial, Industrial, Transportation, Waste, and Other. The Residential and Commercial areas were further broken down into the usage of electricity, heating oil, and natural gas. The electricity and natural gas usage for the Industrial sector was included in the data for the Commercial sector; therefore, heating oil is the only subdivision within the Industrial category. The Transportation section was divided into gasoline, diesel, and electricity (train). The Other section consisted of buildings at Tufts University. Only energy use and eCO<sub>2</sub> are calculated for community emissions; costs cannot be determined.

### **Residential**

The Emissions Inventory determined that in the Residential sector heating oil was the largest contributor to greenhouse gas emissions in Medford, with electricity usage following very closely behind. Utilizing the results of the Inventory enables the City to focus policies and programs that will create the greatest reductions in emissions, as well as save the residents of Medford substantial amounts of money. Refer to section VI of this report for further details on proposed community reduction measures. The following pie chart summarizes the emissions from each source within the Residential sector for 1998.

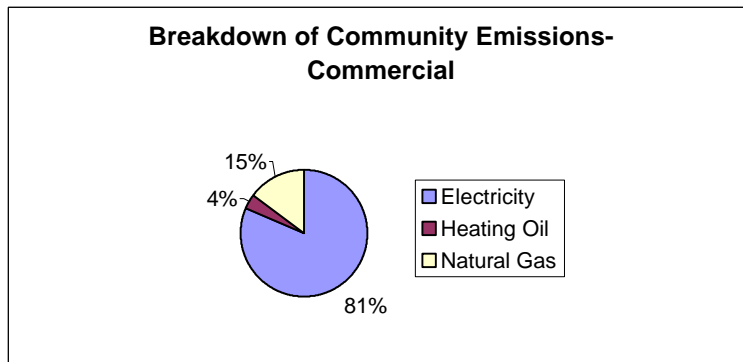
**Chart 7**



**Commercial**

For the Commercial sector, electricity was by far the largest contributor to greenhouse gas emissions in Medford. Programs aimed at energy efficiency in lighting and office equipment may be the most beneficial for reducing emissions in this sector. Refer to section VI of this report for further details on proposed community reduction measures. Chart 8 summarizes the emissions from each source within the Commercial sector for 1998.

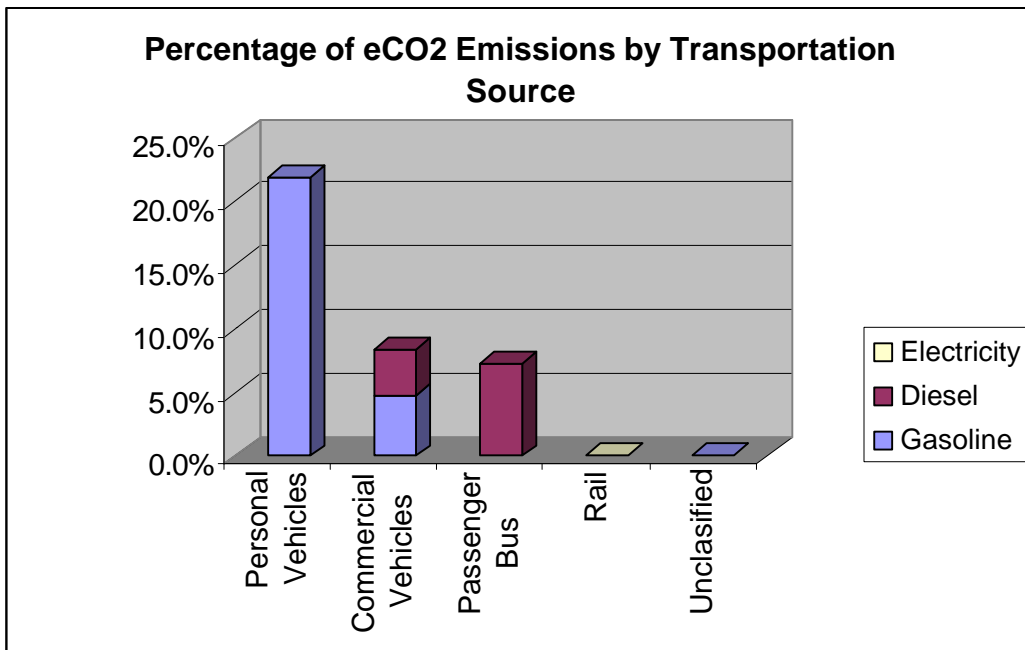
**Chart 8**



**Transportation**

The Transportation sector of the inventory consisted of personal vehicles, commercial vehicles, passenger buses, rail, and unclassified. The Inventory indicated personal vehicles as the single highest source of greenhouse gas emissions in the City. The 1998 data for tons of eCO<sub>2</sub> among modes of transportation are summarized in the following chart.

**Chart 9**



Emissions reductions can come about in the Transportation section through the implementation programs and policies aimed at getting people out of their vehicles through seeking alternative modes of transportation, such as biking or walking. Additionally, the City can encourage residents to take advantage of public modes of transportation, carpools, or alternative fuel vehicles. Refer to section VI of this report for further details on proposed community reduction measures.

**Waste**

The Emissions Inventory did not quantify emissions for waste. The majority of waste produced in Medford is incinerated, however a small amount, approximately 3,000 tons per year, is landfilled. Any solid waste that is sent to a landfill can contribute to CH<sub>4</sub> gas emissions from decomposition. Quantifying the emissions from solid waste is difficult without knowing the actual content, therefore these emissions have not been calculated here, but the Energy Task Force believed it was important to recognize that there are emissions from this source.

