

# Town of Westford, Massachusetts

## Energy Reduction Plan



In fulfillment of the Massachusetts Green Communities Grant Program  
Criteria 3

Prepared by

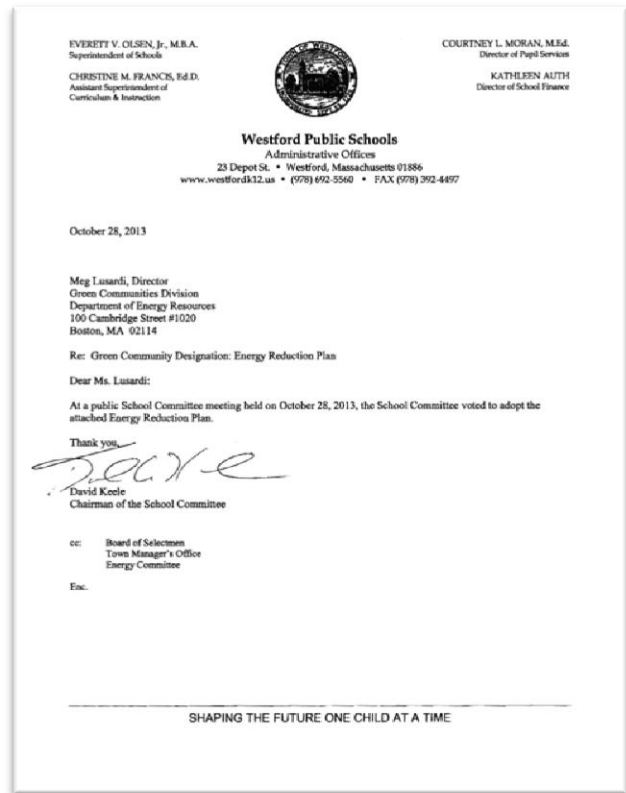
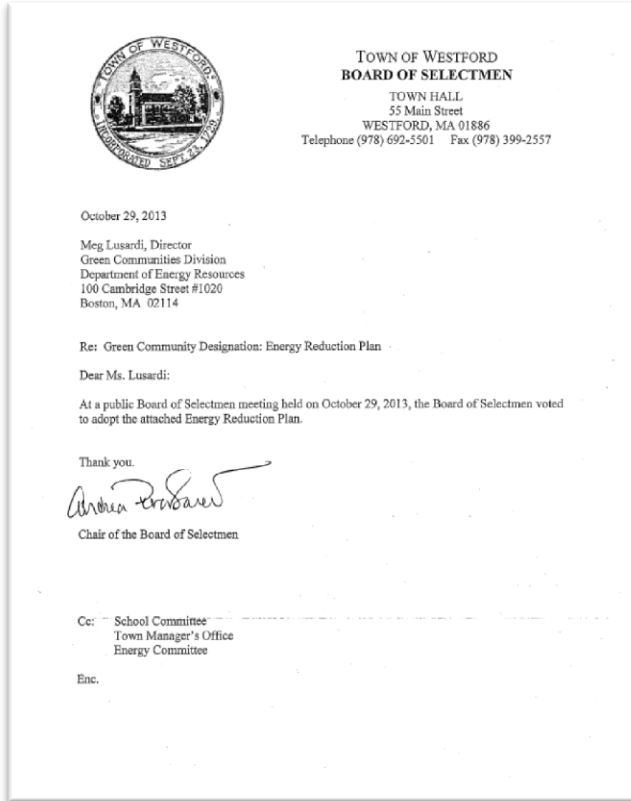
Town Manager's Office

Town of Westford, Massachusetts

October 29, 2013 (Revised December 6, 2013)

## I. Purpose and Acknowledgements:

This Energy Reduction Plan (ERP) outlines energy efficiency measures that are proposed to be implemented to reduce costs and environmental impacts of municipal energy use in the town of Westford in accordance with the Massachusetts Green Communities Grant Program Criteria 3. Included below are copies of letters of support for this plan from the Board of Selectmen and School Committee. Additional details regarding Westford's application for designation as a Green Community are online at: [www.westfordma.gov/greencommunity](http://www.westfordma.gov/greencommunity).



The following groups and individuals contributed to the development of the energy baseline and the ERP process:

- Jeff Geller, Energy Committee
- Jeffrey Zhang, Energy Committee
- Jodi Ross, Town Manager
- John Mangiaratti, Assistant Town Manager
- Kathy Auth, Director of School Finance
- Richard Crocker, School Facilities Manager
- Jeremy Downs, Assistant Town Engineer
- Danielle Mucciarone, Northern Middlesex Council of Governments
- Fire Department
- Highway Department
- J.V. Fletcher Library
- Permitting Department
- Police Department
- Technology Department
- Water Department

## II. Executive Summary

### A. Narrative Summary of the Town of Westford

Westford is located in Middlesex County approximately 10 miles from Lowell and 35 miles from Boston. According to the 2010 Census, Westford's population was 20,868. The total area of the town is 30.2 square miles and we have approximately 160 miles of public roadways. We have an open town meeting form of government with a five-member Board of Selectmen and a Town Manager. The home rule charter in effect today was originally approved by the town and the state legislature in 1989, ratified by Westford voters in 1990, and amended in 1992. The town owns more than 3,200 acres and uses more than 50 buildings and structures for various municipal operations.

We have an active and engaged Energy Committee and Recycling Commission that both promote sustainable practices. There are also local groups such as Sustainable Westford and Solarize Westford that help advocate and educate about energy efficiency.

### B. Summary of Municipal Energy Uses

The total number of buildings including schools is broken down by type of heating fuel in Table 1 below.

**Table 1: Summary of Municipal Energy Users**

|                                | <b>Number</b> | <b>Ownership</b> |
|--------------------------------|---------------|------------------|
| <b>Buildings</b>               |               |                  |
| Oil Heat                       | 6             | Municipal        |
| Natural Gas Heat               | 28            | Municipal        |
| Propane Heat                   | 5             | Municipal        |
| Biomass Heat                   | 0             | N/A              |
| Other Heat Type                | 0             | N/A              |
| <b>Vehicles</b>                |               |                  |
| Non-Exempt                     | 14            | Municipal        |
| Exempt                         | 133           | Municipal        |
| <b>Street Lights</b>           | 200           | Municipal        |
| <b>Street Lights</b>           | 975           | National Grid    |
| <b>Traffic Lights</b>          | 3             | Municipal        |
| <b>Water and Sewer</b>         |               |                  |
| Drinking Water Treatment Plant | 3             | Municipal        |
| Wastewater Treatment Plant     | 4             | Municipal        |
| Pumping Stations               | 10            | Municipal        |

*Building Additions and New Construction:* Our Permanent Town Building Committee has recommended that we discontinue use of the former fire substations located at 1 East Prescott Street used as the Technology offices, and 54 Broadway Street used for storage. Relocating these uses to other facilities may impact energy consumption.

