



Town of Westford Designation Grant Final Report



February 24, 2015

Jodi Ross, Town Manager

John Mangiaratti, Assistant Town Manager

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Executive Summary

The town of Westford was designated as a Green Community by the Massachusetts Department of Energy Resources (DOER) in December of 2013 and qualified for a base grant of \$156,025. We used our grant funds, combined with \$44,831.50 in incentives from National Grid, to complete nine projects with a total value of **\$200,854.50**. These projects will help us achieve energy efficiency and sustainability goals identified in our Energy Reduction Plan (ERP). Our ERP is available online: <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/energy-reduction-plan-westford.pdf>

The projects we completed with our designation grant are expected to save approximately **\$29,000** per year in utility expenses and additional savings in maintenance costs. A single high efficiency boiler was installed to replace two existing boilers at the Blanchard Middle School. High efficiency LED lighting was installed in the parking lots at the Police Station, Library, and the Senior Center. All interior lighting at the Police Station was retrofitted with high efficiency LED and florescent fixtures. Interior lighting in portions of the Highway Facility, classroom lighting at the Colonel John Robinson Elementary School, and the lobby of the Cameron Senior Center were also retrofitted. These projects have resulted in energy savings and created awareness throughout the community of the benefits of participating in the Green Community program.

In this report you will find a summary of each project we completed with photographs and other related information to demonstrate how the town of Westford benefitted from this grant program.

We are looking forward to monitoring and tracking the success of these projects using the MassEnergyInsight tool. The point of contact for DOER to connect with for future reporting of actual energy savings at one year and two years for all of the projects in this report is John Mangiaratti, Assistant Town Manager (jmangiaratti@westfordma.gov or 978-692-5501)



Figure 1 Town of Westford Acceptance of Green Community Designation and Grant Award (pictured left to right) John Mangiaratti, Assistant Town Manager; Kelly Ross, Selectman; Jodi Ross, Town Manager; Paul Mucci, Energy Committee; Representative James Arciero; Senator Eileen Donoghue; Secretary Richard Sullivan

*Projected Annual Savings:
\$7,313 (8,084 therms)*

Project 1 – Boiler Replacement at Blanchard Middle School

Summary

We replaced two obsolete boilers with a single new energy efficient boiler. The Blanchard Middle School previously operated on a five-boiler system, three of which were replaced in FY2011. We initially proposed to replace both of the remaining boilers, but due to the high efficiency of the equipment, we were able to install a single boiler to do the work of two. The benefits of this project will be reduced consumption of natural gas and improved performance of the heating system.



Figure 2 High efficiency boiler at Blanchard School

Project Team

Project Lead – Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Richie Crocker, School Facility Manager
Project Lead – Vendor	Charlie Ehl, Guardian Energy
Sub-contractor	Industrial Boiler Inc.

Project Timeline

DOER Approval	May 19, 2014
Town Approval	April 9, 2014
Kick-off Meeting	May 27, 2014
Installation Start	May 27, 2014
Installation End	June 26, 2014
Final Invoice Paid	July 31, 2014

Total Project Cost: \$49,344
Green Community Funding: \$41,619
National Grid Incentives: \$7,725
Town funds: \$0

Procurement Process

Guardian Energy was selected as the vendor for this project in accordance MGL Chapter 25 section 14.

Lessons Learned

The original scope of the project was to replace two boilers and after an engineering review, it was determined that one high efficiency boiler would be adequate to provide the heat that previously needed two boilers. We learned that it is critical to conduct a comprehensive energy consumption and capacity analysis when we prepare specifications for boiler replacement projects.

Project 2 – Lighting Retrofit- Police Station (53 Main Street)

All of the light fixtures inside and outside the Police Station were retrofitted with more efficient lighting solutions. This facility operates 24 hours per day and 365 days per year and many of the lights in this building are always turned on. Lighting efficiency improvements will reduce our energy consumption considerably. Also 413 interior light fixtures and 30 exterior light fixtures were replaced with either LED or other modern energy efficient lighting solutions. The exterior lighting at Police Station is illuminated throughout the night and more efficient fixtures will reduce cost, improve quality of light, and reduce light pollution. Other benefits include standardization of lighting components and reduced maintenance cost related to longer useful life of components.

