


# Barrington

## RHODE ISLAND

## Strategic Energy Plan

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VHB

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# Table of Contents

## List of Figures



## List of Tables

# I Executive Summary

The Strategic Energy Plan puts Barrington on a path toward becoming a more sustainable community by providing a comprehensive set of strategies designed to produce significant energy savings for the Town, resulting in a reduction of energy costs and associated greenhouse gas emissions. The Town, working with consultant Vanasse Hangen Brustlin, Inc., developed the Plan with financial support from an Energy Efficiency and Conservation Block Grant awarded by the Rhode Island Office of Energy Resources.

The Strategic Energy Plan outlines concrete steps for meeting Barrington's energy-reduction target of 10% below 2009 levels by 2015 for municipal and school facilities. This goal was established in 2009 when the Town joined the US Environmental Protection Agency (EPA) Energy Star Challenge program. Additionally, Barrington is extending their reduction goal to include their vehicle fleet and street lighting.

Reaching the Town's energy reduction target first requires determining the current level of energy use – the baseline – from which to measure Barrington's progress. The Town selected the 2008-09 Fiscal Year (FY 2009) as the point in time for calculating the energy baseline. As of June 30, 2009, the end of FY 2009, municipal and school energy consumption totaled 66,491 million british thermal units (MMBTU). Based on this figure, the Town's official energy usage baseline, the Town would need to reduce energy consumption by a minimum of 6,649 MMBTU by 2015 in order to meet its energy reduction target.

This Strategic Energy Plan lays out the details of Barrington's baseline energy use, describes measures already in place to reduce consumption, and outlines strategies for additional energy reductions that will help the Town reach, and likely surpass, its 10% reduction goal.

Estimates of the reductions from existing measures, described in Section IV and Appendix A, demonstrate that the Town, since July 1, 2009 (the beginning of FY2010) has reduced consumption by 2.8% from its baseline, for a total of 1,857 MMBTU saved. These measures have included numerous lighting upgrades and HVAC improvements in municipal and school buildings.

The plan also outlines a number of strategies for continued energy improvements to help Barrington achieve its 10% reduction commitment and beyond. A number of the recommendations are for municipal building efficiency improvements, detailed in Appendix C. Other recommendations include streetlight conversions to light emitting diode (LED) technology, computer power management programs, a green fleet program, and an Energy Management System. While the Town's goals are focused on its own operations, it has a strong desire to

"lead by example" for its community. Therefore, the Strategic Energy Plan also outlines a number of strategies for community-wide engagement and outreach, including both residential and commercial programs.

The Plan highlights a number of residential and commercial utility incentives as well as other potential funding sources that could assist with implementation of the recommended strategies. Additionally, the Plan provides several low or no-cost energy saving strategies, which can be implemented with minimal time and financial investment. These could allow the Town to demonstrate progress while working to leverage the financial and planning support necessary to implement the more complex and/or costly strategies.

The Town of Barrington has already taken strides to build up momentum and a capacity to make significant reductions in its annual energy consumption. The Strategic Energy Plan provides the guidance necessary to take the next steps to implement both short-term and long-term strategies that will help the Town reach and surpass energy reduction goals.

Credit: Acme401; www.flickr.com

## Summary of Energy Reduction Strategies

| STRATEGIES | RESPONSIBLE DEPARTMENT(S) |
|---|---|
| **GOAL 1**<br>Reduce overall municipal and school building and fleet energy usage by at least 10% by 2015 | |
| **OBJECTIVE 1.1**<br>Install cost-effective energy efficiency and renewable energy measures at municipal and school facilities | |
| Complete energy efficiency upgrades in buildings | Public Works, School Department |
| Pursue installation of solar photovoltaic and/or hot water for municipal and school facilities | Public Works, School Department |
| Pursue regional renewable energy projects, including wind and solar projects. | Town Manager, Town Planner |
| Install computer power management tolls at municipal and school buildings | Information Technology, Public Works, School Department |
| Convert streetlight fixtures to LEDs | Public Works |
| Install municipal- and school system-wide Energy Management Systems | Public Works, School Department |
| **OBJECTIVE 1.2**<br>Improve fuel efficiency of municipal fleet vehicles where appropriate | |
| Institute a Green Fleet Program for municipal operations | Public Works |
| **OBJECTIVE 1.3**<br>Enact policies and financing mechanisms to support implementation of energy-reduction measures | |
| Enact an energy efficiency policy for the Town and School Department | Town and School Finance Departments, Town Council, School Committee |
| Adopt Environmentally Preferable Purchasing (EPP) Program policies | Town and School Finance Departments, Town Council, School Committee |
| Establish a Revolving Energy Fund | Town and School Finance Departments |
| Evaluate purchase of carbon offsets to supplement energy efficiency reduction measures | Finance Department, Town Manager, Committee for Renewable Energy for Barrington (CREB) |
| **GOAL 2**<br>Encourage residents and businesses to adopt energy-conserving measures | |
| **OBJECTIVE 2.1**<br>Develop community education and incentive programs | |
| Create a Renewable Energy Center | CREB, Public Works, School Department |
| Establish a Property Assessed Clean Energy (PACE) Financing Program | Finance Department |
| Consider establishing a "Green Business" program | TBD |
| Consider measures to encourage community members to purchase and use fuel-efficient vehicles | TBD |

II

# Glossary of Terms

**Benchmark:** A reference of energy use, by which reductions can be measured over time.

**British Thermal Unit (BTU):** BTU is a common unit allowing different energy and fuel types, such as kilowatt hours of electricity and gallons of fuel oil, to be calculated together. In this report, one million BTU is most commonly used.

**Carbon Dioxide Equivalent ($CO_2e$):** A unit often used to report greenhouse gas emissions or reductions. Carbon Dioxide Equivalent is the standard value used to compare the potency of different greenhouse gases against carbon dioxide ($CO_2$), the primary greenhouse gas.

**Energy Intensity:** The ratio of energy consumption to a measure of the demand for services (for example, the amount of energy used per square foot of a building). This is often used as a measure of energy efficiency since it measures energy per a unit of space, rather than overall consumption where the amount of space is not a factor.

**Greenhouse Gas (GHG):** Gases, such as carbon dioxide, methane, and chlorofluorocarbons, that act as a shield and trap heat within the earth's atmosphere. While GHGs are needed for life to survive on this planet, like all natural systems, when there is too much, changes begin to occur. It is this increase in GHGs that is contributing to climate change.

**Kilo British Thermal Units (kBTU):** One thousand British Thermal Units.

**Kilowatt- hour (kWh):** A unit or measure of electricity supply or consumption of 1,000 Watts over the period of one hour. Most electricity from the consumer side is reported in kWh, such as on an electricity bill.

**Light-Emitting Diode (LED):** A highly efficient light source often used for digital displays; LEDs are increasingly used for streetlights, traffic lights, exit signs and in other lighting fixtures. In addition to being more efficient overall than incandescent and other bulbs, LEDs also have a longer lifespan, allowing for savings in maintenance costs as well as straight energy reduction costs.

**Megawatt-hour (MWh):** One thousand kilowatt-hours. Large sources of electricity, particularly from power plants of large scale wind farms are measured in MWh.

**Metric Ton:** A unit of mass equal to 1,000 kilograms or 2,204.6 pounds. Greenhouse gases are often measured in metric tons.

**Million British Thermal Units (MMBTU):** One million British Thermal Units.

**Therm:** A unit of heat containing 100,000 British Thermal Units (BTU). Natural gas is often measured in therms.

**Watt:** The unit in which electricity is measured.

# III Introduction

## The Town of Barrington

Barrington is located nine miles southeast of Providence in Bristol County, Rhode Island. A suburban community with more than 16,000 year-round residents, this coastal town encompasses 15.4 square miles, including seven square miles of surface waters.

The municipal side of the Town of Barrington operates under a council-manager form of government, with a five-member Town Council responsible for the legislative functions of the town and a Town Manager to manage the day-to-day operations, similar to a chief executive officer. The Department of Public Works is responsible for municipal buildings and a fleet of vehicles, including large diesel trucks, a street sweeper, and field maintenance equipment. The Fire and Police Departments, headquartered in the Public Safety Building on Federal Road, also have large fleet vehicle.

The Barrington School Department operates independently of the municipal government. A Superintendent of Schools serves as the School Department's chief administrative agent. The School Committee determines and controls policies affecting the administration, maintenance, and operation of the public schools. A facilities director oversees school building maintenance and operations, including planning and implementing energy improvements.

The Town budget, which encompasses municipal and school operations and capital improvement projects, requires formal adoption by voters at the annual Financial Town Meeting. The capital budget, an important resource for financing the energy projects recommended in the Strategic Energy Plan, is developed each year by the Planning Board as part of the annual update of the 6-year Capital Improvement Program for municipal and school facility improvements and fleet replacement.

## Efforts to Date

In recent years, the Town and the School Department have taken strides to address energy consumption within municipal and school operations. The Town also has worked to encourage the community at large to consider this issue and engage in energy conservation efforts.

### Committee for Renewable Energy for Barrington

In 2007, the Town Council formed the volunteer Committee for Renewable Energy for Barrington (CREB) to initially advise the Council on short- and long-term strategies to promote

energy efficiency and conservation and to explore the feasibility of installing a wind turbine in the town. CREB was additionally charged with reaching out to neighboring communities and regional resources, and providing education and assistance to the citizens of Barrington on energy efficiency and clean energy opportunities.

One of the key objectives in the Town's Comprehensive Community Plan and in this Strategic Energy Plan is education of citizens on the importance of energy conservation and the use of renewable energy resources. CREB has identified a critical first step toward meeting this objective with the establishment of a Renewable Energy Center. As later described in the "Recommended Measures" **Section VI** of this plan, the Center would comprise small-scale renewable energy systems employing the latest commercially available technology, from which data would be collected and made publicly available for general education and to aid in decision-making about the technical and economic viability of larger scale systems, prior to making expenditures. It is anticipated that funding from the Town's Energy Efficiency and Conservation Block Grant allocation from the State, awarded to Barrington in 2010, will help fund the initial renewable energy systems that will tie into the Renewable Energy Center.

The Renewable Energy Center will help CREB broaden its efforts to build awareness about local opportunities for clean energy technology installations and energy efficiency improvements in town. CREB plans to continue events similar to the April 2010 Energy Fair, where CREB partnered with local schools, student groups, and energy-related vendors to provide citizens resources and information on opportunities to reduce energy consumption and to explore alternative energy solutions.

Credit: Christopher Chaisse; www.ci.barrington.ri.us

## "Barrington Goes Green"

In 2007, the Barrington Conservation Commission presented to the Town Council its recommendations on energy and other issues in a report titled, "*Barrington Goes Green: An Environmental Mandate for the 21st Century.*"[1] Many of the report's recommendations were included in the 2009 update of the Town's Comprehensive Community Plan as well as this plan. These included:

- Establishing a minimum of 4.5% of Town-acquired electricity from renewable energy sources by 2010; 10% by 2015; and 16% by 2020.
- Investigating the potential for developing or purchasing renewable energy resources such as wind, solar, biomass, and low impact hydroelectric power
- Instituting "Green Office" practices in partnership with the School Department and Town Manager, including policies on turning off computers, installing occupancy sensors in offices and improving recycling at Town and school buildings.
- Holding Town meetings/workshops for citizens to learn about energy efficiency, organic lawn care, water conservation and other topics.

## Energy Star Challenge

In 2010, the Town signed on to participate in the EPA Energy Star Challenge. Through this initiative the Town has committed to benchmark the energy use in its buildings and take

1 See http://www.barrington.ri.gov/planning/Barrington_Green_finalsubmittal072307.pdf

actions to reduce its overall building energy consumption by 10 percent. CREB has supported this effort for the Town, collecting and inputting energy usage data from all municipal buildings for a baseline year of FY 2009 into the Energy Star Portfolio Manager tool. This tool makes it possible for the Town to compare its building energy consumption by type with other similar buildings in New England. If updated annually, the tool will also track changes over time. The data collected for the Energy Star Challenge was essential to the development of this Strategic Energy Plan.

Based on the data input, the EPA tool provides a rating for the building on a scale of 0-100, indicating its efficiency level as compared to other buildings of similar size, usage, and in the same region. Any building with a score of 75 or higher is eligible for an Energy Star designation and plaque. Early results indicate that the High School and the Town Hall may qualify for the Energy Star designation based on FY 2009 data.

## Energy Efficiency Projects

The Town and School Department have also been actively taking advantage of utility-sponsored programs to assess the overall energy usage in the buildings and to begin to take action to increase the efficiency of these buildings.

Municipal projects to date include lighting upgrades, replacement of inefficient boilers, installation of occupancy sensors, and replacement of police vehicles with more fuel efficient vehicles. The Town has utilized a National Grid-sponsored incentive program to complete some of these energy efficiency projects, in particular lighting projects.

In the past 5 years, the Barrington School Department has upgraded all of the lighting in the school buildings, and installed occupancy sensors in about 85% of classrooms as well as installing Direct Digital Controls[2] in all of the schools. The roofs at Primrose and Nayatt Schools were recently replaced with insulated, white roofs that were designed for future installation of photovoltaic panels. The two schools also have **Solatube** [http://www.solatube.com] skylights in each of the corridors that maximize daylighting and reduce the need for artificial lighting in the corridors. In addition, there are newer (insulated, white) roofs on Hampden Meadows and Sowams Schools. The School Department also had National Grid complete a "Whole Building Assessment" of the High School, which has provided a basis for identifying additional energy efficiency upgrades at this school, the Town's largest energy user.

