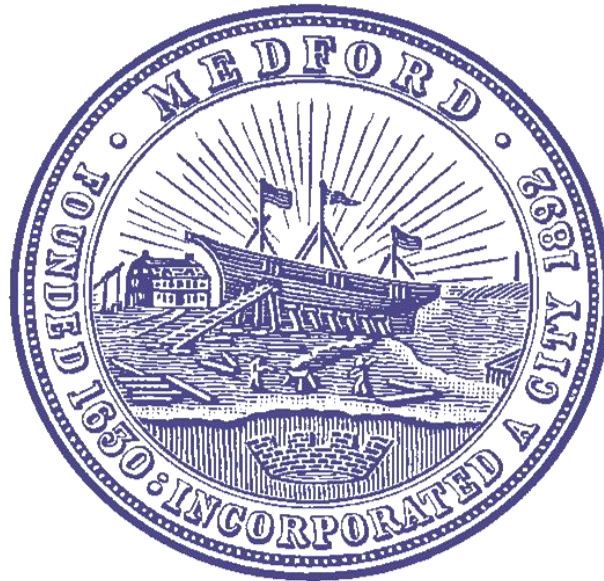

The City of Medford Local Energy Action Plan

Part I – Medford Energy Profile, Goals, & Actions

February 25th, 2013



Prepared by the Metropolitan Area Planning Council (MAPC)

for

The City of Medford



Acknowledgments

This plan was produced with input from municipal staff including Mayor Michael J. McGlynn and the Energy and Environmental Office, as well as City of Medford residents and businesses. Professional technical assistance was provided by the Metropolitan Area Planning Council: Erin Brandt, Energy Planner; Helen Aki, Energy Services Coordinator; and Po-Yu Yuen, Energy Intern.

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*Medford Harvest Your Energy Festival 2012
(From left: Medford Energy Committee Chair Fred Laskey,
Director of Energy and Environment Carey Duques, and Mayor
McGlynn)*

Executive Summary

In the wake of a national economic recession and increasing frequency and severity of extreme weather, local governments are paying more attention than ever to the costs and impacts of their energy consumption.

For over ten years, the City of Medford has been a leader in the advancement of energy efficiency and renewable energy. In 2001, the City adopted its first Climate Action Plan, identifying policies and programs to reduce greenhouse gas emissions. Since then, the City has made strides towards reducing municipal energy consumption, including becoming a Green Community. After achieving several of the goals outlined in the Climate Action Plan, the City of Medford is now ready to update its goals for the future and set more ambitious targets for clean energy actions in the community.

The Metropolitan Area Planning Council (MAPC) wrote the Medford Local Energy Action Plan in collaboration with the City of Medford. As part of MAPC's Local Energy Action Program (LEAP), the City was selected through a competitive application process to receive MAPC's technical assistance to write this plan and to help with project implementation over a two-year period. This plan is designed to provide clear guidance on how stakeholders, including city officials, the Medford Energy Committee, residents, and businesses, can advance their clean energy efforts.

The plan is divided into three parts. Part I presents a profile of Medford's energy consumption, highlighting how energy is used in Medford's municipal, residential, and commercial sectors, as well as a list of recommended short and long-term energy goals and actions. Part II of the plan consists of detailed action strategies to help guide energy stakeholders through key energy activities. Lastly, Part III presents supporting materials and information for the plan.

The breakdown of energy consumption among Medford's municipal, residential, and commercial/industrial sectors reveals the need to take a multi-sector approach in order to make significant reductions in Medford's overall energy use. In addition to having the City continue to invest in energy efficiency and renewable energy projects, it is critical that Medford residents and businesses also take the lead in such efforts. Having already met the existing municipal energy reduction goals, this plan recommends that new energy reduction and renewable energy generation municipal goals are set. Further, this plan emphasizes the need to set clear MassSave program participation goals and energy reduction goals for the residential and commercial sectors to help drive new clean energy actions.

While many of the recommendations and actions presented in this plan are outlined to take place in the next five years, this plan is designed to also position the City and its constituents to continue to set and to pursue new energy goals beyond the five-year mark.

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Introduction

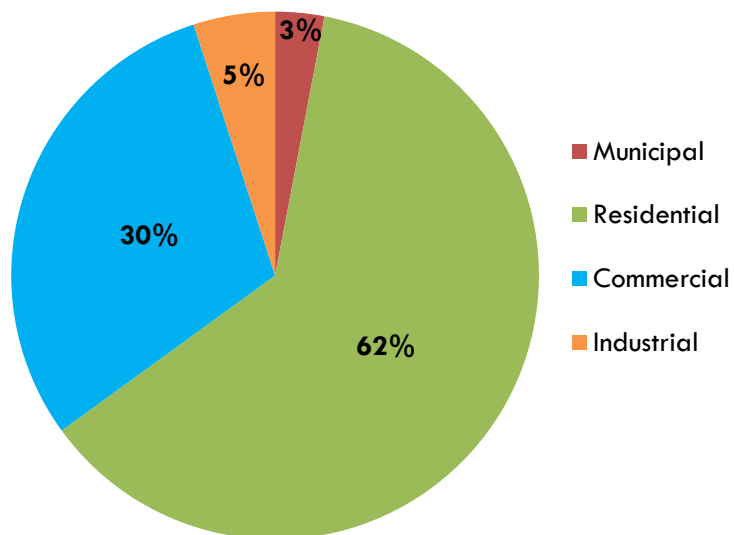
The Medford Energy Action Plan provides a blueprint for how the City of Medford can achieve community-wide energy reductions. Due to concerns over increasing energy costs, municipal fiscal responsibilities, and environmental consequences due to climate change, communities across the country are pursuing cost-effective and innovative ways to reduce energy consumption and invest in cleaner energy sources.

Over the last ten years, Medford has demonstrated the many steps a municipality can take to reduce municipal energy consumption, increase adoption of cleaner energy sources, and encourage and support its residents and businesses in pursuing such actions.

In February 2012, MAPC selected the City of Medford through a competitive application process, to participate in MAPC’s Local Energy Action Program (LEAP). Over a ten-month period, MAPC met with city officials, including the Mayor and the Office of Environment staff, Medford Energy Committee, residents, business owners, and other stakeholders such as National Grid, to understand the community’s priorities and interests in energy, sustainability, and community and economic development issues. These stakeholders were also represented on a Medford LEAP Working Group, which provided guidance and recommendations to MAPC during the development of the plan. Using feedback from the City and the LEAP Working Group, MAPC drafted the Energy Action Plan to provide guidance to the City and its constituents on the steps Medford can take to continue its commitment to clean energy.

Since the residential, commercial, and industrial sectors account for 97% of the City’s energy consumption, it is crucial that any clean energy efforts in Medford address energy use outside of municipal facilities. The Energy Action Plan contains recommendations and actions to promote energy efficiency and renewable energy installations, to increase community awareness of the importance of clean energy efforts, and to help Medford residents and businesses access clean energy opportunities.

FY 2012 Medford Energy Consumption by Sectors



How to Use the Plan

The purpose of this plan is to arm Medford with new energy goals and action strategies to advance the community's clean energy efforts. While the plan focuses on specific guidance for the next five years, it is also designed to position the City and its energy stakeholders to continue to work on energy issues indefinitely. This plan should be treated as a "living document," meaning that the City and the Energy Committee should review and update the document on an annual basis so that it continues to guide the community beyond 2017.

The plan is divided into three parts:

- **Part I**
 - **Medford Energy Profile:** This section provides an overview of Medford's energy use, including a history of Medford's past energy work and achievements and a profile of municipal, residential and commercial energy use.
 - **Medford Energy Goals and Actions:** This section offers recommended energy goals and actions for the City of Medford to expand its clean energy work.
- **Part II**
 - **Energy Action Strategies:** The Energy Action Strategies presented in Part II are designed to help stakeholders design and implement recommended energy actions.
- **Part III**
 - **Appendix:** The Appendix includes information that was used to develop the Medford Energy Action Plan.



Medford Energy Profile

For over a decade, the City of Medford has been a leader in pursuing clean energy opportunities. From municipal energy planning, to energy efficiency retrofits, to renewable energy development, the City has displayed great leadership in implementing clean energy efforts in the state.

Medford Climate Action Plan

In 2001, the City developed the Commonwealth's first [Climate Action Plan](#). The ultimate goal of the action plan was to identify actions and initiatives, such as programs and policies, to help Medford reduce its greenhouse gas emissions by 20% below 1998 levels by 2010.

Energy Efficiency Retrofits

Since the establishment of the Climate Action Plan, Medford has focused on municipal energy efficiency efforts. In 2002, the City conducted lighting upgrades in multiple municipal facilities, including converting all traffic lights to LEDs. In 2004, Medford City Hall became the first city hall in Massachusetts to receive an EPA Energy Star Plaque, which acknowledges the building's superior energy efficiency performance.

Clean Fleets

In 2005, Medford was among one of the first municipalities in the Commonwealth to implement the EPA Clean School Bus project. As part of the project, the City installed diesel particulate and diesel oxidation catalysts filters on the schools' 86 buses, which was estimated to reduce greenhouse gas emissions by more than 60 percent. During this time, the City also launched its Vehicle Emissions Reduction Program to reduce the emissions of the Housing Department, Public Safety Department, and Department of Public Works municipal fleets.

Medford Energy Use At-A-Glance

Community Overview			
Electric Provider	National Grid		
Natural Gas Provider	National Grid		
Population	56,173		
Area	8.6 sq. miles		
Density	6,859.9/sq. mile		
Medford Energy Profile			
	Energy Consumption (MMBTUs)	Energy Costs (Millions)	% of Total Community Energy Consumption
Municipal Sector	99 Thousand	\$3	3%
Residential Sector	2.2 Million	\$45	62%
Commercial Sector	1.1 Million	\$21	30%
Industrial Sector	197,000	unknown	5%
Total Energy Consumption	3.6 Million	\$69	100%

Energy-Pedia #1: Medford developed the Commonwealth's first Climate Action Plan.

In 1999, the City participated in the International Council on Local Environmental Initiatives' (ICLEI) Cities for Climate Protection (CCP) Campaign. As part of the campaign's five-step process, Medford used electric, gas, and oil utility bills to establish a baseline emissions inventory and an emissions reduction target. Using the emissions inventory and reduction target, the City designed its first Climate Action Plan. The plan highlighted the importance of reducing municipal building and municipal fleet energy consumption. Recommended measures for increasing municipal energy efficiency and lowering greenhouse gas emissions included:

- Conduct annual energy audits and examine potential renewable energy sources in each of the municipal buildings;
- Perform energy efficiency retrofits at Hormel Stadium;
- Maintain municipal streetlight inventory;
- Perform streetlight retrofits to more energy efficient fixtures;
- Perform traffic light retrofits to LEDs;
- Increase fuel efficiency of municipal fleet and downsize vehicles;
- Procure alternative fuel vehicles to replace gasoline and diesel vehicles in municipal fleet;
- Support cleaner fuel school buses; and
- Purchase only Energy Star® or equivalent appliances.

