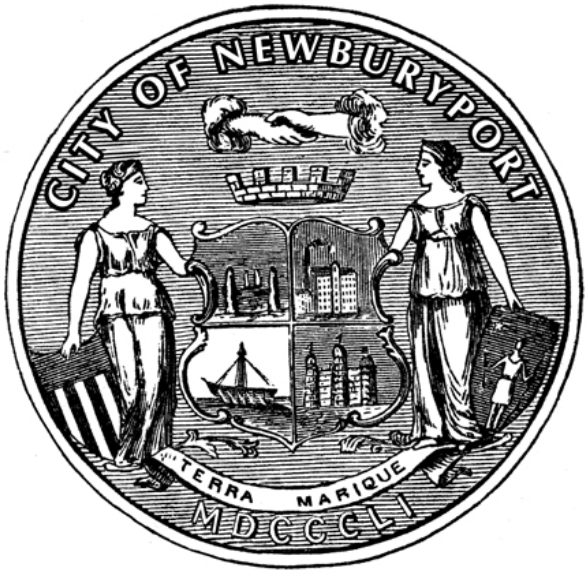
City of Newburyport
Energy Reduction Plan



Submitted by
Donna D. Holaday, Mayor
and
Marc Kerble, EdD., School Superintendent
City of Newburyport
Massachusetts
November 16, 2010

Submitted by:
Donna D. Holaday, Mayor
Marc Kerble, EdD., Public School Superintendent

Principal Authors:
Molly Ettenborough, Recycling and Energy Manager
Jennifer Lamarre, PhD., Grant Writer, City of Newburyport

Contributors:
Steve Bergholm, Facilities Manager, Newburyport Public Schools
Gary Calderwood, Building Commissioner, City of Newburyport
Joseph Cheever, Energy Advisory Committee, City of Newburyport
Art Currier, Co-Chairman of the Board, Greater Newburyport Eco-Collaborative
Deirdre Farrell, Assistant Superintendent of Schools, Newburyport Public Schools
Andrew Flanagan, Director Policy and Administration, City of Newburyport
Clifford A. Goudey, M.S., Energy Advisory Committee, City of Newburyport
Chris Hale, Co-Chairman of the Board, Greater Newburyport Eco-collaborative
Jill Haley-Murphy, J.D., Board Member, Greater Newburyport Eco-Collaborative
Robert Kaplan, Energy Advisory Committee, City of Newburyport
Davis McDougall, Energy Advisory Committee, City of Newburyport
Robert Miller, Energy Advisory Committee, City of Newburyport
Andrew Port, M.S., Director, Planning & Development Department, City of Newburyport
Manfred Rachke, PhD., Energy Advisory Committee, City of Newburyport
Neils Robison, Energy Advisory Committee, City of Newburyport
Sr. Lt. Richard Siemasko, Administrative Lieutenant, Newburyport Police Department
Jim Stiles, Energy Advisory Committee, City of Newburyport
William Squillace, Auditor, City of Newburyport
Michael Strauss, PhD., Energy Advisory Committee, City of Newburyport
Steve Wiehe, Energy Advisory Committee, City of Newburyport

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PURPOSE AND ACKOWLEDGEMENTS

This document is the result of planning and participation of all municipal departments in the City of Newburyport, including the Newburyport Public Schools. Letters from the City of Newburyport's Mayor, Donna D. Holaday as well as Newburyport Public Schools Superintendent, Dr. Marc Kerble, are attached and verify the adoption of this plan by the municipality and the public schools.

The process of gathering our baseline data and ensuring its accuracy has led to a better understanding of energy use throughout the City. As a result of the thoughtful planning of the contributors listed on the previous page, we are confident that the implementation of the City of Newburyport's Energy Reduction Plan will yield long-term savings in annual energy costs and reductions in our community's greenhouse gas emissions. We are anticipating benefits from this plan in years to come by investing a portion of our cost savings in projects that provide further energy efficiencies.

EXECUTIVE SUMMARY

The City of Newburyport serves a population of approximately 17,200 residents. The City operates 14 municipal buildings, including 4 schools, a waste-water treatment plant, and a drinking-water treatment plant. The City also has 4 wells/pumping stations in the Water Department and 15 pumping stations in the Sewer Department. National Grid owns Newburyport's 1594 streetlights and Newburyport owns 278 lights including decorative streetlights in the downtown area, traffic lights, and flashing school lights. National Grid provides electricity and natural gas to most of our City buildings. The majority of municipal buildings use natural gas for heat. However, the Nock/Molin Middle School is heated with electricity and the Brown School and Kelley Youth Center are heated by oil. The City currently has 503-kilowatt of solar photovoltaic systems installed at the Nock/Molin Middle School and the Department of Public Services. There are approximately 126 vehicles of which 15 are classified as non-exempt by our Fuel Efficient Vehicle Policy. Table 1 summarizes the municipal energy use.