Section IV

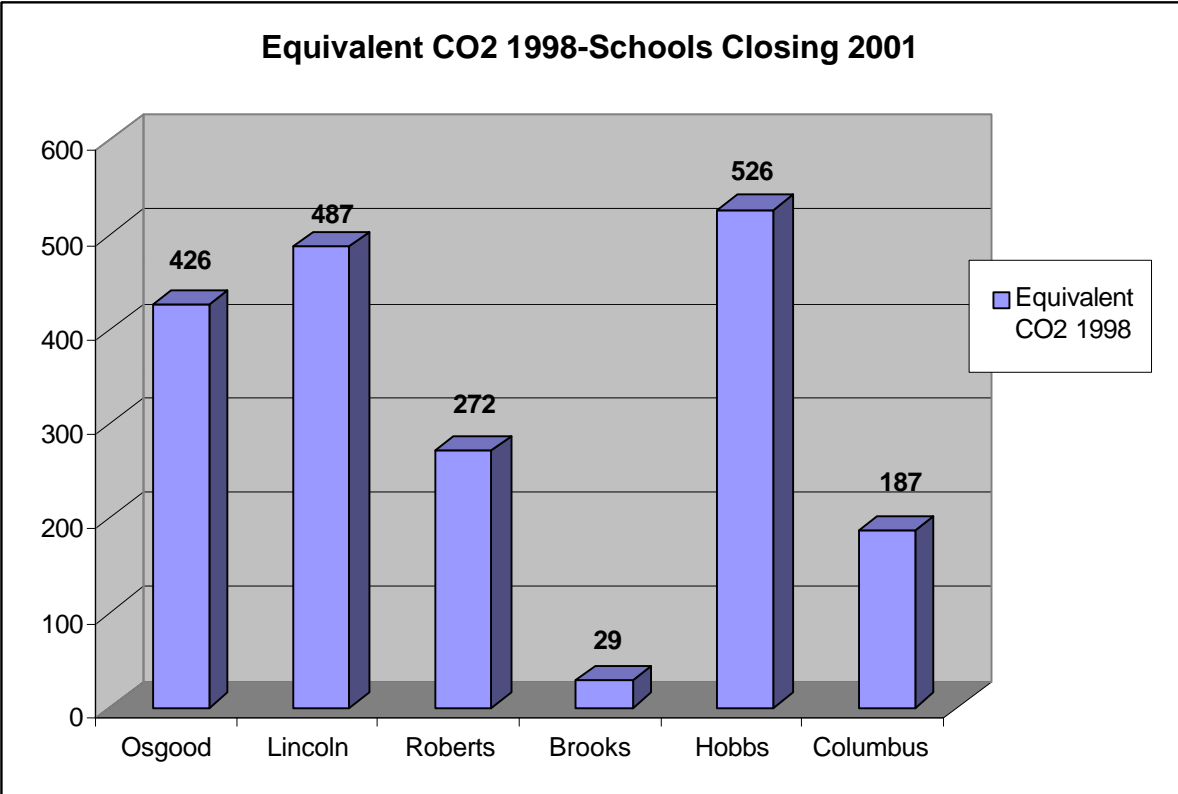
**EXISTING/PROPOSED REDUCTION MEASURES-MUNICIPAL**

**BUILDINGS**

According to the Emissions Inventory, over 56% of Medford's 1998 municipal emissions were from the schools. The 1998 eCO<sub>2</sub> emissions from the schools were

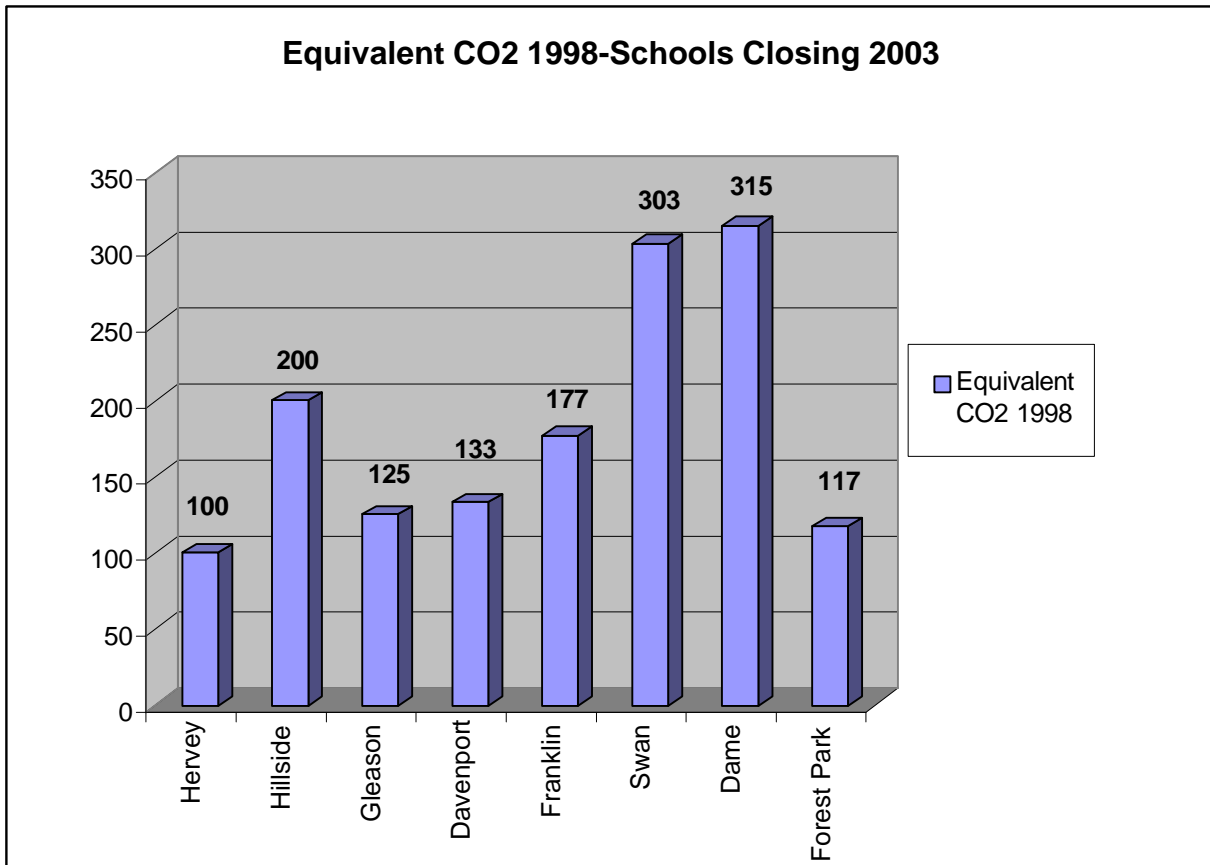
8,898 tons. The City of Medford currently has 11 elementary schools, 3 middle schools, 1 high school/vocational school, and 2 alternative schools. The average age of the elementary and middle school buildings is nearly 80 years. The City has already undertaken a major construction project which consists of replacing all the current elementary and middle schools with 5 new school buildings by 2003. The Brooks, Columbus, and Osgood elementary schools and the three current middle schools (Hobbs, Lincoln, and Roberts) will close after the 2000-2001 school year. Two new elementary and one new middle school will replace these schools. All remaining old elementary schools will close after the 2002-2003 school year. The above mentioned six schools accounted for 1,927 tons of that total. These buildings are going to be replaced with new buildings and reopened for students in 2003. Therefore, these emissions will not be completely eliminated, but are expected to decrease depending on the degree of efficiency the new buildings are created with.

**Chart 10**



Of the remaining schools, the schools listed in the chart below will be sold or destroyed. In 1998, these buildings collectively accounted for 1,470 tons of eCO<sub>2</sub> from municipal emissions. The actual eCO<sub>2</sub> reduction, however, will be dependent on the decisions made regarding the fate of each of these buildings.