Projected Annual Savings:
\$11,916 (88,267 kWh)



Figure 3 LED Retrofit Police Station Parking Lot

Project Team

Project Lead – Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Bill Kenison, Facility Technician
Project Lead – Vendor	Eric Hanian, EMC Inc.
Project Manager – Vendor	Carl Edin, EMC Inc.
Sub-contractor	Wakita Electric
Other Team Member	Don Guillmette, Police Department Maintenance Staff

Project Timeline

DOER Approval	May 19, 2014
Town Approval	May 14, 2014
Kick-off Meeting	May 21, 2014
Installation Start	June 22, 2014
Installation End	July 8, 2014
Final Invoice Paid	August 8, 2014

Total Project Cost: \$75,868

Green Community Funding:
 \$55,363

National Grid Incentives:
 \$20,505

Town funds: \$279

Procurement Process

EMC Inc. was selected as the vendor for this project in accordance MGL Chapter 25 section 14.

Lessons Learned

This project has resulted in a decrease in electricity consumption. Our use decreased by 20% in the first quarter of FY15 as compared to first quarter of FY14. In the second quarter of FY15 there was a



Figure 4 LED Retrofit Police Station Parking Lot

decrease in electricity consumption of 15% from prior year second quarter. These reductions are shown in the graphic below extracted from the MassEnergyInsight database. These reductions in electricity have produced significant savings for the town.

Monitoring Use Dashboard

Compare use for any quarter to previous quarters, or for any year to previous years. Percent difference is calculated from previous period. To collapse or expand the charts, hover over the names of your City, Departments, Buildings, etc., then click the plus (+) or minus (-) symbols at the top of the columns.

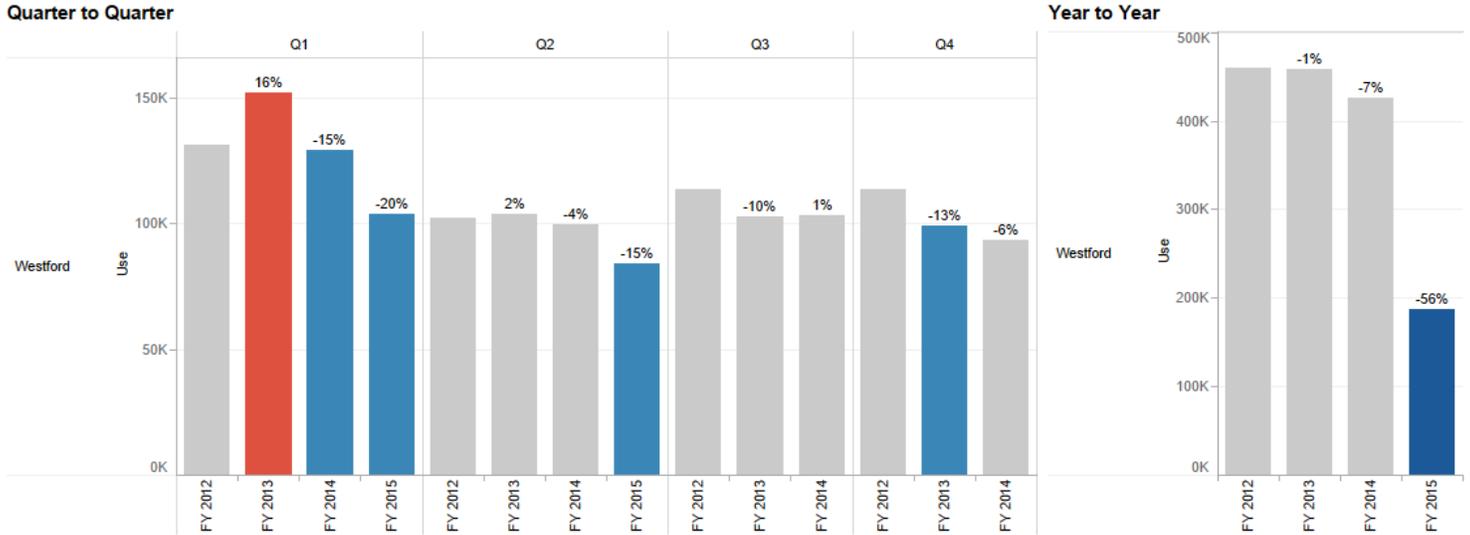


Figure 5 Graphic extracted from MassEnergyInsight showing energy consumption at the Police Station.