The Five Milestones of CCP Campaign

Milestone One • Conduct a Baseline

Milestone Two • Set a Reduction Target

Milestone Three • Develop an Action Plan

Milestone Four • Implement Actions

Milestone Five • Monitor Reductions

Source: Medford Climate Action Plan. For more information, see:

http://www.medford.org/pages/medfordma_energy/FINAL_LAP.pdf

Renewable Energy Projects



Medford's clean energy accomplishments are marked by the City's commitment to renewable energy. In 2009, the City received a \$37,000 technical assistance grant from the Massachusetts Department of Energy and Resources (DOER) to conduct a rooftop solar feasibility study on all six schools. The study has since been completed and the City is working towards installing solar on the roofs of the schools. That same year, the City commissioned Massachusetts's first municipal-scale wind turbine at the McGlynn and Andrews Schools Complex. The 100-kW turbine was funded by Massachusetts Technology Collaborative, Mass Energy Consumers Alliance, and a Clean Energy Choice Grant. Since January 2009, the turbine has produced approximately 10 percent of the McGlynn School's power. In addition to saving approximately \$25,000 annually in electricity bills, the project serves as a valuable educational opportunity for

Medford students and showcases how a municipality can lead the way for renewable energy awareness and development in the community.

State and Federal Recognition

A decade after adopting its first Climate Action Plan, Medford continues to lead by example in clean energy efforts. In 2009, the City received an Energy Efficiency and Conservation Block Grant totaling \$504,000 from the Federal Government to complete retro-commissioning and ventilation upgrades at the middle and elementary schools and to hire a part-time Energy Efficiency Coordinator.

In 2010, the City was among the first municipalities to be designated as a Green Community by DOER. As part of its designation, in the summer of 2011 the City received over \$270,000 in grant funding that it used to upgrade both Medford High School's hot water heaters and the lighting in 15 municipal buildings. Medford applied for the competitive Green Communities grant round in 2012 and was the only community to receive over \$250,000 in both the first and second round of grant awards. Medford plans to use the funding from the second grant round to complete energy efficiency work at the Chevalier Theater, including an oil-to-gas conversion.

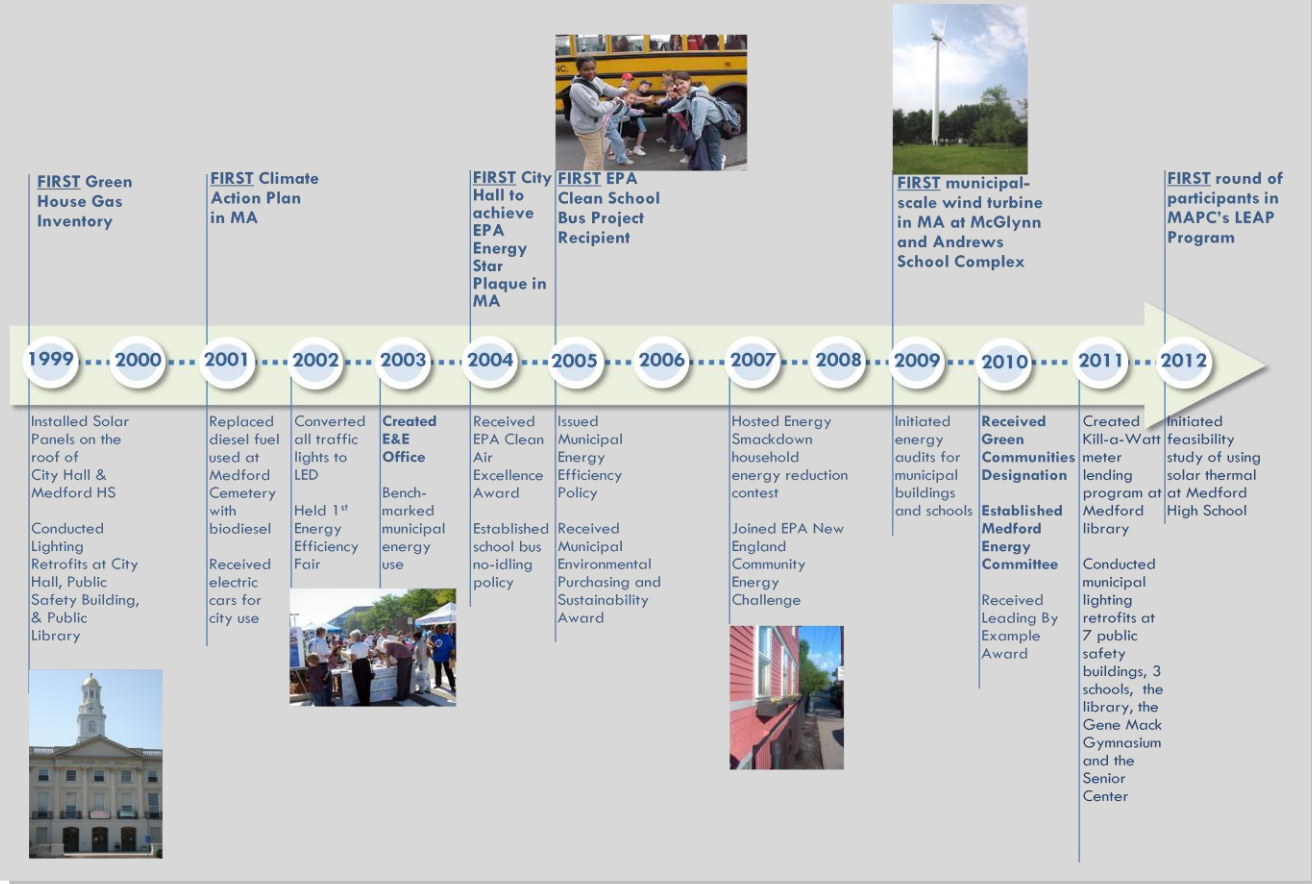
Community Clean Energy Efforts

In addition to the City's municipal clean energy efforts, Medford residents and businesses are also pursuing renewable energy and energy efficiency work. Medford residents can borrow a Kill-a-Watt meter at the Medford Library to assess the energy efficiency of their home appliances. The City also hosts several energy-related outreach events, including the Harvest Your Energy Festival to engage residents and businesses and to promote local clean energy efforts.



Source: Medford Patch

Energy-Pedia #2: Medford Leads-by-Example in Clean Energy Efforts



Source: From left: Medford Public Schools, Boston.com, and MedfordPatch

MUNICIPAL ENERGY PROFILE

The City of Medford established the Office of Energy and Environment (E&E Office) in 2003 with the responsibility of overseeing and implementing environmentally beneficial programs to improve energy efficiency, air quality, climate change protection, wetlands protection, open space conservation, and storm water management in Medford. The E&E Office is currently comprised of a full-time director of Energy and Environment and a part-time Energy Efficiency Coordinator. In 2010, the City revitalized the Medford Energy Committee for the purpose of identifying new energy goals and action steps for the community. Together, the E&E Office and the Energy Committee work to encourage clean energy initiatives, improve energy efficiency, increase renewable energy use, and promote sustainability actions in Medford.

Municipal Energy Profile At-A-Glance

- Designated **Green Community**, 2010
- U.S. Department of Energy's **Better Buildings Challenge** participant since 2012
- **Municipal Energy Staff:**
 - Director of Energy and Environment
 - Energy Efficiency Coordinator
- **Volunteers:**
 - 12-member Energy Committee
- **Municipal Energy Baseline Consumption:**
 - 137,000 MMBTU in 2009
 - ~3% of total city-wide usage

Existing Municipal Energy Goals

Medford's commitment to clean energy is represented by three existing energy reduction goals:

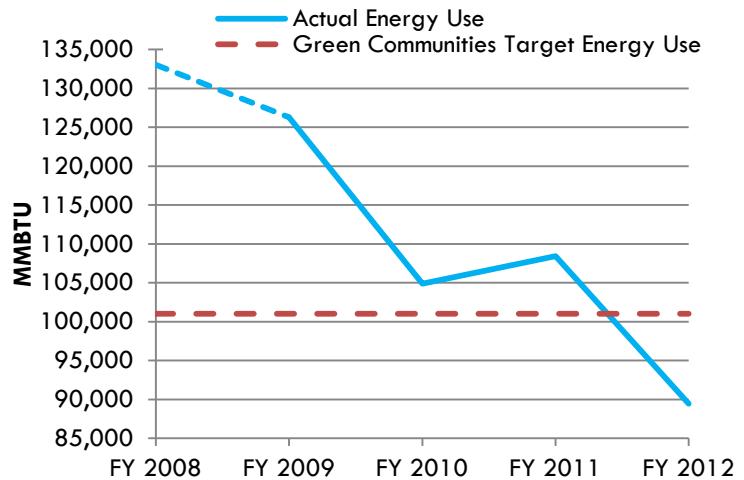
Source of Energy Goal	Baseline Year	Energy Reduction Target	Detail	Status
Climate Action Plan	FY 1998	20% reduction in total municipal emissions (3911.6 tons eCO ₂) by 2010	The City established the Municipal Emissions Reduction Target in 1999 as part of the ICLEI Cities for Climate Protection Campaign (CCP).	Accomplished
Green Communities Designation Requirement	FY 2009	20% reduction in total municipal energy consumption by 2014	The City established an overall energy reduction goal in 2009 in fulfillment of its Green Communities status. The City is committed to reduce its overall municipal energy consumption (including all buildings, municipal facilities, outdoor recreation facilities, streetlights, and vehicles) by 20% in 5 years by 2014.	Accomplished as of 2012
Better Buildings Challenge	FY 2009	20% reduction in building energy consumption per square foot by FY 2020.	The City is a partner in the U.S. Department of Energy's Better Buildings Challenge. To accomplish the challenge, the City is committed to reducing its weather normalized building energy usage per square foot by 20% by 2020.	On-track

Municipal Energy Reduction Progress¹

Green Communities^{2,3}

As part of Medford's Green Communities designation requirements, the City is committed to reducing its municipal energy consumption from its FY 2009 baseline by 20% by 2014. As the graph on the right shows, Medford has steadily reduced its municipal energy consumption since 2009. Between 2011 and 2012, the City successfully met its Green Communities energy reduction goal, two years before the target date.

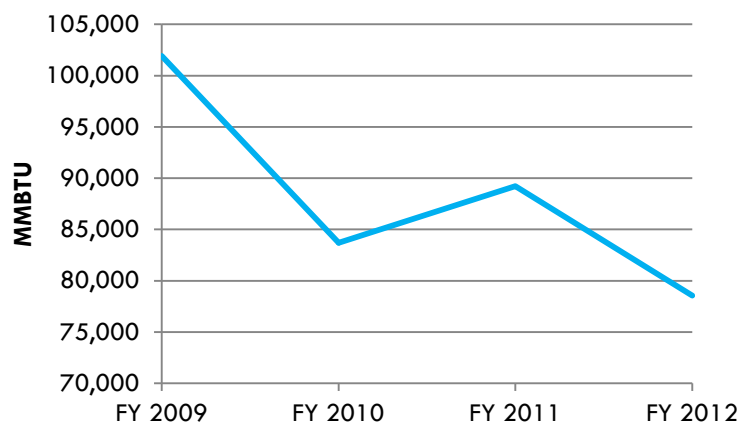
Annual Total Municipal Energy Use



Better Buildings Challenge

As a community partner in the U.S. DOE Better Buildings Challenge, Medford is committed to reducing its FY2009 municipal building energy consumption per square foot by 20% by 2020. There are 21 municipal buildings in Medford that are currently in the Better Buildings Challenge. As the graph on the right highlights, by 2012, the City reduced its total annual building energy use by 23% from the 2009 baseline.

Annual Municipal Building Energy Use



¹ As of October 2012, Medford's MEI account is missing vehicle data from July 2011 to December 2011. Some of the overall energy reduction trends and energy data analysis described in this document may need to be adjusted to account for this data gap.