**Chart 11**

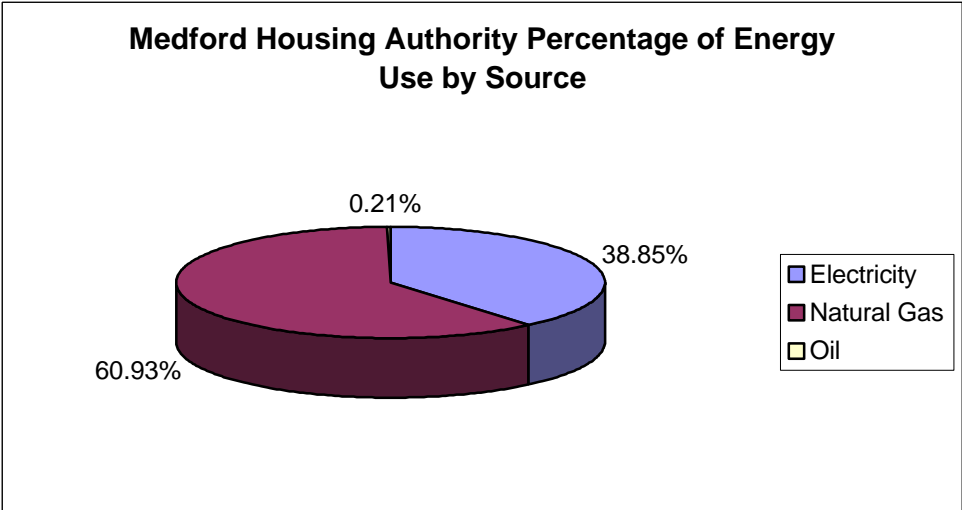


In 1998, the high school was the largest emitter of eCO<sub>2</sub>. This building is not scheduled for a replacement, however the City is converting the high school heating system from oil to natural gas. This measure will take place summer 2001. Based on the same level of usage, this will result in a reduction of 665 tons of eCO<sub>2</sub> per year. Although natural gas is a greenhouse gas, it produces about 30% fewer eCO<sub>2</sub> emissions as heating oil. Additionally, the City is considering various efficiency upgrades within the high school, which will increase the eCO<sub>2</sub> reduction value.

Although the Medford Housing Authority (MHA) is not technically a part of the municipal government, it was included in the Emissions Inventory that was conducted in 1999. Therefore, it will be included in this plan and strongly encouraged to take appropriate measures to create its own emission reductions. MHA manages seven properties and approximately 854 units within Medford. The MHA has already taken several energy efficiency measures throughout these properties. These measures include water saver toilets, low-flow shower heads, and conversion of all lighting, except appliances, to fluorescent bulbs and electronic ballasts. Additionally, two properties have converted to high-efficiency gas burners and several more are examining the possibility. MHA is currently working with

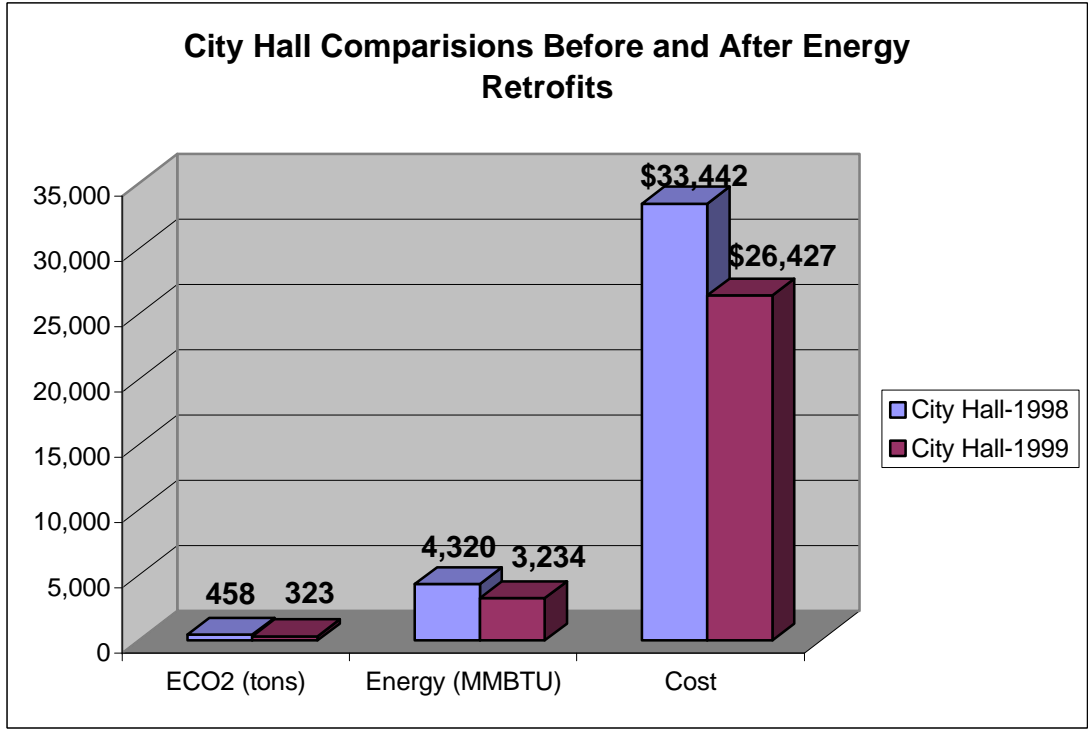
Keyspan Energy Delivery Service to convert their 121 Riverside building from electric heat to natural gas. Based on the same level of usage as 1998, this measure will result in an estimated reduction of 541 tons of eCO<sub>2</sub> per year, once completed.

**Chart 12**



In 1999, City Hall underwent a conversion from heating oil to natural gas. Additionally, most indoor lighting was upgraded from magnetic to electronic ballasts and efficient lighting replaced previous lights. This conversion and the lighting upgrades created an estimated reduction of 133 tons of eCO<sub>2</sub> per year, reduced energy costs by more than \$7,000, and created a significant reduction in maintenance costs from 1998 to 1999. The following chart depicts the changes from 1998 to 1999.

**Chart 13**



All reduction measures are estimated assuming the current level of energy is equal to the level calculated at the time of the Emissions Inventory.

**Table 3  
EXISTING AND PROPOSED REDUCTION MEASURES FOR BUILDINGS**

Measures	Estimated Reductions in Tons of eCO <sub>2</sub>
School Replacement-2001	1,927
School Replacement-2003	1,470
High School Conversion Oil to Gas	665
MHA Conversion Electric to Gas	541
City Hall Retrofits	133
<b>TOTAL</b>	<b>4,736</b>