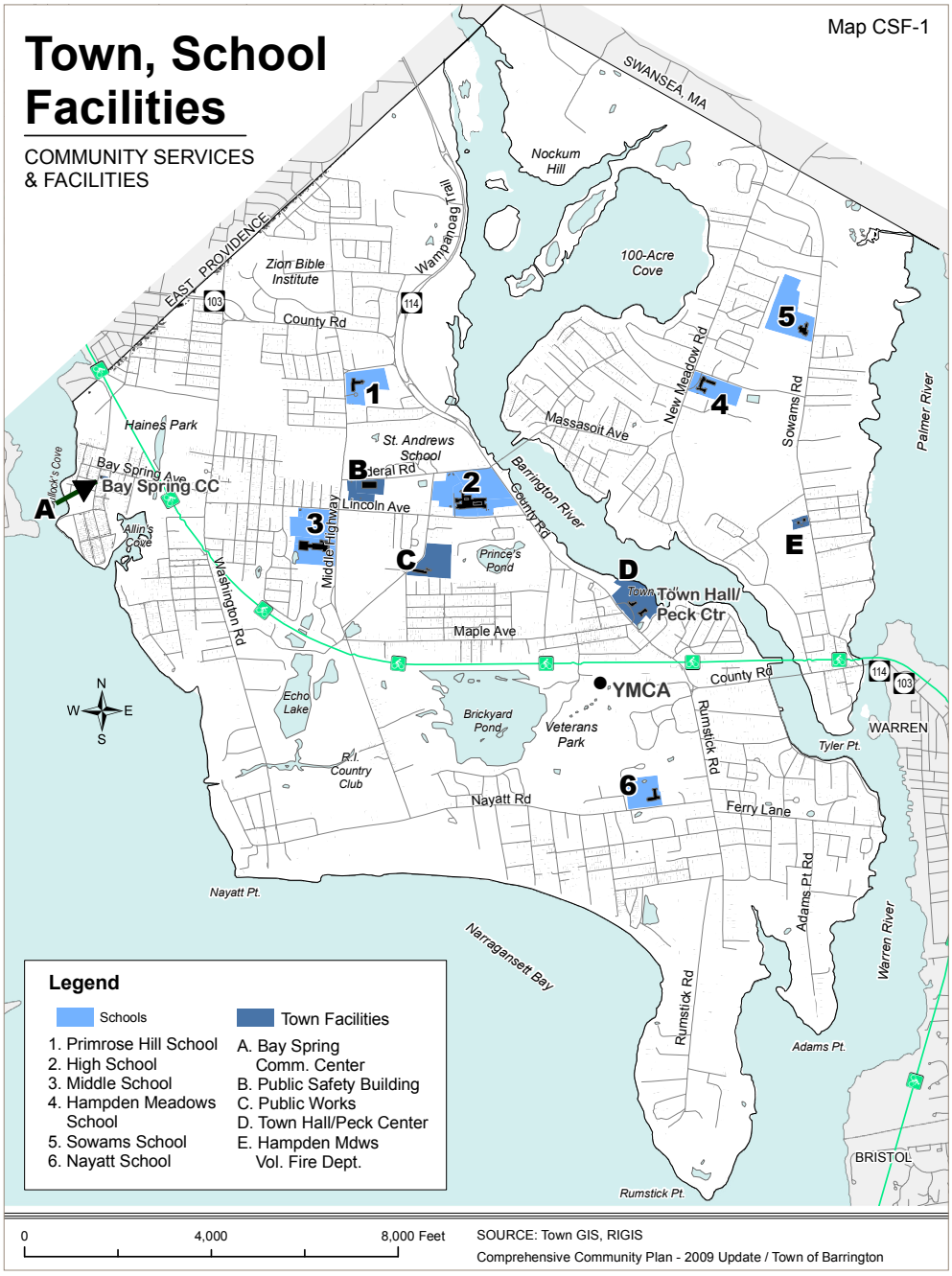
## Renewable Energy Projects

Barrington has not yet installed a renewable energy system of significance on a public building. In 2009, the Town moved forward on developing a municipal wind turbine on Brickyard Pond at the end of Legion Way, but the Town Council declined to proceed with the project due to a lack of reliable data, particularly in the amount of wind.

Since then, the Town has joined the East Bay Energy Consortium (EBEC), a consortium formed in 2009 consisting of 9 cities and towns in the East Bay Region. (EBEC members are Barrington, East Providence, Warren, Bristol, Portsmouth, Middletown, Newport, Tiverton, and Little

2 Direct digital controls (DDC's) provide automated control of energy systems by a digital device (computer)

Compton.) As of Fall 2010, EBEC was working on securing a site in Tiverton to install eight to ten 2.5 megawatt (MW) wind turbines to benefit the EBEC communities, taking advantage of the State's net metering law allowing each municipality to net meter up to 3.5 MW. If successful, and depending on the scale, the project has the potential to offset the Town's (including schools) entire electrical load. Due to the unique nature and scope of the EBEC project, the energy production Barrington receives from the Town's participation in the wind farm, if installed, will not be considered as contributing toward meeting the Energy Star Challenge goal.



# IV Overview of Municipal Energy Use and Existing Strategies


To determine the annual energy use of the municipal and school operations, the Town of Barrington collected data on electricity, natural gas, heating oil, gasoline and diesel fuel use from each of its departments and the School Departments. The Town selected FY 2009 as the baseline year from which to measure all progress. This section of the Energy Plan summarizes the results of this effort and provides the Town's official energy use baseline, from which all future energy reduction efforts will be measured. Additionally, at the end of this section is a summary of the impacts of the strategies that have already been implemented by the Town since the baseline year.

## Municipal Energy Use

As of the baseline year, FY 2009, the total energy used in Barrington's municipal operations, including buildings, fleet, and street lighting, was equivalent to 66,491 MMBTU[1]. Units of energy are expressed in MMBTU, or one million BTU (British Thermal Units) to allow for consumption comparisons among fuels that are measured in different units. The conversion factors can be found in Appendix B. When converted to carbon dioxide equivalent ($CO_2e$), Barrington's energy use in FY 2009 would require 1,381 acres of pine forest to absorb it in one year[2]. The breakdown by sector and fuel type is summarized in Table 1:

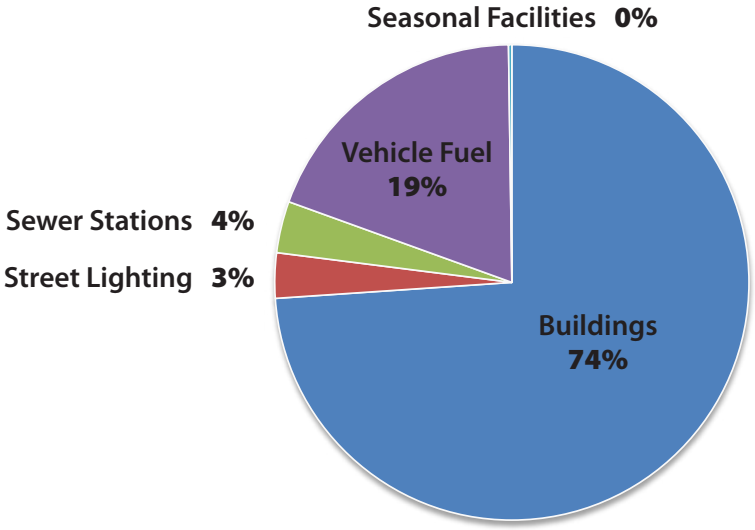
### Table 1: Energy Use Baseline - FY09 (MMBTU)

| | ELECTRICITY | NATURAL GAS | FUEL OIL | GASOLINE/DIESEL | TOTAL |
|---|---|---|---|---|---|
| **Buildings** | 12,903 | 30,418 | 5,833 | - | 49,155 |
| **Street Lighting** | 2,044 | - | - | - | 2,044 |
| **Sewer Stations** | 2,334 | - | - | - | 2,334 |
| **Vehicle Fuel** | - | - | - | 12,808 | 12,808 |
| **Seasonal Facilities** | 150 | - | - | - | 150 |
| **TOTAL** | **17,431** | **30,418** | **5,833** | **12,808** | **66,491** |

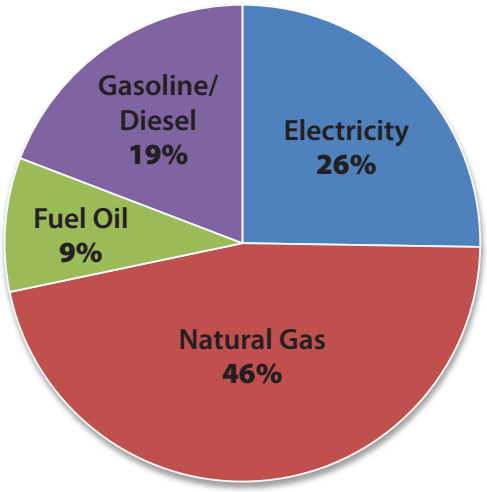
1 All data was provided by the Town of Barrington. VHB did not review original utility bills.
2 EPA Greenhouse Gas Equivalencies Calculator: http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results

Figures 1 and 2 below illustrate Barrington's total energy use by sector of municipal government as well as by fuel type.

### Figure 1: Baseline Total Energy Use by **Sector**

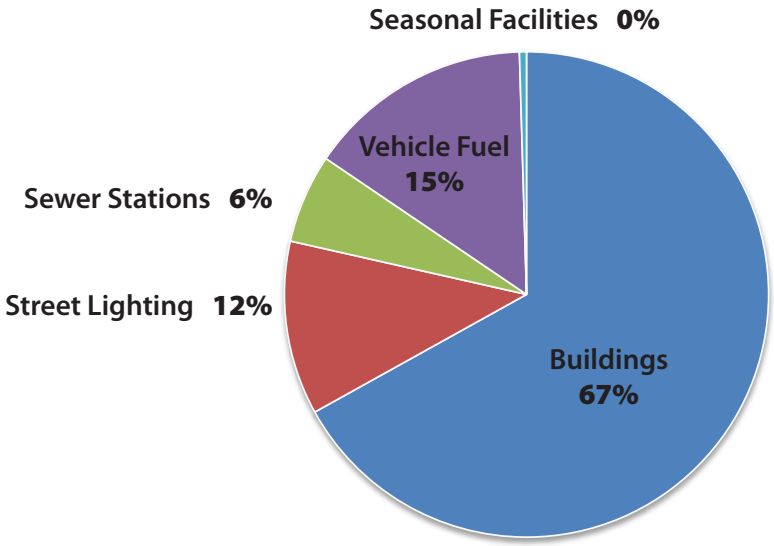



### Figure 2: Baseline Total Energy Use by **Fuel Type**




For FY 2009, the Town of Barrington spent $1,606,684 on energy for its municipal operations. As is common in smaller towns, the schools, as the department with the highest energy consumption, had the highest energy costs at $853,918. The costs broken down by sector can be seen in Figure 3.

### Figure 3: Energy Costs by **Sector**



As fossil fuel-based energy is consumed through municipal operations, greenhouse gases are emitted. The Town is interested in taking an active role in not only reducing its overall energy consumption, but also the greenhouse gas (GHG) emissions associated with that consumption. In order to do this, the town needs to have an understanding of its baseline GHG emissions. While the information provided in this Energy Plan is useful towards that goal, and is an important first step, the Town has not yet embarked on a comprehensive GHG emissions inventory for its operations or the community at large. This report provides GHG emissions, expressed as metric tons of carbon dioxide equivalent ($CO_2e$), only for the electricity, natural gas, fuel oil, gasoline, and diesel utilized by the Town's buildings, fleet, public lighting, and sewer stations. A comprehensive greenhouse gas inventory is a recommended next step for Barrington.

Based on the annual energy use by fuel type, electricity use accounts for the majority of greenhouse gas emissions in the Town of Barrington. The emissions broken down by fuel type in metric tons of $CO_2$ equivalent ($mtCO_2e$) follow:

| | |
|---|---|
| Electricity | 3,669 $mtCO_2e$ |
| Natural gas | 1,521 $mtCO_2e$ |
| Gasoline/diesel | 863 $mtCO_2e$ |
| Fuel oil | 426 $mtCO_2e$ |
| **Total** | **6,479 $mtCO_2e$** |

Table 2 below shows the overall breakdown of energy use, emissions, and costs across municipal and school operations. As is often the case in towns like Barrington, buildings represent the largest percentage of energy consumption, energy costs, and associated greenhouse gas emissions.

### Table 2: FY09 Baseline Energy Use, Emissions, and Costs

| | ENERGY USE (MMBTU) | GHGS $MTCO_2E$ | COST ($) |
|---|---|---|---|
| **Buildings Total** | **49,155** | **4,728** | **$1,075,623** |
| Municipal | 12,307 | 1,294 | $253,632 |
| *Library* | 3,653 | 430 | $82,208 |
| *Public Safety* | 5,074 | 547 | $103,029 |
| *Public Works* | 1,485 | 119 | $27,379 |
| *Town Hall* | 2,095 | 198 | $41,016 |
| School | 36,848 | 3,369 | $821,991 |
| *Barrington High School* | 14,114 | 1,255 | $297,772 |
| *Barrington Middle School* | 10,051 | 1,022 | $233,205 |
| *Hampden Meadows Elementary* | 3,980 | 340 | $76,750 |
| *Nayatt Elementary* | 2,677 | 244 | $74,825 |
| *Primrose Hill Elementary* | 3,351 | 310 | $90,074 |
| *Sowams Elementary* | 2,674 | 198 | $49,365 |
| **Street Lighting Total** | **2,044** | **430** | **$186,143** |
| **Sewer Stations Total** | **2,334** | **491** | **$95,253** |
| **Seasonal Facilities Total** | **150** | **32** | **$7,511** |

| | ENERGY USE (MMBTU) | GHGS MTCO$_2$E | COST ($) |
|---|---|---|---|
| **Fleet Tot** | **12,808** | **863** | **$242,154** |
| Municipal | 10,979 | 739 | $210,227 |
| *DPW* | 7,526 | 507 | $144,055 |
| *Police* | 2,428 | 164 | $46,536 |
| *Fire* | 1,024 | 69 | $19,636 |
| School (excludes school buses) | 1,830 | 123 | $31,927 |
| TOTAL | 66,491 | 6,479 | $1,606,684 |