² The building energy consumption data in this document is adjusted to account for abnormal fuel consumption due to weather differences each year using Simple-Ratio Based Weather Normalization. For detailed information about the normalization methodology, please refer to Appendix B.

³ Medford's overall municipal energy consumption includes the energy use of the 21 municipal buildings in the Better Buildings Challenge, as well as the cemetery buildings, the Tufts Park & Pool, traffic signals, municipally-owned streetlights, two water and sewer facilities, seven recreational parks, and municipal vehicle fleets for the Park, Highway, Engineering, Forestry, Water & Sewer, Fire, Police, Council on Aging, Housing, School, and Public Works Departments.

Energy-Pedia #3: Do you know how Medford monitors its municipal energy use?

Medford monitors its municipal energy data using the MassEnergyInsight (MEI) tool. MEI is a free, web-based tool developed by Peregrine Energy Group and made available to cities and towns in Massachusetts through the Department of Energy Resources (DOER) as part of the Massachusetts Green Communities Program. Electricity and natural gas usage for Medford's municipal accounts is pre-loaded by National Grid into the MEI program. Other fuel use data (such as heating oil and vehicle fuel) must be manually entered and kept up-to-date by Medford staff.

For more information, see: <http://www.massenergyinsight.net/mei/overview.html>

Energy-Pedia #4: Medford was one of the first communities to receive a Green Communities designation.

The MA Green Communities Designation and Grant Program recognizes municipalities' clean energy efforts and provides assistance to help cities and towns reduce energy use and lower their carbon footprints. Medford was in the first round of 35 municipalities to achieve Green Communities designation. As of November 2012, the number of designated Green Communities has grown to 103. There are five criteria for Green Communities designation:

- Provide as-of-right siting in designated locations for renewable/alternative energy generation, research and development, or manufacturing facilities;
- Adopt an expedited application and permit process for as-of-right energy facilities;
- Establish an energy use baseline and develop a plan to reduce energy use by 20% within 5 years;
- Purchase only fuel-efficient vehicles; and
- Set requirements to minimize life-cycle energy costs for new construction.

Source: Massachusetts Energy and Environmental Affairs: Green Communities. For more information, see: <http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/>

Energy-Pedia #5: Do you know what Medford, Denver, and Staples all have in common? They are all partners in the Better Buildings Challenge.

The U.S. DOE Better Buildings Challenge aims to promote energy savings in commercial buildings and industrial plants by providing property owners with technical assistance on energy efficiency and by facilitating information sharing and collaboration among Challenge participants. The program includes a network of stakeholders to support building energy efficiency across the country. These stakeholders include:

Partners	Commercial businesses, industrial corporations, universities, states, and other building owners that are committed to reducing energy consumption in their facilities.
Community partners	Municipalities that are committed to reducing energy consumption across their own building stock, as well as helping local businesses access energy efficiency opportunities and resources.
Allies	Financial institutions and utilities that are committed to supporting the energy efficiency marketplace with specific, commercial available products and programs.

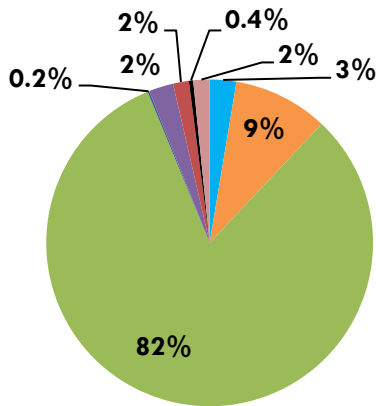
Medford joined the Better Buildings Challenge in 2012. As a community partner, the City is committed to reducing its building energy use per sq.ft by 20% across the entire municipal building stock (1.37 million sq.ft in floor area) by 2020. As part of the Challenge, the city is also looking to collaborate with corporate partners and local businesses in Medford to promote energy efficiency efforts in the commercial sector.

Source: U.S. Department of Energy Better Buildings Challenge. For more information, see: <http://www4.eere.energy.gov/challenge/>

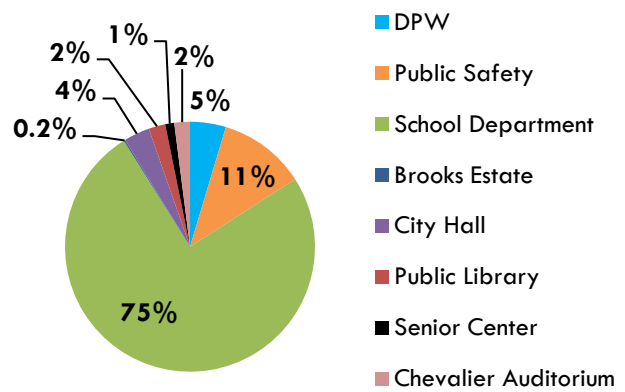
Municipal Building Energy Overview⁴

Municipal buildings make up approximately 93% of Medford’s municipal energy use. The school department is the biggest energy user in the municipality. The seven schools together made up 75% of the City’s annual energy consumption in FY 2012. Within the School Department, Medford High School and the McGlynn Middle School have the highest energy building consumption. The Public Safety Department (comprised of the Public Safety Headquarters, the Training Station, and the five Fire Department buildings) has the second highest energy consumption, comprising of 11% of the City’s municipal energy use.

Building Energy Use by Departments (2009)



Building Energy Use by Departments (2012)



Municipal Building Inventory⁵

Building	Building Floor Area (Sq. Ft)	2009 Energy Use (MMBTU)	2009 EUI (kBtu/ Sq.Ft)	2012 Energy Use (MMBTU)
LoConte Ice Rink	34,126	2,605	76	2,996
Brooks Estate	10,000	181	18	152
Chevalier Auditorium	25,000	1,642	66	1,588
City Hall	39,745	2,468	62	2,625
Public Library	29,568	1,597	54	1,695
Senior Center	6,400	428	67	918
Hormel Stadium	9,210	75	8	647
Fire Dept. Engine 2	5,089	629	124	557
Fire Dept. Engine 3	6,774	635	94	631
Fire Dept. Engine 4	8,428	899	107	886
Fire Dept. Engine 5	10,228	1,455	142	1,013
Fire Dept. Engine 6	8,352	604	72	579
Public Safety HQ	32,993	4,246	129	4,256
Training Building	9,570	1,112	116	937
Brooks Elementary School	95,155	6,596	69	5,208
Columbus Elementary School	92,895	5,698	61	4,434
Curtis High School	30,800	1,088	35	1,164
High School	532,000	45,643	86	30,610
McGlynn Elementary School/Middle School	186,090	11,387	61	8,220
Andrews Middle School	101,100	7,325	72	5,632
Roberts Elementary School	95,510	5,598	59	3,799

⁴ The sizes of the “Building Energy Use by Department” pie charts are proportional to the building energy consumptions in 2009 and 2012.

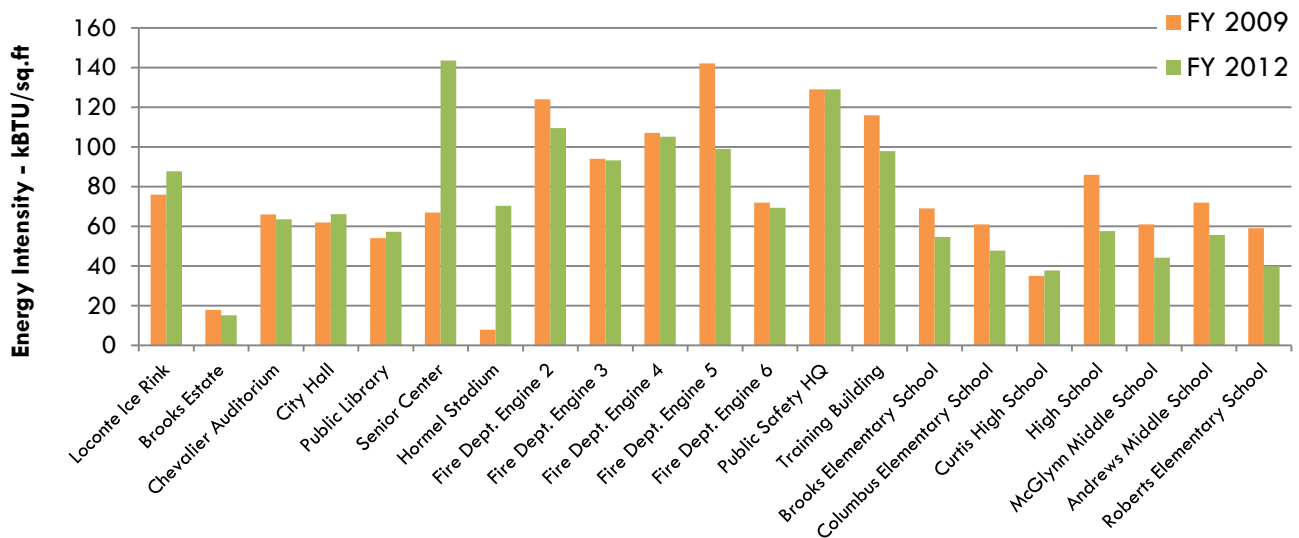
⁵ This inventory only lists buildings that are included in the Better Buildings Challenge; it does not include the City Yard, the Water and Sewer Shop, the Wright’s Pond Bath House, the Cemetery, and the Tufts Park and Pool facilities.

Building Energy Efficiency

Although energy consumption data reveals which buildings use the most energy, this data does not indicate how efficient a building is in terms of how it is built and operated. Energy Use Intensity (EUI), or the ratio between total building energy use and floor area, can be a better indicator for identifying energy savings opportunities. As noted in the “Municipal Building Energy Efficiency” chart, while the School Department is the biggest energy user in the Medford, school buildings have a relatively low EUI. The Department’s significant improvement in efficiency is attributable to the implementation of lighting retrofits and EMS upgrades in 2010.

It is important to note that when making energy project decisions, EUI should only be used as one type of indicator for determining building energy efficiency. EUI only measures the ratio between building energy use and floor area; a building’s EUI rating may be affected by other factors, such as a building’s operation hours and usage. Therefore, a comparison of EUI ratings may not truly reflect the efficiency of Medford’s municipal buildings. Therefore, it is critical that the City work with a professional building energy auditor to accurately assess the energy efficiency and energy reduction potential of each municipal building.

Municipal Building Energy Use Intensity (FY 2009 and FY 2012)



Municipal Building Projects

The City has implemented significant energy efficiency improvements in the past three years. In 2011, Medford performed lighting upgrades in the Public Safety Department and the School Department. That same year, the City retro-commissioned and installed energy management system upgrades in five school buildings. The City has also allocated funding for heating system improvements in the Public Safety Department. In 2012, the City proposed completing a multi-measure efficiency upgrade project in Medford High School that will save the City over 2,700 MMBTU per year. The proposed energy efficiency improvements for the school include lighting retrofits, weatherization, and steam trap repairs. In 2012, the City also allocated funding to complete heating upgrades in the Fire Department. A structural assessment on the Public Safety Headquarters has also been proposed. A lighting upgrade project in the City Hall and a heating system assessment for the Senior Center are also currently under consideration. Lastly, the City completed the installation of a low-emissivity (low-e) ceiling at the LoConte Ice Rink in October 2012.