**C. Summary of Energy Use Baseline and Plans for Reductions**

**Table 2: Summary of Municipal Energy Use Baseline**

| BASELINE YEAR:<br>July 1, 2011 to June<br>30, 2012 (FY2012) | MMBtu<br>Used in<br>Baseline<br>Year | % of Total<br>MMBtu<br>Baseline<br>Energy<br>Consumption | Projected<br>Planned<br>MMBtu<br>Savings | Savings as %<br>of Total<br>MMBtu<br>Baseline<br>Energy<br>Consumption |
|---|--------------------------------------|--|--|--|
| Buildings   | 69,543                               | 74%  | 14,062                                   | 15.0%  |
| Vehicles  | 14,995                               | 16%  | 194                                      | 0.2%   |
| Street/Traffic Lights                                       | 1,542                                | 2%   | 384                                      | 0.4%   |
| Water/Sewer/Pumping   | 7,293                                | 8%   | 108                                      | 0.1%   |
| Open Space*   | 310                                  | <1%  | 0  | 0.0%   |
| Total   | 93683                                | 100%   | 14,804                                   | 15.8%  |

**\*Open Space Includes:** East Boston Camps  
 Forge Village Ballfield  
 Pine Grove Cemetery Office  
 Westford Soccer  
 American Legion Ballfield  
 Forge Pond  
 Veteran's Memorial  
 Edwards Beach  
 Town Common  
 Fairview Cemetery Building  
 Greystone Field

### III. Energy Use Baseline Inventory

#### A. Identification of the Inventory Tool Used

The town of Westford will use the MassEnergyInsight (MEI) database as the inventory tool for our energy reduction plan.

#### B. Identification of the Baseline Year

We plan to complete our 20% reduction as outlined in this ERP in a 5 year period starting in fiscal 2013 and ending in fiscal 2017. The baseline year for our energy reduction plan is fiscal year 2012, starting on July 1, 2011 and ending on June 30, 2012. The total consumption of energy in fiscal year 2012 was 93,683 MMBtu.

#### C. Municipal Energy Consumption for the Baseline Year

The town's energy use and energy generation during fiscal year 2012 is shown in the tables below in fuel units (Table 3a) and in MMBtu (Table 3b). The chart below was developed by DOER and is included to help readers understand how an MMBtu is calculated.

#### *Fuel Energy Content of Common Fossil Fuels per DOE/EIA*

#### BTU Content of Common Energy Units – (1 million Btu equals 1 MMBtu)

1 kilowatt hour of electricity = 0.003412 MMBtu

1 therm = 0.1 MMBtu

1 ccf (100 cubic foot) of natural gas = 0.1028 MMBtu (based on U.S. consumption, 2007)

1 gallon of heating oil = 0.139 MMBtu

1 gallon of propane = 0.091 MMBtu

1 cord of wood = 20 MMBtu

1 gallon of gasoline = 0.124 MMBtu (based on U.S. consumption, 2007)