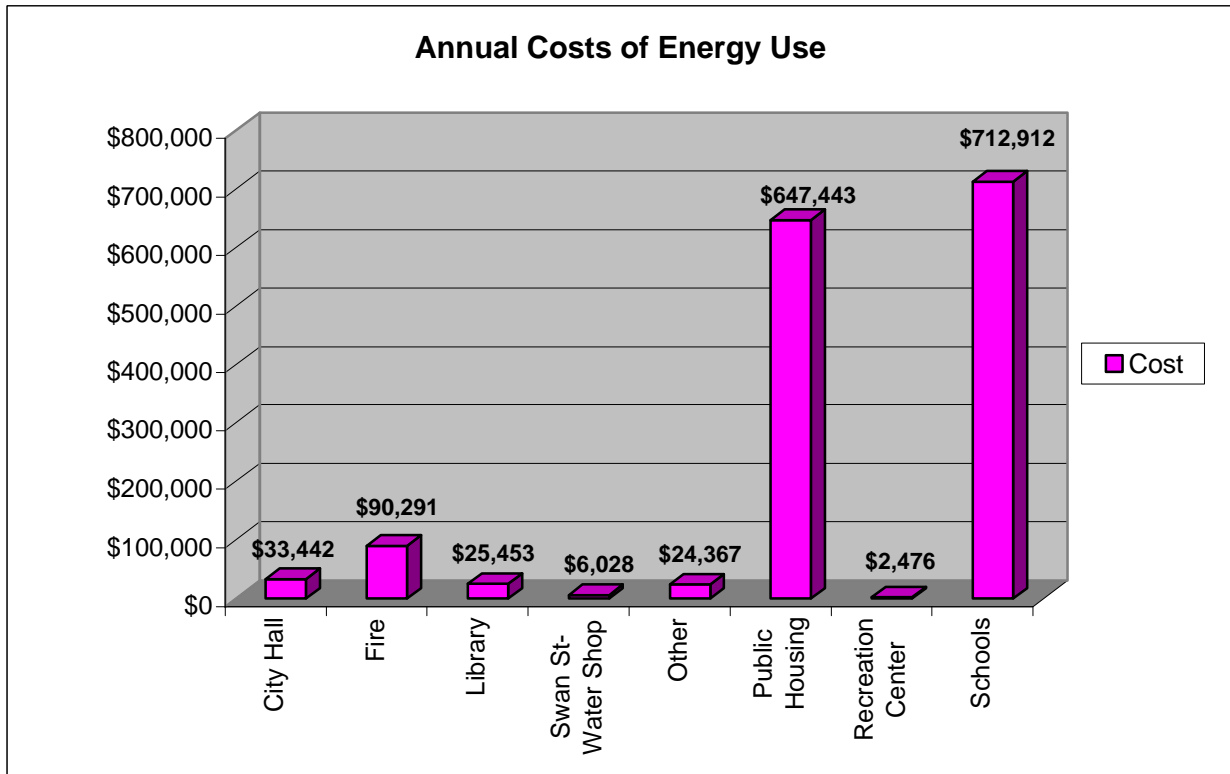
Although the estimated emissions reduction numbers add up to 4,736 tons, this number does not take into account the emissions from the new schools, which cannot be calculated until the schools are operating for nearly one year. Also, the emissions from school buildings that are being sold and not destroyed does not eliminate these emissions from the atmosphere, but just eliminates the ownership from the City. These emissions will still be included in the community emissions analysis, and therefore, are still part of the City's emissions. The City of Medford prefers to calculate emission reductions from complete elimination of CO<sub>2</sub>

emissions, not just transfers from one owner to another. Therefore, our target is not considered attained until it can be confirmed through a follow-up inventory.

Various Fire and Public Safety buildings within Medford have also incorporated energy efficient measures into their budgets, such as insulating doors and replacing windows. Additionally, the Fire Department is investigating converting two of the Public Safety Buildings from oil to natural gas heat. This conversion alone should provide a 30% reduction in eCO<sub>2</sub> emissions from these buildings.

It is important to note that the emissions reductions, which this Plan is aimed at achieving, will also create cost savings to the City. This was demonstrated with the City Hall model above. Energy efficient retrofits of other municipal buildings could create a significant cost reduction for the City. The following chart summarizes the costs of energy use within municipal buildings for the year 1998.

**Chart 14**



Since the inventory, the City has also acquired another building, Hormel Stadium, which is emitting an estimated 129 tons of eCO<sub>2</sub> and is incurring energy costs of more than \$16,000 annually. Please refer to Section IV of this report for further details on Hormel Stadium.

In addition to the reduction measures already taken, the City of Medford has proposed additional programs to create emission reductions. These programs are summarized below.

### **Local Energy Efficiency Code-Municipal Buildings**

There have been some recent changes regarding new energy conservation requirements made to the Massachusetts State Building Code. Prior to these changes, the State energy requirement for all buildings was 10% above the minimum threshold needed. Now, the recently passed proposals require that it be at the minimum threshold.<sup>16</sup>

The conservation requirements for new low-rise buildings (under four stories in height) took effect on March 1, 1998. These requirements are based on the 1995 Model Energy Code, with Massachusetts specific amendments. On July 13, 1999, the Board of Building Regulations and Standards (BBRS) voted to adopt a complete revision to the energy conservation requirements for new commercial buildings in the Massachusetts State Building Code (780 CMR, Chapter 13). The new requirements took full effect as an option on January 1, 2001 and became mandatory on July 1, 2001.<sup>17</sup>

The code for the City of Medford is the same as the State and applies to the residential and commercial sectors. The State's new building code regulations will apply to the City as well. However, the City could also consider developing its own regulatory or voluntary green building code that would require enhanced energy efficiency design in all new structures or substantial additions.

The City can develop a local energy efficient building code-detailing the use of insulation, double paned windows, compact fluorescent light bulbs, and other efficiency measures, as well as the use of renewable energy sources. This code could be a supplement for the Energy Efficiency Code of Massachusetts, detailing more specific information for residents in Medford. If adopted, this program would require all new municipal buildings to meet or exceed both the State and local efficiency codes.

### **Annual Energy Audits**

The City of Medford should conduct annual energy audits in each of the municipal buildings. The City should rate each of the buildings based on the level of efficiency and assign a priority to each in order to update all buildings with the most efficient technology feasible. Additionally, the efficiency retrofits should be coordinated into a time schedule to ensure the completion of all retrofits within a specified time frame.

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<sup>16</sup> Town of Brookline. 2001. Action Plan (Model Two), May 21.

<sup>17</sup> Town of Brookline. 2001. Action Plan (Model Two), May 21.

## **Renewable Energy Sources**

The City of Medford should require all municipal buildings have annual energy audits. As part of these energy audits the City should examine potential renewable energy sources. This should include an evaluation of the economic feasibility of converting existing buildings to realistically available renewable energy sources. Any new municipal buildings should be required to utilize a renewable energy source for at least one energy use: heating, electricity, or hot water, or for 35% of total energy use per building.

### **Hormel Stadium-Retrofit**

The City of Medford acquired Hormel Stadium from the Metropolitan District Commission in the year 2000. This building is in dire need of energy efficiency upgrades. Energy use in 1999 cost \$16,534 and emitted approximately 129 tons of eCO<sub>2</sub>.

The City proposes several energy efficiency measures at Hormel Stadium, including insulation and possible conversion to renewable energy sources. The Energy Task Force has taken the initiative to evaluate the potential measures necessary at Hormel to create energy savings and a cost reduction for the City.

## **LIGHTING**

The Emissions Inventory indicated lighting as the second largest emitter of greenhouse gas emissions in Medford in 1998. The following are a list of initiatives the City can undertake to curb these emissions.