Municipal Building Projects Overview

Completed Projects as of December 2012	
Projects	Facility
Lighting upgrade	Brooks Elementary School; Columbus Elementary School; High School; McGlynn Middle School; Andrews MS; Roberts ES; Chevalier Auditorium; Public Library; Senior Center; City Hall
Retro-commissioning & EMS upgrade	Brooks Elementary School; Columbus Elementary School; McGlynn Middle School; Andrews Middle School; Roberts Elementary School
Ventilation upgrade	Chevalier Auditorium
Hot water system replacement	High School
Chiller replacement	City Hall
Weatherization	High School
Steam traps repair	High School
Solar hot water study	High School
Funded Projects as of October 2012	
Projects	Facility
Heating system upgrade	Fire Dept – Engine 2, 3, 4, 5, 6;
Structural assessment	Public Safety HQ
Pool renovations and hot water system upgrade	High School
Oil-to-gas conversion	Chevalier Auditorium
Hot water separation	Chevalier Auditorium
Projects Under Consideration as of October 2012	
Projects	Facility
Heating system assessment	Senior Center
Solar hot water installation	High School

Non-Building Energy Overview

Open space, street and traffic lights, water and sewers, and vehicles together make up roughly 7% of Medford’s municipal energy use. Street and traffic lights have the highest energy use among all non-building categories, followed by municipal fleets, open space, and water and sewer.

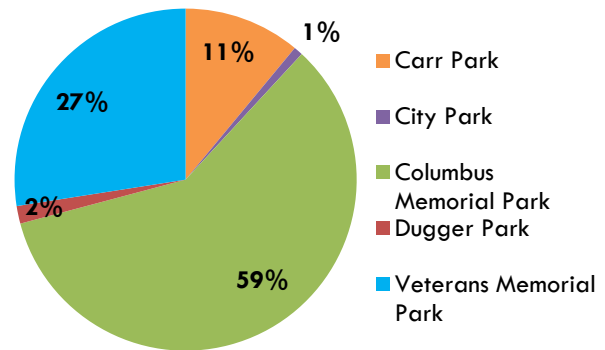
Water/Sewers

The two pumping stations in the City only consume electricity, not gas or fuel oil, and together, the two facilities make up roughly 2% of Medford’s municipal energy consumption.

Open Space

Medford's open space that has lighting includes six public parks.⁶ The City's open space accounts for 4% of municipal energy use in FY 2012. The Columbus Memorial Park has the highest energy consumption among open space facilities, followed by the Veterans Memorial Park.

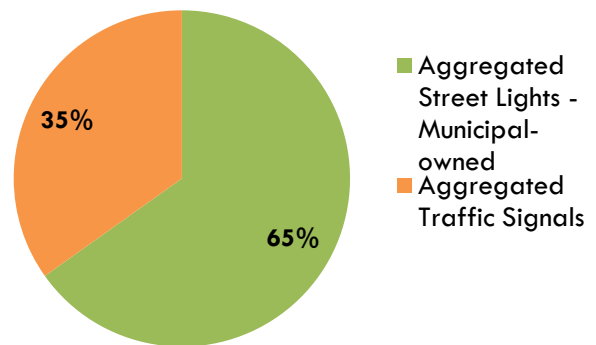
Open Space Energy Use (2012)



Street and Traffic Lights

In FY 2012, street and traffic lights accounted for 10% of Medford's non-building energy consumption. The municipality currently owns 158 decorative streetlights located in Medford Square. All 4,627 cobra head streetlights in the City are owned by National Grid. Medford completed LED retrofits on traffic lights in 2002 and all municipal-owned streetlights in 2012. The City is currently looking into purchasing utility-owned streetlights for LED conversion.

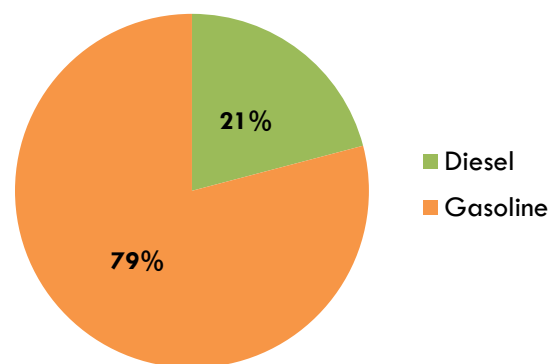
Street/Traffic Lights Energy Use (2012)



Municipal Fleets

Municipal vehicle fuel consumption made up approximately 84% of the City's non-building energy use in FY 2012. A majority of the City's municipal fleets are gasoline vehicles, with the remaining minority consisting of diesel vehicles. With attention to making the municipal fleet more efficient, Medford Cemetery Division's vehicles switched to using biodiesel in 2004. The City is also looking into replacing the City's gasoline and diesel fleets with alternative fuel vehicles.

Municipal Fleet Energy Use (2012)



⁶ The Playsted Park is not listed in the "Medford 2012 Open Space Energy Use by Facilities" pie chart due to insufficient data.

RESIDENTIAL, COMMERCIAL, & INDUSTRIAL ENERGY PROFILE⁷

Medford’s residential, commercial, and industrial sectors account for approximately 97% of Medford’s energy consumption. The best way to assess residential, commercial, and industrial consumption is to look at aggregated utility data for each sector. However, because there was difficulty accessing such data, this plan uses publicly available data such as census data, labor statistics, and building energy survey analyses to estimate aggregated energy use by sector. The information in this section is meant to serve as a baseline for the purposes of local energy planning efforts and to provide insight into the types and scale of energy use within Medford. However, since consumption use is estimated based on static data sources, the energy consumption baselines presented in this plan cannot be used to benchmark and monitor subsequent changes in use. In other words, real aggregated data must be used to accurately measure the success of any future energy project. For a detailed explanation of how the estimated energy consumption was derived, please refer to Appendix A.

RESIDENTIAL SECTOR

Medford’s population by race and ethnicity is fairly proportional to the state average, with slightly larger Asian and Black populations and a slightly smaller Latino population. Medford’s population is younger than the state average, with a higher percentage of young adults in their 20s and 30s. Medford’s median household income (\$70,102) is slightly higher than then state median (\$62,859). However, 45% of Medford’s households earn below the state’s annual median income, with 13% earning between 60% and 80% of the state median household income.

Medford’s housing stock is diverse and has a large renter population. 40% of the households in the City are renter-occupied, while 42% of the households are non-family households (i.e., made up of non-related persons living together). Almost half of homes in Medford heat with natural gas (48%). An additional 32% of homes

Medford Residential Profile			
Median Household Income	\$70,102		
Total # Housing Units	23,928		
Owner-Occupied Units	60%		
Renter-Occupied Units	40%		
Units that Heat with Natural Gas	48%		
Units that Heal with Heating Oil	32%		
Housing Type	Overall	Owner-Occupied	Renter-Occupied
Single-Family, Detached	35%	33%	2%
Single-Family, Attached	11%	4%	7%
Multi-Family, 2-4 Units	31%	14%	17%
Multi-Family, 5+ Units	21%	7%	14%
Total	100%	60%	41%

Source: US Census 2010

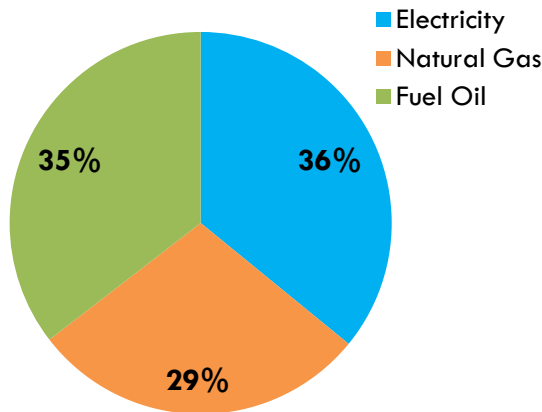
⁷ MAPC and the City of Medford are currently working with National Grid to get aggregate residential and commercial data to create a more accurate residential and commercial energy profile and baseline and to establish energy reduction and program participation goals directly linked to such baselines.

heat with fuel oil. The remaining 20% have electric heat or use another heating fuel such as cordwood.

Residential Energy Consumption⁸

The residential sector makes up approximately 62% of energy consumption in Medford. By fuel type, electricity is the largest source of greenhouse gas emissions, followed by fuel oil and then natural gas. Medford residents spend approximately \$45 million each year on home energy expenditures.

2012 Residential Greenhouse Gas Emissions by Fuel Types



COMMERCIAL AND INDUSTRIAL (C&I) SECTORS

The commercial and industrial sectors in Medford consist of 869 business establishments. The education sector and business offices are the largest employers in Medford, due in large part to the local presence of Tufts University. The City also has a large outpatient care sector due to the number of health service institutions in the community, including Lawrence Memorial Hospital. The City has a relatively small industrial sector. Among all industrial establishments, the food industry has the largest number of establishments in the City, followed by the fabricated metal industry.

Residential Energy Overview

Annual Residential Energy Consumption in Medford		
Fuel Type	Energy Consumption	Greenhouse Gas Emission
Electricity	1.56 million kWh	130 million lbs CO ₂
Natural Gas	8.8 million therms	103 million lbs CO ₂
Fuel Oil	5.7 million gallons	128 million lbs CO ₂
Total	2.2 million MMBTUs	361 million lbs CO₂

GHG emissions were derived using the energy consumption by fuel type and the following conversion factors:

GHG Emissions Conversion Factors		
Fuel Type	Factor (lbs CO ₂ per Fuel Unit)	Fuel Unit
Electricity	0.828	kWh
Natural Gas	11.71	Therms
Fuel Oil	22.38	gallons

Source: MassEnergyInsight

C&I Sectors At-A-Glance

Medford Commercial Profile	
Median Weekly Wage	\$952
Total Employment	17,190
Total Establishments	1,304

Industry	# Est.	# Emp.
Education	20	3,511
Food Sales	37	785
Food Service	83	1,057
Outpatient Care	81	1,154
Lodging	11	823
Retail (non-mall)	71	950
Enclosed and Strip Malls	39	364
Office	326	2,455
Public Assembly	17	261
Religious Worship	18	58
Service	130	881
Warehouse & Storage	36	794

Medford Industrial Profile		
Industry	# Est.	# Emp.
Food	7	397
Printing and Related Support	5	26
Fabricated Metal	6	61
Computer and Electronic Products	3	29

Source: Bureau of Labor Standards Economic Survey, 2010

⁸ Annual residential energy consumption and expenditures was approximated based on the average heating energy consumption for Massachusetts households provided by the 2009 Energy Information Administration Residential Energy Consumption Survey. For detailed information on the survey data, please refer to Appendix B.

Commercial and Industrial Energy Consumption

Energy use in the commercial and industrial sectors accounts for approximately 30% and 5% of the City’s energy consumption, respectively. By fuel type, electricity is the largest source of greenhouse gas emissions in the commercial sector, followed by natural gas then fuel oil. In the industrial sector, natural gas is the largest source of greenhouse gas emissions, followed by electricity then fuel oil. Medford’s commercial establishments spend approximately \$21 million annually on energy. Due to the limitations of the data sets used to approximate this baseline, industrial sector energy expenditures are uncertain.