## Buildings

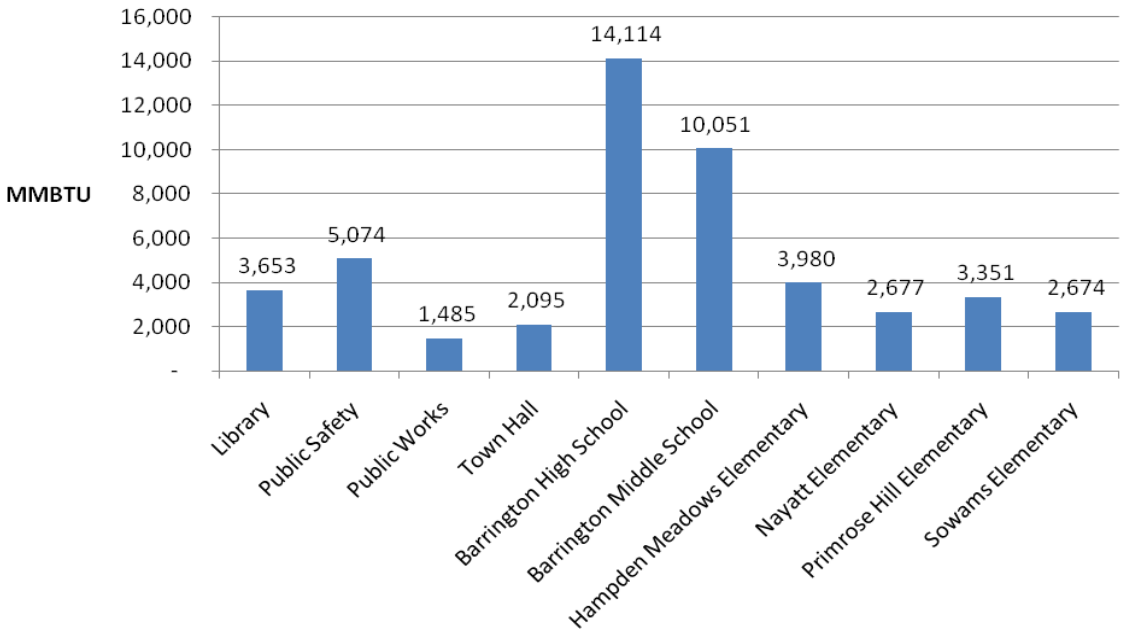
Table 3 below shows the total energy consumed by buildings (in MMBTU) as well as the energy intensity of each building (in thousand BTU (kBTU) per square foot) in FY 2009. The energy intensity allows the Town to better understand overall efficiency of a building, as you cannot determine that through direct total consumption. As can be seen in Figures 4 and 5, the buildings that consume the most energy overall are not necessarily the most inefficient buildings. For example, Barrington High School is the largest consumer of energy, yet is more efficient than several other municipal buildings on a per square footage basis. In fact, the High School is one of only two buildings that would be eligible to achieve an Energy Star rating based on the standards established by the US Environmental Protection Agency, given its current score of 80. Town Hall currently has the highest Energy Star rating with a score of 88. The remaining buildings are not yet eligible for Energy Star rating as their scores are too low. However, six out of the ten buildings are performing average or better than average when compared to similar buildings of their type.[3]

### Table 3: Energy Use and Intensity by Building[4]

| | TOTAL MMBTU | kBTU/SQ FT | TOTAL SQ FT | BASELINE RATING (1-100) |
|---|---|---|---|---|
| **Library** | 3,653 | 83.4 | 43,783 | N/A |
| **Public Safety** | 5,074 | 131.1 | 38,714 | N/A |
| **Public Works** | 1,485 | 65.6 | 22,651 | N/A |
| **Town Hall** | 2,095 | 58.2 | 35,991 | 86 |
| **Barrington High School** | 14,114 | 74.7 | 189,000 | 77 |
| **Barrington Middle School** | 10,051 | 68.4 | 147,000 | 46 |
| **Hampden Meadows Elementary** | 3,980 | 85.6 | 46,500 | 19 |
| **Nayatt Elementary** | 2,677 | 78.6 | 34,000 | 39 |
| **Primrose Hill Elementary** | 3,351 | 92.9 | 36,000 | 20 |
| **Sowams Elementary** | 2,674 | 91.3 | 29,300 | 24 |

3 Energy Information Administration CBECS 2003 data: http://www.eia.doe.gov/emeu/cbecs/cbecs2003/detailed_tables_2003/2003set9/2003pdf/c3.pdf
4 Data in Table 3 summarized from data in the Town's Portfolio Manager database.

## Figure 4: Total Energy Use (MMBTU) by Building




## Figure 5: Energy Intensity by Building

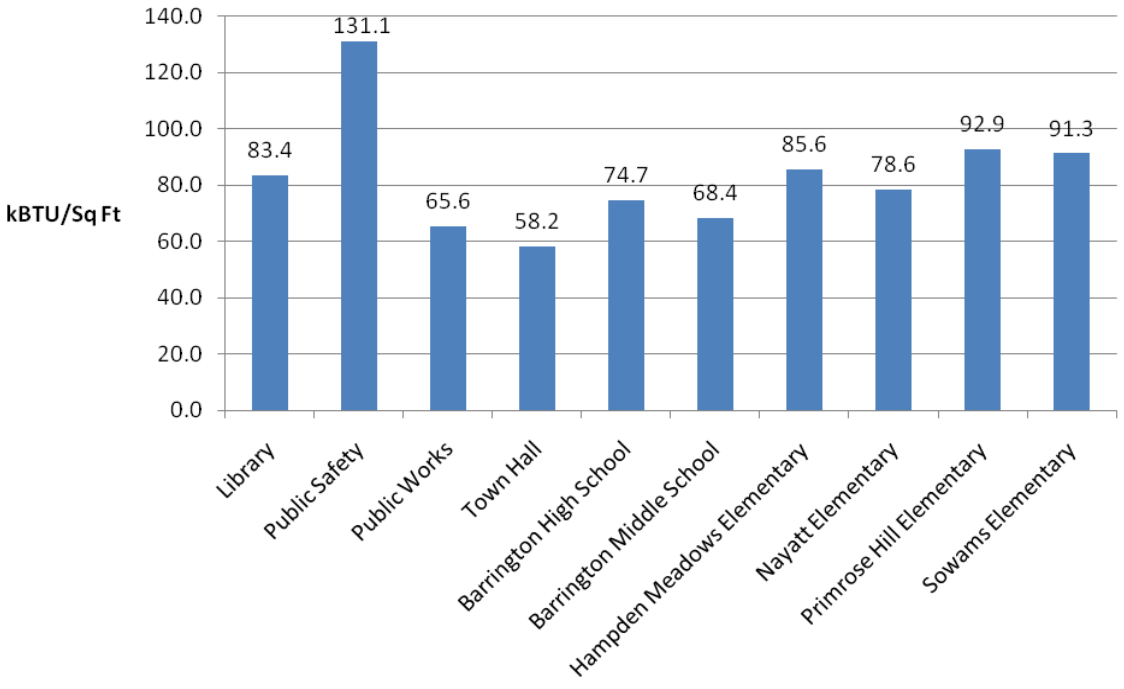


Table 4 below provides the details of the annual energy costs by fuel type in FY 2009 by building.

### Table 4: Energy Costs by Building

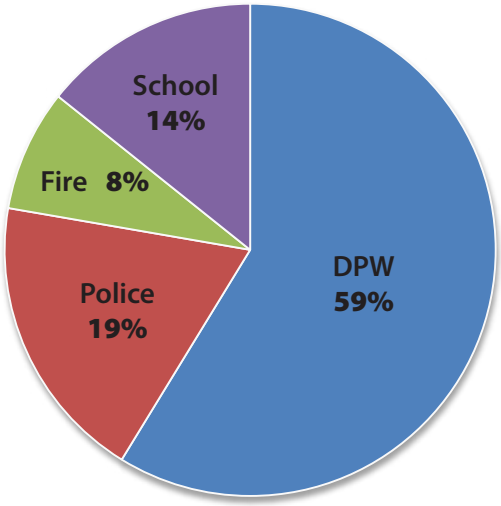
| | ELECTRICITY | NATURAL GAS | FUEL OIL | TOTAL |
|---|---|---|---|---|
| **Barrington High School** | $145,009 | $152,763 | | $297,772 |
| **Barrington Middle School** | $139,094 | $94,111 | | $233,205 |
| **Public Safety** | $61,435 | $41,594 | | $103,029 |
| **Primrose Hill Elementary** | $21,620 | | $68,454 | $90,074 |
| **Library** | $54,525 | $27,683 | | $82,208 |
| **Hampden Meadows Elementary** | $35,794 | $34,142 | $6,814 | $76,750 |
| **Nayatt Elementary** | $16,834 | | $57,991 | $74,825 |
| **Sowams Elementary** | $18,266 | $31,099 | | $49,365 |
| **Town Hall** | $20,581 | $20,435 | | $41,016 |
| **Public Works** | $10,801 | $16,578 | | $27,379 |

## Fleet

Barrington's vehicle fleet includes 125 on-road, off-road, and marine vehicles and equipment for the various municipal departments, such as the Department of Public Works, Police, Fire, and Schools[5]. The total diesel and gasoline utilized by the Town in FY 2009 was 97,033 gallons equating to a cost of $242,154. Figure 6 below illustrates the breakdown of the fleet's energy usage by department.

5 Note that the School Department has a private contract for school buses and they are therefore not included in the energy baseline..

### Figure 6: Fleet Vehicle Fuel Oil Consumption by Department



## Lighting

The cost of public lighting is often a large expense for towns like Barrington. In particular, street lighting and traffic lights consume a lot of energy and can often be easily upgraded to more efficient models. These upgrades not only reduce municipal energy consumption but also reduce municipal energy costs.

### a. Street Lighting

The Town of Barrington maintains 1,773 outdoor lighting fixtures, primarily street lighting. The annual energy consumption for street lights in FY 2009 was 599,000 kWh, which is the equivalent of 48,389 gallons of gasoline consumed.[6] The associated costs for this electricity in FY 2009 was $186,143.

### b. Traffic Lights

The few traffic lights that exist in Barrington are all owned by the State of Rhode Island. Therefore, the Town is not responsible for the maintenance or payment of the traffic lighting and signalization system and they are not included in the energy baseline.

## Existing Strategies

The Town of Barrington has already taken significant action since the baseline year of FY 2009 to improve the overall efficiency of its buildings through the implementation of various energy efficiency strategies. A summary of the existing strategies, identified through conversations with municipal officials, is provided in Appendix A. The total estimated savings from these existing strategies, which include lighting upgrades and HVAC improvements, is 1,857 MMBTU, $63,666, and 192 mt$CO_2$e.

This energy reduction represents nearly a third of the total reduction that Barrington has committed to achieve by 2015. The Town will need to reduce energy by an additional 4,792 MMBTU between now and 2015 to achieve its 10% reduction goal from its FY 2009 use.

6 Source: EPA Greenhouse Gas Equivalencies Calculator http://www.epa.gov/cleanenergy/energy-resources/calculator.html

# V Goals, Objectives, and Strategies

Through the EPA Community Energy Challenge, the Town has committed to reduce its municipal and school energy use by 10% of the FY 2009 baseline level by 2015. Based on the energy use baseline, that translates to a reduction of 6,649 MMBTU (Million British Thermal Units) by 2015, which would bring the Town's total annual energy consumption to 59,842 MMBTU. As previously indicated, the Town has already implemented some energy efficiency strategies in its buildings since the baseline year, realizing an energy use reduction of 1,857 MMBTU, representing 28% of the total reduction goal that Barrington has committed to achieve by 2015. The Town will need to reduce energy consumption by an additional 4,792 MMBTU between now and 2015 to meet its overall 10% energy use reduction target. The strategies below describe energy reduction measures and programs designed to allow Barrington to meet, and potentially surpass, this energy use reduction target.

The following are the goals, objectives, and identified strategies the Town of Barrington could implement to meet its energy reduction goals. The actual timeline for implementing each strategy will need to be determined by the Town as it evaluates its priorities and funding availability.

## Goal 1

*Reduce overall municipal and school building and fleet energy usage by at least 10 percent by 2015*

### Objective 1.1

*Install cost-effective energy efficiency and renewable energy measures at municipal and school facilities.*

**Strategy 1.1.1**

*Complete energy efficiency upgrades in buildings.*

**Responsible Department:** Public Works, School Department

**Estimated Cost:** Varies- see Appendix C

**Estimated Energy and GHG savings:** 13,453 MMBTU[1]

Despite having implemented various efficiency strategies throughout its municipal buildings, the Town still has significant opportunities for further reductions through envelope improvements, mechanical system upgrades, and lighting retrofits. The specific recommendations were provided from the various energy audits conducted by National Grid/RISE Engineering

1 This estimated total does not take into account cascading—the likely effect of an energy improvement lessening the impact of an additional improvement. Also, not all of the improvements listed in Appendix C are included in this estimated total, as additional information would be necessary to accurately estimate the impact of certain improvements.

and conversations with Town officials. Due to their length and technical nature, the specific recommendations are detailed in Appendix C.

Efficiency upgrades are recommended for the following facilities: Town Hall, Library, Public Works, Public Safety, High School, Middle School, Primrose Hill School, Nayatt School, Hampden Meadows School, and Sowams School. The Town has allocated a portion of its Energy Efficiency and Conservation Block Grant (EECBG) funds to implement several energy efficiency measures in municipal and school buildings. Additionally, they have received a competitive energy grant from the State of Rhode Island through the EECBG program to implement energy efficiency strategies at the Public Safety building.

Table 5 below provides an overview of how the Town may reach its 10% energy reduction goal through implementation of a small selection of the proposed strategies, identified in Appendix C of the Strategic Energy Plan, and the existing strategies already implemented. However, prior to making a decision to implement any one of these strategies, further analysis is needed of all potential energy measures, including cost considerations, age of equipment and other factors.