Table 1: Energy use and the associated number of buildings/vehicles/streetlights

Buildings	**Number**
Oil Heat	2
Natural Gas Heat	11
Solar PV/Electric Heat	1
Vehicles	
Non-exempt	15
Exempt	106
Street Lights	
Municipally-owned (12 traffic lights; 6 flashing school lights; 260 downtown lamps)	278
Utility-owned (Streetlights)	1594

Reducing energy consumption in City operations has been a priority for Newburyport for a number of years. In 2006, Newburyport became a member of ICLEI's Cities for Climate Protection program and was also a signatory on the US Mayors Climate Protection Agreement. The Mayor established the Energy Advisory Committee (EAC) in 2007. The current Mayor has adopted the EAC's recommendation of having the goal of achieving a net-zero energy city by 2028. Newburyport has already taken steps to reduce energy consumption and green its municipal buildings and operations. Table 2 provides examples of additional key milestones in Newburyport's progress toward net-zero energy.

The EAC has developed an on-going process to refine energy goals for the city, to create and maintain lists of potential projects that can be implemented to reach those goals, and to provide advice and council to the Mayor and City Council on energy and greenhouse gas-related issues. The Mayor recently established an Energy Coordinator position in the City of Newburyport. Being designated as a Green Community represents a critical milestone for Newburyport in its efforts to reduce greenhouse gas emissions as well as to minimize energy use and its cost to the taxpayers.

Table 2: City of Newburyport Climate & Energy Milestones

Year	Milestone
1998	Green Teams established at Newburyport Elementary Schools
1998	Green Teams established at Newburyport Middle School
2006	Newburyport joins ICLEI – Local Governments for Sustainability
2007	Mayor establishes Energy Advisory Committee
2007	Environmental Club established at High School
2008	Mayor signs US Mayors Climate Agreement
2008-2009	Newburyport conducts energy audits of municipal buildings including schools
2009	Mayor endorses goal established by EAC for Newburyport to become a zero-energy city by 2028
2009	Greater Newburyport Eco-Collaborative formed (Collaboration between the City of Newburyport, the Greater Newburyport Chamber of Commerce, and Local Eco-Groups)
2009	Solar panel installation completed at Molin/Nock School
2009	City receives grant for LEED-certified Waste Water Treatment Plant Building
2009	City receives grant for solar panels on the waste water treatment plant
2010	City creates and fills Energy Manager position
2010	City receives EECBG Grant for Energy Efficiency Measures at the Kelley School Youth Center
2010	City conducts a carbon challenge for municipal employees
2010	City conducts community-wide carbon challenge
2010	City implements community-wide weatherization program
2010	EAC completes street light study and energy-saving recommendations
2010	City Council adopts Stretch Energy Code
2010	City participates in Regional ESCO (Merrimac Valley Planning Department) RFP for Municipal Buildings

The City's emphasis on energy reduction has been embraced by both the local business community as well as residents. The Newburyport business sector has historically been interested in renewable energy as evidenced by Bixby International's being chosen as a demonstration site for Evergreen Solar's new flat roof mounting system for solar panels in 2004. More recent examples in our business community include a 600-kilowatt turbine that powers Mark Richey Woodworking in Newburyport's Industrial Park; a biomass furnace that heats 80,000 square feet of Richey's Woodworking facility; and a 60-kilowatt building-mounted photovoltaic array at the Tannery (retail shops, restaurants, offices) located in downtown Newburyport. The residents of Newburyport have recently participated in a city-wide carbon challenge and are also beginning to take advantage of weatherization incentives though efforts by the EAC.

The guiding principles in Newburyport's 2001 Master Plan are based on sustainable development under which environmental quality, economic vitality, and social equity are interrelated and equally important. The City of Newburyport has a strong commitment to the environment and to the reduction of energy and green house gas emissions. The City has been tracking its energy consumption since 2008 in EPA's online database called EPA Portfolio Manager. The City recently transitioned the data to the Mass Energy Insight System (MEI) and in doing so, performed a quality check on the previous data and entered data for the missing municipal buildings. Newburyport will use the MEI on an on-going basis. Not only will the system serve as an energy data repository but it will also be the primary source to identify buildings where energy efficiency improvements are required. As we begin to make these improvements and monitor the data on an on-going basis, we will use MEI to confirm that improvements were successful in reducing energy consumption. Molly Ettenborough, Energy Coordinator for the City of Newburyport has been designated to monitor energy consumption in municipal buildings. Steve Bergholm, Facilities Manager for the Newburyport Public Schools will monitor energy consumption in Newburyport School Buildings. Ms. Ettenborough and Mr. Bergholm will ensure data is entered appropriately into MEI and will assess the impact of energy conservation measures as well as identify where the City should invest in energy conservation methods.