C& I Energy Overview

Annual Commercial Energy Consumption in Medford		
Fuel Type	Energy Consumption	Greenhouse Gas Emission
Electricity	211 million kWh	175 million lbs CO2
Natural Gas	2.5 million therms	30 million lbs CO2
Fuel Oil	786 thousand gallons	18 million lbs CO2
Total	1.1 million MMBTUs	223 million lbs CO2

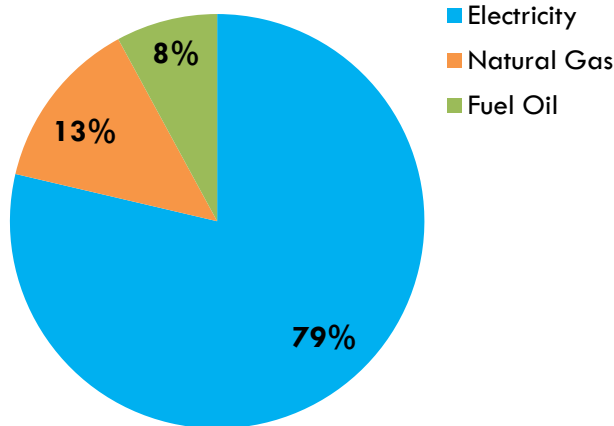
Annual Industrial Energy Consumption in Medford		
Fuel Type	Energy Consumption	Greenhouse Gas Emission
Electricity	14 million kWh	12 million lbs CO2
Natural Gas	1 million therms	12.4 million lbs CO2
Fuel Oil	45 thousand gallons	1 million lbs CO2
Total	197 thousand MMBTUs	25.4 million lbs CO2

GHG emissions were derived using the energy consumption by fuel type and the following conversion factors:

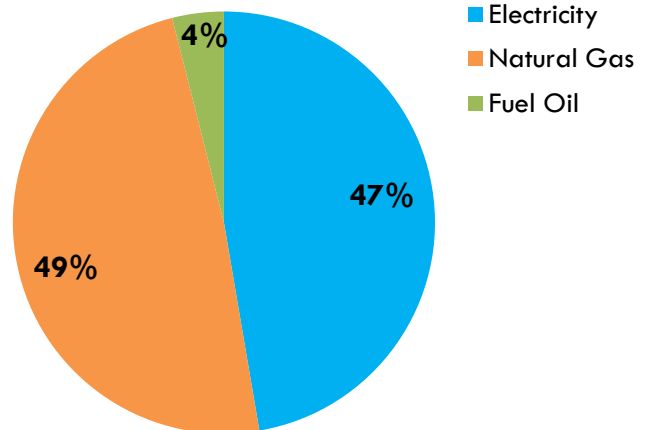
GHG Emissions Conversion Factors		
Fuel Type	Factor (lbs CO ₂ per Fuel Unit)	Fuel Unit
Electricity	0.828	kWh
Natural Gas	11.71	therms
Fuel Oil	22.38	gallons

Source: MassEnergyInsight

Commercial Greenhouse Gas Emissions by Fuel Type



Industrial Greenhouse Gas Emissions by Fuel Type

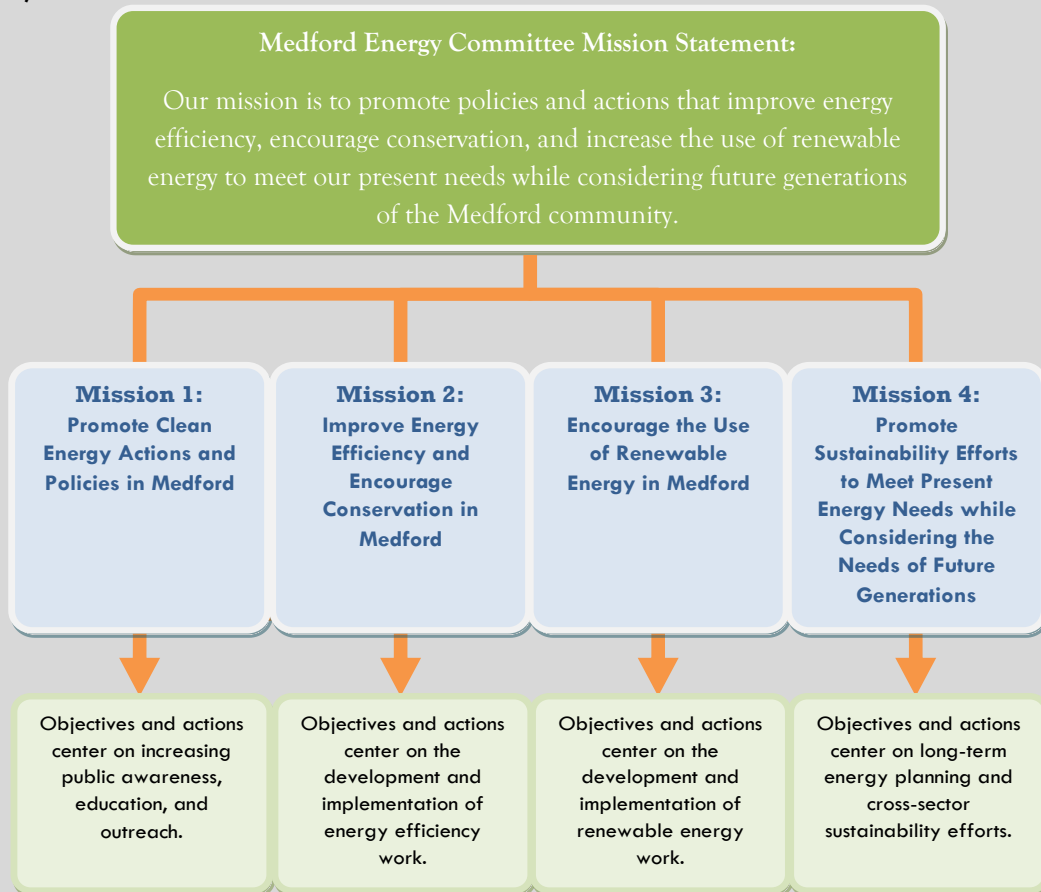


Medford Energy Goals & Actions

The recommendations for energy goals and actions presented in this section were established based on the Medford Energy Profile and the feedback generated from the community visioning process held with Medford municipal staff, the Medford Energy Committee, other energy stakeholders in the region, and local residents and businesses. Municipal energy consumption accounts for just 3% of Medford’s overall energy use, which highlights the importance of developing a multi-sector clean energy action plan in order to achieve significant energy savings.

Energy-Pedia #6: How does the Medford Energy Action Plan align with the Medford Energy Committee’s mission?

The Medford Energy Action Plan builds on the Medford Energy Committee’s mission to identify specific objectives and actions to promote clean energy actions in Medford in the municipal, residential, and commercial sectors.



RECOMMENDATIONS FOR MUNICIPAL ENERGY GOALS AND ACTIONS

As the “Municipal Energy Profile” in this plan reveals, Medford has already set and met important energy reduction targets over the last ten years. Given Medford’s achievements in energy reduction and its interest in maintaining its leadership in the clean energy realm, it is recommended that the City:

- Establish new municipal energy reduction goals,
- Establish renewable energy goals,
- Prioritize municipal energy projects, and
- Promote clean energy policies.

The following recommendations should guide municipal decision-making concerning energy and capital improvement projects.

1. ESTABLISH NEW ENERGY REDUCTION GOALS.

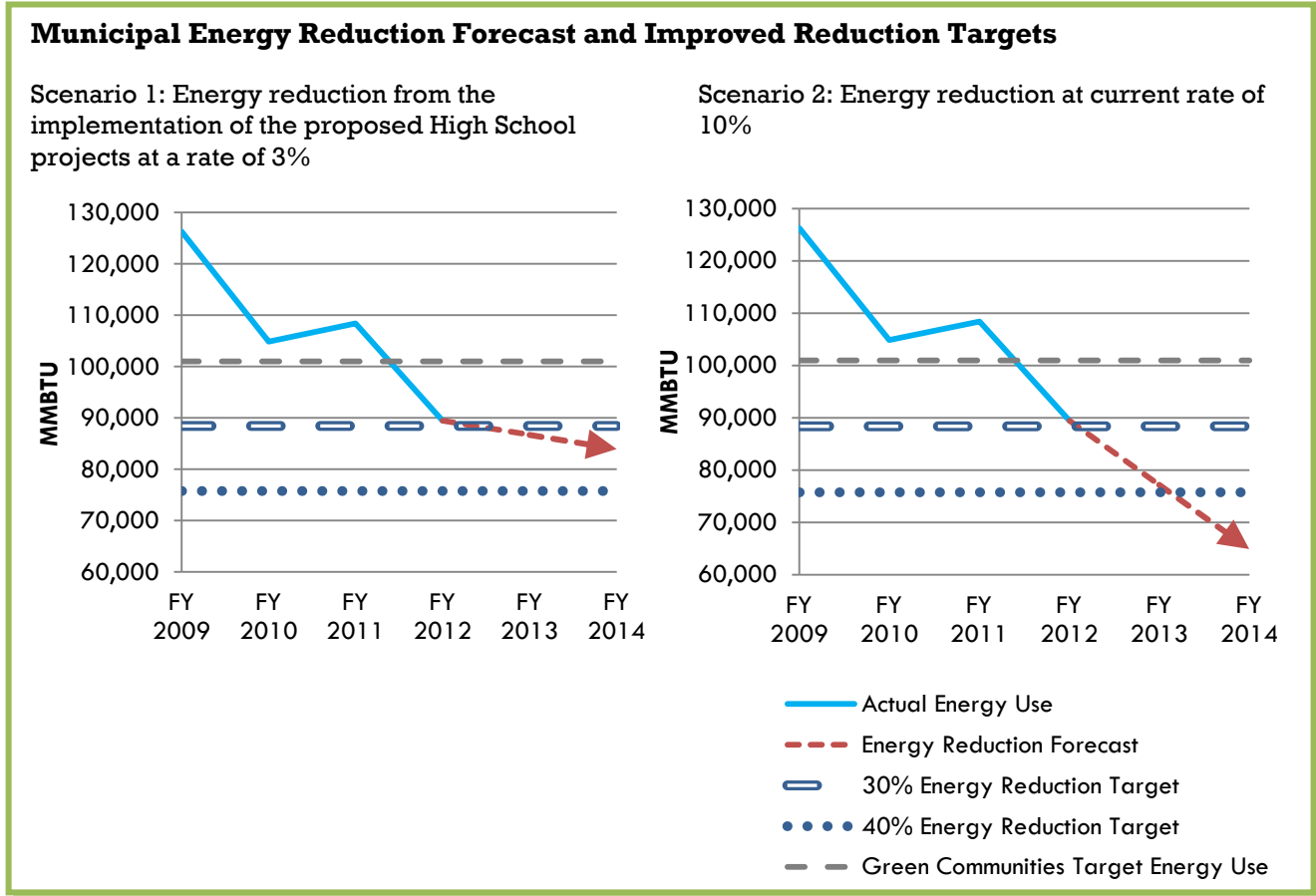
As of FY 2012, the City met its Green Communities energy reduction target and is on track to meet its Better Buildings Challenge energy reduction goal that is to be completed by 2020 (For more information, refer to the “Municipal Energy Reduction Progress” section on page 7). Since 2009, the City has reduced its municipal energy consumption on average by 10% annually (12,279 MMBTU reduction per year).⁹

To support the Medford’s goal of advancing its clean energy work, the City should increase its municipal energy reduction beyond its current 20% reduction goal overall. The following charts project when Medford could reduce its municipal energy use by 30% and 40% from the 2009 baseline.

1. Scenario 1 assumes that moving forward, the City continues to implement energy efficiency measures on an annual basis that have the same magnitude of energy reductions as the energy projects currently proposed for the High School. In this scenario, the City will have an annual energy reduction rate of 3% and will meet a 30% energy reduction target by FY 2013. At this rate, Medford will have reduced municipal energy consumption by 34% in FY 2014.
2. Scenario 2 assumes the City continues to pursue energy efficiency projects such that the current energy reduction rate of 10% is maintained. At this rate, the City’s overall energy

⁹ Municipal energy consumption includes energy consumption in buildings, open spaces, water and sewer facilities, street/traffic lighting, and vehicles.

consumption will reduce by 49% by FY 2014. In this scenario, Medford can reach a 30% energy reduction goal by FY 2013, and exceed a 40% energy reduction target by 2015.