Figure 7 LED retrofit inside Police Station corridor



Figure 6 Old fixture on left side of door, new fixture on right side

Project 3 – Lighting Retrofit- JV Fletcher Library Parking Lot (50 Main Street)

The exterior lighting at the library is illuminated throughout the night and more efficient fixtures will reduce cost, improve quality of light, and reduce light pollution. Other benefits of this project included standardization of lighting components and reduced maintenance cost-related to longer useful life of components. Six 250 watt metal halide post top fixtures were retrofitted using 90 watt LED post top kits in the parking area for the library. Two 150 watt high pressure sodium wall packs were replaced with new 30 watt LED wall packs.

*Projected Annual Savings:
\$914 (6,771 kWh)*

Project Team

Project Lead – Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Bill Kenison, Facility Technician
Project Lead – Vendor	Eric Hanian, EMC Inc.
Project Manager – Vendor	Carl Edin, EMC Inc.
Sub-contractor	Wakita Electric

Project Timeline

DOER Approval	May 19, 2014
Town Approval	May 14, 2014
Kick-off Meeting	May 21, 2014
Installation Start	June 22, 2014
Installation End	July 8, 2014
Final Invoice Paid	August 8, 2014

Total Project Cost: \$4,584

**Green Community Funding:
\$2,310**

National Grid Incentives: \$2,274

Town funds: \$0

Procurement Process

EMC Inc. was selected as the vendor for this project in accordance MGL Chapter 25 section 14.

Lessons Learned

We learned that exterior lighting retrofit projects are a quick and low-impact way to reduce energy consumption.

Project 4 – Lighting Retrofit Senior Center Exterior (20 Pleasant Street)

The exterior lighting at Senior Center is illuminated throughout the night and more efficient fixtures will reduce cost, improve quality of light, and reduce light pollution. Other benefits of this project includes standardization of lighting components and reduced maintenance cost-related to longer useful life of components

Projected Annual Savings:
\$1,117 (8,277 kWh)



Figure 8 New LED wallpack light fixture at Cameron Senior Center

Project Team

Project Lead – Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Bill Kenison, Facility Technician
Project Lead - Vendor	Eric Hanian, EMC Inc.
Project Manager – Vendor	Carl Edin, EMC Inc.
Sub-contractor	Wakita Electric

Project Timeline

DOER Approval	May 19, 2014
Town Approval	May 14, 2014
Kick-off Meeting	May 21, 2014
Installation Start	June 22, 2014
Installation End	July 8, 2014
Final Invoice Paid	August 8, 2014

Total Project Cost: \$5,843
Green Community Funding: \$2921.50
National Grid Incentives: \$2921.50
Town funds: \$0

Procurement Process

EMC Inc. was selected as the vendor for this project in accordance MGL Chapter 25 section 14.



Figure 9 Retrofit light fixture at Cameron Senior Center

Project 5 – Lighting Retrofit Highway Mechanics Area (28 North Street)

We replaced the existing 400W metal halide fixtures in the Mechanics Garage at the Highway Facility with new LED fixtures to reduce energy consumption significantly. The LED lights will also provide improved illumination for the employees working in the space.