### **Streetlight Conversion**

Lighting of public places and streets is a major energy drain for municipalities. The City of Medford does not own the vast majority of the streetlights in the City. They are owned by either the electric utility, Massachusetts Electric, or the State through the Metropolitan District Commission. Although the utility owns the streetlights, the City pays the electricity bills. Therefore, having the most efficient lighting possible will not only reduce emissions, but will also generate cost savings for the City.

The lighting industry is constantly developing new technologies that produce the same amount of light while using less energy and therefore creating a substantial cost savings in energy expenses. For streetlights, one of the most efficient lamps at this time is the high-pressure sodium vapor. The majority of the streetlights within Medford have been converted from the less efficient incandescent and mercury vapor lamps to the more efficient high-pressure sodium vapor. The high-pressure sodium lighting is 57 percent more efficient than incandescent, using 825 fewer kilowatt-hours (kWh), and 32 percent more efficient than mercury vapor, using 292 fewer kWh.<sup>18</sup>

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<sup>18</sup> City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

As of summer 2001, 541 of the approximate 4,600 streetlights in Medford are still mercury vapor. The City is working with Massachusetts Electric to convert these remaining lamps. Upon the completion of this conversion the City will save an estimated \*\$19,647.80 annually on its electricity bill and further reduce eCO<sub>2</sub> emissions by 148 tons.

\* = This number is based on a 196,478 kilowatt hour (kwh) savings at \$0.10 per kwh.

Additionally, Medford should require any new streetlights added to its system be high-pressure sodium or the most energy efficient lamp at the time of purchase.

### **Streetlight Inventory**

In a further effort to reduce emissions from streetlight usage, the City of Medford can conduct an inventory of all streetlights in the City to evaluate the necessity of each streetlight for public safety concerns. The Medford Energy Task Force will oversee this program, if initiated. To be effective, the program must detail specific criteria, as approved by the Chief of Police, for determining the necessity of each streetlight for the purposes of public safety. Once a light has been determined by the Energy Task Force and the Police Chief to be unnecessary for public safety the lamp will be removed from the streetlight and stored in a facility for re-use in another streetlight, if feasible, or should be recycled by a licensed contractor.

### **Traffic Light Conversion**

In 1998, City traffic lights accounted for 114 tons of eCO<sub>2</sub> and cost the City nearly \$37,000. New technologies have been developed to replace energy-intensive incandescent bulbs in traffic signal lights with highly efficient light emitting diodes (LEDs). The technology is expected to reduce energy use by 90 percent, lower maintenance due to increased life, and incorporate innovations such as battery backup using photovoltaics.<sup>19</sup> Since 1998, there have been three intersections in Medford where traffic lights have been converted to LEDs. Two additional intersections are currently scheduled for replacement.

In regards to the costs, the electric utility offers a rebate for the conversion to LEDs, providing a \$75 rebate for every red light converted and a \$90 rebate for each green light conversion. Yellow lights are typically not converted due to the lesser amount of time which they are on.

Additionally, any new traffic lights that are added onto the Medford system should be required to be LEDs.

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<sup>19</sup> Suozzo, Margaret. American Council for an Energy-Efficient Economy. 2001. LED Traffic Signal Market Transformation: An Update with Boston-Area Case Studies. February.

## **Photovoltaic Recreational Lighting**

The City of Medford manages over 20 parks. These parks are used primarily in the spring and summer. Due to the seasonal usage, this is a significant opportunity for installing photovoltaic cells to fuel the arc lights in the recreational fields. These lights will nearly eliminate emissions, but will also serve as a demonstration of the City's commitment to reduce its impact on the environment and to create a cleaner, healthier Medford.

The City should establish a replacement schedule to phase in the photovoltaic lamps over a five-year period. Medford aims to have all lights in all municipally owned recreational parks converted to photovoltaic lamps by 2010.

## **FLEET**

The City of Medford strives to maintain as efficient a fleet as is economically feasible. The City will consider undertaking several measures, including those listed below in order to reduce greenhouse gas emissions from its municipal fleet.

### **Increase Fuel Efficiency and Downsize Vehicles**

Whereas the City of Medford is committed to reducing its emissions of greenhouse gases and reducing air pollution, the City should require that all new vehicles purchased by the City for municipal use, be the most fuel-efficient vehicle in the class required for the job.

Additionally, current vehicles in every department shall be evaluated to determine if the size and the fuel type of the vehicles are appropriate based on the frequency and the type of usage. Where feasible, the City of Medford should purchase smaller vehicles for each department.

### **Alternative Fuel Vehicles**

There are currently several alternative fuels available for use by vehicles. Many of these fuels are considered "Clean Fuels" because they create less pollution than traditional gasolines.

U.S. Department of Energy classifies the following fuels as "alternative" to gasoline: biodiesel, electric, ethanol, hydrogen, methanol, natural gas, propane, P-series, and solar. The Commonwealth of Massachusetts mandates that 75% of new light-duty vehicles purchased for the State are alternative fuel vehicles (AFVs).

The City of Medford could commit to purchasing AFVs to replace gasoline and diesel vehicles currently in the City's fleet. The City of Medford may consider a goal of having 50% of all new light duty vehicles purchased for the City be AFVs, by 2003. In addition to the above fuel options, the City can also consider gasoline-electric hybrids for local work in the interim. Although hybrid vehicles are not

nationally considered AFVs due to the fact that they utilize gasoline, the City of Medford believes they have could be useful in certain positions within the City. Hybrid vehicles are ideal for most of the inspectors within the City that utilize a vehicle if they are traveling locally at slower speeds and do not need to carry a significant amount of materials.

Medford understands that the best opportunity to reduce emissions within its fleet is through the purchase and use of alternative fuel vehicles. One fuel the City has researched is CNG. Natural gas is a significantly cleaner fuel than petroleum. The City should commit to gradually turning its municipal fleet over to alternative fuels such as CNG. Additionally, the City should make a commitment to support the construction of any alternative fueling station within Medford, provided that the fuel will be available to municipal vehicles and will aid in the conversion of the City fleet to AFVs.

### **Support Cleaner Fuel School Buses**

Due to the fact that the public school buses are contracted the only way in which the City can make changes is by adjusting its contract to specify the use of alternative and cleaner fuel buses. There has already been some discussion between the City and Joseph's Transportation, the current contract holder, regarding pursuing an investment in cleaner fuel buses. The City of Medford is willing to assist Joseph's and any other bus company with whatever information they may require to make decisions on purchasing cleaner fuels buses. By 2003, the City should also require that 25% of the public school buses are AFVs.