## Table 5: Example of How Barrington Could Reach its Reduction Goal

| | |
|---|---|
| **FY 2009 Baseline Energy Use** | **66,491 MMBTU** |
| **10% Reduction Goal** | **6,649 MMBTU** |

| ESTIMATED REDUCTION OF PROPOSED STRATEGIES TO BE IMPLEMENTED PER THE STRATEGIC ENERGY PLAN (APPENDIX C) | | |
|---|---|---|
| **Town Hall** | Envelope improvements | 104.8 |
| **Public Works** | Programmable thermostats | 62.0 |
| **Public Safety** | Insulate ceiling | 324.4 |
| **Public Safety** | Replace boiler system | 389.3 |
| **Public Safety** | Demand controlled ventilation | 866.0 |
| **High School** | Lighting retrofits-woodshop | 39.5 |
| **High School** | Demand controlled ventilation | 2775.5 |
| **Middle School** | Lighting retrofit - gym | 47.0 |
| **Middle School** | Occupancy sensors - entire bldg | 551.2 |
| **Nayatt School** | Lighting retrofit- outdoor fixtures | 30.7 |
| **Primrose Hill** | Lighting retrofit- outdoor fixtures | 37.1 |
| **Sowams School** | Occupancy sensors - entire bldg | 67.7 |
| **Estimated Reduction from Example Proposed Strategies** | | **5295.2** |
| **Impact of Existing Strategies Implemented since the Baseline Year** | | **1857.0** |
| **Total Estimated Reduction from Existing and Proposed Strategies** | | **7152.2** |
| *% Reduction of Baseline Energy Use (Existing and Proposed Strategies)* | | *10.8%* |

**Strategy 1.1.2**

*Pursue installation of solar photovoltaic and/or hot water systems for municipal and school facilities.*

**Responsible Department:** Public Works, School Department

**Estimated Cost:** Varies

**Estimated Energy and GHG savings:** To be determined

While the Town is implementing the various energy efficiency strategies it may also want to consider, where feasible, the installation of a solar photovoltaic (PV) or hot water system for specific buildings. The Town will find that, depending on the load, the solar hot water system will provide a shorter payback period. Incentives do exist for the installation of renewable energy technologies. Refer to **Appendix D** of this Plan for more information on available funding resources.

**Strategy 1.1.3**

*Continue to pursue regional renewable energy projects, including wind and solar projects.*

**Responsible Department:** Town Manager, Town Planner

**Estimated Cost:** Varies

**Estimated Energy and GHG savings:** To be determined

Barrington, as one of nine municipalities that comprise the East Bay Energy Consortium (EBEC), might have an opportunity to participate in the development of a wind farm in the East Bay area near the coast, where the wind resource is more suitable for wind turbine installations. The Town's potential share of the estimated 20- to 25-megawatt project would offset the Town's (including schools) entire electrical load. Barrington could also consider dedicating a portion of its 3.5 MW net metering capacity toward other regional projects, such as, the City of East Providence's proposed development of a large-scale photovoltaic project at one of its closed landfill sites.

**Strategy 1.1.4**

*Install computer power management tools at municipal and school buildings.*

**Responsible Department:** IT, Public Works, School Department

**Estimated Cost:** Free

**Estimated Energy and GHG savings:** 700 to 750 kWh per computer annually

If Barrington were to join EPA's Low Carbon IT Challenge, the Town would gain access to various tools and resources designed to assist in determining the best way to incorporate effective PC Power Management in their specific IT environment. The EPA Energy Star Computer Power Management Tool allows each computer within a facility or on a shared network to have specific settings for powering down during periods of extended inactivity. EPA estimates this program can save as much as $75 annually per computer.[2]

2 http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_management

## ANN ARBOR, MICHIGAN CASE STUDY

The City of Ann Arbor installed LED streetlights to reduce lighting costs and greenhouse gas emissions. After successfully piloting an LED replacement for the downtown "globe" lights, the City received a $630,000 grant from the Ann Arbor Downtown Development Authority to fund retrofits for over 1,000 downtown lights. This initial installation will save the City over $100,000 per year, reducing annual greenhouse gas emissions by 267 tonnes of $CO_2e$. In addition, testing will continue on LED replacements for neighborhood streetlights, with the eventual goal of replacing all of the public lighting throughout the City with LEDs. Full implementation of LEDs would cut Ann Arbor's public lighting energy use in half and reduce greenhouse gas emissions by 2,200 tonnes of $CO_2e$ annually.[1]

1 Ann Arbor's LED Streetlight Program http://www.a2gov.org/government/publicservices/systems_planning/energy/Documents/LED_Summary.pdf

**Strategy 1.1.5**

*Install municipal- and school system-wide Energy Management Systems.*

**Responsible Department:** Public Works, School Department

**Estimated Cost:** Varies

**Estimated Energy and GHG savings:** National Grid estimates 79,312 lbs of $CO_2$ annually

The Town could install an energy management system to monitor the ongoing energy use in all of its buildings. Ideally, this system will have remote controls allowing facility managers to adjust temperatures in various buildings remotely for maximum control. Energy management systems range significantly in what they offer and how they function, the Town will want to investigate its options and determine what specific features are most appropriate for its situation. National Grid estimates a $9,582 yearly cost savings from this strategy.

**Strategy 1.1.6**

*Convert streetlight fixtures to LED.*

**Responsible Department:** Public Works

**Estimated Cost:** Unknown

**Estimated Energy and GHG savings:** 40-50% of annual kWh(based on estimates from other local governments)[3]

With the success of light emitting diode (LED) traffic light installations across the country, LED streetlights are fast becoming the new technology of choice. With various incentives and energy savings of up to 50%, the economics might make sense. This measure has also proven to be effective for GHG emissions reductions. The Town of Barrington should investigate its opportunities to install LED streetlights throughout the Town.

### Objective 1.2

*Improve vehicle fuel efficiency of municipal fleet vehicles where appropriate.*

**Strategy 1.2.1**

*Institute a Green Fleets Program for municipal operations.*

**Responsible Department:** Public Works

**Estimated Cost:** Varies

**Estimated Energy and GHG savings:** To be determined. Haverford Township, PA estimated a 25% fuel use savings through a Green Fleets Program. Applying this standard of a 25% reduction of fuel use, Barrington could realize a reduction of 3,202 MMBTU.

The Town of Barrington could implement a Green Fleets program based on the Town's priorities for the purchase and maintenance of vehicles within the municipal fleet. This program should establish fuel efficiency standards for all new municipal vehicles purchased, based on the job they are needed for. Additionally, the Town could pursue alternative fueled vehicles. The Ocean State Clean Cities Coalition is a good resource for the Town to learn what

3 www.haverfordtownship.com/egov/docs/1239295902_125946.pdf, http://govpro.com/public_works/highways/content/LED_San_Jose_0518/, and LA http://bsl.lacity.org/

alternative fuels are readily available and at what cost. The Clean Cities Coalitions also are available to connect stakeholders to funding opportunities. The components of a successful green fleet program usually include:

- An established replacement schedule for vehicles
- A requirement to meet certain MPG standards by class
- Incorporation of alternative fuel vehicles
- No Idling policy[4]

## Objective 1.3

*Enact policies and financing mechanisms to support implementation of energy-reduction measures.*

### Strategy 1.3.1

*Enact an energy efficiency policy for the Town and School Department*

**Responsible Department:** Town and School Finance Departments, Town Council, School Committee

**Estimated Cost:** N/A

**Estimated Energy and GHG savings:** N/A

In an effort to institutionalize energy efficiency into daily work routines and influence overall behavior, the Town and Schools will develop and ensure that it enforces an energy efficiency policy for the Town. A strong, effective policy will broadly address energy use throughout municipal operations as well as through contracted services.

### Strategy 1.3.2

*Adopt Environmentally Preferable Purchasing (EPP) Program policies.*

**Responsible Department:** Town and School Finance Departments, Town Council, School Committee

**Estimated Cost:** N/A

**Estimated Energy and GHG savings:** Will have tremendously different results depending on how it is implemented and what is included in the program. For example, Haverford Township, PA estimated a 30% reduction in energy use by electronic devices through their EPP Program[5]

Development and implementation of an environmentally preferable purchasing (EPP) program that includes purchase of Energy Star equipment and requires taking various energy and sustainability principles into account when purchasing or contracting for the Town. This could complement or be incorporated into the energy efficiency policy proposed above.

4 This would be enforcement of and expansion of existing Rhode Island anti-idling policy for diesel engines: Diesel Emissions Reduction Act.

5 www.haverfordtownship.com/egov/docs/1239295902_125946.pdf

**Strategy 1.3.3**
*Establish a Revolving Energy Fund*

**Responsible Department:** Town, School Finance Departments

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

A revolving energy fund has become one way in which local governments create a more sustainable funding stream for energy efficiency and clean energy programs. This municipal pool of funds capitalizes a loan fund and loan repayments recapitalize the fund to allow additional lending on an ongoing basis. Revolving funds can be managed directly by the Town or by a third party. There are state requirements that will need to be reviewed before establishing such a fund.

**Strategy 1.3.4**
*Evaluate purchase of carbon offsets to supplement energy efficiency reduction measures.*

**Responsible Department:** Finance Department, Town Manager

**Estimated Cost:** varies from $3-$15 per tonne of $CO_2e$ in the US

**Estimated Energy and GHG savings:** Purchasing carbon offsets does not reduce actual energy use. However, it has been used as an effective tool to supplement energy efficiency measures and reach overall GHG reduction goals.

If Barrington chooses to identify a greenhouse gas reduction goal, this strategy might be considered an appropriate last resort to meet that goal if the Town is unable to meet it through actual implementation of reduction strategies. This strategy does not count towards any energy use reduction goal.

## Goal 2
*Encourage residents and businesses to adopt energy-efficiency measures.*

### Objective 2.1
*Develop community education and incentive programs.*

**Strategy 2.1.1**
*Create a Renewable Energy Center.*

**Responsible Department:** CREB, Public Works, School Department

**Estimated Cost:** Start-up cost estimated at $20,000[6]

**Estimated Energy and GHG savings:** Depends on the type of equipment installed.

CREB has identified as a priority the development of a renewable energy center. The Center would consist of small-scale renewable energy systems of the latest commercially available technology, from which data would be collected and made publicly available for general education and to aid in decision-making about the technical and economic viability of larger scale systems, prior to making expenditures. The Town has committed to use a portion of its recent approximate $164,000 allocation from the (state-administrated) Energy Efficiency and Conservation Block Grant program to purchase the first renewable energy system module.



6 Source: Barrington CREB

**Strategy 2.1.2**

*Establish a Property Assessed Clean Energy (PACE) Financing Program*

**Responsible Department:** Finance

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

PACE lets homeowners utilize special property tax assessments to pay off the cost of energy efficiency and clean energy upgrades to their home. The PACE program could take various shapes depending on the local realities, including state enabling regulation requirements, ability of Town to implement and maintain a program, and overall political will to engage in such an initiative[7].

**Strategy 2.1.3**

*Consider establishing a "Green Business" program.*

**Responsible Department:** To be determined

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

The Town of Barrington could consider implementing a program that allows their local businesses to receive a "green" designation based on a set of previously identified criteria. Local governments across the country are utilizing a green business program as a means to motivate local businesses to take action on energy and climate protection by linking them to existing utility programs and other resources to enable them to improve the efficiency of their operations and save money. Oftentimes these programs are complemented with a recognition program involving everything from a sticker to place in their window to an awards ceremony.

Some examples of green business programs include the following:

- Cambridge GoGreen Awards **http://www.cambridgema.gov/cdd/et/ggm/gg_bawhist.html**

**Strategy 2.1.4**

*Consider measures to encourage community members to purchase and use fuel-efficient vehicles*

**Responsible Department:** To be determined

7 As of the printing of this document, the PACE program was undergoing significant scrutiny by national lenders and the ultimate fate of this program model has not yet been determined though many feel the lenders do not have a strong case.

## MONTGOMERY COUNTY, MD GREEN BUSINESS CERTIFICATION PROGRAM

The Green Business Certification Program of Montgomery County, Maryland is a partnership of the Montgomery County Department of Environmental Protection, the Montgomery County Chamber of Commerce, and Montgomery College. Currently there are 20 businesses that have been certified under the program, which aims to help businesses become leaders in the community by reducing their environmental footprint and saving money, while giving the businesses community-wide recognition. Certification is based on achieving action items on a checklist in seven categories, including:

1. Organizational Commitment
2. Waste Reduction & Recycling
3. Environmentally Responsible Purchasing
4. Energy Efficiency and Renewable Energy
5. Efficient Runoff Management and Water Use
6. Pollution Prevention
7. Transportation and Travel

Each section is additionally broken down into:

- Policy
- Actions and programs
- Performance Measurement

For more information on this program, visit: **http://mcgreenbiz.org/overview/**

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

The Town of Barrington could identify parking and purchase-related incentives to support use of hybrid vehicles and alternative fuel vehicles by municipal and school employees and/or community members. An example of action that other local governments have taken includes preferential parking for hybrids at certain locations throughout the town; the Town could amend its standards for commercial parking lots to encourage hybrid-priority parking. Barrington is in the process (as of summer 2010) of amending development standards to require new commercial projects to install bike racks, as part of efforts to encourage more biking and walking over driving within town.

# VI Monitoring and Verification

Now that the Town has established a baseline of energy use, it will be important to continue to track actual energy reductions and identify future opportunities to implement reduction strategies. The Town has joined the Energy Star Community Energy Challenge and taken advantage of the free online energy tracking tool, Portfolio Manager, as part of this program. This tool will be of most use to the town moving forward if kept up to date on a monthly or quarterly basis. Relevant staff should coordinate a streamlined process by which energy consumption and cost data for all facilities and fuel types is collected on a routine basis and uploaded into the Portfolio Manager tool. Portfolio Manager provides templates for the upload of this data to simplify the collection process. Ideally, one staff member or volunteer could be delegated this as a monthly or quarterly task. In Portfolio Manager, the facilities will be given a score based on energy performance. A score of 75 or above will make the facility eligible for an Energy Star rating. The Town can then apply to have the building officially rated, receive a plaque, and demonstrate to the community its commitment to energy efficiency and achievement on that front.[1]

The regular updates of this data will be useful for the Town in prioritizing energy reduction strategies, but is also required as part of the benchmarking process in the Energy Star Community Energy Challenge. In addition to the consumption data, Portfolio Manager should be updated whenever there is a change of utility accounts, meters, changes to building square footage, opening or closing or change of use of a facility, etc. The Town will need to coordinate internally to make sure this information is communicated to relevant staff and to the primary staff person responsible for keeping Portfolio Manager up to date. It is recommended that the Town provide an annual report to the community on its progress in implementing these various recommended strategies and achieving their energy reduction goals.

1 Note that Portfolio Manager will not rate a facility if its data is more than 120 days old.

VII

# Further Recommendations

A key next step for the Town of Barrington will be to establish priorities in moving forward to accomplish its energy reduction goals. A prioritization workshop could be useful to help weigh the recommended strategies outlined in this plan against each other and the practical and financial feasibility of implementing each.