*Projected Annual Savings:
\$2,456 (18,196 kWh)*



Project Team

Project Lead - Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Bill Kenison, Facility Technician
Project Lead - Vendor	Eric Hanian, EMC Inc.
Project Manager – Vendor	Carl Edin, EMC Inc.
Sub-contractor	Wakita Electric

Project Timeline

DOER Approval	May 19, 2014
Town Approval	May 14, 2014
Kick-off Meeting	May 21, 2014
Installation Start	June 22, 2014
Installation End	July 8, 2014
Final Invoice Paid	August 8, 2014

Total Project Cost: \$16,200

Green Community funds:
\$11,651

National Grid incentives:
\$4,549

Town funds: \$0

Procurement Process

EMC Inc. was selected as the vendor for this project in accordance MGL Chapter 25 section 14.

Lessons Learned

The Highway Garage mechanics are pleased with their new light fixtures. The fixtures are so bright; the mechanics keep 50% of the lights shut off during the daylight hours. We learned that improved lighting quality may allow us to light some spaces such as the mechanic’s bay without turning on all of the lights.

Project 6 – Energy Management Training for Facilities Staff

The town of Westford utilizes energy management systems to improve the efficiency of heating and cooling systems. Howse Corporation installed a Johnson Controls Metasys energy management system during the renovation of the Town Hall in 2010. Since that time we have updated the controls at the Senior Center, Police Station, and Highway Facility. The energy management systems require constant monitoring and adjustments to maximize the efficiency of the buildings. Howse Corporation met with a total of six town employees at four buildings and provided individual training from introductory beginner level for some, refresher courses for others, to higher level training for those that required it. We were also able to solve two HVAC issues we were having at the Police Station, and create a schedule for an exhaust fan to provide some energy savings. This increased expertise in the energy management systems will help the town operate each building more efficiently, and better utilize the sophisticated controls that are in place.

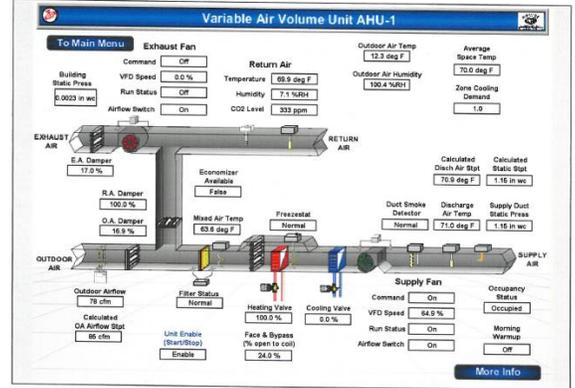


Figure 10 Image of Town Hall HVAC Controls

Project Team

Project Lead – Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Bill Kenison, Facilities Technician
Project Manager – Vendor	Fran Cahill, Howse Corp.
Training attendees	Don Guillmette, Chris Mitchell, Andrew McDonough, Joe Ingalls

Project Timeline

DOER Approval	May 19, 2014
Town Approval	November 19, 2014
Training Day	December 12, 2014
Final Invoice Paid	January 29, 2015

Total Project Cost: \$800
Green Community funds: \$800
National Grid incentives: \$0
Town funds: \$0

Procurement Process

Howse Corporation was selected as the vendor for this project using sound business practices.

Lessons Learned

This training day was money well spent and we will consider providing another training opportunity next year. In the Town Hall, Andrew McDonough, Town Maintenance Staff, received introductory training at his own desk from this highly skilled field technician. At the Police Station, Don Guillmette, Police Department Maintenance Staff, was able to get answers to specific questions about Metasys software functions. At the Senior Center, Chris Mitchell, Senior Center Maintenance staff, was able to add to his basic system knowledge and John "Willie" Wilson, Senior Center Maintenance staff, learned how to adjust the HVAC schedule to accommodate off-hour events. At the Highway Garage, Joe Ingalls, the Highway Operations Supervisor, was able to build on his previous experience and advance his understanding and capabilities of the HVAC system functions. Bill Kenison, Facility Technician, attended each of the training sessions, as both a student and an advisor, and gained skills which will help him better support the efficient operation of our buildings systems.