### **Idling Policy**

The City recognizes idling as an unnecessary waste of money and fuel and a senseless contributor to air pollutants and greenhouse gases in the atmosphere. A gasoline vehicle idling for two hours burns two gallons of gas and emits approximately 44 pounds of eCO<sub>2</sub> into the atmosphere. A diesel vehicle idling for two hours burns approximately one to two gallons of fuel<sup>20</sup> and emits 22-44 pounds of eCO<sub>2</sub> into the atmosphere.<sup>21</sup> In addition to emissions, an idling vehicle effect engine life. A diesel vehicle that idles for one hour a day is equivalent in engine wear to driving 64,000 miles and using over 500 gallons of fuel annually. This creates significant maintenance and fuel costs for the City.<sup>22</sup>

The Commonwealth of Massachusetts has mandated a 5-minute maximum idling time for vehicles.<sup>23</sup> The City of Medford will consider establishing an Idling Enforcement Program for municipal operations, which will enforce the 5-minute idling time prescribed by the State regulations. The primary method of enforcement

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<sup>20</sup> International Council for Local Environmental Initiatives, Green Fleets, from [www.greenfleets.org](http://www.greenfleets.org)

<sup>21</sup> Environmental News Network, "Truck and Bus Operators to Study Idle Emissions Controls," July 19, 2001, from [www.enn.com](http://www.enn.com)

<sup>22</sup> American Trucking Association. 1989. Document #1419 "Diesel Idling," February 2, from [www.greentruck.com/air\\_emissions/1419.html](http://www.greentruck.com/air_emissions/1419.html).

<sup>23</sup> Massachusetts General Law, Chapter 90, Section 16A, from [www.state.ma.us/legis/laws/mgl/90-16A.htm](http://www.state.ma.us/legis/laws/mgl/90-16A.htm)

will be through an educational program as well as through incentives. The City can provide incentives in the form of public recognition for City employees who obey the idling policies of the State and City government.

### **Trip Reduction Program-City Hall Employees**

Motor vehicle usage accounted for 38% of community emissions in Medford in 1998. Out of this, personal vehicles were more than 21%. In an effort to reduce these amounts and to encourage the use of alternative modes of transportation among municipal employees, Medford is establishing several Trip Reduction Programs.

The City aims to develop and manage a variety of commuter Trip Reduction Programs designed to encourage vanpooling, carpooling, use of transit services, bicycling, and walking by City employees commuting to and from work. These commuter programs will be available to all City employees not requiring the use of their own vehicle for work related business. The goals of these types of programs is to alleviate traffic congestion, reduce energy consumption, and curtail vehicle emissions and air pollution to create a healthier workforce and downtown environment. Some trip reduction initiatives are listed below.

- ❑ The City of Medford can organize carpools and vanpools for City employees who live in the same areas of Medford. Ideally, the employees will rotate drivers each day. The City can also provide preferential parking for the carpools. This will not only reduce greenhouse gas emissions, it will also cut gasoline costs for each member of the carpool.
- ❑ Various incentives can be offered to those employees that take advantage of the Program. The City will consider seeking discounts and coupons from local businesses for such things as lunch, clothing, and specialized items.
- ❑ A City contact should be established to arrange for alternative transportation-shuttle buses, carpools, vanpools, etc. for City Employees.
- ❑ The City should also provide incentives and discounts to those employees that walk or bike to work. These employees will be completely eliminating emissions from their commute. Therefore, the City should do its best to provide bike racks and places for storing equipment.
- ❑ The City can research the opportunity of getting involved in the Zipcar program. The most common comment regarding taking alternative modes of transportation to work is that the employees like to run errands on their breaks. The solution to this could be establishing a corporate account for the City of Medford employees with Zipcar. The Zipcar program is a Boston-based program which provides vehicles for people to use on an hourly basis. This type of situation is ideal for running errands. The City of Medford can set up a corporate account which will allow its employees to use the vehicle for various purposes throughout the day.

## **Bicycle Patrol Program**

Although the police department vehicles were not included in the Emissions Inventory for the years 1995 and 1998, the City does have data for 2000-2001. From June 2000 to April of 2001, the police department used 47,677.7 gallons of fuel. In addition to cost savings, alternative modes of transportation will create significant reductions in greenhouse gas and general air pollutant emissions within this area of municipal government.

Bicycle patrols provide a low-cost and highly visible vehicle alternative that improves community relations and officer morale while reducing emissions. Over the years, the City has demonstrated the viability of using bicycles in place of patrol vehicles throughout the City.<sup>24</sup> Currently, Medford owns eight bicycles and has 15 officers that are certified to use them. Medford should continue to increase these numbers over the next nine years.

Please refer to Section V of this report for additional transportation policies that relate to the community as a whole.

### **Section V**

## **Additional Municipal Emission Reduction Measures**

### **PROCUREMENT**

Procurement policies specify how and what goods and materials the City purchases. Municipalities are often required to submit proposals for services and goods. The purchase is made from the entity that supplies the services and/or goods for the least amount. This low-bidder requirement can often leave the City with a lower quality product. Therefore, it is imperative that the City specifies certain requirements in its proposal. By inserting energy efficiency requirements into the procurement policies, Medford can guarantee that its efforts to reduce its emissions will not be compromised by having to choose the low-bidder.

To ensure energy and cost savings for the future, the City of Medford should institute two important procurement policies: an Energy Star® or Equivalent Purchases Only Policy and Life Cycle Cost Analysis Policy. In addition, Medford should create a Green Energy Procurement Policy, which could be utilized, as renewable energy sources become more readily available.

### **Only Energy Star® or Equivalent Purchases**

The Energy Star® office equipment program was created in 1992 by the DOE and EPA to increase the energy efficiency of common office equipment. Energy Star® manufacturing partners voluntarily join this effort by agreeing to label products that meet stringent efficiency criteria. Many computers, monitors, copiers, fax machines

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<sup>24</sup> City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

and other devices on the market are Energy Star®-compliant, and as the program expands new products are being added to the list of labeled products, including televisions, VCRs and lighting fixtures.<sup>25</sup>

Energy Star®-labeled equipment (which is designed to use energy more efficiently while in operation) contains automatic power management features that will reduce its power, or even turn itself off, after a period of inactivity. Priced comparably with conventional office equipment, Energy Star®-labeled equipment can save as much as 50-75 percent of total electricity use, depending on the type of device and usage patterns. This creates an opportunity for substantial operating cost savings and pollution prevention.<sup>26</sup>

Because of these substantial projected savings in electricity costs, the City of Medford should require all new office appliances purchased for the City be Energy Star® or equivalent and should establish an Environmentally Preferable Product Program based on the program established by the Commonwealth of Massachusetts.

It is important to note that in order to be effective, Energy Star® products must have the specific energy efficient features active. The City of Medford should assign a member of the Data Processing Team to ensure that all computers and other office equipment with the Energy Star® logo are in the active mode. Additionally, the City could provide educational resources for its employees to train them on how to maintain the equipment in active mode and the benefits of doing so.

### **Require Life Cycle Cost Analysis**

Currently, many of the most efficient products on the market tend to have a slightly higher up front cost than the competition, but by looking at the overall costs of owning the appliance, typically the more efficient product will be cheaper. Life Cycle Cost Analysis will examine the overall costs of an item including the maintenance and energy costs along with the initial costs of the item. Utilizing Life Cycle Cost Analysis will ensure that the most energy efficient product for the job will be purchased and avoid the downfalls of going with the cheapest product that costs much more to maintain and operate.

The City of Medford should institute a procurement regulation requiring that Life Cycle Cost Analysis is evaluated before a major product purchase, such as computers, printers, copiers, etc., is made by any municipal department, including schools.