1 gallon of E100 ethanol = 0.084 MMBtu

1 gallon of E85 ethanol = 0.095 MMBtu

1 gallon of diesel fuel = 0.139 MMBtu

1 gallon of B100 biodiesel = 0.129 MMBtu

1 gallon of B20 biodiesel = 0.136 MMBtu

1 gallon of B10 biodiesel = 0.137 MMBtu

1 gallon of B5 biodiesel = 0.138 MMBtu<sup>9</sup>

1 barrel of residual fuel oil = 6.287 MMBtu

Source: DOER Criterion 3 Guidance

| Type              | ID           | Location                        | FY           | Electric (kWh)   | Gas therms     | Oil gallons  | Gasoline gallons | Diesel gallons | Propane gallons | Solar (kWh)   |
|-------------------|--------------|---------------------------------|--------------|------------------|----------------|--------------|------------------|----------------|-----------------|---------------|
| Building          | 404          | Parker Village Schoolhouse      | 2012         | 2,050            |                |              |                  |                |                 |               |
| Building          | 562          | Cameron Senior Center           | 2012         | 148,000          | 5,498          |              |                  |                |                 |               |
| Building          | 565          | Town Hall                       | 2012         | 147,956          | 3,206          |              |                  |                |                 |               |
| Building          | 1612         | John A. Crisafulli ES           | 2012         | 509,000          | 32,855         |              |                  |                |                 |               |
| Building          | 3954         | Abbot ES                        | 2012         | 206,760          | 35,749         |              |                  |                |                 |               |
| Building          | 3955         | Blanchard MS                    | 2012         | 491,600          | 39,105         |              |                  |                |                 |               |
| Building          | 3956         | Col John Robinson Primary       | 2012         | 199,945          | 24,195         |              |                  |                |                 |               |
| Building          | 3957         | Day ES                          | 2012         | 240,640          | 46,605         |              |                  |                |                 |               |
| Building          | 3959         | Nabnasset Primary               | 2012         | 238,320          | 24,183         |              |                  |                |                 |               |
| Building          | 3960         | Rita E. Miller ES               | 2012         | 589,600          | 34,858         |              |                  |                |                 |               |
| Building          | 3961         | Stony Brook MS                  | 2012         | 1,083,037        | 62,532         |              |                  |                |                 | 45,375        |
| Building          | 3962         | Westford Academy                | 2012         | 1,883,811        | 62,392         |              |                  |                |                 |               |
| Building          | 4222         | Town Farm Building              | 2012         | 11,879           | 2,591          |              |                  |                |                 |               |
| Building          | 4245         | JV Fletcher Library             | 2012         | 226,920          | 7,800          |              |                  |                |                 |               |
| Building          | 4247         | Police Station                  | 2012         | 460,400          | 13,347         |              |                  |                |                 |               |
| Building          | 4251         | Millennium School               | 2012         | 182,400          | 6,982          |              |                  |                |                 |               |
| Building          | 4253         | Co Warehouse                    | 2012         | 3,215            | 0              |              |                  |                |                 |               |
| Building          | 4254         | Highway Facility                | 2012         | 296,760          | 22,039         |              |                  |                |                 |               |
| Building          | 4256         | Animal Control -30 Beacon St    | 2012         | 4,795            |                |              |                  |                |                 |               |
| Building          | 4257         | Beacon St Maintenance Bldg      | 2012         | 31,719           | 4,676          |              |                  |                |                 |               |
| Building          | 18515        | Fire Station 1/Headquarters     | 2012         | 67,765           | 2,491          |              |                  |                |                 |               |
| Building          | 18516        | Old Graniteville Sub Station #2 | 2012         | 0                | 1,221          |              |                  |                |                 |               |
| Building          | 18518        | Fire Station 3/Forge Village    | 2012         | 49,109           | 3,142          |              |                  |                |                 |               |
| Building          | 18519        | Fire Station 4/Nabnasset        | 2012         | 13,269           | 1,362          |              |                  |                |                 |               |
| Building          | 32071        | Technology Department           | 2012         | 110,054          | 143            |              |                  |                |                 |               |
| Building          | 43769        | Water Department Garage         | 2012         | 21,521           | 4,099          |              |                  |                |                 |               |
| Building          | 43842        | Diesel - Generators             | 2012         |                  |                |              |                  | 2,142          |                 |               |
| Building          | 43844        | Heating Oil                     | 2012         |                  |                | 2,485        |                  |                |                 |               |
| <b>Building</b>   | <b>Total</b> | <b>Total</b>                    | <b>Total</b> | <b>7,220,525</b> | <b>441,071</b> | <b>2,485</b> | <b>0</b>         | <b>2,142</b>   | <b>0</b>        | <b>45,375</b> |
| Open Space        | 1236         | Veteran's Memorial              | 2012         | 1,158            |                |              |                  |                |                 |               |
| Open Space        | 1512         | Westford Soccer                 | 2012         | 12,859           |                |              |                  |                |                 |               |
| Open Space        | 4223         | Edwards Beach                   | 2012         | 1,039            |                |              |                  |                |                 |               |
| Open Space        | 4224         | Forge Pond                      | 2012         | 1,999            |                |              |                  |                |                 |               |
| Open Space        | 4225         | American Legion Ballfield       | 2012         | 6,419            |                |              |                  |                |                 |               |
| Open Space        | 4226         | American Legion Pole Building   | 2012         | 3,184            |                |              |                  |                |                 |               |
| Open Space        | 4227         | Forge Village Ballfield         | 2012         | 14,274           |                |              |                  |                |                 |               |
| Open Space        | 4229         | Town Common                     | 2012         | 1,105            |                |              |                  |                |                 |               |
| Open Space        | 4231         | Fairview Cemetery Building      | 2012         | 617              |                |              |                  |                |                 |               |
| Open Space        | 4232         | Pine Grove Cemetery Office      | 2012         | 1,479            |                |              |                  |                | 321             |               |
| Open Space        | 42015        | Greystone Field                 | 2012         | 33               |                |              |                  |                |                 |               |
| Open Space        | 43847        | East Boston Camps               | 2012         | 18,760           |                |              |                  |                | 728             |               |
| <b>Open Space</b> | <b>Total</b> | <b>Total</b>                    | <b>Total</b> | <b>62,926</b>    | <b>0</b>       | <b>0</b>     | <b>0</b>         | <b>0</b>       | <b>1,049</b>    | <b>0</b>      |

| Type                         | ID           | Location                               | FY           | Electric (kWh)   | Gas therms     | Oil gallons  | Gasoline gallons | Diesel gallons | Propane gallons | Solar (kWh)   |
|------------------------------|--------------|--|--------------|------------------|----------------|--------------|------------------|----------------|-----------------|---------------|
| Street/Traffic Lights        | 4230         | Hamilton Security-Flood Lights         | 2012         | 2,978            |                |              |                  |                |                 |               |
| Street/Traffic Lights        | 4233         | Streetlights                           | 2012         | 410,207          |                |              |                  |                |                 |               |
| Street/Traffic Lights        | 4234         | Salt Shed - 30 Beacon St               | 2012         | 1,718            |                |              |                  |                |                 |               |
| Street/Traffic Lights        | 4236         | Traffic Signals                        | 2012         | 11,935           |                |              |                  |                |                 |               |
| Street/Traffic Lights        | 43837        | Exterior Lights                        | 2012         | 22,992           |                |              |                  |                |                 |               |
| Street/Traffic Lights        | 43869        | Flashing School Lights                 | 2012         | 2,057            |                |              |                  |                |                 |               |
| <b>Street/Traffic Lights</b> | <b>Total</b> | <b>Total</b>                           | <b>Total</b> | <b>451,887</b>   | <b>0</b>       | <b>0</b>     | <b>0</b>         | <b>0</b>       | <b>0</b>        | <b>0</b>      |
| Vehicle                      | 43838        | Gasoline - Offsite                     | 2012         |                  |                |              | 76,394           |                |                 |               |
| Vehicle                      | 43839        | Diesel - Offsite                       | 2012         |                  |                |              |                  | 3,256          |                 |               |
| Vehicle                      | 43840        | Gasoline - Bulk                        | 2012         |                  |                |              | 12,027           |                |                 |               |
| Vehicle                      | 43841        | Diesel - Bulk                          | 2012         |                  |                |              |                  | 12,041         |                 |               |
| Vehicle                      | 43843        | Diesel - Small Bulk                    | 2012         |                  |                |              |                  | 13,700         |                 |               |
| <b>Vehicle</b>               | <b>Total</b> | <b>Total</b>                           | <b>Total</b> | <b>0</b>         | <b>0</b>       | <b>0</b>     | <b>88,421</b>    | <b>28,997</b>  | <b>0</b>        | <b>0</b>      |
| Water/Sewer                  | 1400         | Francis Hill Storage Tank              | 2012         | 1,642            |                |              |                  |                |                 |               |
| Water/Sewer                  | 1608         | Town Farm Storage Tank                 | 2012         | 3,059            |                |              |                  |                |                 |               |
| Water/Sewer                  | 4237         | Forge Village Water Treatment Plant    | 2012         | 512,800          | 8,651          |              |                  |                |                 |               |
| Water/Sewer                  | 4238         | Nutting Rd Treatment Plant             | 2012         | 369,000          | 4,110          |              |                  |                |                 |               |
| Water/Sewer                  | 4240         | Nutting Rd Well                        | 2012         | 50,382           | 373            |              |                  |                |                 |               |
| Water/Sewer                  | 4241         | Country Rd Well                        | 2012         | 59,614           |                |              |                  |                | 330             |               |
| Water/Sewer                  | 4242         | Howard Rd Well                         | 2012         | 42,768           |                |              |                  |                | 419             |               |
| Water/Sewer                  | 4244         | Forge #1 Well                          | 2012         | 35,641           | 985            |              |                  |                |                 |               |
| Water/Sewer                  | 4252         | Abbot/Wastewater Treatment             | 2012         | 28,826           | 2,783          |              |                  |                |                 |               |
| Water/Sewer                  | 18540        | Stepinski - Beacon St Pump Station     | 2012         | 129,464          |                |              |                  |                |                 |               |
| Water/Sewer                  | 18541        | Forge #2 Well                          | 2012         | 63,386           | 269            |              |                  |                |                 |               |
| Water/Sewer                  | 41966        | Prospect Hill Storage Tank             | 2012         | 100,882          |                |              |                  |                |                 |               |
| Water/Sewer                  | 41967        | Hildreth Hill Storage Tank             | 2012         | 2,374            |                |              |                  |                |                 |               |
| Water/Sewer                  | 41985        | Boston Rd Booster Station #2           | 2012         | 5,900            | 71             |              |                  |                |                 |               |
| Water/Sewer                  | 41991        | Fletcher Well                          | 2012         | 38,200           | 377            |              |                  |                |                 |               |
| Water/Sewer                  | 42010        | Depot St Well                          | 2012         | 7,477            | 295            |              |                  |                |                 |               |
| Water/Sewer                  | 43767        | Cote Well                              | 2012         | 91,452           |                |              |                  |                | 469             |               |
| Water/Sewer                  | 43772        | Nutting Rd Perchlorate Treatment Plant | 2012         | 36,786           |                |              |                  |                |                 |               |
| <b>Water/Sewer</b>           | <b>Total</b> | <b>Total</b>                           | <b>Total</b> | <b>1579,653</b>  | <b>17,914</b>  | <b>0</b>     | <b>0</b>         | <b>0</b>       | <b>1,218</b>    | <b>0</b>      |
| <b>Grand Total</b>           | <b>Total</b> | <b>Total</b>                           | <b>Total</b> | <b>9,314,991</b> | <b>458,985</b> | <b>2,485</b> | <b>88,421</b>    | <b>31,139</b>  | <b>2,267</b>    | <b>45,375</b> |