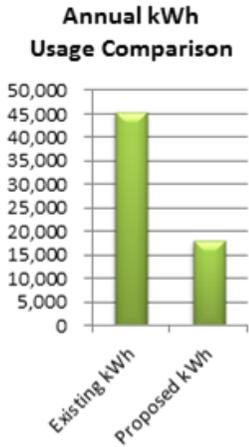
Project 7 – Lighting Retrofit Robinson School Classrooms (60 Concord Road)

This lighting project replaced the original 4x4 light fixtures in the classrooms at the school. Photographs below show the existing fixtures which will be replaced with new fixtures using LED tube technology. The existing fixtures were difficult to repair, inefficient, and in poor condition.

*Projected Annual Savings:
\$4,114 (27,427 kWh)*



Return on Investment Estimates	
Return on Investment Rate	12%
Payback Timeframe (years)	8.55
Ten Year Payback Scenario	\$5,963
Annual Cost Existing System	\$6,804
Annual Cost Proposed System	\$2,690
Est. Annual Cost Savings	\$4,114
Average Monthly Savings	\$343
MMBTU Saved	93.6
Tons of CO2 Saved	20.8



Project Team

Project Lead – Town	John Mangiaratti, Assistant Town Manager
Project Lead – Vendor	Charlie Ehl, Guardian Energy
Project Oversight – Town	Richie Crocker, School Facility Manager

Project Timeline

DOER Approval	November 3, 2014
Town Approval	January 13, 2015
Kick-off Meeting	January 30, 2015
Installation Start	February 9, 2015
Installation End	February 24, 2015
Final Invoice Paid	February 24, 2015

Total Project Cost: \$42,034
Green Community funds: \$35,177
National Grid incentives: \$6,857
Town funds: \$0

Procurement Process

Guardian Energy was selected as the vendor for this project in accordance MGL Chapter 25 section 14.

Lessons Learned

We learned an important distinction between LED tubes and fluorescent lamps. With an LED tube, light is emitted directionally 180 degrees, while in fluorescent lamps light is emitted 360 degrees. Depending on how the luminaire is designed, you can dramatically change the appearance and diminish the light quality in a classroom by switching from fluorescent to LED, even if the lumen output is equivalent or better. At Robinson school we used down lighting through a prismatic lens so 360 degree lighting is not necessary.

Project 8 – Lighting Retrofit Senior Center Lobby (20 Pleasant Street)

On January 23, 2015, the town of Westford, MA, working with Energy Management Consultants Inc., completed a re-lamping project in the lobby and main administration office areas of the Cameron Senior Center. Twenty-two 75 watt incandescent recessed can lights were replaced with twenty-two 15 watt LED recessed can lights. The project was completed in five hours with minimum interruption to office routine and the staff is delighted with the results. The office is brighter and more cheerful, and makes for a more welcoming atmosphere for our seniors entering the facility.

Projected Annual Savings:
\$1,089 (6,726 kWh)

Project Team

Project Lead - Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Bill Kenison, Facility Technician
Project Lead - Vendor	Eric Hanian, EMC Inc.
Project Manager – Vendor	Carl Edin, EMC Inc.
Installer Sub-contractor	Wakita Electric

Project Timeline

DOER Approval	December 23, 2014
Town Approval	December 23, 2014
Kick-off Meeting	January 23, 2015
Installation Start	January 23, 2015
Installation End	January 23, 2015
Final Invoice Paid	January 29, 2015

Total Project Cost: \$5,674
Green Community funds: \$4,904
National Grid incentives: \$770
Town funds: \$0

Procurement Process

EMC Inc. was selected as the vendor for this project in accordance MGL Chapter 25 section 14.



Figure 11 LED fixture



Figure 11 Wakita Electric installing new LED fixtures



Figure 13 Cameron Senior Center hallway

Project 9 – Lighting Retrofit Highway Operations Area (28 North Street)

This project involved using the existing fixtures and adding new LED bulbs. This project will serve as a pilot effort to test out the new LED tube technology. We expect that installing LED tubes in existing fixtures will reduce the frequency of light bulb replacements while saving energy.