Summary of Energy Use Baseline and Plans for Reductions

The City has established the Fiscal Year 2009 as its energy baseline for municipal properties (48,734 MMBtus in FY2009) and aims to reduce its consumption by at least 20% (9710 MMBtus) by the completion FY 2014. Energy audits of all the schools and four major municipal buildings were completed in 2009 by LCI energy. These audits, in addition to other actions already taken and/or planned for each building will enable a 20% energy reduction from FY2009 through the end of FY2014. Table 3 summarizes the projected energy reductions from our baseline.

Table 3: Energy Reductions projected from baseline in FY2009

	MMBtu FY2009	% of Total MMBtu Baseline Energy Consumption	Projected Savings By FY 2014	Savings as % of Total MMBtu Baseline Energy Consumption
Buildings	38,701	79%	9710	20%
Water/Sewer	9307	19%	0	0
Vehicles*	81	0%	19	0
Traffic Lights/Flashing School Lights	575	1%	0	0
Total	48,734	100%	9722	20%

*Please note: our vehicle policy will not be implemented until 11/16/2010. The MMBtus associated with gasoline usage for non-exempt vehicles is provided for FY2009 in Table 3, but has already been reduced by approximately 11 MMBtus prior to implementation of the new vehicle policy.

The streetlights in Newburyport are owned by National Grid and are **thus not included in our baseline numbers or as a component of our 20% reduction plan**. However, we are taking significant steps to reduce the energy consumption of the streetlights. We anticipate being able to reduce the energy consumption by about 30% (961 MMBtus) by the end of FY 2011.

Table 4: Potential Energy Reductions from National Grid-Owned Streetlights (note: note included as part of 20% baseline reduction)

	MMBtu FY2009	% Savings Projected (MMBtus)	Projected Planned Savings By FY 2011
1594 National Grid-owned Streetlights	3203	30%	961 MMBtus

Summary of Goals and Strategies to be used in Carrying Out the Action Plan

Becoming a Green Community will be a critical milestone in the City of Newburyport's efforts to reduce energy and greenhouse gas emissions. The assignment of an Energy Coordinator who reports directly to the Mayor will ensure the on-going focus on energy consumption and the on-going progress of plans to reduce that consumption. The Energy Advisory Committee is in place to provide advice and counsel to the mayor and City Council on energy-related issues. And, finally, continued membership in National organizations such as ICLEI and local organizations such as the Merrimac Valley Planning Department and the Greater Newburyport Eco-Collaborative, will provide the City with the resources and outreach capabilities and grassroots support it requires to ensure its energy and greenhouse gas reduction plans.

ENERGY USE BASELINE INVENTORY FISCAL YEAR 2009 (FY 2009)

Identification of Inventory Tool Used and Identification of Baseline Year

As mentioned previously, the City of Newburyport has been tracking the energy consumption associated with the majority of its municipal buildings since 2008 in EPA's online database called EPA Portfolio Manager. The City has been transitioning data to the Mass Energy Insight System (MEI) throughout 2010. When moving data over to MEI, the City entered data for buildings which were not included in the EPA database and performed a quality check on the previous data. Newburyport will use the MEI on an on-going basis. Not only will the system served as a data inventory but will also serve as a source to identify buildings where energy efficiency improvements are required. As we begin to make these improvements and monitor the data on an on-going basis, we will be able to confirm that the improvements were successful in reducing energy consumption and carbon emissions.

The City is using Fiscal Year 2009 as its baseline year and municipal energy consumption during FY2009 is indicated in Table 5.

Table 5: Municipal Energy Consumption for FY2009

Facility	MMBtus				
	Electricity	**Natural Gas**	**Fuel Oil**	**Gasoline**	**Total**
Water Department	5905	1257	n/a	n/a	7162
Sewer Department	2190	18	n/a	n/a	2208
R.A. Nock Middle School	5038	n/a	n/a	n/a	5512
Newburyport High School	4448	9427	n/a	n/a	13875
Street and Traffic Lights	575	n/a	n/a	n/a	575
Library	1607	1090	n/a	n/a	2697
G.W. Brown School	350	93	n/a	n/a	2609
Police Department	1099	1230	n/a	n/a	2329
City Hall	326	1044	n/a	n/a	1370
F.T. Bresnahan School	913	5342	n/a	n/a	6255
Fire Department	298	843	n/a	n/a	1141
Public Works Department	338	815	n/a	n/a	1153
Firehouse Center (Cultural Center)	426	n/a	n/a	n/a	426
Harbormaster Building	24	n/a	n/a	n/a	24
Kelley Youth Center	22	n/a	1288	n/a	1310
Vehicles	n/a	n/a	n/a	81	81
Total	23,559	21,633	3,454	81	48,727

Identify Areas of Least Efficiency/Greatest Waste

MEI is an excellent tool for enabling us to identify areas of least efficiency. The Bresnahan School, the Police Department, the Library, and the Kelley School Youth Center have been identified as buildings of least efficient in our City. In addition, the Nock/Molin Middle School, the Newburyport High School, the Brown Elementary School and City Hall have been identified as high energy users.