| Type              | ID    | Location                        | FY           | Diesel     | Electric      | Gas           | Gasoline | Oil        | Propane   | Solar Electric | Grand Total  |
|-------------------|-------|---------------------------------|--------------|------------|---------------|---------------|----------|------------|-----------|----------------|--------------|
| Building          | 404   | Parker Village Schoolhouse      | 2012         |            | 7             |               |          |            |           |                | 7            |
| Building          | 562   | Cameron Senior Center           | 2012         |            | 505           | 550           |          |            |           |                | 1055         |
| Building          | 565   | Town Hall                       | 2012         |            | 505           | 321           |          |            |           |                | 826          |
| Building          | 1612  | John A. Crisafulli ES           | 2012         |            | 1,737         | 3,286         |          |            |           |                | 5023         |
| Building          | 3954  | Abbot ES                        | 2012         |            | 705           | 3,575         |          |            |           |                | 4280         |
| Building          | 3955  | Blanchard MS                    | 2012         |            | 1,677         | 3,911         |          |            |           |                | 5588         |
| Building          | 3956  | Col John Robinson Primary       | 2012         |            | 682           | 2,420         |          |            |           |                | 3102         |
| Building          | 3957  | Day ES                          | 2012         |            | 821           | 4,661         |          |            |           |                | 5482         |
| Building          | 3959  | Nabnasset Primary               | 2012         |            | 813           | 2,418         |          |            |           |                | 3231         |
| Building          | 3960  | Rita E. Miller ES               | 2012         |            | 2,012         | 3,486         |          |            |           |                | 5498         |
| Building          | 3961  | Stony Brook MS                  | 2012         |            | 3,695         | 6,253         |          |            |           | 155            | 10103        |
| Building          | 3962  | Westford Academy                | 2012         |            | 6,428         | 6,239         |          |            |           |                | 12667        |
| Building          | 4222  | Town Farm Building              | 2012         |            | 41            | 259           |          |            |           |                | 300          |
| Building          | 4245  | JV Fletcher Library             | 2012         |            | 774           | 780           |          |            |           |                | 1554         |
| Building          | 4247  | Police Station                  | 2012         |            | 1,571         | 1,335         |          |            |           |                | 2906         |
| Building          | 4251  | Millennium School               | 2012         |            | 622           | 698           |          |            |           |                | 1320         |
| Building          | 4253  | Co Warehouse                    | 2012         |            | 11            | 0             |          |            |           |                | 11           |
| Building          | 4254  | Highway Facility                | 2012         |            | 1,013         | 2,204         |          |            |           |                | 3217         |
| Building          | 4256  | Animal Control -30 Beacon St    | 2012         |            | 16            |               |          |            |           |                | 16           |
| Building          | 4257  | Beacon St Maintenance Bldg      | 2012         |            | 108           | 468           |          |            |           |                | 576          |
| Building          | 18515 | Fire Station 1/Headquarters     | 2012         |            | 231           | 249           |          |            |           |                | 480          |
| Building          | 18516 | Old Graniteville Sub Station #2 | 2012         |            | 0             | 122           |          |            |           |                | 122          |
| Building          | 18518 | Fire Station 3/Forge Village    | 2012         |            | 168           | 314           |          |            |           |                | 482          |
| Building          | 18519 | Fire Station 4/Nabnasset        | 2012         |            | 45            | 136           |          |            |           |                | 181          |
| Building          | 32071 | Technology Department           | 2012         |            | 376           | 14            |          |            |           |                | 390          |
| Building          | 43769 | Water Department Garage         | 2012         |            | 73            | 410           |          |            |           |                | 483          |
| Building          | 43842 | Diesel - Generators             | 2012         | 298        |               |               |          |            |           |                | 298          |
| Building          | 43844 | Heating Oil                     | 2012         |            |               |               |          | 345        |           |                | 345          |
| <b>Building</b>   |       |                                 | <b>Total</b> | <b>298</b> | <b>24,636</b> | <b>44,109</b> | <b>0</b> | <b>345</b> | <b>0</b>  | <b>155</b>     | <b>69543</b> |
| Open Space        | 1236  | Veteran's Memorial              | 2012         |            | 4             |               |          |            |           |                | 4            |
| Open Space        | 1512  | Westford Soccer                 | 2012         |            | 44            |               |          |            |           |                | 44           |
| Open Space        | 4223  | Edwards Beach                   | 2012         |            | 4             |               |          |            |           |                | 4            |
| Open Space        | 4224  | Forge Pond                      | 2012         |            | 7             |               |          |            |           |                | 7            |
| Open Space        | 4225  | American Legion Ballfield       | 2012         |            | 22            |               |          |            |           |                | 22           |
| Open Space        | 4226  | American Legion Pole Building   | 2012         |            | 11            |               |          |            |           |                | 11           |
| Open Space        | 4227  | Forge Village Ballfield         | 2012         |            | 49            |               |          |            |           |                | 49           |
| Open Space        | 4229  | Town Common                     | 2012         |            | 4             |               |          |            |           |                | 4            |
| Open Space        | 4231  | Fairview Cemetery Building      | 2012         |            | 2             |               |          |            |           |                | 2            |
| Open Space        | 4232  | Pine Grove Cemetery Office      | 2012         |            | 5             |               |          |            | 29        |                | 34           |
| Open Space        | 42015 | Greystone Field                 | 2012         |            | 0             |               |          |            |           |                | 0            |
| Open Space        | 43847 | East Boston Camps               | 2012         |            | 64            |               |          |            | 66        |                | 130          |
| <b>Open Space</b> |       |                                 | <b>Total</b> |            | <b>215</b>    |               |          |            | <b>95</b> |                | <b>310</b>   |