Another important step will be leveraging the funds to implement these strategies. This Strategic Energy Plan has outlined a number of incentives and funding sources that could assist the Town with implementation of the strategies. Funding opportunities and incentive programs change frequently, however, so the Town will need to keep up to date on what opportunities are available and which ones would be most appropriate for Barrington.

# Appendix A

## Table A-1: Existing Strategies Calculations Summary by Building

| BUILDING TOTALS | ELECTRIC SAVINGS (KWH) | NATURAL GAS SAVINGS (THERMS) | ENERGY SAVINGS (MMBTU) | COST SAVINGS ($) | COST SAVINGS GHG REDUCTIONS ($MTCO_2E$) |
|---|---|---|---|---|---|
| **Public Library** | 94,478.52 | 5,271.50 | 849.51 | $22,262 | 67.76 |
| **Town Hall** | 5,010.88 | | 17.10 | $577 | 2.11 |
| **Public Safety** | 33,383.43 | | 113.90 | $3,845 | 14.05 |
| **DPW** | 16,892.20 | | 57.64 | $1,946 | 7.11 |
| **High School** | 142,884.00 | | 487.86 | $20,018 | 60.17 |
| **Middle School** | 5,532.36 | | 18.88 | $830 | 2.33 |
| **Hampden Meadows School** | 47,283.33 | | 161.57 | $7,102 | 19.93 |
| **Nayatt School** | 19,069.52 | | 65.07 | $3,051 | 8.02 |
| **Primrose Hill School** | 25,220.24 | | 86.05 | $4,035 | 10.61 |
| **Sowans School** | Information Not Available | | | | |
| **TOTAL** | **389,754.48** | **5,271.50** | **1,857.58** | **$63,667** | **192.09** |

The energy reduction from these measures represents 28% of the ten percent reduction of total energy use that Barrington has committed to achieve by 2015. The Town will need to reduce energy use by an additional 4,792 MMBTU between now and 2015 to meet its overall 10% energy use reduction target.

## Table A-2

| | 2009 BASELINE ENERGY USE | CURRENT ENERGY USE AFTER IMPLEMENTATION OF EXISTING STRATEGIES | 2015 ENERGY USE GOAL |
|---|---|---|---|
| **MMBTU** | 66, 491 | 64,634 | 59,842 |
| **% Change** | - | 2.80% | 10% |

## Table A-3: Detailed Existing Strategies Table

| BUILDING | MEASURE | ELECTRIC (SAVINGS - KWH) | NAT.GAS (SAVINGS - THERMS) | FUEL OIL (SAVINGS -GAL) | ELECTRIC (MMBTU) | NAT.GAS (MMBTU) | FUEL OIL (MMBTU) | ENERGY SAVINGS (MMBTU) | ENERGY COST SAVINGS (DOLLARS) | GHG REDUCTION ($MTCO_2E$) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Public Library** | Lighting: reballast to T8s & add occupancy sensors | 50,115.52 | | | 170.99 | | | 170.99 | $5,774 | 21.09 |
| | HVAC: add Energy Management System | 44,363.00 | | | 151.37 | | | 151.37 | $9,582 | 18.67 |
| | Boiler: replace with 1 new high pressure gas boiler | | 5,271.50 | | | 527.15 | | 527.15 | $6,906 | 28.00 |
| **Town Hall** | Lighting: reballast to T8, install CFLs & add occupancy sensors | 5,010.88 | | | 17.10 | | | 17.10 | $577 | 2.11 |
| **Public Safety** | Lighting: reballast to T8 & add occupancy sensors | 33,383.43 | | | 113.90 | | | 113.90 | $3,845 | 14.05 |
| **DPW** | Lighting: reballast to T8, install CFLs & add occupancy sensors | 16,892.20 | | | 57.64 | | | 57.64 | $1,946 | 7.11 |
| **High School** | Lighting (Small Gym): reballast T8s to T5s with electronic ballasts - approx. 16 whole lamps + ballasts | 99.53 | | | 0.34 | | | 0.34 | $14 | 0.04 |
| | Lighting (Outdoors): replace 250W HPS with 150W HPS - 20 lights | 4,320.00 | | | 14.74 | | | 14.74 | $605 | 1.82 |
| | Lighting (Big Gym): replace 320W lamps with T5s - assume 25 lights | 14,364.00 | | | 49.01 | | | 49.01 | $2,011 | 6.04 |
| | Lighting (Hallways): convert 2x2 fixtures from 2 40W bulbs and 32W T8s to 16W bulbs (about 35% complete) - 3,590 lights complete | 124,070.40 | | | 423.33 | | | 423.33 | $17,370 | 52.21 |
| | Computers: replace all CRT monitors with LCD displays - assume 100 computers | 129.60 | | | 0.44 | | | 0.44 | $18 | 0.05 |
| **Middle School** | Lighting (Outdoors): replace 250W HPS with 150W HPS - 20 lights | 4,320.00 | | | 14.74 | | | 14.74 | $648 | 1.82 |
| | Lighting (Emergency Lighting): replace 27W with 9W - 20 lights | 175.56 | | | 0.60 | | | 0.60 | $26 | 0.07 |
| | Lighting (3 Rooms): reballast T12 to T8- 30 lights | 1,036.80 | | | 3.54 | | | 3.54 | $156 | 0.44 |
| **Hampden Meadows Elementary School** | Lighting (All Rooms): install occupancy sensors | 39,788.07 | | | 135.76 | | | 135.76 | $5,968 | 16.74 |
| | Lighting (Gym): replace 320W pulse with T5 & add occupancy sensors - 12 lights | 7,495.26 | | | 25.57 | | | 25.57 | $1,124 | 3.15 |
| | Lighting (Boiler Room): reballast T12 to T8 - assume 2 lights | 69.12 | | | 0.24 | | | 0.24 | $10 | 0.03 |
| **Nayatt School** | Lighting (Classrooms): install dual purpose occupancy sensors (motion and sound) | 17,599.04 | | | 60.05 | | | 60.05 | $2,816 | 7.41 |
| | Lighting (Gym): reballast T12 to T5 & reduce number of lights from 20 to 12 | 1,219.92 | | | 4.16 | | | 4.16 | $195 | 0.51 |
| | Lighting (Display Cases): replace 32W T12 with 3W LED - 4 lights | 250.56 | | | 0.85 | | | 0.85 | $40 | 0.11 |
| **Primrose Hill Elementary School** | Lighting (Classrooms): install dual purpose occupancy sensors (motion and sound) | 23,749.76 | | | 81.03 | | | 81.03 | $3,800 | 9.99 |
| | Lighting (Gym): reballast T12 to T5 & reduce number of lights from 20 to 12 | 1,219.92 | | | 4.16 | | | 4.16 | $195 | 0.51 |
| | Lighting (Display Cases): replace 32W T12 with 3W LED - 4 lights | 250.56 | | | 0.85 | | | 0.85 | $40 | 0.11 |
| **Sowams Elementary School** | Lighting (Gym): replace 400W mercury vapor with super T8s - 12 lights | Information Not Available | | | | | | | | |

# Appendix B

## Table B-1: Existing Reduction Strategies – Conversions and Calculations

| ABBREVIATIONS |
|---|
| Watt (W) |
| Kilowatt Hour (kWh) |
| Megawatt Hour (MWh) |
| Million British Thermal Units (MMBTU) |
| Pound (lb) |
| Metric Ton (mt) |

All calculations use the following conversion formulas:

| CONVERSION FORMULAS | | |
|---|---|---|
| **FROM** | **TO** | **FORMULA** |
| Watt Hour (Wh) | Kilowatt Hour (kWh) | Wh / 1000 |
| Kilowatt Hour (kWh) | One million British Thermal Units (MMBTU) | kWh * 0.003412 |
| Kilowatt Hour (kWh) | Megawatt Hour (MWh) | 1000 * kWh |
| Pound (lb) | Metric Ton (mt) | lb/2204.6226 |
| Emissions Factor ($CO_2$ equivalent)[1]: 927.68 lbs/MWh 117.080 lbs/MMBTU[2] | | |
| 927.68 lbs/MWh | Mt/kWh | 0.00421 mt/kWh[1] |
| Therm (Thm) | One million British Thermal Units (MMBTU) | Thm * 0.1 |

**1** 927.68/1000 = 0.92768 lbs/kWh; 0.92768/2202.6226 = 0.00421 mt/kWh

All calculations within the Strategic Energy Plan and its appendices are based on the following average energy costs and baseline energy use.

### Table B-2: FY 2009 Energy Costs and Baseline Energy Use

| BUILDING | ELECTRICITY COST (PER KWH) | NATURAL GAS COST (PER THERM) | BASELINE ELECTRIC USE (KWH) | BASELINE NATURAL GAS USE (THERMS) |
|---|---|---|---|---|
| **Public Library** | $0.12 | $1.31 | 452,720.00 | 21,086.20 |
| **Town Hall** | $0.12 | $1.35 | 169,797.00 | 15,158.40 |
| **Public Safety** | $0.11 | $1.28 | 536,160.00 | 32,443.00 |
| **DPW** | $0.13 | $1.37 | 81,121.00 | 12,081.80 |
| **High School** | $0.14 | $1.43 | 1,003,200.00 | 106,911.00 |
| **Middle School** | $0.15 | $1.38 | 950,200.00 | 68,089.00 |
| **Hampden Meadows Elementary School** | $0.15 | $1.33 | 231,326.00 | 25,661.00 |
| **Nayatt School** | $0.16 | n/a | 102,320.00 | n/a |
| **Primrose Hill Elementary School** | $0.16 | n/a | 138,080.00 | n/a |
| **Sowams Elementary School** | $0.16 | $1.37 | 116,800.00 | 22,754.00 |

## Public Library

### Lighting:

Adding occupancy sensors and re-ballasting the lighting to T8 saves an estimated 50,115 kWh of electricity annually[1].

### HVAC:

Adding an Energy Management System (EMS) to control the heating, ventilation and air conditioning system saves an estimated 44,363 kWh of electricity annually[2].

### Boiler:

High efficiency gas-fired boilers reduce heating related fuel use by 15% - 35%[3].

Assumptions:

- The new boiler is 25% more efficient
- The boiler will save 25% of the total natural gas used in the library

1 National Grid Small Commercial and Industrial Program, Energy Savings Plans" [Proposal for Town of Barrington- Town Hall, Public Library, Public Safety Building, and Dept. of Public Works]. Presented by Joe Goncalves, RISE Engineering. January 8, 2009. HARDCOPY (from Joe Piccerelli)

2 "Energy Conservation Measures" [for Barrington Public Library, 281 County Road, Barrington, RI 02806]. RISE Engineering [sponsored by National Grid]. May 20, 2009. HARDCOPY (from Joe Piccerelli)

3 Energy Action Plan." [Recommendations prepared for the Town of Barrington, RI, Public Library]. Compiled by Chris Fuller on behalf of National Grid. March 20, 2009. PDF (from Joe Piccerelli).

Calculation:

- The library used 21,086.20 therms of natural gas in FY 2009. Multiply that by 0.25 to obtain the energy savings.
- 21,086.2 therms * 0.25 = 5,271.5 therms total savings

## Town Hall

### Lighting:

Re-ballasting lighting to T8, installing compact fluorescent light bulbs and adding occupancy sensors saves an estimated 5,011 kWh of electricity annually[4].

## Public Safety

### Lighting:

Adding occupancy sensors and re-ballasting the lighting to T8 saves an estimated 33,383 kWh of electricity annually[5].

## DPW

### Lighting:

Adding occupancy sensors and re-ballasting the lighting to T8 saves an estimated 16,892 kWh of electricity annually[6].

## High School

### Lighting (Small Gym):

T5 fluorescent lights are approximately 9% more efficient than T8 fluorescent lights[7].

Assumptions:

- The original bulbs are 32 watts ( standard T8 bulb[8])
- The lights are on for 12 hours a day 180 days a year (2160 hours)

Calculations:

- To determine the total kWh savings, the per-fixture savings must first be calculated. To calculate the per-fixture savings, the fixture's wattage is multiplied by the number of hours the fixture is on and then by 0.09 to account for the added efficiency of T5 bulbs. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.

4 "National Grid Small Commercial and Industrial Program, Energy Savings Plans" [Proposal for Town of Barrington- Town Hall, Public Library, Public Safety Building, and Dept. of Public Works]. Presented by Joe Goncalves, RISE Engineering. January 8, 2009. HARDCOPY (from Joe Piccerelli)

5 "National Grid Small Commercial and Industrial Program, Energy Savings Plans" [Proposal for Town of Barrington- Town Hall, Public Library, Public Safety Building, and Dept. of Public Works]. Presented by Joe Goncalves, RISE Engineering. January 8, 2009. HARDCOPY (from Joe Piccerelli)

6 "National Grid Small Commercial and Industrial Program, Energy Savings Plans" [Proposal for Town of Barrington- Town Hall, Public Library, Public Safety Building, and Dept. of Public Works]. Presented by Joe Goncalves, RISE Engineering. January 8, 2009. HARDCOPY (from Joe Piccerelli)

7 http://www.lightingsolutions.ca/index.php?option=com_content&view=article&id=25&Itemid=26

8 http://ecmweb.com/ops/electric_fluorescent_lamp_coming/

- (32W * 2160 hours) / 1000 = 69.12 kWh
- 69.12 kWh * 0.09 = 6.22 kWh
- 6.22kWh * 16 fixtures = 99.53 kWh total savings

### Lighting (Outdoors):

Replacing 250W high pressure sodium bulbs with 150W high pressure sodium bulbs saves 100W per fixture.

Assumptions:

- The lights are on for 12 hours a day 180 days a year (2160 hours)

Calculations:

- To determine the total kWh savings, the number of watts saved is multiplied by the number of hours the fixture is on. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (100W * 2160 hours) / 1000 = 216kWh
- 216kWh *20 fixtures = 4,320 kWh total savings

### Lighting (Big Gym):

Fluorescent bulbs are 4-6 times more efficient than incandescent bulbs[9].