Identify Areas that Can Most Easily be addressed

The Newburyport Public Schools (Brown School, Bresnahan School, Newburyport High School, and Nock/Molin Middle School) can most easily be addressed as they have a full-time facilities manager that can identify and make relatively inexpensive adjustments (lighting, energy management systems, and repairs) that have a major impact on energy consumption. Our plans to reduce the energy consumption in four of the municipal buildings (City Hall; Police Station; Library; Kelley Youth Center) have been detailed and we have received funding (EECBG Grant) to take energy reduction measures in one of those buildings (the Kelley Youth Services Center). We continue to look for grant opportunities to make changes in these buildings and plan to put 10% of the operations savings from investments such as those in the Kelley Youth Center towards funding energy conservation methods in the other buildings.

Identify Measures Implemented during FY2009 that Created Energy Reductions in 2010

We have been working on reducing energy consumption in the Newburyport Schools for a number of years and have data that indicates a steady annual reduction since FY2004. The schools will continue to represent opportunities for improvement over the next several years.

The majority of the savings from FY2009 to FY 2010 came from energy efficiency measures taken in the schools. The reduction in gas consumption can be attributed primarily to a new boiler at the Bresnahan School. Energy management controls were implemented at the Newburyport High School as well as at the Nock /Molin School. New lighting was put in place at the high school and repairs were made to heating equipment in both schools yielding more efficiency. These changes provided for the majority of the decrease in electricity consumption. New boiler controls were installed in the Brown School during the summer of 2009 which can account for the decreased oil consumption in FY 2010.

Though the number of heating days was less in FY 2010, when we factor in variations due to heating, we still achieve a reduction. However, the reductions resulting form the individual energy efficiency measures taken were probably greater than those predicted in Table 7 because of the weather differences between FY2009 and FY 2010 as well as the fact that our predictions were conservative.

Table 6 provides an MMBtu and CO2 emission comparison between FY2009 and FY 2010 for electricity, oil, and gas.

Table 6: FY2009 vs. FY2010 energy consumption and greenhouse gas emissions in municipal buildings

	FY2009		FY2010	
	CO_2 emissions	**Energy consumption**	**CO_2 emissions**	**Energy consumption**
Electric	6,192,829	23,559	6221298	21,113
Gas	2,530,139	21,633	2150510	18,882
Oil	552,204	3,454	474255	2967
Total	**9275172**	**48646**	**8846063**	**42962**

SUMMARY OF ENERGY AUDITS

In 2009, LCI energy conducted an audit of eight Newburyport buildings – four school and four city buildings in 2009. The eight buildings were evaluated based on data gathered during site walkthroughs, reviews and tabulations of utility bills and building drawings, and conversations with site maintenance and administrative personnel. The energy conservation measures proposed as a result of this audit included:

- Air sealing and insulation repair
- New boiler at the Bresnahan school
- Air source heat pumps and gas-fired duct heaters at the Nock/Molin School
- HVAC Controls improvements at the Brown and Bresnahan schools
- Lighting and/or lighting upgrades in several buildings
- Economizer operation for air handling units at the police station
- Air-sealing and insulating three of the city buildings
- Lighting controls at the library
- HVAC controls improvements at the Police Station and City Hall
- HVAC modernization at the Kelley School

The projected savings from these measures in addition to a few additional measures is approximately 9710 MMBtus which represents approximately 20% energy savings from the Newburyport's Fiscal Year 2009 baseline for all buildings in the City. Thus, the present energy reduction plan is based primarily on measures detailed in the audit, with additional measures analyzed and determined by Steve Bergholm, Facilities Manager for the Newburyport Public Schools.

ENERGY USE REDUCTION PLAN_SUMMARY

Short and Long-Term Goals

Table 7 (below) outlines the specific energy conservation measures we plan to take over the next five years that we enable us to meet the short term goal of reducing the City's energy consumption in municipal buildings by at least 20% by the end of FY 2014. As mentioned previously, the current Mayor has adopted the long term goal of achieving a net-zero energy city by 2028. The Energy Coordinator, Molly Ettenborough, will continue to develop plans that enable the City to reach the goal of being a net-zero energy city by 2028. We are confident that a combination of building envelope measures, energy efficiency measures, and clean-technology projects will enable us to meet our goal.

Getting to a 20% Reduction by end of FY2014

With efforts that have already been undertaken we are seeing significant reductions in many areas from our FY09 baseline. For example, the Bresnahan School used less natural gas in FY10 than it did in FY09 thanks in large part to the installation of a new, more efficient boiler. In addition, with the implementation of a new Energy Management System at the Nock Middle School, that building used less electricity in FY10 than it did the previous year. At the Brown School, new boiler controls helped to produce a reduction in oil usage at that building.