| Type                         | ID    | Location                               | FY           | Diesel       | Electric     | Gas          | Gasoline      | Oil      | Propane    | Solar Electric | Grand Total  |
|------------------------------|-------|--|--------------|--------------|--------------|--------------|---------------|----------|------------|----------------|--------------|
| Street/Traffic Lights        | 4230  | Hamilton Security-Flood Lights         | 2012         |              | 10           |              |               |          |            |                | 10           |
| Street/Traffic Lights        | 4233  | Streetlights                           | 2012         |              | 1,400        |              |               |          |            |                | 1400         |
| Street/Traffic Lights        | 4234  | Salt Shed - 30 Beacon St               | 2012         |              | 6            |              |               |          |            |                | 6            |
| Street/Traffic Lights        | 4236  | Traffic Signals                        | 2012         |              | 41           |              |               |          |            |                | 41           |
| Street/Traffic Lights        | 43837 | Exterior Lights                        | 2012         |              | 78           |              |               |          |            |                | 78           |
| Street/Traffic Lights        | 43869 | Flashing School Lights                 | 2012         |              | 7            |              |               |          |            |                | 7            |
| <b>Street/Traffic Lights</b> |       |  | <b>Total</b> |              | <b>1,542</b> |              |               |          |            |                | <b>1542</b>  |
| Vehicle                      | 43838 | Gasoline - Offsite                     | 2012         |              |              |              | 9,473         |          |            |                | 9473         |
| Vehicle                      | 43839 | Diesel - Offsite                       | 2012         | 453          |              |              |               |          |            |                | 453          |
| Vehicle                      | 43840 | Gasoline - Bulk                        | 2012         |              |              |              | 1,491         |          |            |                | 1491         |
| Vehicle                      | 43841 | Diesel - Bulk                          | 2012         | 1,674        |              |              |               |          |            |                | 1674         |
| Vehicle                      | 43843 | Diesel - Small Bulk                    | 2012         | 1,904        |              |              |               |          |            |                | 1904         |
| <b>Vehicle</b>               |       |  | <b>Total</b> | <b>4,031</b> |              |              | <b>10,964</b> |          |            |                | <b>14995</b> |
| Water/Sewer                  | 1400  | Francis Hill Storage Tank              | 2012         |              | 6            |              |               |          |            |                | 6            |
| Water/Sewer                  | 1608  | Town Farm Storage Tank                 | 2012         |              | 10           |              |               |          |            |                | 10           |
| Water/Sewer                  | 4237  | Forge Village Water Treatment Plant    | 2012         |              | 1,750        | 865          |               |          |            |                | 2615         |
| Water/Sewer                  | 4238  | Nutting Rd Treatment Plant             | 2012         |              | 1,259        | 411          |               |          |            |                | 1670         |
| Water/Sewer                  | 4240  | Nutting Rd Well                        | 2012         |              | 172          | 37           |               |          |            |                | 209          |
| Water/Sewer                  | 4241  | Country Rd Well                        | 2012         |              | 203          |              |               |          | 30         |                | 233          |
| Water/Sewer                  | 4242  | Howard Rd Well                         | 2012         |              | 146          |              |               |          | 38         |                | 184          |
| Water/Sewer                  | 4244  | Forge #1 Well                          | 2012         |              | 122          | 99           |               |          |            |                | 221          |
| Water/Sewer                  | 4252  | Abbot/Wastewater Treatment             | 2012         |              | 98           | 278          |               |          |            |                | 376          |
| Water/Sewer                  | 18540 | Stepinski - Beacon St Pump Station     | 2012         |              | 442          |              |               |          |            |                | 442          |
| Water/Sewer                  | 18541 | Forge #2 Well                          | 2012         |              | 216          | 27           |               |          |            |                | 243          |
| Water/Sewer                  | 41966 | Prospect Hill Storage Tank             | 2012         |              | 344          |              |               |          |            |                | 344          |
| Water/Sewer                  | 41967 | Hildreth Hill Storage Tank             | 2012         |              | 8            |              |               |          |            |                | 8            |
| Water/Sewer                  | 41985 | Boston Rd Booster Station #2           | 2012         |              | 20           | 7            |               |          |            |                | 27           |
| Water/Sewer                  | 41991 | Fletcher Well                          | 2012         |              | 130          | 38           |               |          |            |                | 168          |
| Water/Sewer                  | 42010 | Depot St Well                          | 2012         |              | 26           | 30           |               |          |            |                | 56           |
| Water/Sewer                  | 43767 | Cote Well                              | 2012         |              | 312          |              |               |          | 43         |                | 355          |
| Water/Sewer                  | 43772 | Nutting Rd Perchlorate Treatment Plant | 2012         |              | 126          |              |               |          |            |                | 126          |
| <b>Water/Sewer</b>           |       |  | <b>Total</b> |              | <b>5,390</b> | <b>1,792</b> | <b>0</b>      | <b>0</b> | <b>111</b> | <b>0</b>       | <b>7293</b>  |

|                    |                     |  |  |              |               |               |               |            |            |            |               |
|--------------------|---------------------|--|--|--------------|---------------|---------------|---------------|------------|------------|------------|---------------|
| <b>Grand Total</b> | <b>Total MMBTUs</b> |  |  | <b>4,329</b> | <b>31,783</b> | <b>45,901</b> | <b>10,964</b> | <b>345</b> | <b>206</b> | <b>155</b> | <b>93,683</b> |
|--------------------|---------------------|--|--|--------------|---------------|---------------|---------------|------------|------------|------------|---------------|