Assumptions:

- The original fixture was incandescent
- The new bulbs are, on average, five times more efficient
- T5 bulbs are 54 watts (standard T5 bulb[10])
- There are 25 lights in the big gym
- The lights are on for 12 hours a day for 180 days a year (2160 hours)

Calculations:

- To determine the total kWh savings, the number of watts saved is multiplied by the number of hours the fixture is on. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- 266W * 2160 hours / 1000 = 574.56 kWh
- 574.56kWh * 25 fixtures = 14,364 kWh total savings

### Lighting (Hallways):

Converting 40W bulbs to 32W saves 8W per light bulb; there are two light bulbs in each fixture resulting in a 16W savings per fixture.

Assumptions:

- The lights are on for 12 hours a day for 180 days a year (2160 hours)

**9** http://www.iwrc.org/downloads/pdf/LightBulbFacts.pdf
**10** http://ecmweb.com/ops/electric_fluorescent_lamp_coming/

Calculations:

- To determine the total kWh savings, the number of watts saved is multiplied by the number of hours the fixture is on. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (16W * 2160 hours) / 1000 = 34.56 kWh
- 34.56kWh *3590 fixtures = 124,070.4 kWh total savings

### Computers:

The typical LCD monitor uses 45W of energy. The typical CRT monitor uses 135W, resulting in a 90W savings when CRT monitors are replaced with LCD monitors[11].

Assumptions:

- There are 100 computers in the school, each with a 17" CRT that is replaced by a 15" LCD (has the same viewing area) [12]
- The computers are on for 8 hours 180 days a year (1440 hours)

Calculation:

- To calculate how much energy will be saved, multiply the number of watts saved per computer by the number of hours the computer is on.
- (90W * 1440 hours) / 1000 = 129.6 kWh total savings

## Middle School

### Lighting (Outdoors):

Replacing 250W high pressure sodium bulbs with 150W high pressure sodium bulbs saves 100W per fixture.

Assumptions:

- The lights are on for 12 hours a day 180 days a year (2160 hours)

Calculations:

- To determine the total kWh savings, the number of watts saved is multiplied by the number of hours the fixture is on. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (100W * 2160 hours) / 1000 = 216kWh
- 216kWh *20 fixtures = 4,320 kWh total savings

### Lighting (Emergency Lighting):

Replacing 27W light bulbs with 9W light bulbs saves 18W per fixture.

Assumption:

- The emergency lights are on 24 hours a day 365 days a year (8760 hours)

11 https://www.reliant.com/en_US/Page/Generic/Public/esc_purchasing_advisor_computer_monitors_bus_gen.jsp
12 https://www.reliant.com/en_US/Page/Generic/Public/esc_purchasing_advisor_computer_monitors_bus_gen.jsp

Calculations:

- To determine the total kWh savings, the number of watts saved is multiplied by the number of hours the fixture is on. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (18W * 8760 hours) / 1000 = 8.778 kWh
- 8.778kWh * 20 fixtures = 175.56 kWh total savings

### Lighting (3 Rooms):

T8 fluorescent lights are approximately 40% more efficient than T12 fluorescent lights[13].

Assumption:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- The original bulbs were 40W (standard T12 bulb[14])

Calculations:

- To determine the total kWh savings, the per-fixture savings must first be calculated. To calculate the per-fixture savings, the fixture's wattage is multiplied by the number of hours the fixture is on and then by 0.4 to account for the added efficiency of T8 bulbs. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (40W * 2160 hours) / 1000 = 86.4kWh
- 86.4kWh * 0.4 = 34.56kWh
- 34.56kWh * 30 fixtures = 1,036.8 kWh total savings

## Hampden Meadows Elementary School

### Lighting (All Rooms):

Occupancy sensors reduce lighting costs by 40% - 46%[15]. Lighting accounts for 30% - 50% of a building's electric costs[16].

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- Occupancy sensors reduce lighting electric use by 43%
- Lighting accounts for 40% of a building's energy use

Calculation:

- To calculate the total energy savings, the amount of electricity used for lighting must first be calculated. The Hampden Meadows Elementary School used a total of 231,326 kWh of electricity in FY 2009. To determine the amount used specifically for lighting, multiply 231,326 by 0.4. To find the total energy savings, multiply the amount of electricity used for lighting by 0.43.
- 231,326kWh * 0.4 = 92,530.4 kWh
- 92,530.4kWh * 0.43 = 39,788.07 kWh total savings

13 http://www.lightingsolutions.ca/index.php?option=com_content&view=article&id=25&Itemid=26
14 http://ecmweb.com/ops/electric_fluorescent_lamp_coming/
15 http://www.focusonenergy.com/files/document_management_system/business_programs/occupancysensor_factsheet.pdf
16 http://www.green.ca.gov/EPP/building/sensors.htm

## Lighting (Gym):

Fluorescent bulbs are 4-6 times more efficient than incandescent bulbs17. Occupancy sensors reduce lighting costs by 40% - 46%[18].

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- Original bulbs were incandescent
- T5 bulbs are five times more efficient
- T5 bulbs are 54W (standards T5 bulb[19])
- Occupancy sensors reduce lighting electric use by 43%

Calculations:

- To determine the total energy savings, the per-fixture energy savings must be calculated. To calculate the per-fixture energy savings, multiply the number of watts saved by the number of hours it is on. Installing occupancy sensors saves another 43% beyond the initial savings. To calculate this additional savings, the amount of energy each fixture is still using must be calculated. To find the per-fixture usage, multiply the fixture's wattage by the number of hours it is on. Multiply the per-fixture usage by 0.43 to find the savings associated with installing occupancy sensors. To find the total savings, add the per-fixture savings to the occupancy sensor savings and multiply the result by the number of fixtures.
- Per-Fixture Savings: (266W * 2160 hours) / 1000 = 574.56 kWh
- Occupancy Sensor Savings: (54W * 2160 hours) / 1000 = 116.64 kWh
  116.64kWh * 0.43 = 50.16 kWh
- Total Savings: (574.45kWh + 50.16kWh) * 12 = 7,495.26 kWh total savings

## Lighting (Boiler Room):

T8 fluorescent lights are approximately 40% more efficient than T12 fluorescent lights[20].

Assumption:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- There are 2 light fixtures in the boiler room
- The original bulbs were 40W (standard T12 bulb[21])

Calculations:

- To determine the total kWh savings, the per-fixture savings must first be calculated. To calculate the per-fixture savings, the fixture's wattage is multiplied by the number of hours the fixture is on and then by 0.4 to account for the added efficiency of T8 bulbs. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (40W * 2160 hours) / 1000 = 86.4 kWh
- 86.4kWh * 0.4 = 34.56 kWh
- 34.56kWh * 2 = 69.12 kWh total savings

17 http://www.iwrc.org/downloads/pdf/LightBulbFacts.pdf
18 http://www.focusonenergy.com/files/document_management_system/business_programs/occupancysensor_factsheet.pdf
19 http://ecmweb.com/ops/electric_fluorescent_lamp_coming/
20 http://www.lightingsolutions.ca/index.php?option=com_content&view=article&id=25&Itemid=26
21 http://ecmweb.com/ops/electric_fluorescent_lamp_coming/

## Nayatt School

### Lighting (Classrooms):

Occupancy sensors reduce lighting costs by 40% - 46%22. Lighting accounts for 30% - 50% of a building's electric costs[23].

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- Occupancy sensors reduce lighting electric use by 43%
- Lighting accounts for 40% of a building's energy use

Calculation:

- To calculate the total energy savings, the amount of electricity used for lighting must first be calculated. The Nayatt School used 102,320 kWh of electricity in FY 2009. To determine the amount used specifically for lighting, multiply 102,320 by 0.4. To find the total energy savings, multiply the amount of electricity used for lighting by 0.43.
- 102,320kWh * 0.4 = 40,928 kWh
- 40,928kWh * 0.43 = 17,599.04 kWh total savings

### Lighting (Gym):

T5 fluorescent lights are approximately 51% more efficient than T12 fluorescent lights[24]. Additionally, the number of fixtures is being reduced from 20 to 12.

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- The original bulbs were 40W (standard T12 bulb[25])

Calculations:

- To determine the total kWh savings, the per-fixture savings must first be calculated. To calculate the per-fixture savings, the fixture's wattage is multiplied by the number of hours the fixture is on and then by 0.51 to account for the added efficiency of T5 bulbs. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings. However, to account for the reduction in fixtures, another calculation must be performed. This calculation finds the amount of energy saved by eliminating 8 fixtures. To calculate the savings from the 8 eliminated fixtures, multiply their wattage by the number of hours they would have been on and multiply the result by the number of fixtures that were eliminated. Add the savings from the more efficient fixtures to the savings on the eliminated fixtures to find the total savings.

Savings on 12 Remaining Fixtures

- (40W * 2160 hours) / 1000 = 86.4 kWh
- 86.4kWh * 0.51 = 44.06 kWh
- 44.06kWh * 12 fixtures = 528.72 kWh savings

22 http://www.focusonenergy.com/files/document_management_system/business_programs/occupancysensor_factsheet.pdf
23 http://www.green.ca.gov/EPP/building/sensors.htm
24 http://www.lightingsolutions.ca/index.php?option=com_content&view=article&id=25&Itemid=26
25 http://ecmweb.com/ops/electric_fluorescent_lamp_coming/

Savings on 8 Eliminated Fixtures

- (40W * 2160 hours) / 1000 = 86.4 kWh
- 86.4kWh * 8 fixtures = 691.2 kWh savings

Total Savings

- 528.72kWh + 691.2kWh = 1,219.92 kWh total savings

### Lighting (Display Cases):

Replacing 32W T12 bulbs with 3W LED bulbs saves 29W per light.

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)

Calculation:

- To determine the total kWh savings, the number of watts saved is multiplied by the number of hours the fixture is on. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (29W * 8760 hours) / 1000 = 62.64 kWh
- 62.64kWh * 4 fixtures = 250.56 kWh total savings

## Primrose Hill Elementary School

### Lighting (Classrooms):

Occupancy sensors reduce lighting costs by 40% - 46%26. Lighting accounts for 30% - 50% of a building's electric costs[27].

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- Occupancy sensors reduce lighting electric use by 43%
- Lighting accounts for 40% of a building's energy use

Calculation:

- To calculate the total energy savings, the amount of electricity used for lighting must first be calculated. The Primrose Hill Elementary School used 138,080 kWh of electricity in FY 2009. To determine the amount used specifically for lighting, multiply 138,080 by 0.4. To find the total energy savings, multiply the amount of electricity used for lighting by 0.43.
- 138,080kWh * 0.4 = 55,232 kWh
- 55,232kWh * 0.43 = 23,749.76 kWh total savings

### Lighting (Gym):

T5 fluorescent lights are approximately 51% more efficient than T12 fluorescent lights[28]. Additionally, the number of fixtures is being reduced from 20 to 12.

**26** http://www.focusonenergy.com/files/document_management_system/business_programs/occupancysensor_factsheet.pdf
**27** http://www.green.ca.gov/EPP/building/sensors.htm
**28** http://www.lightingsolutions.ca/index.php?option=com_content&view=article&id=25&Itemid=26

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)
- There are 2 light fixtures in the boiler room
- The original bulbs were 40W (standard T12 bulb[29])

Calculations:

- To determine the total kWh savings, the per-fixture savings must first be calculated. To calculate the per-fixture savings, the fixture's wattage is multiplied by the number of hours the fixture is on and then by 0.51 to account for the added efficiency of T5 bulbs. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings. However, to account for the reduction in fixtures, another calculation must be performed. This calculation finds the amount of energy saved by eliminating 8 fixtures. To calculate the savings from the 8 eliminated fixtures, multiply their wattage by the number of hours they would have been on and multiply the result by the number of fixtures that were eliminated. Add the savings from the more efficient fixtures to the savings on the eliminated fixtures to find the total savings.

Savings on 12 Remaining Fixtures

- (40W * 2160 hours) / 1000 = 86.4 kWh
- 86.4kWh * 0.51 = 44.06 kWh
- 44.06kWh * 12 fixtures = 528.72 kWh savings

Savings on 8 Eliminated Fixtures

- (40W * 2160 hours) / 1000 = 86.4 kWh
- 86.4kWh * 8 fixtures = 691.2 kWh savings

Total Savings

- 528.72kWh + 691.2kWh = 1,219.92 kWh total savings

### Lighting (Display Cases):

Replacing 32W T12 bulbs with 3W LED bulbs saves 29W per light.

Assumptions:

- The lights are on for 12 hours a day for 180 days (2160 hours)

Calculation:

- To determine the total kWh savings, the number of watts saved is multiplied by the number of hours the fixture is on. The per-fixture savings is multiplied by the number of fixtures to find the total energy savings.
- (29W * 8760 hours) / 1000 = 62.64 kWh
- 62.64kWh * 4 fixtures = 250.56 kWh total savings

## Sowams Elementary School

### Lighting (Gym)

Information Not Available

29 http://ecmweb.com/ops/electric_fluorescent_lamp_coming/

# Appendix C

## Recommended Energy Reduction Strategies – Municipal Buildings

Through the various energy audits and assessments that have been conducted for the Town, a number of recommended strategies have been identified. These strategies are referenced collectively in the Energy Plan as Strategy 1.1.1 and detailed here in Appendix C. The total estimated savings resulting from the implementation all of the recommended strategies for municipal buildings is 13,453 MMBTU, which translates to a 20% reduction from the FY 2009 baseline energy use, far exceeding the 10% goal that the Town has set for itself. It is important to note, however, that this estimated total does not take into account cascading—the likely effect of an energy improvement lessening the impact of an additional improvement. It is also based on conservative estimates of savings potential from each strategy (i.e. if it states 40%-46%, 43% was used). Additionally, some recommendations outlined below will require more information to estimate savings. This total does not include any potential savings from those strategies.

## Buildings[1]

### Town Hall (Baseline Energy Use: 2,095 MMBTU)

**Strategy:** Envelope Improvements

**Responsible Department:** Public Works

**Estimated Cost:** Dependent on scope of effort and type of insulation utilized

**Estimated Energy and GHG savings:** 5-10% of baseline energy use

**Financial Incentives:** Up to 20% off from National Grid

**Description of Strategy:** Add insulation in attic, basement, exterior walls, and around windows and doors; also replace windows and doors with Energy Star windows or with a window with plate glass glazing of U-value of .55 or less.