During the summer of 2010 enclosed vestibules were created at Newburyport High School, Nock Middle School and Bresnahan Elementary School. These areas will help to limit the travel of cold air into the buildings reducing demand on the heating systems. The entry canopy at the Nock Middle School was chosen as a test site for LED lighting in the city. An area that was previously lighted with several hundred watts of electricity now uses just 120 watts. With the success of this test, the decision has been made to replace more exterior lighting with LED fixtures as they fail rather than repair the current technology on this and other school buildings. The EECBG-funded energy reduction measures at the Kelley Youth Center are currently being implemented.

With our involvement in the Merrimack Valley Planning Commission's RFQ for a regional Energy Services Company, we have become excited about the possibilities that process will present to us. We look forward to beginning a dialog with the chosen ESCO to get their thoughts and ideas on the potential to reduce our energy consumption city-wide.

When we achieve designation as a Green Community and are awarded grant funding we anticipate channeling that funding to two of our more critical buildings: City Hall and the Police Station. Once we demonstrate operational savings resulting from the energy efficiency measures, we hope to be able to use a portion of the energy savings from those and other projects to expand to even more energy conservation measures across the city.

Our energy savings will help to create more savings, making our energy reduction plan sustainable. In addition, we continue to pursue grant funding wherever possible.

PLANNED REDUCTION MEASURES

The specific measures we plan on implementing to achieve at least a 20% reduction across all City buildings are indicated on the Table below. The energy efficiency measures that were taken in either in FY2009 or in FY2010 or are currently in progress are noted by the gray shading. The buildings we are targeting specifically over the next five years include the Police Station, the Library, City Hall, the Kelley Youth Center and the four Newburyport Schools. Molly Ettenborough, Energy Coordinator for the City, will be responsible for ensuring the plans get implemented and for monitoring the energy saving associated with the plans in the City buildings. Steve Bergholm, facilities manager for the schools has been and will continue to be responsible for implementation of energy efficiency measures at the schools as well as for monitoring the energy consumption at the schools.

Table 7: Specific Energy Conservation Methods by Building

Building	Energy Conservation Measure	Projected Annual Savings (MMBtus)	Source for projected savings
City Hall	Lighting Lamp change-out	12	LCI Energy audit
City Hall	Air seal and establish thermal zones	255	LCI Energy audit
City Hall	Improve steam and radiator control	112	LCI Energy audit
City Hall	Insulate steam and condensate piping	103	LCI Energy audit
Police Station	Air seal attics	307	LCI Energy audit
Police Station	Provide unoccupied hour operation selected areas	156	LCI Energy audit
Police Station	Modify HVAC units and exhaust fans for economizer	106	LCI Energy audit
Library	Lighting controls	71	LCI Energy audit
Library	Lighting controls book stacks	39	LCI Energy audit
Library	Restore hot water supply reset	26	LCI Energy audit
Library	AHU-3 economizer cooling, reduce run hours	17	LCI Energy audit
Library	Variable speed pumping	55	LCI Energy audit
Library	Retro-commission HVAC equipment and controls	62	LCI Energy audit
Library	Address window and air leakage	28	LCI Energy audit
Kelley Youth Center	Air seal and insulate attic	161	LCI Energy audit
Kelley Youth Center	Install new ventilation system with heat recovery	386	LCI Energy audit
Kelley Youth Center	Insulate steam piping and service steam traps	78	LCI Energy audit
Brown School	Daylight controls, gym, stairwells	10	LCI Energy audit
Brown School	Boiler controls upgrade	250	Internal analysis/LCI Energy audit
Brown School	Controls upgrade in classrooms	270	LCI Energy audit
Brown School	Insulate steam and hot water piping	95	LCI Energy audit
Brown School	Rebuild and replace steam traps	85	LCI Energy audit
Brown School	Air seal plenum and other areas	71	LCI Energy audit
Bresnahan School	Day lighting controls	7	LCI Energy

			audit
Bresnahan School	Upgrade controls for setbacks & more efficient boiler operation	1066	LCI Energy audit
Bresnahan School	Replace one boiler	490	LCI Energy audit
Bresnahan School	Air sealing , weather stripping, exterior insulation	353	LCI Energy audit
Bresnahan School	Install new condenser for freezer	58	LCI Energy audit
Bresnahan School	Insulate condensate receiver tank	19	LCI Energy audit
Bresnahan School	Vestibule to put barrier between outside and indoors during winter	100	Internal analysis
Bresnahan School	Replace Windows with ultra high performance translucent glass	350	Internal analysis
Nock/Molin School	Day lighting controls	37	LCI Energy audit
Nock/Molin School	New energy management system	443	LCI Energy audit
Nock/Molin School	Replace CRT with flat screen monitors	88	LCI Energy audit
Nock/Molin School	Install heat pump units in place of univents	1766	LCI Energy audit
Nock/Molin School	Weather-strip operable windows	138	LCI Energy audit
Nock/Molin School	Vestibule to put barrier between outside and indoors during winter	60	Internal analysis
High School	Upgrade EMS (orig. installed 2002) with new technology	100	Internal analysis
High School	Lighting retrofits (gym and cafeteria)	100	Internal analysis
High School	Lighting retrofits	191	LCI Energy audit
High School	Lighting controls	26	LCI Energy audit
High School	Replace CRTs with flat screen computer monitors	260	LCI Energy audit
High School	Adjust ventilation air levels supplied by RTU-1 and RTU-2	1064	LCI Energy audit
High School	Shave pump impellers	65	LCI Energy audit
High School	Improve unoccupied hour pumping control	97	LCI Energy audit
High School	Vestibule to put barrier between outside and indoors during winter	75	Internal analysis
Total Anticipated Reduction		**9710**	