### **Block Purchasing of Green Energy**

With the deregulation of electricity in Massachusetts, consumers are free to choose their electricity provider. An option communities have is to pool together their

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<sup>25</sup> City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

<sup>26</sup> Ibid.

electricity needs and engage in block purchases in order to save money. Additionally, electricity providers will be better able to provide green energy options, which draw electricity from renewable energy resources.

Local governments now have the opportunity to build a block purchasing group either within the City or with other cities to buy green power from electric utilities. Medford could consider working with the City of Somerville and/or Tufts University to create a block purchasing group for green energy. Additionally, the City could pass a resolution requiring the utilities to provide a certain percentage of renewable energy sources to Medford customers.

## **WASTE/RECYCLING**

The majority of Medford's municipal solid waste is sent to an incinerator, however approximately 3,000 tons of solid waste per year is transported to a landfill located in New Hampshire. Any solid waste that is sent to a landfill can contribute to CH<sub>4</sub> gas emissions from decomposition.

Medford currently runs a very successful recycling program which provides residents the opportunity to recycle paper products, various containers, scrap metal, and yard waste. Additionally, the City provides compost bins for a small fee. Medford does not currently provide recycling services for the commercial or industrial sectors of the City. Private haulers are responsible for waste from these sectors and are not required to provide recycling services. The City should continue to seek ways of diverting solid waste from the landfill through recycling efforts.

### **Increase Recycling Areas and Awareness**

Although Medford has a strong recycling program, there are a few ways in which the City could further reduce waste. The only recommendation for the residential recycling is to increase individual recycling amounts through educational awareness programs. It may be beneficial to involve school children so they can apply what they learn in school to what they do at their own homes.

Currently, municipal curbside recycling is not offered to commercial or industrial operations within Medford. Providing these sectors the opportunity to participate in local recycling with the City could ensure recycling within these areas. Another option to ensure recycling in these sectors is to create a by-law requiring all private haulers who service commercial and industrial sectors in Medford provide recycling services for their customers.

## **Section VI**

### **EXISTING/PROPOSED REDUCTION MEASURES-COMMUNITY**

The above proposed policies are the measures that the City places on itself to reduce municipal emissions. By initiating such programs, the municipal government can be a role model for the entire community. The City can encourage the local community to reduce the amount of electricity used by promoting numerous efficiency solutions. An array of products and services are available, including energy-efficient refrigerators, washing machines, and light bulbs; home energy audits; and heating, ventilation and air conditioning system tune-ups and new equipment purchase incentives. The following proposed policies are measures the City can take to encourage residents and the private sector to be more energy efficient within their homes and businesses and to reduce their own greenhouse gas emissions.

#### **BUILDINGS**

##### **Local Energy Efficiency Code-Residential**

In an attempt to make residential buildings more efficient, the City should evaluate and pilot a few incentive programs which are aimed at encouraging residents to utilize energy efficient products, particularly Energy Star® products in the home. These incentives should apply to those residents who are building or remodeling energy efficient houses. These incentives may consist of reduced costs or priority consideration for permits for energy efficient homes. The City can develop a local energy efficient building guidebook-detailing the use of insulation, double paned windows, compact fluorescent light bulbs, and other efficiency measures, as well as the use of renewable energy sources. Additionally, the guidebook should include where and how to obtain grant money for undertaking such efficiency upgrades.

##### **Local Energy Efficiency Code-Commercial & Industrial**

To encourage energy efficiency and emissions reductions within the commercial and industrial sectors, the City could require all new commercial and industrial buildings meet strict energy efficiency standards. These standards should be detailed in the new City Building Code created through the acceptance of this Climate Action Plan (refer to Section IV of this report). To aid in the compliance of the new energy code, the City should develop a local energy efficient building guidebook-detailing the use of insulation, double paned windows, compact fluorescent light bulbs, utilizing renewable energy sources, and other efficiency measures. This guidebook should also contain information on grant money available to anyone who pursues such measures.

One possible requirement for new commercial and industrial buildings in Medford is the installation of a light-colored roof in order to lower energy costs in the summer from air conditioning. Additionally, each commercial and industrial building could be

required to utilize a renewable energy source for at least one energy use: heating, electricity, or hot water, or for 35% of total energy use.

### **Incentives for Energy Efficiency and Renewable Energy Sources**

In order to encourage efficiency upgrades, the City could reduce the cost of a permit for remodeling or building which include measures that increase efficiency and consider renewable energy sources for buildings.

## **TRANSPORTATION**

### **Biker/Pedestrian Friendly Roads**

The four greatest impediments for commuters choosing to bike to work are weather, distance, safety, and inadequate facilities for storage and changing at their destination. Although the City does not have control over the weather or the distance a person commutes to work, it can work to ensure the safety of its bicycling community. One way to do this is provide more biker and pedestrian friendly roads. By adding more bike lanes in conjunction with road improvements the City can demonstrate its commitment to its bicycling community and to its goal of reducing its per capita vehicle miles traveled, thereby reducing overall vehicle emissions. Additionally, the City can make an effort to provide more bike racks throughout the downtown area and outside City Hall and other public buildings.

To encourage walking or biking among children, a “Walking Bus” program could be established through cooperation with the elementary schools. Such a program would allow parents to walk their kids to school. Those families that live closest to the schools their children attend would utilize this program. Similar programs have been initiated in other Massachusetts cities and have fostered strong parent-child relationships as well as created a greater sense of community when families walked together.

### **Alternative Fuel Buses/ Alternative Fuel Taxis**

As the City is committed to creating a cleaner, healthier Medford, and as this Plan calls for the increased use of public transportation rather than personal vehicles, Medford will do all it can to encourage local transit and taxi operators to convert their fleet to cleaner fuel vehicles. The City is willing to provide educational tools as well as act as a liaison between transit and taxi operators and alternative fuel vehicle experts.

### **Encourage Transit Use by Local Business**

In addition to municipal efforts, the City could work with the commercial and industrial sectors to encourage them to provide incentives for employees to utilize public transportation. This will create a cleaner Medford, while educating local workers and increasing business for transit operators.

## **City-Wide Trip Reduction Program**

Motor vehicle usage in Medford accounted for 38% of community emissions in 1998. Out of this, personal vehicles were more than 21%. In an effort to reduce these amounts and to encourage the use of alternative modes of transportation among all residents of Medford, the City can foster and provide information to businesses to establish their own Trip Reduction Programs. These Trip Reduction Programs can follow the template established by the Municipal Employee Trip Reduction Program. The programs can consist of many alternatives to commuting as a solo driver, such as organizing and providing funding for carpools, vanpools, the use of transit services, bicycling, and walking. The goals of these types of programs is to alleviate traffic congestion, reduce energy consumption, and curtail vehicle emissions and air pollution to create a healthier workforce and downtown environment.

Additionally, businesses can participate in the proposed Zipcar program that the City may establish for the downtown area. Refer to Section IV of this report for further information on the proposed Trip Reduction measures to be taken for municipal employees.