## **IV. Energy Reduction Plan**

### **A. Narrative Summary**

1. Overview of Goals for Years 1-3
  - a. Boiler Replacements (Robinson School, etc)
  - b. Window Replacements (Day School and Robinson)
  - c. Lighting Efficiency Improvements (Schools, Museum, etc)
  - d. Vehicle Efficiency Improvements (Highway, Police)
  - e. LED Retrofit of municipally-owned street lights
  - f. Improved standards for new construction and major renovations per the stretch code
  - g. Behavior changes (education, policies, reminders)
2. Overview of Goals for Years 4-5
  - a. Develop a standard specification for Energy Management Systems and upgrade buildings as practicable
  - b. Develop a standard specification for replacing the HVAC system components as they reach life expectancy
3. Identify Areas of Least Efficiency/Greatest Waste – MassEnergyInsight’s “Buildings to Target” view is helpful in identifying these areas
  - a. Buildings to target will determined through analysis of MEI data

### **B. Getting to a 20% Energy Use Reduction Within the 5 Year Period Following the Baseline Year –**

1. *Program Management Plan for Implementation, Monitoring and Oversight* – The Town Manager’s office will be responsible both for oversight of the Energy Reduction Plan and for implementation of energy conservation measures within the organization, public works infrastructure and in all of the town buildings except for the library and schools. The Town Manager’s office will take on the responsibility for the Annual Reporting requirements.
2. *Summary of Energy Audit(s) or Other Sources for Projected Energy Savings* - List of audits that are attached to this plan:
  1. Lighting Upgrade Cost/Analysis Phase 1 for Westford Schools 8/22/12
  2. Lighting Upgrade Cost/Analysis Phase 2 for Westford Schools 10/9/12
  3. Lighting Upgrade Cost/Analysis Phase 3 for Westford Schools 1/22/13
  4. Lighting Upgrade Cost/Analysis Phase 4 for Westford Schools 3/29/13
  5. High Performance Energy Saving Project Proposal for Retrofit to LED Street Lights by Energy Management Consultants Inc. 8/13/13
  6. Lighting Improvement Project Proposal for Westford Academy by Energy Management Consultants Inc. 5/20/13
  7. Energy Efficiency Opportunities Westford Library by B2Q Associates 6/22/11

8. Energy Efficiency Opportunities Westford Police Department by B2Q Associates 6/22/11
9. Technical Audit Report Westford Schools by Peregrine White, Jr. P.E. 2/17/06
10. Savings for VFD installations in the school department from Report by ICS Corporation on 10/8/13

3. *Energy Conservation Measures* – All of the proposed projects listed in this report represent a strategy to achieve 20% savings over 5 years. This strategy is subject to change depending on municipal needs and availability of funding. The specific details about the proposed measures to achieve a 15% reduction are listed in Table 4 starting on the next page of this report. Projected energy savings in Table 4 were obtained from various sources and each record contains a calculation method and details about the source. The calculations of annual cost savings for building improvements were projected based on the cost of \$0.12/kwh and \$1.10/therm. Vehicle cost savings projections were obtained using the fuel savings calculator available at [fueleconomy.gov](http://fueleconomy.gov).

The general strategy to achieve the remaining 5% reduction is shown below.

- Each town department should check its electronic/heating/lighting/hvac equipment for energy efficiency (and optionally conduct auditing for opportunities of improvement).
- Each town department should establish and promote a set of best practices that is appropriate for its businesses and employees. The following are a sample of recommended best practices
  - Identify computers that do not need to run all the time, and set up automatic standby/hibernate options so that the monitor, hard disk, and the system will be put into standby or hibernate mode at a set time
  - Encourage employees to have available warmer clothes so that the heating can be set a lower level, rather than forcing some others to open windows to cool down.
  - Set cooling to the highest temperature as long as it is still comfortable.
  - Establish guidelines for open-window air exchange.
  - Check to confirm if any public buildings are unnecessarily lighted when they're not in use.
  - When feasible, upgrade to automatic light switches and thermostats, and encourage employees to turn off the lights and dial down cooling/heating when leaving the room/building.
- Evaluate/implement energy efficient cooling strategies for IT computer rooms.
- Turn off equipment not in use during the summer at school buildings.