Projected Annual Savings:
\$227 (790 kWh)

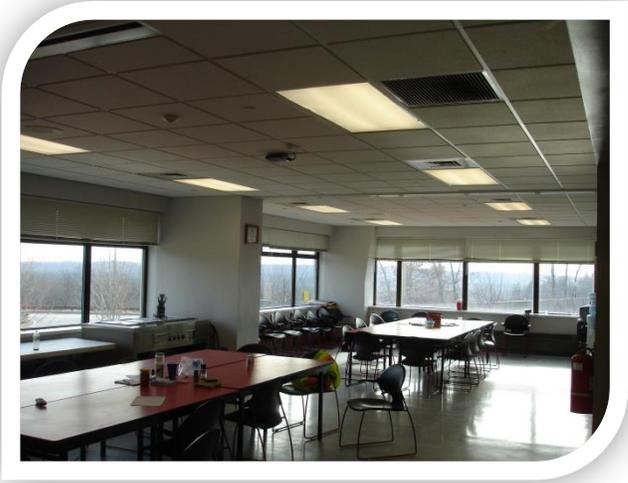


Figure 12 Operations and Lunch Area

Project Team

Project Lead - Town	John Mangiaratti, Assistant Town Manager
Project Oversight – Town	Bill Kenison, Facility Technician
Project Lead - Vendor	Eric Hanian, EMC Inc.
Project Manager – Vendor	Carl Edin, EMC Inc.

Project Timeline

DOER Approval	January 28, 2015
Town Approval	January 28, 2015
Kick-off Meeting	February 10, 2015
Installation Start	February 12, 2015
Installation End	February 12, 2015
Final Invoice Paid	February 12, 2015

Total Project Cost: \$1,621
Green Community funds:
 \$1,279.50
National Grid incentives:
 \$340
Town funds: \$1.50

Procurement Process

EMC Inc. was selected as the vendor for this project in accordance MGL Chapter 25 section 14.

Lessons Learned

One lesson learned is that newer fixtures may be retained and still be retrofitted with LED tube technology to achieve energy savings.

Public Involvement and Support

All of the projects were discussed at public meetings conducted by the Energy Committee and most were also discussed at Board of Selectmen and Finance Committee meetings. Monthly Town Manager's newsletters were used to inform residents of these projects.

Other Energy-related Projects and Activities Leveraged by the Grant Funding

In 2014 we participated in the DOER free lamp program, and received 18,000 bulbs for schools and more than 1,126 bulbs for town buildings. We saved close to \$30,000 in the cost of bulbs, and will save approximately \$25,000 per year in electricity. This is a significant achievement towards our goal as a Green Community to reduce our energy consumption. Since we did this work with in-house resources from Schools and Highway, our installation cost was minimal, and the payback on our investment is immediate.

Media Coverage of Green Community Efforts in Westford

- 4/22/2011 On Earth Day, Westford's First Town Building Goes Solar
<http://patch.com/massachusetts/westford/on-earth-day-westfords-first-town-building-goes-solar>
- 6/19/2013 Solar Deal Could Save Westford \$400,000 Annually
<http://patch.com/massachusetts/westford/solar-deal-could-save-westford-400-000-annually>
- 9/24/2013 Residents Hear Details Of Westford's Last Step to Becoming "Green Community"
<http://patch.com/massachusetts/westford/residents-hear-details-of-westfords-last-step-to-becoming-green-community>
- 8/12/2014 A Look At Westford's New Solar Investment <http://www.westfordtemplate.com/2014/08/a-look-at-westfords-new-solar-investment/>
- 11/20/2014 Solar-farm agreement a bright spot for Westford
http://www.lowellsun.com/News/ci_26976114/Solarfarm-agreement-a-bright-spot-for-Westford
- WINTER 2015 The solar disconnect:- If sun power is expensive, why is it saving municipalities money?
<http://commonwealthmagazine.org/environment/the-solar-disconnect/>
- 1/23/2015 Westford reduces limits for trash
http://www.lowellsun.com/news/ci_27378237/westford-reduces-limits-trash
- 1/29/2015 Nexamp Flips the Switch on 4.4 Megawatt Solar Installation
<http://finance.yahoo.com/news/nexamp-flips-switch-4-4-143000975.html>

Final Grant Table (GC Grant Final Table.xls)



Table of Invoices and Payments