Building Stock Changes

New Buildings Currently Planned
The City currently has no plans for new construction to take place during the 5 year Energy Reduction period, from the beginning of FY2009 to the end of FY 2014.

The Emma Andrews Library, 71 Prospect Street
A small branch library (actually the 1st floor of an older home in the City) was closed in FY 2009 because of high lead levels on the windows and several surfaces. When the building was open for public use, it was only occupied for very few hours a week. This building is not currently included in our baseline.

The City is currently working to replace the windows in the building and de-lead the surfaces. When the building reopens, it will no longer be a branch of the library, but a multi-purpose building that will be used for book lending, tutoring, senior activities, historical and cultural activities. Upon reopening (a timeframe for reopening has not yet been confirmed), we will add this building to Mass Energy Insight, track its energy usage, conduct an audit, and put together a plan for energy conservation measures.

The Office of Emergency Management (OEM), 59 Low Street
The OEM recently closed down and its function moved to the Police Station. There are no plans to re-open the building. We had captured the building's greenhouse gas emissions and energy use in MEI. However, that data is not included in the baseline presented in the current plan. We have removed data associated with this building from both the baseline and from the reduction measures included in the present plan per the guidance provided by DOER.

Table 8: Building Stock Change Summary

Building	Change	Building Use Included in Energy Consumption?	How we will report
The Emma Andrews Library, 71 Prospect Street	**Closed, but will be added in the future** (treating similar to new construction since it was closed during FY 2009- our baseline)	**No**	Once the building opens again, we will provide separate monitoring
The Office of Emergency Management (OEM), 59 Low Street	**Removal**	**No**	Happened 6/2010, so didn't include in baseline numbers provided in the present plan and will not be part of annual reporting

Estimated Capital and Operating Costs

Table 9 presents the estimated capital and operating costs; we will be tracking the operating cost savings and are planning to invest at least 10% of the savings into

additional energy conservation measures. So, over the nest 5 years, we anticipate investing at least $50,000 into energy reduction measures across the municipal buildings.

Table 9: Estimated Costs and payback for Energy Conservation Measures

Building	Total Cost of ECMs	Potential Utility Incentives (estimated)	Net Cost	Annual $$ Saved	Years to Payback
City Hall	$41,562	$21,000	$20,562	$7685.00	2.68
Police Station	$51,080	$20,000	$31,080	$12,839.00	2.42
Library	$70,754	$15,000	$55,754	$10,485.00	5.32
Kelley School	$116,190	0	$116,190	$7,712.00	15.07
Brown School	$61,360	0	$61,360	$10,083.00	6.09
Bresnahan School	$127,107	$22,500	$104,607	$312,492.00	3.29
Nock/Molin Middle School	$1,696,365	$78,000	$1,618,365	$119,707.00	13.52
High School	$75,252	$23,000.	$52,252	$43,381.00	1.20
Total	**$2,239,670**	**$179,500**	**$2,060,170**	**$524,384**	**8.45**

Table 10: Schedule for Implementation

Facility	FY09	FY10	FY11	FY12	FY13	FY14
Water Department						
R.A. Nock Middle School	x	x	x	x	x	x
Newburyport High School	x	x	x	x	x	x
Street and Traffic Lights						
Library				x	x	x
G.W. Brown School	x	x	x	x	x	x
Police Department			x	x		
Sewer Department						
City Hall			x	x	x	
F.T. Bresnahan School	x	x	x	x	x	x
Fire Department						
Public Works Department						
Firehouse Center						
Office of Emergency Management						
Harbormaster Building						
Kelley Youth Center			x			
Projected Savings (MMBtu)		4023*	3000	1691	1000	
% Change from Baseline		-6%	-5%	-5%	-4%	
Total Savings:	**9714 MMBtus**					

* Note: 4023 MMBtu savings were projected; 5684 MMBtu savings were achieved

Vehicular Energy Conservation

The City of Newburyport has 15 vehicles which are non-exempt for the Fuel Efficient Vehicle Policy. The vehicle purchase and replacement policy will be effective as of November 18, 2010. Though our new policy will not be affective until this time, the City of Newburyport has been able to reduce gasoline usage associated with vehicle purchase since FY 2009.