Table 4

Town of Westford Energy Reduction Plan  
11/19/2013

| Table 4  |  |  |  |   |  |  |   |   |   |                           |                            |                         |               |                                 |   |   |   |
|--|--|--|--|---|--|--|---|---|---|---------------------------|----------------------------|-------------------------|---------------|---------------------------------|---|---|---|
| Measure  |  | Status   | Energy Data                                |   |  |  |   |   | Financial Data  |                           |                            |                         |               | Reference Data                  |   |   |   |
| Category/ Building   | Energy Conservation Measure  | Status (Completed with month/year or planned Qtr/year) | Projected Annual Electricity Savings (kWh) | Projected Annual Natural Gas Savings (therms) | Projected Annual Heating Oil Savings (gallons) | Projected Annual Propane Savings (gallons) | Projected Annual Gasoline Savings (gallons) | Projected Annual Diesel Savings (gallons) | Projected Annual Cost Savings (\$) based on \$.12/kwh and \$1.1/therm | Total Installed Cost (\$) | Green Community Grant (\$) | Utility Incentives (\$) | Net Cost (\$) | Funding Source(s) for Net Costs | Assumptions   | Calculations  | Source for Projected Savings  |
| Abbot School   | Install EMS  | Proposed 2017  | 0  | 2,038   | 0  | 0  | 0   | 0   | \$2,241   | TBD                       | \$0                        | \$0                     | TBD           | Operating                       | 5.7% savings on heat for adjusting thermostats for seasonal changes   | 0.057*35749 therms  | <a href="http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf">http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf</a>   |
| Abbot School   | Install VFDs on three 7.5 hp boiler pumps  | Proposed 2017  | 17,000                                     | 0   | 0  | 0  | 0   | 0   | \$2,040   | \$12,000                  | \$0                        | \$0                     | \$12,000      | Operating                       | see audit   | see audit   | Technical Audit Report Westford Schools February 17, 2006 (page 3.04)   |
| Abbot School   | Boiler Replacement (1st boiler)  | Completed in FY13                                      | 0  | 3,039   | 0  | 0  | 0   | 0   | \$3,343   | \$74,500                  | \$0                        | TBD                     | TBD           | Capital Plan                    | 17% reduction based on going from 70% to 82%  | 0.17 * 35749 therms divided by 2 (to account for second boiler) | <a href="http://energy.gov/energysaver/articles/furnaces-and-boilers">http://energy.gov/energysaver/articles/furnaces-and-boilers</a>   |
| Abbot School   | Boiler Replacement (2nd boiler)  | in progress  | 0  | 3,039   | 0  | 0  | 0   | 0   | \$3,343   | \$90,000                  | \$0                        | TBD                     | TBD           | Capital Plan                    | 17% reduction based on going from 70% to 82%  | 0.17 * 35749 therms divided by 2 (to account for second boiler) | <a href="http://energy.gov/energysaver/articles/furnaces-and-boilers">http://energy.gov/energysaver/articles/furnaces-and-boilers</a>   |
| Blanchard School   | LED Exit Sign install 45   | Proposed 2017  | 5,913                                      | 0   | 0  | 0  | 0   | 0   | \$710   | \$4,500                   | \$0                        | TBD                     | \$4,500       | Operating                       | see audit   | see audit   | Technical Audit Report Westford Schools February 17, 2006 (page 3.07)   |
| Blanchard School   | Boiler Replacement Two Units   | Proposed FY15  | 0  | 6,648   | 0  | 0  | 0   | 0   | \$7,313   | \$60,000                  | \$0                        | TBD                     | TBD           | Capital Plan                    | 17% reduction based on going from 70% to 82%  | 0.17 * 39105 therms   | <a href="http://energy.gov/energysaver/articles/furnaces-and-boilers">http://energy.gov/energysaver/articles/furnaces-and-boilers</a>   |
| Blanchard School   | Install VFDs on 8 air handling units and four 7.5hp heat pumps and two 5hp heat pumps                            | Proposed 2017  | 45,719                                     | 0   | 0  | 0  | 0   | 0   | \$5,486   | TBD                       | \$0                        | TBD                     | TBD           | Operating                       | 9.3% savings for installing VFD   | 0.093* 491600 therms  | Technical Audit Report Westford Schools February 17, 2006 (page 3.07) savings estimate:<br><a href="http://www.energystar.gov/ia/business/download/s/BP_Checklist.pdf">http://www.energystar.gov/ia/business/download/s/BP_Checklist.pdf</a>    |
| Blanchard School   | Install demand control ventilation in gymnasium, auditorium, locker rooms, cafeteria, band room, and the library | Proposed 2017  | 7,005                                      | 0   | 0  | 0  | 0   | 0   | \$841   | TBD                       | \$0                        | TBD                     | TBD           | Operating                       | see audit   | see audit   | Technical Audit Report Westford Schools February 17, 2006 (page 3.08)   |
| Cameron Senior Center  | Energy Management System Upgrade   | Completed FY13   | 0  | 313   | 0  | 0  | 0   | 0   | \$345   | TBD                       | \$0                        | TBD                     | TBD           | Renovation Budget               | 5.7% savings on heat for adjusting thermostats for seasonal changes   | 0.057*5498 therms   | <a href="http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf">http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf</a>   |
| Crisafulli School  | Install Demand control ventilation in gym, cafeteria, and library  | Proposed 2017  | 7,253                                      | 1,873   | 0  | 0  | 0   | 0   | \$2,930   | TBD                       | \$0                        | TBD                     | TBD           | Operating                       | 5.7% savings on heat for adjusting ventilation  | 0.057*32855 therms  | Technical Audit Report Westford Schools February 17, 2006 (page 3.12) - savings estimate:<br><a href="http://www.energystar.gov/ia/business/download/s/BP_Checklist.pdf">http://www.energystar.gov/ia/business/download/s/BP_Checklist.pdf</a>  |
| Crisafulli School  | Install motions sensors in corridors   | Proposed 2017  | 4,072                                      | 0   | 0  | 0  | 0   | 0   | \$489   | TBD                       | \$0                        | TBD                     | TBD           | Operating                       | 3.2% savings for occupancy sensors  | 0.032*509000/4 (to account hallways being 25% of the building)  | Technical Audit Report Westford Schools February 17, 2006 (page 3.12) -- savings estimate:<br><a href="http://www.energystar.gov/ia/business/download/s/BP_Checklist.pdf">http://www.energystar.gov/ia/business/download/s/BP_Checklist.pdf</a> |
| Crisafulli School  | Lighting Retrofit  | Proposed 2017  | 1,840                                      | 0   | 0  | 0  | 0   | 0   | \$221   | \$12                      | \$0                        | TBD                     | \$12          | Operating                       | see audit   | see audit   | Technical Audit Report Westford Schools February 17, 2006 (page 3.12)   |
| Crisafulli School  | Install VFDs   | in progress  | 156,096                                    | 0   | 0  | 0  | 0   | 0   | \$18,732  | TBD                       | \$0                        | TBD                     | TBD           | Operating                       | See estimate  | see estimate  | Tally Sheet from ICS Corp October 8, 2013   |
| Day School   | Install EMS  | Proposed 2017  | 0  | 2,656   | 0  | 0  | 0   | 0   | \$2,922   | TBD                       | \$0                        | TBD                     | TBD           | Operating                       | 5.7% savings on heat for adjusting thermostats for seasonal changes   | 0.057*46605 therms  | <a href="http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf">http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf</a>   |
| Day School   | Window replacements 150 4x8 single pane windows  | Proposed FY15  | 0  | 9,216   | 0  | 0  | 0   | 0   | \$10,138  | \$1,300,000               | \$0                        | TBD                     | TBD           | Capital and MSBA funding        | (glazing area1) x (change in U-factor) x (heating degree days) x 24 hours = MMBTU/year saved1 then there are 150 4x8 windows so we plug that in and consider a 0.8 u-factor change. Take the final number and convert to therms | ((4*8*150)*0.8*24)*0.1  | <a href="http://energyexperts.org/EnergySolutionsDatabase/ResourceDetail.aspx?id=1533">http://energyexperts.org/EnergySolutionsDatabase/ResourceDetail.aspx?id=1533</a>   |
| Day School   | Boiler Replacement   | Proposed FY17  | 0  | 7,923   | 0  | 0  | 0   | 0   | \$8,715   | \$90,000                  | \$0                        | TBD                     | TBD           | Capital Plan                    | 17% reduction based on going from 70% to 82%  | 0.17 * 39105 therms   | 17% reduction based on going from 70% to 82% efficiency according to this site:<br><a href="http://energy.gov/energysaver/articles/furnaces-and-boilers">http://energy.gov/energysaver/articles/furnaces-and-boilers</a>                        |
| Day School   | LED Exit Signs install 25  | Proposed 2017  | 721.92                                     | 0   | 0  | 0  | 0   | 0   | \$87  | \$2,500                   | \$0                        | TBD                     | TBD           | Operating                       | 0.3% savings for LED signs  | 0.003*240640 kwh  | <a href="http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf">http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf</a>   |
| East Boston Camps  | Lighting retrofit to CFL   | Proposed FY17  | 225  | 0   | 0  | 0  | 0   | 0   | \$27  | \$0                       | \$0                        | TBD                     | TBD           | Operating                       | 1.2% savings for changing to CFL  | 0.012*18760   | <a href="http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf">http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf</a>   |
| Exterior Lighting at Crisafulli, Day, and Miller                         | Lighting Retrofit  | Completed FY13   | 129,131                                    | 0   | 0  | 0  | 0   | 0   | \$15,496  | \$81,974                  | \$0                        | \$28,538                | \$54,436      | Operating                       | see report  | see report  | Lighting Upgrade Cost/Analysis Phase 2 for Westford Schools October 9, 2012   |
| Exterior Lighting at Westford Academy, Stony Brook, and Blanchard School | Lighting Retrofit  | Completed FY13   | 201,642                                    | 0   | 0  | 0  | 0   | 0   | \$24,197  | \$113,147                 | \$0                        | \$48,166                | \$64,981      | Operating                       | see report  | see report  | Lighting Upgrade Cost/Analysis Phase 1 for Westford Schools August 22, 2012   |
| Highway Facility   | Energy Management System Upgrade   | Proposed FY16  | 0  | 1,256   | 0  | 0  | 0   | 0   | \$1,382   | TBD                       | \$0                        | TBD                     | TBD           | Capital Plan                    | 5.7% savings on heat for adjusting thermostats for seasonal changes   | 0.057*22039 therms  | <a href="http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf">http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf</a>   |