In comparing these scenarios, it is important to note that the City captured a large portion of energy reductions from comprehensive lighting upgrades in the School Department between 2009 and 2012. As a result, the actual energy reduction rate from 2012 onward is likely to be more gradual than the current annual rate of 10%. Realistically, Scenario 2 is unlikely unless the City takes aggressive actions moving forward, and Scenario 1 paints a more realistic picture for the future.

2. ESTABLISH RENEWABLE ENERGY GOALS.

The City is already supportive of renewable energy development, as demonstrated by the McGlynn School wind turbine. Given the time and capacity restraints of municipal staff and the Energy Committee, it is important for the City to set renewable energy goals if renewable energy development is a priority. Such goals will then help the City prioritize pursuing renewable energy projects when the City is deciding how to allocate its limited time and resources on energy projects. It is also important to note that Medford’s renewable energy goals can be tied to energy reduction goals if energy reduction goals and benchmarking are focused on the reduction of fossil fuel consumption, not overall energy use.

The City may also want to establish renewable energy goals that are focused on developing specific types of technology on municipal property, such as photovoltaic panels and organics-to-

energy facilities. However, given how rapidly energy technologies evolve, it is recommended that the City focus on establishing at least some renewable energy goals that are technology-neutral to ensure that City is pursuing the most innovative and advance renewable energy systems.

The first step in establishing renewable energy goals should be to conduct feasibility studies to identify renewable energy opportunities. Once the City's renewable energy potential is identified, the Energy Committee should work with the E&E Office to establish clean energy goals and prioritize clean energy projects based on their ability to advance such goals. Medford should closely monitor DOER and MassCEC opportunities, as both have provided funding for feasibility studies in the past.

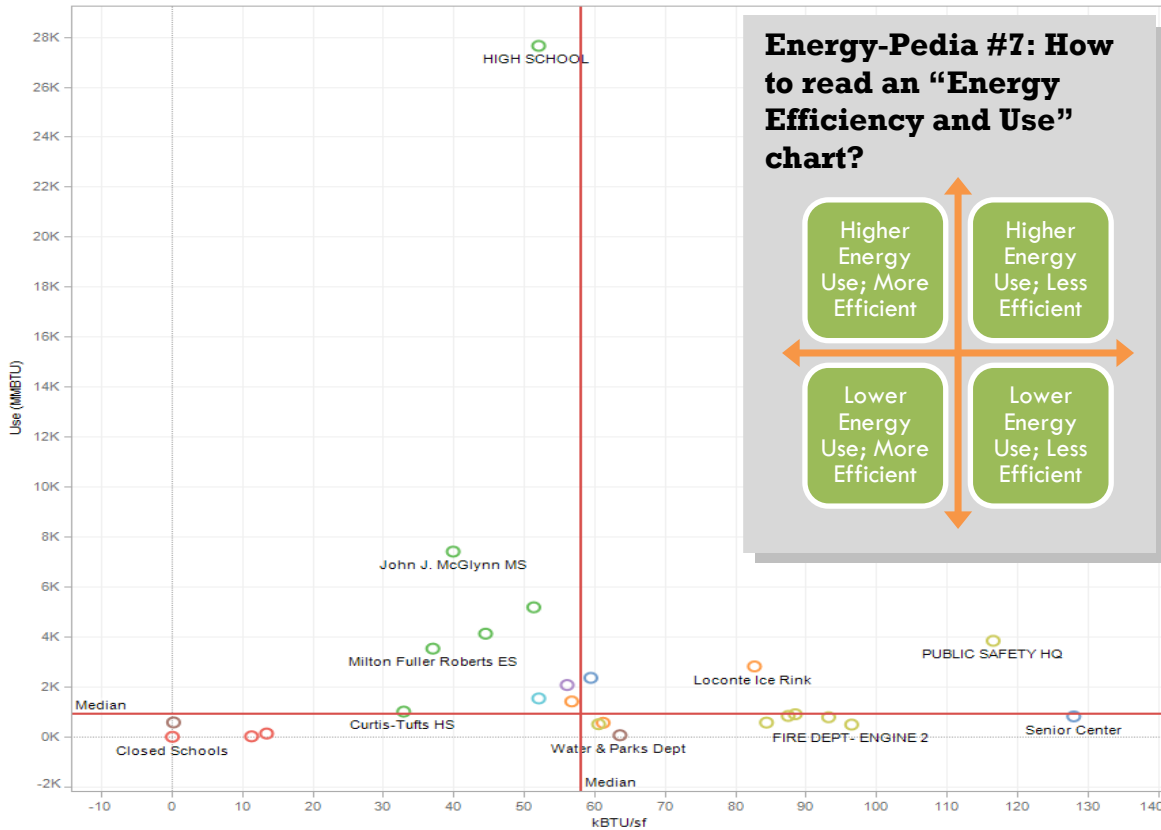
3. PRIORITIZE MUNICIPAL ENERGY PROJECTS.

Once the City identifies new energy reduction goals, it will be important for the City to prioritize projects based on their ability to help the City achieve not only its energy goals, but other goals as well, such as those related to cost savings and capital improvements. The Action Strategy "Planning for Municipal Retrofit Projects" in Part II of the plan provides guidance to municipal staff on how to prioritize municipal energy projects and how to establish an implementation process.

Identify Inefficient Buildings

The clearest path to achieving significant energy reductions is to perform energy efficiency upgrades in buildings with the lowest efficiency that are using significant amounts of energy. In order for the City to achieve more ambitious energy reductions, the E&E Office should work with the Energy Committee, the Building Department, and the Department of Public Works alongside building audit professionals on an annual basis to assess other energy efficiency opportunities for the City's buildings that use the most energy and are least efficient. The City can assess Medford's energy efficiency information using MEI's "Energy Efficiency and Use" chart.

FY 2012 Municipal Building Energy Use and Energy Efficiency



Source: MassEnergyInsight

Pursue Energy Efficiency through Capital Improvement Projects.

As the City plans for new clean energy opportunities, it should also consider advancing energy efficiency in older and less efficient buildings through capital improvement projects. The E&E Office should work with the Mayor’s Office and the Financial and Auditing Office to explore establishing a policy for having all municipal capital investment contracts address long-term operating expenditure and include life-cycle cost analysis. Additionally, the E&E Office and the Energy Committee should provide guidance and technical support to the development of the City’s “Chart the Course” Capital Improvement Plan to ensure energy consumption reduction and cost savings opportunities are intergraded in to the planning process.

Implement “Low-Hanging Fruit” Projects

The E&E Office should work with the Energy Committee to identify “low-hanging fruit” projects that may be lower in cost and/or require minimal implementation time. These projects include the funded projects that are listed on the “Municipal Building Projects Overview” table on page 12, as well as energy efficiency retrofits and improvement projects that can be funded through utility incentive programs. The following chart is an overview of the incentive programs available for funding municipal retrofit projects.

Incentive Program	Descriptions	Available Projects
New Construction and Equipment Incentives	Provides technical assistance and incentives to improve energy efficiency in a new facility or for replacing aging equipment.	Lighting & Controls; HVAC Systems' Motors; Compressed Air; Variable Speed Drives
Existing Facility Incentives	Provides technical assistance and incentives to improve energy efficiency and promote energy savings for energy efficiency retrofits at an existing facility or for replacing inefficient equipment.	Lighting & Controls; HVAC Systems' Motors; Compressed Air; Variable Speed Drives; Energy Management System

Source: National Grid and MassSave

For more information, see:

- MassSave New Construction: <http://www.masssave.com/business/new-construction-and-equipment/find-incentives>
- MassSave Retrofit: <http://www.masssave.com/business/building-or-equipment-upgrades/find-incentives>
- National Grid: http://www.nationalgridus.com/masselectric/business/energyeff/3_large.asp

Plan for More Extensive Projects

There are several energy-related projects that the Office of Energy and the Environment is interested in pursuing in the future. These projects include:

- Investigating converting the MHS steam plant to hot water;
- Installing Energy Management Systems throughout municipal buildings;
- Pursuing an umbrella maintenance program or contract for municipal buildings;
- Working with the MHS Pool reconstruction team to ensure maximum energy efficiency (currently underway);
- Working with City's Owner's Project Manager to include energy efficient and environmentally friendly components in capital projects;
- Identifying new renewable energy opportunities on municipal buildings; Working to convert all remaining municipal oil heating systems to natural gas;
- Investigating options to make police and fire department vehicles more environmentally friendly;
- Identifying opportunities for co-generation in City buildings;
- Installing remote/wireless systems to improve outdoor lighting control; and
- Exploring a community-based residential composting program.

As the City considers pursuing these projects, it is important that it determine the potential savings and costs for a particular project. Such information will help the City strategically plan in terms of which projects it pursues to achieve its energy goals and in terms of how the City will coordinate such work with other related efforts.

In instances where Medford is considering the implementation of low-hanging fruit projects, the City should also consider the benefits of bundling such projects with energy work that has a longer payback period. It may be beneficial for Medford to consider the benefits of working with a professional Energy Services Company (ESCO) to provide energy management services through a performance contract. Performance contracting is a creative financing mechanism that allows communities to use guaranteed energy cost savings over a 15-20 year period to pay for a bundle of energy-saving, infrastructure-renewing projects across a portfolio of buildings.

The City should also conduct further research to identify additional financing mechanisms and funding opportunities, such as municipal lease financing, revolving loan funds, and state grants.

Pursue Renewable Energy Projects

Once municipal renewable energy goals are established, the City should prioritize which goals to pursue, keeping in mind energy grant and program opportunities offered by DOER, MAPC, and MassCEC.

Pursue Unrealized Climate Action Plan Measures

As the City identifies new clean energy projects, Medford should consider pursuing the remaining measures recommended in the City's 2001 Climate Action Plan (CAP) that have yet to be realized. The following chart summarizes the unrealized CAP measures and provides recommendation measures and LEAP equivalent energy actions that the City can implement. The LEAP energy actions will be discussed in more detail in the following "Energy Action Summary" section.

CAP Recommendation	Action Taken as of October 2012	Energy Efficiency Measures	LEAP Equivalent Action
Streetlight Conversion	Medford upgraded its municipal-owned streetlights to LED in 2012. The City is currently considering purchasing utility-owned streetlights for LED retrofits.		Retrofit utility-owned streetlights with LEDs or more efficient fixtures; purchase streetlights if necessary.
Increase Fuel Efficiency and Downsize Vehicles	The City adopted a policy in 2005 that as new vehicles are purchased size is evaluated for function and smallest, most fuel-efficient vehicle purchased. The policy was updated in 2012 to reflect Green Communities language.		Identify and implement parking policies that support electric vehicles/ alternate fuel vehicles/ high-efficiency vehicles adoption; and Install EV infrastructures to prepare for mass EV adoption.
Alternative Fuel Vehicles	The City began using biodiesel in Cemetery vehicles in 2001. Biodiesel usage is approximately 6,500 gallons per year. The City has periodically used electric vehicles. Century Bank installed four 24 hour electric charging stations in the parking lot of Century Bank's Headquarters in Medford, which will be open for public use in November 2012.		Identify and implement parking policies that support electric vehicles/ alternate fuel vehicles/ high-efficiency vehicles adoption; and Install EV infrastructures to prepare for mass EV adoption.
Idling Policy	An anti-idling policy was adopted in the City's 2005 Energy Policy and currently needs enforcement.	Create an anti-idling education plan to strengthen enforcement.	
Require Life Cycle Cost Analysis	None.		Design and implement a policy for using life cycle cost analyses when making energy-related purchasing decisions.