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**Strategy:** Control Improvements

**Responsible Department:** Public Works

**Estimated Cost:** $2,475.00

**Estimated Energy and GHG savings:** 3-7% of fuel usage

**Financial Incentives:** $375 from National Grid

**Description of Strategy:** Install boiler reset controls and programmable thermostats.

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1 Unless otherwise noted, the following strategies were identified by National Grid during their walk through "Energy Action Plan" audits of municipal buildings by Chris Fuller in March 2009, provided in hardcopy by Joe Piccerelli. Some recommendations from that report were removed due to an indication by municipal facilities officials that they were unlikely to implement them.

## Town Hall (continued)

**Strategy:** Existing Mechanical System Improvements

**Responsible Department:** Public Works

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** Insulating the hot water heater should increase efficiency to the 90-95% range[2]

**Financial Incentives:** $1.50 off per linear foot of pipe insulation

**Description of Strategy:** Install pre-split high density fiberglass insulation on the currently uninsulated domestic hot water, process, and heating pipes. The National Grid Energy Action Plan[3] for the Library did not provide an estimated cost for this measure.

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**Strategy:** New Mechanical Systems—High Efficiency Heating >92% Gas Furnace

**Responsible Department:** Public Works

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 10-15% of heating related gas usage

**Financial Incentives:** $300 - $500 from National Grid, depending on size

**Description of Strategy:** Replace current furnace with a high efficiency gas fired furnace that operates above a 92% Annual Fuel Utilization Efficiency (AFUE).

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**Strategy:** New Mechanical Systems—On-Demand Tankless Water Heater

**Responsible Department:** Public Works

**Estimated Cost:** $3,000

**Estimated Energy and GHG savings:** 8-14% (for buildings using more than about 85 gallons of hot water/day); 24-34% (for buildings using less than 41 gallons of hot water/day); if installed for each hot water outlet, a tankless heater can be 27-54% more efficient[4].

**Financial Incentives:** $500.00 from National Grid

**Description of Strategy:** Replace existing domestic hot water heating system at the end of its life with an efficient, on-demand tankless system which only produces hot water when needed. Incentives apply to on-demand tankless heaters with an Energy Factor of .82 or higher with an electronic ignition.

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## Library (Baseline Energy Use: 3,653 MMBTU)

**Strategy:** Existing Mechanical System Improvements

**Responsible Department:** Public Works

**Estimated Cost:** To be determined

2 (page 19) "Energy Efficiency Engineering Analysis Report." [Report for the Town of Barrington, RI, Public Safety Complex 100 Federal Road, Barrington, RI]. Compiled by Roger S. Harris and Richard P. Galipeau, Gaskell Associates. April 5, 2010. PDF (from Joe Piccerelli).

3 "Energy Action Plan." [Recommendations prepared for the Town of Barrington, RI, Public Library]. Compiled by Chris Fuller on behalf of National Grid. March 20, 2009. PDF (from Joe Piccerelli). (Public Library Energy Action Plan 2009)

4 http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=12820 and http://www.energycode.com/?page_id=238

**Estimated Energy and GHG savings:** Insulating the hot water system should allow for a 90-95% efficiency improvement[5]

**Financial Incentives:** $1.50 off per linear foot of pipe insulation

**Description of Strategy:** Install pre-split high density fiberglass insulation to uninsulated domestic hot water, process, and heating pipes.

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## Public Works (Baseline Energy Use: 1,485 MMBTU)

**Strategy:** Programmable Thermostats

**Responsible Department:** Public Works

**Estimated Cost:** $675 ($550 net)

**Estimated Energy and GHG savings:** 62 MMBTU annually approximately $1,806

**Financial Incentives:** Up to $125 or 19% off from National Grid for up to 5 digital programmable thermostats

**Description of Strategy:** Adjust the heat timer control to a lower reset curve to match the heating equipment's scheduled entering water temperature of 180 degrees on a design day.

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## Public Safety[7] (Baseline Energy Use: 5,074 MMBTU)

**Strategy:** Insulate Ceiling

**Responsible Department:** Public Works

**Estimated Cost:** $15,000

**Estimated Energy and GHG savings:** 10% of facility baseline natural gas use

**Financial Incentives:** Up to 20% off from National Grid

**Description of Strategy:** Install insulation above the Apparatus Room ceiling with 2-3" of blown fiberglass or cellulose insulation, or fire retardant treated icynene insulation.

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**Strategy:** Adjust Heat Timer Control

**Responsible Department:** Public Works

**Estimated Cost:** $150

**Estimated Energy and GHG savings:** 1% of facility baseline natural gas use

**Financial Incentives:** To be determined

**Description of Strategy:** Adjust the heat timer control to a lower reset curve to match the heating equipment's scheduled entering water temperature of 180 degrees on a design day.

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5 "Energy Efficiency Engineering Analysis Report." [Report for the Town of Barrington, RI, Public Safety Complex 100 Federal Road, Barrington, RI]. Compiled by Roger S. Harris and Richard P. Galipeau, Gaskell Associates. April 5, 2010. PDF (from Joe Piccerelli).

6 EPA Savings Calculator set for Providence: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=TH

7 All of the recommendations for the Public Safety Building were provided through Gaskell; it is our understanding that these strategies have not been implemented to date. "Energy Efficiency Engineering Analysis Report." [Report for the Town of Barrington, RI, Public Safety Complex 100 Federal Road, Barrington, RI]. Compiled by Roger S. Harris and Richard P. Galipeau, Gaskell Associates. April 5, 2010. PDF (from Joe Piccerelli). (Gaskell 2010)

**Strategy:** Hot Water System

**Responsible Department:** Public Works

**Estimated Cost:** $9,000

**Estimated Energy and GHG savings:** 3% of facility baseline natural gas use

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Replace the current domestic hot water tank, which is oversized for the building's actual load, with an appropriately sized high efficiency domestic hot water system that would improve the system's efficiency by approximately 30%.

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**Strategy:** Boiler System Replacement

**Responsible Department:** Public Works

**Estimated Cost:** $75,000

**Estimated Energy and GHG savings:** 12% of facility baseline natural gas use

**Financial Incentives:** Up to 6% off from National Grid

**Description of Strategy:** Install three high efficiency condensing boilers fueled by natural gas to replace existing boilers.

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**Strategy:** Demand Controlled Ventilation (DCV)

**Responsible Department:** Public Works

**Estimated Cost:** $31,000

**Estimated Energy and GHG savings:** 3% of facility baseline electricity use and 25% of baseline natural gas use

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Install a DCV system, with proper controls for unoccupied ventilated areas for appropriate sections of the building. Associated upgrades include the installation of carbon dioxide sensors to allow vacant rooms to have little or no ventilation via adjustment of the AHU air flow rates and VAV.

---

**Strategy:** Energy Recovery Ventilation (ERV)

**Responsible Department:** Public Works

**Estimated Cost:** $70,000

**Estimated Energy and GHG savings:** 30% of facility baseline natural gas energy use

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Install an ERV unit to take the exhaust fan generated exhaust air and pass it through to an air to air exchanger to recover about 65 percent of the heat in pre-heating of incoming air. This strategy lowers the operating cost for the ventilation heating and cooling coil source, among other benefits.

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## High School[8] (Baseline Energy Use: 14,114 MMBTU)

### Short-Term

**Strategy:** Whole Building Assessment

**Responsible Department:** School Facilities

**Estimated Cost:** Free

**Estimated Energy and GHG savings:** To be determined

**Timeline for implementation:** In progress

**Financial Incentives:** N/A

**Description of Strategy:** The utility hired a consultant to do a walk-through audit and provide energy-saving recommendations for the facility, focusing on those which National Grid offers incentives for. This will be similar to the report conducted for the Public Works building.

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**Strategy:** Lighting Retrofit (woodshop)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 1.15% of building's baseline electricity use (saves approximately 11,578 kWh total)

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Switch out 20 lights from 300W high pressure mercury vapor fixtures to T5.

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**Strategy:** Lighting Retrofit (kitchen)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 346 kWh or 0.3% of building's baseline electricity use

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Switch out 20 lights from T12 fixtures to T8 fixtures

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**Strategy:** Lighting Retrofit (display cases)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 0.47% of baseline electricity use (4,666 kWh savings total)

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

8 All of the recommendations for the Schools were provided directly from conversations with Skip Learned, Facilities Manager for the Town of Barrington, School Department.

**Description of Strategy:** Switch out lighting in 10 cases (3-4 lights in each) from 75W incandescent to LEDs. LED fixtures in display cases are usually 3W, so the switch saves 72W per light, or approximately 216W per case assuming 3 lights in each case. Total savings for the whole school would be approximately 2,160W (all 10 cases).

---

**Strategy:** Demand Control Ventilation (DCV) (auditorium)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 3% of baseline electricity use and 25% of baseline natural gas use[9]

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Install a DCV system, with proper controls for unoccupied ventilated areas for appropriate sections of the building. Associated upgrades include installing software controls and carbon dioxide sensors to allow vacant rooms to have little or no ventilation via adjustment of the AHU air flow rates and VAV.

---

## Long-Term

**Strategy:** Boiler System Replacement

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 25% of baseline facility energy use

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Upgrading from conventional gas boilers to condensing gas boilers saves 15-35% in MMBTU[10], and using the average of that range, it is assumed that the switch would result in 25% energy savings.

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**Strategy:** Upgrade Refrigeration

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** kWh savings will be equal to approximately 35% of current refrigerator/freezer consumption

**Financial Incentives:** To be determined

**Description of Strategy:** Upgrade 2 walk-in coolers to more efficient appliances. Energy Star-rated commercial refrigerators and freezers are estimated to be 35% more efficient than non-Energy Star models.[11]

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**9** Gaskell 2010
**10** Public Library Energy Action Plan 2009
**11** Energy Star: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=CRF

## Middle School (Baseline Energy Use: 10,051 MMBTU)

### Short Term

**Strategy:** Lighting Retrofit (gym)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** Savings of 13,789 kWh or 1.5% of building's baseline electricity use

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Replace 24 320W pulse start bulbs with T5 light fixtures.

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**Strategy:** Lighting Retrofit (3 rooms)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** Savings of 518 kWh or 0.05% of baseline electricity use

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Change approximately 30 lights in three rooms from T12 to T8 fixtures.

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**Strategy:** Lighting Occupancy Sensors (entire building)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 17% savings off of baseline electricity use

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Occupancy sensors improve lighting efficiency by 40 – 46% in schools. Based on the assumption that lighting consumes 40% of building electricity on average, and using the average of 40% and 46% to arrive at a 43% savings potential, installing occupancy sensors results in approximately 17% savings (40% * 43% = 17.2%).

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### Long Term

**Strategy:** Demand Controlled Ventilation (DCV) (auditorium)

**Responsible Department:** School Facilities

**Estimated Cost:** Sensors typically cost about $250 to $260 each, uninstalled. For a new system, the installed cost will generally be about $600 to $700 per zone[12].

**Estimated Energy and GHG savings:** 25-60% total savings from baseline energy use. The potential of $CO_2$-based DCV for operational energy savings has been estimated in the literature at from $0.05 to more than $1 per square foot annually[13].

12 https://www1.eere.energy.gov/femp/pdfs/fta_co2.pdf
13 https://www1.eere.energy.gov/femp/pdfs/fta_co2.pdf

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Install a DCV system, with proper controls for unoccupied ventilated areas for appropriate sections of the school. Associated upgrades include the installation of carbon dioxide sensors to allow vacant rooms to have little or no ventilation via adjustment of the AHU air flow rates and VAV. Based on utility company savings estimates of 3% of baseline electricity use and 25% of baseline heating fuel for municipal buildings[14], and other DCV energy savings estimates that are calculated to be as high as 60 percent for spaces that are lightly used but designed for large numbers of people (for example, gymnasiums)[15], the school should expect 25-60% energy savings.

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## Primrose Hill (Baseline Energy Use: 3,351 MMBTU)

### Short Term

**Strategy:** Lighting Retrofit (Outdoor fixtures)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 10,886 kWh savings or 7.9% of baselines electricity use

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Upgrade approximately 24 250W high pressure sodium outdoor lights to fluorescents. The average T12 light is 40W, so approximately 210 watts per fixture could be saved.

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**Strategy:** Lighting Retrofit (classrooms)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Install dual purpose occupancy sensors (motion and sound). Occupancy sensors improve lighting efficiency by 40 – 46% in schools.

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### Long Term

**Strategy:** Boiler System Replacement

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 25% of baseline facility energy use

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

14 (Gaskell 2010)
15 http://www.oregon.gov/ENERGY/CONS/BUS/DCV/DCVowners.shtml

**Description of Strategy:** Upgrading from conventional gas boilers to condensing gas boilers can save 15-35% in MMBTU.[16] Without knowing the size of the boiler system, and using the average of the range of savings, there is a 25% energy savings potential between the two systems

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**Strategy:** Occupancy Sensors for Ventilation

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Install occupancy sensors on all unit ventilators. HVAC occupancy sensors are often included as part of a set of energy efficiency measures, and energy savings directly resulting from the occupancy sensors have not been calculated. For example, occupancy sensors are often installed in conjunction with demand-controlled ventilation systems which have been shown to improve efficiency by up to 60%[17].

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## Nayatt School (Baseline Energy Use: 2,677 MMBTU)

### Short Term

**Strategy:** Boiler System Replacement

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 25% of baseline energy use

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Upgrading from conventional gas boilers to condensing gas boilers can save 15-35% in MMBTU.[18] Without knowing the size of the boiler system, and using the average of the range of savings, there is a 25% energy savings potential between the two systems

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**Strategy:** Lighting Retrofit (outdoor fixtures)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined based on fixture/ballast selection, but likely to be a minimum savings of approximately 9,000 kWh or 9% of baseline electricity use.

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Upgrade approximately 24 250W high pressure sodium (HPS) outdoor lights to fluorescent fixtures. The savings will depend on the wattage of the fluorescents because while many HPS and fluorescents have approximately equal efficiency, the fluorescent will have a lower wattage which will result in net energy savings.