## **C. Summary of Long-Term Energy Reduction Goals – Beyond 5 years**

1. Municipal Buildings (including schools)
  - i. The proposed town-wide facility study will produce a series of recommended capital improvements over the next ten years. The town will incorporate energy efficiency improvements into all of the proposed projects whenever practicable.
2. Vehicles (including schools)
  - i. The town will continue to replace older vehicles with more fuel efficient vehicles.
3. Street and Traffic Lighting
  - i. The town is proposing to convert the currently owned fixtures to LED to reduce energy consumption. An analysis will be performed to evaluate the feasibility of taking ownership of the remaining light fixtures from the utility company and converting them all to LED.
  - ii. The school department has replaced one of its flashing lights “slow down school zone” with a solar powered unit. The town and school will continue to identify opportunities to utilize solar energy as substitute for hard wired street lighting systems.
4. Perpetuating Energy Efficiency
  - i. The Energy Committee will continue to provide recommendations for best practices to improve the energy efficiency throughout the organization.

## **V. Onsite Renewable Energy Projects & Renewable Energy**

In 2011, the town installed a 36 kilowatt solar array on the roof of the Stony Brook Middle School. The new town-owned photovoltaic installation was funded by a \$28,000 Clean Energy Choice grant from the Massachusetts Renewable Energy Trust and a \$150,000 Energy Efficiency and Conservation Block Grant (EECBG) from the \$2.7 billion federal provision of the 2009 American Recovery and Reinvestment Act. No town money was used in the project.

The array consists of one hundred seventy six Evergreen ESA 210 solar panels and two Solectria PVI inverters. It will generate an estimated 40,000 kilowatt-hours (kWh) annually, enough electricity to power more than three average homes for an entire year. The power produced by the panels will be used only by the school, except during summer vacation, when the array may produce enough electricity to send some power back into the grid. See Table 5 below for energy and costs details about this project and Table 2 above for production results in FY12

The town will continue to pursue opportunities to install renewable energy projects such as solar panels on municipal and school buildings.

**Table 5 Renewable Energy**

| Renewable Energy Measure                      |  | Projected Energy Data               |  | Financial Data          |                                    |                            |                              |                     | Reference Data                    |   |
|---|--|-------------------------------------|--|-------------------------|------------------------------------|----------------------------|------------------------------|---------------------|-----------------------------------|---|
| Location                                      | Renewable Energy Project   | Annual Electricity Generation (kWh) | Thermal Generation/ Displaced (therms) | Total Project Cost (\$) | Projected Annual Cost Savings (\$) | Green Community Grant (\$) | MassCE C & Other Grants (\$) | Net Town Costs (\$) | Funding Source for Net Town Costs | Source for Projected Generation and Savings   |
| <i>Stony Brook Middle School 9 Farmer Way</i> | <i>36 kW rooftop solar installation<br/><br/>Completed 9/30/2010</i> | 45,375                              | 0                                      | 178,000                 | 8,000                              | 0                          | 178,000                      | 0                   | no cost                           | <a href="http://www.solrenview.com/cgi-bin/CGIhandler.cgi?&amp;sort=pvi_IDs&amp;cond=site_ID=691">http://www.solrenview.com/cgi-bin/CGIhandler.cgi?&amp;sort=pvi_IDs&amp;cond=site_ID=691</a> |
| <b>Renewable Energy Projects Total</b>        |  | <b>45,375</b>                       | <b>0</b>                               | <b>178,000</b>          | <b>\$8,000</b>                     | <b>\$0</b>                 | <b>\$178,000</b>             | <b>\$0</b>          | <i>N/A</i>                        | <i>N/A</i>  |
| <b>TOTAL MMBtu SAVINGS</b>                    |  | <b>155</b>                          | <b>0</b>                               |                         |                                    |                            |                              |                     |                                   |   |

**VI. List of Resources**

In addition to the audits and reports referenced above in Section IV and attached this report, we utilized the following web pages for analysis of cost and energy savings.

1. Information about Stony Brook Solar Project:
  - o [http://westfordma.gov/pages/FOV1-00046751/westfordma\\_notices/Archive/I064138BD](http://westfordma.gov/pages/FOV1-00046751/westfordma_notices/Archive/I064138BD)
  - o [http://www.solrenview.com/cgi-bin/CGIhandler.cgi?&sort=pvi\\_IDs&cond=site\\_ID=691](http://www.solrenview.com/cgi-bin/CGIhandler.cgi?&sort=pvi_IDs&cond=site_ID=691)
2. Information about energy savings for replacing windows:
  - o <http://energyexperts.org/EnergySolutionsDatabase/ResourceDetail.aspx?id=1533>
3. Projections for building improvement project energy savings obtained from:
  - o [http://www.energystar.gov/ia/business/downloads/BP\\_Checklist.pdf](http://www.energystar.gov/ia/business/downloads/BP_Checklist.pdf)
4. Projections for savings for boiler replacements:
  - o <http://energy.gov/energysaver/articles/furnaces-and-boilers>
5. Vehicle fuel efficiency data:
  - o [www.fueleconomy.gov](http://www.fueleconomy.gov)
6. Fuel efficiency calculations:
  - o <http://www.fueleconomy.gov/feg/savemoney.shtml>
7. Variable Frequency Drives (VFDs) energy efficiency calculations:
  - o <http://www.sustainableplant.com/assets/Baldor/Baldor-0411-Pump-Energy-Savings-with-VFDs.pdf>