Source: Medford Climate Action Plan

4. PROMOTE CLEAN ENERGY POLICIES.

To support Medford's clean energy efforts, the Energy Committee should work with the Mayor's Office and the City Council to reach out to elected state officials to become better informed and involved in state energy policy. Policy issues that the City may be interested in pursuing include building energy disclosure ordinances and utility energy data disclosure.

RECOMMENDATIONS FOR RESIDENTIAL ENERGY GOALS AND ACTIONS

With the residential sector accounting for approximately 62% of Medford’s energy consumption, it is critical that any effort to reduce Medford’s energy consumption addresses residential use.¹⁰ Residents in Massachusetts that are served by investor-owned utilities, such as National Grid, are able to participate in MassSave, a state and utility energy efficiency program. All Medford residents served by National Grid are therefore eligible to participate in MassSave. MassSave offers residents free energy assessments, as well as rebates and incentives for insulation, air sealing and the installation of energy efficiency measures, such as efficient lighting and Energy Star appliances. With such an established energy program already in place, the City of Medford should focus its efforts on encouraging residents to participate in MassSave, rather than designing a completely new efficiency program.

Any outreach effort to encourage residential participation in MassSave should be collaborative in nature, leveraging the energy and MassSave institutional knowledge of National Grid and energy service vendors and the local and community expertise of municipal staff, the Medford Energy Committee, and other community stakeholders. Recommendations for how to create a successful efficiency outreach strategy can be found in “Outreach Strategies for Energy Efforts” on page 1 in Part II of this plan.

As mentioned earlier in this plan, the lack of real aggregate energy use data for residents creates a barrier to setting energy reduction targets and to benchmark energy reduction goals. Therefore, it is critical that the City of Medford work with National Grid to develop an agreed upon system

Participation in Home Energy Services Audit/Weatherization Program

MEDFORD DATA	2010	2011	Q1 2012
Audits	401	601	287
Wx Contracts Offered	108	258	156
Wx Contracts Completed	95	90	5
Oil Heat System Rebates	20	12	2
DHW Rebates	12	4	0
WRC Rebates	2	1	0
Window Rebates	N/A	N/A	N/A
Fridge Rebates	10	5	0
Instant Savings Measures	350	489	237
Tstats (Aube)	2	1	0
No. of CFLs	6634	7844	3917
No. Showerheads	108	108	91
No. Aerators	114	98	56
Customers with one or more Roadblocks	174	219	100
<i>Knob & Tube Wiring</i>	109	138	67
<i>Combustion Safety</i>	96	98	38
<i>Moisture</i>	23	34	7

Source: National Grid

¹⁰ MAPC and the City of Medford are currently working with National Grid to get aggregate residential and commercial data to both create a more accurate residential and commercial energy profile and baseline and to establish energy reduction and program participation goals directly linked to such baselines. This plan will be updated upon receipt of such data.

for accessing residential aggregate electricity and natural gas energy usage data by zip code on a semi-annual basis. Accessing aggregate fuel oil data is challenging since fuel oil is delivered by multiple private suppliers. Given this challenge, it is recommended that the Energy Committee work with the Medford Assessor's Office to identify what data will help the City reach fuel oil users and better understand their energy needs and then, if possible, development a system for collecting such data.

The first step to increasing residential energy efficiency is establishing an outreach team and developing an outreach strategy to target residents. Recommendations for how to create a successful efficiency outreach strategy can be found in "Outreach Strategies for Energy Efforts" on page 1 in Part II of this plan. Once an outreach team and a strategy are established, the City should set a MassSave participation goal. For the first year, it is recommended that the goal should be to increase residential MassSave participation by 25%, meaning if 100 households participated in year X, the following year's goal would be 125 participants. With aggregate baseline data, the City will also be able to approximate the expected percentage of energy reductions that would be associated with this participation goal. After a year of targeted outreach, the City can adjust its participation and reduction goals accordingly based on remaining opportunity and likelihood of certain achievements.

In addition to creating a general outreach effort for all residents, the City should consider targeting outreach both to those residents who are more likely to participate in MassSave, such as single-family owner-occupied or multi-family owner-occupied households, and those who face more barriers to MassSave participation, such as renters and fuel oil users. "Community Solar and Efficiency Program" and "Outreach Techniques for Energy Efficiency in Rental Housing" on page 8 and 14 in Part II provide more guidance on how to target such efforts.

Beyond an outreach program, other actions that could potentially help the City reach residential energy goals include increasing the City's municipal capacity for enforcing existing building energy code and adopting as-of-right siting for renewable energy developments.



Source: City of Medford Affordable Housing

RECOMMENDATIONS FOR COMMERCIAL ENERGY GOALS AND ACTIONS

Medford's commercial and industrial sectors account for 35% of the community's energy consumption, and therefore also demand attention when looking to reduce Medford's overall energy consumption.¹¹ Similar to the recommendations made for targeting the residential sector, a campaign to reduce energy in Medford's businesses requires coordination between the City, National Grid and the Medford Chamber of Commerce. Medford should use the momentum created by the Green Business Awards Program to recruit local business champions to lead by example, to showcase local clean energy achievements, and to further engage local businesses in pursuing clean energy opportunities.

Additionally, those working to engage the commercial sector must also address the same baselining and benchmarking challenges that exist with the residential sector. Initially, it is recommended that the City set a goal of increasing commercial MassSave participation by 25%, meaning if 20 businesses participated in year X, the following year's goal would be 25 participants. However, as with the residential sector 25% reduction goal, the City should anticipate adjusting this overall goal and/or developing more targeted goals once a standard system for accessing commercial aggregated data on a semi-annual basis is secured.

As the City collaborates with energy stakeholders such as National Grid and the Chamber, the City should consider focusing on businesses that have the highest energy consumption, such as medical facilities and manufacturing, as well as those businesses that have specific energy consumption patterns, such as the food sales and services industries. "Local Green Business Program" on page 25 in Part II details how the City can develop a more advanced green business program.

To promote community renewable energy efforts, the City should consider working with local property owners, such as River's Edge, Tufts University, and MBTA to identify interests and evaluate potential sites for commercial solar and wind projects in Medford. In addition to large-scale businesses, Medford should also consider designing outreach programs based on the Solarize Mass model to help small businesses vet vendors and aggregate demand for commercial solar installation. "Community Solar and Efficiency Program" on page 8 in Part II provides more guidance on how to design such programs.

In addition to encouraging businesses to participate in the utility MassSave program, the City support commercial energy efforts by increasing municipal capacity for enforcing the City's existing building energy code', adopting as-of-right siting for renewable energy developments, and expanding the expedited permitting process for energy manufacturing facilities.

¹¹ MAPC and the City of Medford are currently working with National Grid to get aggregate residential and commercial data to both create a more accurate residential and commercial energy profile and baseline and to establish energy reduction and program participation goals directly linked to such baselines.

ENERGY ACTION GUIDE

The following chart is designed to highlight the energy actions the City and community energy stakeholders can take to help Medford reach new energy goals. Please refer to Part II for more detailed strategy information for selected energy actions. Actions in bold indicate priority actions.

ACTIONS TO PROMOTE RESIDENTIAL CLEAN ENERGY EFFORTS

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Clean Energy Actions and Policies in Medford.										
1. Track residential energy consumption.	a. Set residential energy reduction goal.	E&E Office		X						
	b. Establish a baseline for residential energy consumption that can be used to benchmark energy reductions.	E&E Office; National Grid; Energy Service Vendors			X	X				
	c. Create an ongoing system for tracking aggregated residential energy consumption and participation in MassSave.	E&E Office; National Grid; Energy Service Vendors		X	X					
2. Increase residential awareness of the opportunities for and benefits of clean energy actions.	a. Identify best practices for how to do effective outreach to promote Go Green Medford projects, programs, and information.	E&E Office; E&E Intern; Energy Committee			X					See Part II
	b. Design and implement a residential energy campaign to help residents access cost-effective energy efficiency and renewable energy opportunities.	E&E Office; E&E Intern; Energy Committee	Use institutional resources, such as Massachusetts Municipal Energy Group forums, webinars, and conferences to facilitate peer-to-peer knowledge sharing on clean energy information.		X	X				



Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Clean Energy Actions and Policies in Medford.										
2. Increase residential awareness of the opportunities for and benefits of clean energy actions.	c. Investigate the benefits of and opportunities for community choice aggregation.	E&E Office			X	X				
	d. Use “Go Green Medford” branding to frame energy and sustainability efforts; develop consistency and a common way for residents to recognize and become familiar with the benefits of incentives, rebates, and other financial opportunities for energy efficiency upgrades, oil to gas conversion, and solar development.	E&E Office; Energy Committee; Green Medford	Use MedfordEnergy.org as a one-stop shop for distributing Go Green Medford and clean energy-related information; Use social media, such as Twitter, local broadcasts such as TV 3 and Made in Medford, and hold public events, like open houses, community workshops, to share information.		X					See Part II
3. Educate Medford youth.	a. Design and implement a school and youth group outreach campaign to educate students on clean energy science, actions, and policies.	E&E Office; E&E Intern; Energy Committee; Schools	Hold guest speaker series, design and conduct competitions, create events such as Energy Fair to inform students of clean energy knowledge.	X					See Part II	
4. Highlight local success stories in clean energy.	a. Promote clean energy success stories and opportunities to targeted audiences.	E&E Office; Energy Committee; Local Civic Groups	Utilize existing networks and events, such as those connected to civic groups and community organizations (e.g., Green Medford, Tufts University, religious institutions, and the Chamber).		X					

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Improve Energy Efficiency and Encourage Conservation in Medford.										
5. Promote participation in residential energy efficiency programs.	a. Design and conduct local outreach campaign to increase participation in MassSave's audit and retrofit opportunities.	E&E Office; National Grid; Energy Service Vendors	Work with utilities and energy vendors to develop Medford-specific energy efficiency programs (i.e., competitions at schools and green resident awards); Conduct strategic outreach to targeted groups (i.e., students, non-English speakers, and low-income residents).		X	X	X			See Part II
	b. Design and conduct energy efficiency outreach campaign for rental housing to increase landlord/tenant participation in MassSave's audit and promote energy efficiency retrofits at rental units.	Energy Committee; Utilities; Energy Service Vendors	Create a Multi-Family Housing Energy Efficiency Outreach Program; Hold workshops at community events, such as Community Day and Harvest Your Energy Festival, and at local university events to deliver the message to Medford residents.		X	X				See Part II
6. Support community members who use heating oil.	a. Design and implement outreach program to promote oil efficiency and oil-to-gas conversion opportunities.	Energy Committee; National Grid; Next Step Living	Hold workshops on oil efficiency and oil to gas conversion opportunities.		X	X				
7. Promote electric vehicle adoption.	a. Conduct outreach to educate the community on the environmental and financial benefits of electric vehicles.	Energy Committee			X	X	X	X		