We purchased a hybrid vehicle in FY 2009 for the Parking Officer which reduced our vehicle-related MMBtus by 8% (6.7 MMBtus). In addition, we replaced three school vehicles with new vehicles this past summer and anticipate that they will reduce the annual vehicular MMBtus by another 6% (4.4 MMBtus). We will be replacing the current recycling dump truck with an Electric Recycling Vehicle in FY2012. Though this vehicle will use electricity instead of gasoline, it will save 8250 pounds of carbon dioxide emissions per year and reduce vehicular MMBtus by 5% (3.5MMBtus). Given our current fleet and plan for replacement indicated below (including the electric recycling truck), we anticipate an additional reduction of 8 MMBtus in energy consumption from implementation of our vehicle policy over the next 5 years. Andrew Flanagen, Director of Policy and Administration for the City of Newburyport is responsible for ensuring enforcement of the policy.

Another way we are reducing energy consumption, is with our Newburyport Police Department Bicycle Patrol Unit which currently consists of 11 bicycles. These bicycles are used by patrol officers from 8am until midnight, weather permitting. Our vehicle policy also mentions the efforts associated with encouraging use of public transportation or alternate transportation by residents as well as municipal employees.

Table 11: Replacement Plan for Non-exempt Vehicles in the City of Newburyport

Vehicle	**Year Purchased**	**Projected Replacement Fiscal Year**										
Make/Model	Year Purchased	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20 & beyond
DODGE RAM VAN (10 PASS)	2000							x				
FORD ELDORADO MINIBUS (16 PASS.)	2001								x			
EL DORADO AERTECH (14 PASSENGER)	2005											X FY24
FORD E450	2008				x							
FORD CROWN VICTORIA	1998				x							
DODGE DAKOTA	2008										x	
FORD E350	2004											x FY25
HONDA CIVIC HYBIRD	2008											x FY25
FORD E100 Van	2010											x FY25
FORD E250 Cargo	2010											x FY25
Ford 250 Pick-up	2010											x FY25
FORD E250 CARGO VAN	1998				x							
DODGE DURANGO 4X4	1999			x								
CHEVROLET CAVALIER	2004											x FY25

Street lights and Flashing School Lights Conservation

Since the majority of the municipal outdoor lighting is owned by National Grid, we did not include them in the reduction plan per the guidelines from DOER. However, we anticipate that we can achieve significant savings in energy and cost associated with streetlight usage. In fact, short term, we believe we can reduce energy consumption related to street lights by 30%. We will do this by shutting off streetlights in non-critical areas. The EAC has developed a set of guidelines which indicate which street lights should be left on. The guidelines state that, at a minimum, streetlights should be left on at crosswalks, along streets with heavy pedestrian traffic, along streets with speed limits greater than 30 miles per hour and where the streetlights reduce the hazard of dangerous sidewalks. Newburyport has conducted a full inventory of its street lights and put them into a mapping system. We are scheduling public reviews of the proposed streetlights to turn off. Based on the data, a conservative estimate indicates that this effort will result in a 30% energy consumption reduction.

We are looking at several long-term options for the streetlights. We are currently conducting a financial analysis of purchasing of the lighting utility poles from National Grid. Options include outright purchase of the poles by the City or having a third party purchase the poles. Ownership would allow Newburyport to adopt more energy efficient lights for the streetlights that remain turned on. This would enable us to reduce energy considerably.

Through a grant from the Massachusetts Clean Energy Center, we are planning on moving the flashing school lights to solar power. We anticipate that this will reduce the City's electrical cost with respect to these lights; however, there will still be energy consumption.

Measurement and Verification Plan for Projected Reductions – Annual Reporting

By the completion of the energy reduction plan, many of the City of Newburyport's municipal buildings and all of its schools will have an Energy Management System (EMS). These systems, in addition to Mass Energy Insight, will be used to verify the projected savings of the individual energy efficiency measures and effectively commission the installed energy efficient equipment. We will provide annual reports to DOER of the energy efficiency measures taken by the City and the energy usage. Ms. Ettenborough and Mr. Bergholm will be providing bi-monthly reports to the City (specifically to Mayor Holaday and Superintendent Kerble) on energy usage in the buildings they are responsible for as well as energy efficiency measures planned and or taken at those facilities. Ms. Ettenborough is the primary contact for DOER and will be the person responsible for the Annual Reports on Measurement and Verification to DOER.

The City of Newburyport will continue to use DOER's web-based energy information tool, Mass Energy Insight, and the available reports. These reports will enable us to track

energy use and compare the actual versus projected reductions associated with energy efficiency measures.

Summary of Long-Term Energy Reduction Goals – Beyond 5

Municipal Buildings (including schools)

Long-term, we consider it critical that all of the larger buildings have energy management systems and provisions to upgrade them every 10 years or so to prevent them from becoming antiquated and losing efficiency. Creating a fund to replace aging HVAC equipment on an ongoing basis to maintain efficiency and to incorporate what will then be the latest most efficient equipment. Lighting in schools was replaced in 2004-2005 but newer technology already exists that would improve on what is now in place, and LED lighting is gaining acceptance and will soon be the standard. Many new technologies will be available 10-15-20 years from now and the City of Newburyport wants to be in a position to take advantage of them by creating a fund from energy savings that can be used to continue to invest in these new technologies.