## **COMMUNITY OUTREACH**

A community reduction target can only be reached through a commitment by the City to not only foster new programs and policies, but also provide thorough community outreach and education. There are three priority avenues which, after research and evaluation, the Energy Task Force believes would be ideal for the City to pursue in order to educate the community as a whole.

### **Public Education Campaign for the Environment**

The City of Medford should conduct a public education campaign that educates the community on climate change and the impacts individual activities can have. A successful campaign will consist of mass mailings to residences and businesses, City events, and educational programming on local cable access television.

### **School Curriculum**

The Energy Task Force has researched several school curriculums on climate change and other environmental issues. The City should seek to establish a climate change program within the science curriculum for the elementary, middle, and high schools. The City is currently in possession of programs created by other agencies which can be used in this capacity. Additionally, Medford should foster the reformation of an Environmental Club within the school system to provide a forum for environmental education and extracurricular activities.

## **Partnering with Community Groups**

The City of Medford and the Medford Energy Task Force should consider partnering with local community groups to conduct local events which provide information to residents and businesses on how to be more energy efficient and how to reduce personal greenhouse gas emissions. These partnerships will assist Medford in reaching its reduction targets as well as create a greater sense of community and responsibility among those involved.

## **Encourage Neighboring Cities to Join CCP Campaign**

As emissions of greenhouse gases understand no political borders, the City of Medford recognizes its commitment to reduce emissions can only go so far on its own. In addition to educating Medford residents and businesses, it will be important to encourage neighboring cities, such as Malden and Everett to join the CCP campaign. Medford is willing to take a leadership role in encouraging other cities in the metropolitan Boston area to recognize the climate change problem and to commit to reducing their own emissions. Neighboring Arlington and Somerville have already made the commitment to reduce greenhouse gas emissions by signing on to the CCP campaign in 2000 and 2001, respectively.

A considerable amount of land in Medford is owned by the Metropolitan District Commission (MDC). The City of Medford should also consider working with this entity to reduce their emissions, particularly in the areas of fleet and streetlighting. A number of streetlights in Medford are owned by the MDC and many of these are still mercury vapor lights. Conversion of streetlights to high-pressure sodium lights, conversion of fleet, and general education on climate change will be essential topics to introduce to the MDC for consideration on their property in Medford.

## **Section VII**

### **Other Measures**

In addition to the above measures to reduce emissions from municipal operations and the community, Medford should pursue two other measures which will increase the likeliness of attaining the reduction target goals.

#### **Hire an Energy Efficiency Coordinator**

The City of Medford should strive to incorporate energy efficient measures throughout every department and facet of municipal operations. The City should consider hiring a full-time Energy Efficiency Coordinator (EEC) who will be charged with the following:

- Maintain the emissions inventory

The EEC must maintain the CCP software and conduct an emissions inventory update once a year. The EEC should receive copies of all heating

and electricity bills for each municipal department in order to successfully quantify reduction measures.

- Director of the Public Education Campaign for the Environment  
The EEC will be charged with organizing programs for the community in order to educate them on energy efficiency, the potential for renewable energy sources, and other issues related to climate change. This will include integrating a climate change curriculum into the public school system.
  
- Head the Energy Task Force  
The EEC will be charged with heading the Medford Energy Task Force. The Task Force has already begun and should continue to conduct regular projects on energy efficiency within the City and host events throughout the City.

### **Tree Planting**

Urban forestry can serve as an effective measure to achieve substantial CO<sub>2</sub> reductions in addition to providing other social, economic and ecological benefits. Trees contribute to reducing CO<sub>2</sub> by sequestering carbon and mitigating the effects of urban heat islands. Strategic planting of trees can shade buildings and air conditioning units from the direct rays of the sun, thereby reducing electricity needed for air conditioning. Trees also provide shade for streets and parking lots (many of which are dark-surfaced and absorb heat), and the evapotranspiration from trees cools ambient air temperatures. Lowering temperatures lessens the energy demand for cooling, which in turn reduces the burning of fossil fuels and the emission of CO<sub>2</sub> and other air pollutants. The City continues to demonstrate a proven commitment to urban forestry and tree planting.<sup>27</sup>

In 1998, the City of Medford became a member of “Tree City USA”. This designation brings Medford official recognition from the Massachusetts Department of Environmental Management and the National Arbor Day Foundation as a City that places the management of trees as a high priority. In order to earn this title, a City must meet four standards: have a Tree Warden, a Tree Care Ordinance, a minimum budget of \$2 per capita, and the City must observe Arbor Day. The City of Medford maintains a forestry department of two people and the Tree Warden has been a City employee for over 30 years. The fiscal year 2001 budget for the Forestry department was \$337,155 dollars amounting to a per capita cost of \$6.05.

The California Energy Commission has estimated that on average, mature urban trees reduce the amount of CO<sub>2</sub> in the air by approximately 115 pounds per year. From 1990 to 2000, the City of Medford planted 2,625 new trees, leading to the sequestration of over 150 tons of equivalent CO<sub>2</sub> annually.

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<sup>27</sup> City of Los Angeles, Environmental Affairs Office. 2001. Los Angeles Energy Climate Action Plan. March.

# Summary of Proposed Emissions Reduction Measures

## **Municipal Reduction Measures**

### **Buildings**

- ❑ Local Energy Efficiency Code-Municipal Buildings
- ❑ Annual Energy Audits
- ❑ Renewable Energy Sources
- ❑ Hormel Stadium Retrofit

### **Lighting**

- ❑ Streetlight Conversion
- ❑ Streetlight Inventory
- ❑ Traffic Light Conversion
- ❑ Photovoltaic Recreational Lighting

### **Fleet**

- ❑ Increase Fuel Efficiency and Downsize Vehicles
- ❑ Alternative Fuel Vehicles
- ❑ Support Cleaner Fuel School Buses
- ❑ Idling Policy
- ❑ Trip Reduction Program-City Hall Employees
- ❑ Bicycle Patrol Program

### **Procurement**

- ❑ Only Energy Star or Equivalent Purchases
- ❑ Require Life Cycle Cost Analysis
- ❑ Block Purchasing of Green Energy

## **Waste/Recycling**

- ❑ Increase Recycling Areas and Awareness

## **Community Reduction Measures**

### **Buildings**

- ❑ Local Energy Efficiency Code- Residential
- ❑ Local Energy Efficiency Code- Commercial & Industrial
- ❑ Incentives for Energy Efficiency and Renewable Energy Sources

### **Transportation**

- ❑ Biker/Pedestrian Friendly Roads
- ❑ Alternative Fuel Buses/Alternative Fuel Taxis
- ❑ Encourage Transit Use by Local Business
- ❑ City-Wide Trip Reduction Program

### **Community Outreach**

- ❑ Public Education Campaign for the Environment
- ❑ School Curriculum
- ❑ Partnering with Community Groups
- ❑ Encourage Neighboring Cities to Join CCP Campaign

## **Other Measures**

- ❑ Hire Energy Efficiency Coordinator
- ❑ Tree Planting