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Sustainability Efforts to Meet Present Energy Needs while Considering Future Generation Needs.										
8. Increase awareness of solar PV and ease of installation.	a. Design and implement outreach program based on Solarize Mass model to inform residents of solar opportunities and encourage the use of financial incentive options for solar installation.	E&E Office; Energy Committee	Use the "SolarizeMass" program model to help residents vet vendors and aggregate demand for residential solar installation.		X	X	X			See Part II
	b. Track numbers of residential solar installation and raise awareness about number of installations.	E&E Office; Building Department; Energy Service Vendor	Work with energy service vendors to identify annual participation rate in solar outreach program; monitor annual residential solar installations by reviewing construction and renovation permits issued.	X						
9. Plan for long-term sustainability development.	a. Improve bike and walking paths.	Energy Committee; Planning Department; Health Department	Conduct a Complete Streets Project; Partner with Health Department to support its existing grants and programs for promoting walking and biking; Increase biking and walking access to public transits.				X			
	b. Increase public awareness of biking, walking, and public transportation opportunities.	E&E Office; MEC; Local Organizations; Health Department	Support Walk-Ride Days.	X						
10. Promote equity in accessing clean energy opportunities.	a. Pursue affordable housing-focused energy efficiency programs	E&E Office; Housing Authority; Office of Community Development; Tri-CAP	LISC/New Ecology Green Retrofit Initiative.			X	X			





Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Sustainability Efforts to Meet Present Energy Needs while Considering Future Generation Needs.										
10. Promote equity in accessing clean energy opportunities.	a. Hold events with local organizations to help non-English speakers access clean energy opportunities.	Energy Committee; Local Civic Organizations				X	X			

ACTIONS TO PROMOTE COMMERCIAL CLEAN ENERGY EFFORTS



Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Clean Energy Actions and Policies in Medford.										
11. Track commercial energy consumption.	a. Set commercial energy reduction goal.	E&E Office		X						
	b. Use aggregated commercial energy consumption data to benchmark energy reductions.	Energy Committee; National Grid; Energy Service Vendors		X						
	c. Create an ongoing system for tracking aggregated commercial energy consumption and participation in MassSave.	Energy Committee; National Grid; Energy Service Vendors		X	X					
12. Increase commercial awareness of the opportunities for and benefits of clean energy actions.	a. Identify best practices for outreach to promote Go Green Medford projects, programs, and information.	E&E Office; E&E Intern; Energy Committee			X					See Part II
	b. Use "Go Green Medford" branding to frame energy and sustainability efforts; develop consistency and a common way for businesses to recognize and become familiar with the benefits of incentives, rebates, and other financial opportunities for energy efficiency upgrades, oil to gas conversion, and solar development.	E&E Office; Energy Committee; Green Medford	Use MedfordEnergy.org as a one-stop shop for distributing Go Green Medford and clean energy-related information; Use social media, such as Twitter, local broadcasts such as TV 3 and Made in Medford, and hold public events, like open houses, community workshops, to share information.		X					

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Clean Energy Actions and Policies in Medford.										
13. Promote local clean energy opportunities.	a. Establish and hold an annual Green Business Program to engage local businesses in clean energy opportunities, celebrate energy improvements that have been implemented, educate and encourage others to pursue energy audits, and implement energy conservation and efficiency measures.	E&E Office; Energy Committee; Chamber of Commerce; Utilities	Green Business Awards events		X					
Improve Energy Efficiency and Encourage Conservation in Medford.										
14. Promote participation in commercial energy efficiency programs.	a. Design and conduct outreach programs that target sector-specific energy use by helping businesses access project-specific retrofit opportunities and building-specific upgrades incentives.	E&E Office; Utilities; Energy Services Vendors	Grocery focused energy efficiency program with PECl; Green Office Challenge; Commercial lighting fixture upgrades; Commercial ventilation control upgrades.		X	X				
	b. Identify corporate partners and encourage local businesses to participate in Better Buildings Challenge.	Energy Committee; Chamber of Commerce	Tufts University, Lawrence Memorial Hospital		X					
15. Increase awareness of solar PV and ease of installation.	a. Design and implement outreach program based on Solarize Mass model to inform businesses of solar opportunities and encourage the use of financial incentive options for solar installation.	E&E Office; Energy Committee	Use the "SolarizeMass" program model to help businesses vet vendors and aggregate demand for commercial solar installation.		X	X	X			See Part II
Promote Sustainability Efforts to Meet Present Energy Needs while Considering Future Generation Needs.										
16. Use clean energy as a vehicle to drive local economic development.	a. Create tax incentive program to attract clean energy business investment.	Office of Community Development; E&E Office						X		


ACTIONS TO PROMOTE MUNICIPAL CLEAN ENERGY EFFORTS

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan	
Promote Clean Energy Actions and Policies in Medford.											
17. Track municipal energy consumption.	a. Monitor the City's progress in reducing energy consumption to meet the Green Communities goal of 20% reductions by 2014 and DOE's Better Business Challenge of 20% by 2020.	E&E Office		X	X	X					
	b. Annually review energy supplier contracts.	E&E Office		X							
	c. Establish a standardized process for (1) maintaining and updating the City's MassEnergyInsight account and (2) utilizing the data to benchmark energy reductions.	Energy Committee; School Support Services; Building Department; Department of Public Works		X	X						
18. Build municipal capacity and leadership.	a. Present Energy Action Plan to municipal officials and the public.	E&E Office; Energy Committee	Hold public presentation on plan prior to the Harvest Your Energy Festival	X							
	b. Annually review Energy Action Plan, document progresses, plan for next steps, and celebrate local achievements and savings.	E&E Office; Energy Committee			X						See Part II
	c. Hold annual municipal department meeting that celebrates energy accomplishments, gets staff input, and provides reminders on energy policies and opportunities.	E&E Office; Energy Committee; Mayor's Office	Hold annual review meetings with department heads to review the Energy Action Plan, remind staff of energy policies, and celebrate achievements.		X						
	d. Create and maintain fund to be used to finance energy projects and/or staff-time.	Budget Director; Mayor's Office				X					

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Clean Energy Actions and Policies in Medford.										
18. Build municipal capacity and leadership.	e. Design and implement a policy for using life cycle cost analyses when making energy-related purchasing decisions.	E&E Office; Energy Committee; Mayor's Office; Procurement Office				X				
	f. Establish an ongoing internship program to provide assistance to E&E Office and to help with the implementation of the Energy Action Plan.	E&E Office	Work with neighboring universities and the Environmental Defense Fund's Climate Corps program.		X					See Part II
	g. Create sub-committees under the Energy Committee to lead specific energy work in Medford.	Energy Committee			X	X				
19. Increase municipal awareness of the opportunities for and benefits of clean energy actions.	a. Identify best practices for outreach to promote Go Green Medford projects, programs, and information.	E&E Office; E&E Intern; Energy Committee			X					See Part II
	b. Use "Go Green Medford" branding to frame energy and sustainability efforts; develop consistency and a common way for municipal staff and stakeholders to recognize and become familiar with energy and sustainability efforts.	E&E Office; Energy Committee; Green Medford	Use MedfordEnergy.org as a one-stop shop for distributing Go Green Medford and clean energy-related information.		X					See Part II
20. Maximize efficiency in municipal buildings and infrastructure.	a. Assess building energy audit needs and have outside vendor perform building or project specific energy audits.	E&E Office; Building Department; National Grid			X	X				
	b. Create and maintain a plan for completing municipal retrofit work, which will include a list of priority projects, how projects will be funded, and how they will be completed.	E&E Office; Building Department; Department of Public Works; National Grid			X					See Part II

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan	
Promote Clean Energy Actions and Policies in Medford.											
21. Maximize efficiency in municipal buildings and infrastructure.	c. Identify and secure utility incentives and rebates for municipal retrofit work.	E&E Office			X	X					
	d. Identify and implement policies and standards that promote building energy efficiency.	E&E Office; Building Department; Mayor's Office	(1) Make energy efficiency a priority for all capital improvement projects; (2) Create a purchasing policy for all appliances and lighting; (3) Implement a tracking system for municipal building systems maintenance; (4) Promote the City's "Energy and Resource Efficiency Policy"	X							
	e. Identify opportunities to retrofit exterior lightings with more efficient fixtures and remote controls.	E&E Office; Building Department	(1) Explore purchasing and retrofitting utility-owned streetlights with LEDs or more efficient fixtures; (2) Survey all building exterior fixtures and explore rebate opportunities for efficiency upgrades; (3) Explore lighting control options for Medford parks and public spaces.		X						
	f. Purchase energy efficient vehicles in compliance with the Green Communities 4th Criteria.	E&E Office; Department of Public Works; Public Safety Departments			X						
	g. Provide training to municipal staff for using life cycle cost analyses when making energy-related purchasing decisions.	E&E Office; Mayor's Office				X	X				

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Promote Clean Energy Actions and Policies in Medford.										
21. Maximize efficiency in municipal buildings and infrastructure.	i. Identify opportunities to retrofit exterior lighting with more energy efficient fixtures and remote controls.	E&E Office	(1) Explore purchasing & retrofitting utility-owned streetlights with LEDS or more efficient fixtures (2) Survey all building exterior fixtures and explore rebate opportunities for efficiency upgrades (3) Explore lighting control options for Medford parks and public spaces.			X	X			
Improve Energy Efficiency and Encourage Conservation in Medford.										
22. Enhance electric vehicle or alternative-fuel vehicle readiness.	a. Identify and implement parking policies that support electric vehicles/ alternate fuel vehicles/ high-efficiency vehicles adoption.	E&E Office; Energy Committee; Mayor's Office	Zoning code for requiring charging infrastructures at parking lots.			X				
	b. Install EV infrastructures to prepare for mass EV adoption.	E&E Office; Building Department					X			See Part II
Encourage the Use of Renewable Energy in Medford.										
23. Increase municipal solar installation.	a. Research solar development opportunities, perform cost-and-benefit analysis, and adopt cost effective financing models for solar installation.	E&E Office; Energy Committee	Conduct cost-and-benefit analysis and compare the benefits of power purchase agreements, net metering, and virtual net-metering models.		X	X	X	X		
24. Identify wind development opportunities.	a. Conduct study to identify siting options for additional wind turbine projects.	Energy Committee; MassCEC					X	X		
25. Support renewable energy development opportunities.	a. Identify and implement zoning policies that support renewable energy development.	E&E Office; Energy Committee	As-of-Right Siting for renewable energy		X	X	X			
	b. Conduct feasibility study for anaerobic digestion.	Energy Committee; MassCEC				X	X			

Objective	Action	Key Implementers	Example Programs/Projects	2012	2013	2014	2015	2016	2017	Additional Action Info in Plan
Encourage the Use of Renewable Energy in Medford.										
25. Support renewable energy development opportunities.	c. Explore opportunities to install solar thermal at municipal buildings.	E&E Office; Energy Committee; MassCEC					X	X		
	d. Explore opportunities to collect and use wood chippings.	Energy Committee; Department of Conservation and Recreation; MassCEC					X			
Promote Sustainability Efforts to Meet Present Energy Needs while Considering Future Generation Needs.										
26. Plan for long-term sustainability development.	a. Integrate clean energy into the City's broader planning and development efforts, like Master Planning.	Energy Committee; Office of Community Development	Audit municipal zoning and master plan documents to identify ways to promote sustainable growth; Explore opportunities to protect and expand the urban tree canopy; Explore opportunities to participate in textile recycling programs, such as Bay State Textile's School Box Recycling Rebate Program.			X	X			
27. Integrate energy goals into public health work.	a. Implement building standards that integrate both building efficiency and healthy housing components, such as weatherizing and ventilation.	E&E Office; Health Department					X	X		
28. Use sustainability as a vehicle to drive local economic development.	a. Use zoning to increase clean energy industries.	E&E Office; Office of Community Development; Chamber of Commerce	Create an Energy Improvement District.					