Vehicles

We want to reduce the total number of vehicles that the City of Newburyport owns and replace the vehicles that are needed with the most energy efficient ones that can fulfill the required function as well as reduce usage. We are investigating technologies such as the Zipcar monitoring technology to more closely monitor and research current usage.

Street and Traffic Lighting

We plan to reduce wattage of the streetlights wherever feasible, reduce the number of lights where it is safe to do so, replace lights with more efficient bulbs, such as LEDs, and work to "full cut off fixtures" (60% redirected from sky to ground). We will investigate "smart" controls so power can be reduced or lights shut off after 1AM

Perpetuating Energy Efficiency

The City is very interested in some type an energy conservation savings reinvestment plan. We are anticipating being able to invest 10% of our savings into future energy reduction measures. We feel this will be necessary to ensure that our transition to a net-zero energy city is sustainable. We currently are researching ways of implementing this type of program, including examples of how this has been done in other Cities**.**

RENEWABLE ENERGY

Solar Photovoltaic

Solar panel installation was completed on the R.A. Nock Middle School and at the Department of Public Services buildings in September of 2009. The photovoltaic system

that was installed on the Nock building produced 313,123 kWh of electricity in FY10 meaning that building used 34.8% less "grid electricity" than in FY09. Since that system did not go online until September of 2009, the production for FY11 will be even greater. Within the next two years, solar panels will provide energy to the waste-water treatment plant. Steve Bergholm, from the City of Newburyport, is on the selection committee with the Merrimack Valley Planning Commission for a Regional ESCO. We are anticipating working with an ESCO over the next several years to install solar panels on those municipal buildings where it makes sense.

BioMass

Our research on biomass technology indicates about 10% of the schools in Vermont are using it. We would like to implement a biomass heating plant at the Bresnahan School. The City would use wood material from its composting facility. As Newburyport is close to wooded areas in New Hampshire, Vermont and Maine, as well as many state parks, it is anticipated that there would be abundant biomass to support the new facility.

Wind

The installation of an on-site 600-kilowatt wind turbine by a manufacturer in our industrial park has demonstrated the utility of this form of renewable energy for Newburyport. Though not without local controversy, a lot was learned about the importance of community outreach and rational siting standards and we see additional opportunities for more wind power in the City. The EAC has led this examination by exploring the wind resources on City-owned land that would allow such an installation under our current guidelines. The northern end of Plum Island stands as an attractive location but would require collaboration with state and federal land owners.

Hydrokinetic

The power of the Merrimack River and the ocean waters that surround portions of Newburyport may represent an untapped renewable resource to help us towards zero-net-energy. Technologies for converting river, tidal, and ocean flows and ocean waves into clean energy are being developed. These technologies are designed to be friendly to the environment and avoid the visual impacts of wind turbines. Considerable thought needs to go into both approaches to avoid user conflicts and to demonstrate to regulatory agencies that they can operate without risks to endangered species.

CONCLUSION

Over the past several years, Newburyport has been developing the infrastructure so it can build an energy reduction plan that will be sustainable. The Energy Advisory committee was formed and the City developed the new position of Energy coordinator. The schools have been extremely involved with educating our students about energy usage and the school facilities manger has been proactive in implementing energy conservation methods at the schools. Over the past two years, the City of Newburyport has invested significant time and resources in entering our data into systems such as EPA, then MEI and working to understand how ewe use energy and developing plans to reduce our energy use. These efforts have put us in a good position to apply for Massachusetts Green Community status in November of 2010. In particular, the detailed energy audits of our facilities provided us with a strong base for our energy reduction plan. The City of Newburyport has also invested in an xxx-kilowatt PV solar system that will significantly reduce our fossil fuel use, but will not contribute towards our Green Community status. However, we believe our initiative t\with Solar PV at the Nock/Molin Middle School and the Department of Public Services building as well as our participation with the Merrimack Valley Planning Commission's RFP for a regional ESCO, are consistent with the goals of the Green Community Initiative.

The city of Newburyport understands how it uses energy and has completed as thorough baseline of its energy use. We have developed detailed plans to reduce our energy use by 20% over 5 years starting with Fiscal Year 2009 as the base year. The majority of the savings will be achieved by implementing energy efficiency measures at the municipal buildings (including schools). Out non-exempt vehicle fleet is comprise of only 15 vehicles, so only a small percentage of the savings will come from common-sense energy savings measures in vehicle use, including a fuel-efficient vehicle purchase policy.

The process associated with our application for green Community status has been a good one for the City of Newburyport. In working to fulfill the requirements, we have made decisions and plans that will continue to enable us to reduce energy and carbon emissions in a sustainable way.