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16 Public Library Energy Action Plan 2009
17 http://www.oregon.gov/ENERGY/CONS/BUS/DCV/DCVowners.shtml
18 Public Library Energy Action Plan 2009

### Long Term

**Strategy:** Occupancy Sensors for Ventilation

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Install occupancy sensors on all unit ventilators. HVAC occupancy sensors are often included as part of a set in of energy efficiency measures; for example, occupancy sensors are often installed in conjunction with demand-controlled ventilation systems which have been shown to improve efficiency by up to 60%[19]. The energy savings directly resulting from the occupancy sensors have not been calculated for this measure.

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## Hampden Meadows Elementary School (Baseline Energy Use: 3,980 MMBTU)

### Short Term

**Strategy:** Lighting Retrofit (boiler room)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined based on number of fixtures selected but an
estimated savings of 17 kWh annually per fixture.

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Switch from T12 to T8 lighting fixtures.

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**Strategy:** Lighting Retrofit (outdoor fixtures)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined based on fixture/ballast selection, but likely to be
a minimum savings of approximately 6,500 kWh or 3% of baseline electric use.

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Upgrade approximately 16 250W high pressure sodium (HPS) outdoor lights to fluorescent fixtures. The savings will depend on the wattage of the fluorescents because while many HPS and fluorescents have approximately equal efficiency, the fluorescent will have a lower wattage which will result in net energy savings.

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**Strategy:** Lighting Retrofit (display cases)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined



19 http://www.oregon.gov/ENERGY/CONS/BUS/DCV/DCVowners.shtml

**Estimated Energy and GHG savings:** 1,050 kWh or 0.5% of baseline electricity use

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Switch out lighting in approximately 6 cases (3-4 lights in each) from incandescent bulbs to LEDs. LED fixtures in display cases are usually 3W. Assuming the current bulbs are 30W incandescents and 3 bulbs per case, there would be a savings of 1,050 kWh or 0.5% of the baseline electricity use.

### Long Term

**Strategy:** Occupancy Sensors for Ventilation

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

**Financial Incentives:** National Grid Efficiency Program Incentive may apply but has not been quoted.

**Description of Strategy:** Install occupancy sensors on all unit ventilators. HVAC occupancy sensors are often included as part of a set in of energy efficiency measures and therefore, energy savings directly resulting from the occupancy sensors have not been calculated. For example, occupancy sensors are often installed in conjunction with demand-controlled ventilation systems which have been shown to improve efficiency by up to 60%[20].

## Sowams Elementary School (Baseline Energy Use: 2,674 MMBTU)

### Short Term

**Strategy:** Lighting Occupancy Sensors (gym)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Occupancy sensors improve lighting efficiency in the gym by 40 – 46%.

**Strategy:** Lighting Retrofit (outdoor fixtures)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined depending on fluorescent light selection, but can estimate a minimum savings of approximately 6,500 kWh or 5.6% of baseline electricity use.

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

20 http://www.oregon.gov/ENERGY/CONS/BUS/DCV/DCVowners.shtml

**Description of Strategy:** Upgrade approximately 16 250W high pressure sodium (HPS) outdoor lights to fluorescent fixtures. The savings will depend on the wattage of the fluorescents because while many HPS and fluorescents have approximately equal efficiency, the fluorescent will have a lower wattage which will result in net energy savings.

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**Strategy:** Lighting Retrofit (kitchen)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** To be determined based on number of fixtures selected but an
estimated savings of 17 kWh annually per fixture.

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Change lights from T12 to T8 fixtures.

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**Strategy:** Occupancy Sensors (entire building)

**Responsible Department:** School Facilities

**Estimated Cost:** To be determined

**Estimated Energy and GHG savings:** 17% savings off of baseline electricity use (for lighting); unknown savings from ventilation sensors

**Financial Incentives:** National Grid Lighting and Controls Incentive Program may apply, but not yet quoted.

**Description of Strategy:** Install occupancy sensors for lighting and on all unit ventilators for heating. Occupancy sensors improve lighting efficiency by 40 – 46% in schools. Based on the assumption that lighting consumes 40% of building electricity on average, and using the average of 40% and 46% to arrive at a 43% savings potential, installing occupancy sensors results in approximately 17% savings (40% * 43% = 17.2%). HVAC occupancy sensors are often included as part of a set in of energy efficiency measures; for example, occupancy sensors are often installed in conjunction with demand-controlled ventilation systems which have been shown to improve efficiency by up to 60%21. The energy savings directly resulting from the heating unit occupancy sensors have not been calculated for this measure.

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**21** http://www.oregon.gov/ENERGY/CONS/BUS/DCV/DCVowners.shtml

# Appendix D

## Funding Resources

There are a number of resources available to implement the various energy reduction strategies highlighted in the Strategic Energy Plan. Many of the utility sponsored incentive programs are listed with the municipal building strategies in **Appendix C**. The available utility incentives for the community are provided in **Appendix E**. This section of the Energy Plan specifically outlines some of the additional funding sources available for local government energy and sustainability programs from other entities, primarily state and federal agencies. Please note that some of the information in this section is dated and only relevant to the timeframe in which this plan was developed Summer 2010. The list is provided as a general resource for informational purposes only and is not an exhaustive list nor does it intend to promote any program over another.

### Federal

#### HUD Sustainable Communities

The HUD (Department of Housing and Urban Development) Sustainable Communities Planning Grant was established to encourage regional planning efforts that integrate housing and transportation decisions and promote more sustainable communities. One hundred million dollars will be available through this grant program for regional initiatives. As of the date of this Plan, this solicitation is open, but Eligibility for this program is limited to multi-jurisdictional or multi-sector partnerships. Therefore, Barrington might consider joining with a regional entity to apply for this opportunity.

#### HUD-DOT Community Challenge Grants

A joint program of HUD and the Department of Transportation (DOT), the Community Challenge Grant program's goal is to promote sustainability at the community level by supporting initiatives such as mixed-use development, affordable housing, and the reuse of older buildings and structures for new purposes.

#### EPA Climate Showcase Communities Grant

The Climate Showcase Communities Program provides funding for planning, demonstration, and/or implementation projects designed to address climate change by reducing GHG emissions. The program seeks to implement innovative programs which demonstrate quantifiable reductions in GHG emissions and are replicable elsewhere in the country. For the 2009 and 2010 programs, EPA made $100,000-$500,000 of funding available per project. A 50% match is required, which may include in kind support. This is a highly competitive program.

### EPA Community Action for a Renewed Environment

CARE is a unique community based, community-driven, multimedia demonstration program designed to help communities understand and reduce risks due to toxic pollutants and environmental concerns from all sources. The CARE grant program works with the eligible entities to help their communities form collaborative partnerships, develop an understanding of the many local sources of toxic pollutants and environmental risks, set priorities, and identify and carry out projects to reduce risks through collaborative action at the local level. CARE's long-term goal is to help communities build self-sustaining, community-based partnerships that will continue to improve human health and local environments into the future. This opportunity is typically offered on an annual basis.

## State

### State Energy Program

The Rhode Island State Energy Program (SEP), administered through the Rhode Island Office of Economic Recovery and Reinvestment, receives funding from the U.S. Department of Energy to support activities that will:

- increase energy efficiency to reduce energy costs and consumption for consumers, businesses and government
- reduce reliance on imported energy
- improve the reliability of electricity and fuel supply and the delivery of energy services
- reduce the impacts of energy production and use on the environment.[1]

The SEP is likely to release solicitations for funding projects similar to those outlined in the Strategic Energy Plan.

### Renewable Energy Fund

The East Bay Energy Consortium, a group of cities and towns of the East Bay region of Rhode Island, received funding through the Renewable Energy Fund to exam the feasibility of a community scale wind project. They are currently examining multiple sites within the East Bay that could accommodate utility scale wind turbine. This effort is funded in conjunction with the Rhode Island Foundation.

Additional funding may be available to Barrington through the Renewable Energy Fund for:

- Business, commercial, and institutional projects
- Affordable housing developments
- Municipal renewable energy projects
- Technical and feasibility studies

## Private

### The Rhode Island Foundation

The Rhode Island Foundation is focused on six sectors for their Strategy Grant program. Under the Environment Sector the primary goal is to maximize the conservation, restoration, and stewardship of Rhode Island's natural resources, and support local opportunities to address climate change. They have targeted the promotion of energy conservation and renewable energy as a top priority. Barrington could engage this foundation on opportunities to develop community based programs.



1 Rhode Island Office of Recovery and Reinvestment: http://www.recovery.ri.gov/programs/energy/SEP.php

# Appendix E

## Incentive Programs for the Community

There are a number of incentive programs available to Barrington's residents and businesses. Eligibility and funding are both dependent on the type of project as well as the availability of funding. At any given time, there are a number of programs available for energy efficiency and conservation projects, it is important to check these program sites frequently to learn of new opportunities. Many of the programs highlighted in this section have established end dates and others end once the funding has been exhausted. The list is provided as a general resource for informational purposes only and is not an exhaustive list nor does it intend to promote any program over another.

### National Grid Programs

National Grid offers a variety of incentive programs for energy efficiency and demand reduction efforts. Programs are available to residential, commercial, and municipal customers. Many incentives are tailored to the specific project, so customers should contact National Grid directly with questions. To qualify for incentives, many projects must be pre-approved, so always check with National Grid before beginning any energy efficiency or conservation project.

### Residential Programs

#### Rhode Island Gas Efficiency

The Rhode Island Gas Efficiency Program allows residential customers to receive a free in-home energy audit and rebates on subsequent weatherization and/or air sealing. Rebates are also available for solar hot water systems; these rebates are 15% of cost (up to $1,500). National Grid recommends that anyone building a new home consider Energy Star qualification. Energy Star is a federal program run by the Environmental Protection Agency. In addition to their home appliance rating system, Energy Star offers a number of programs and incentives to encourage energy efficiency in both new construction and renovation projects.

**Table E-1**

| PROGRAM | INCENTIVE | WEBSITE | TELEPHONE |
|---|---|---|---|
| **In-Home Energy Audit** | Free | https://www.powerofaction.com/rireenergywise/ | 888.633.7947 |
| **Weatherization** | 15% (up to $1,500) | Not available | 888.633.7947 |
| **Air Sealing** | 100% (up to $750) | Not available | 888.633.7947 |
| **Solar Hot Water** | 15% (up to $1,500) | https://www.powerofaction.com/media/pdf/solar.pdf | 800.292.2032 |
| **Energy Star (New Construction)** | Varies | Not available | 800.887.8841 |

## Rhode Island Electric Efficiency

The Rhode Island Electric Efficiency Program offers a number of incentives for residential customers to reduce their individual need for electricity while also lowering their electric bills. National Grid offers free, in-home energy audits of electricity use and provides recommended actions to improve the home's efficiency. National Grid will pick up any second refrigerator or freezer for free and the customer will receive a rebate. In addition to the 2nd refrigerator or freezer turn-in program, National Grid offers rebates on a number of Energy Star appliances and home electronics. Additionally, customers can purchase certain electronics, such as compact fluorescent light bulbs and smart power strips, at a reduced price through National Grid's online store or at participating retailers. Customers who have a system check-up performed on their central air conditioning and heat pump receive an instant rebate on the check-up. Rebates are also available for the purchase of central air conditioning and heat pumps and vary depending on the system's size and specifications. National Grid also provides rebates on certain swimming pool pumps, oil heating systems and room air cleaners. These rebates vary based on the model and specifications. For income-eligible customers, National Grid offers an Appliance Management Program designed to replace inefficient models with more efficient models to reduce the electricity bills of low-income customers.

### Table E-2

| PROGRAM | INCENTIVE | WEBSITE | TELEPHONE |
|---|---|---|---|
| **Second Refrigerator or Freezer Turn-In** | Free Pick up and $50 rebate | https://jacoinc.net/weborder/rebatex.aspx?ProgramID=57 | 877.545.4113 |
| **Central Air Conditioning and Heat Pump System Check-up Instant Credit** | $100 rebate | Not available | 877.333.8153 |
| **Central Air Conditioning and Heat Pump System: New Equipment** | $300 - $500 | https://www.powerofaction.com/media/pdf/MA-RI_COOL-SMART.pdf | Not available |
| **Appliance Management Program** | Varies | Not available | 401.574.9100, Option 7 |
| **Energy Star Refrigerators and Freezers Rebate** | $50 | https://www.powerofaction.com/media/pdf/RI_Fridge_Rbt10.pdf | Not available |
| **Smart Power Strips and CFL Light Bulbs** | Varies | http://www.energyfederation.org/cal/default.php | 800.473.9150 |
| **Energy Star Monitor and/or Desktop Computer Rebate** | $10 - $20 | https://www.powerofaction.com/media/pdf/RI_Monitor_Rbt10.pdf | Not available |
| **Oil Heating Systems** | $200 | https://www.powerofaction.com/media/pdf/ri_oilheat.pdf | 886.915.9941 |
| **Swimming Pool Pumps** | $150 - $400 | https://www.powerofaction.com/media/pdf/RI_PoolPump_Rbt10.pdf | Not available |
| **Room Air Cleaners** | $20 | https://www.powerofaction.com/media/pdf/RI_AirCleaner_Rbt10.pdf | Not available |

## Commercial Programs

In addition to the incentives National Grid offers residential customers, there are energy efficiency and conservation incentives available to both large and small commercial customers.

As a Large Business customer, facilities have access to a number of incentive programs. Commercial, industrial, institutional, educational and municipal buildings are eligible for the Large Business Programs. For existing buildings and for new construction, which includes major renovations and replacing failed equipment, National Grid offers lighting, HVAC, motors, compressed air and variable speed drives programs. If the proposed project does not fit into one of these categories, a Custom Projects Program is also available. For companies interested in energy services, National Grid offers assistance with services such as technical assistance, turnkey services, retro-commissioning and lamp and ballast recycling. National Grid also offers a buyers alliance as well as financing for certain projects. The Energy Solutions Service Office is available to answer questions and help develop a program to suit each business' needs.

Small Business customers performing lighting upgrades, installing energy efficient time clocks, photo cells for outdoor lighting, occupancy sensors or programmable thermostats and/or upgrading walk-in coolers can receive assistance from National Grid. Generally, National Grid will pay up to 70% of the installation cost and allows customers to finance the remaining 30% through their utility bill interest free for 2 years.

### Table E-3

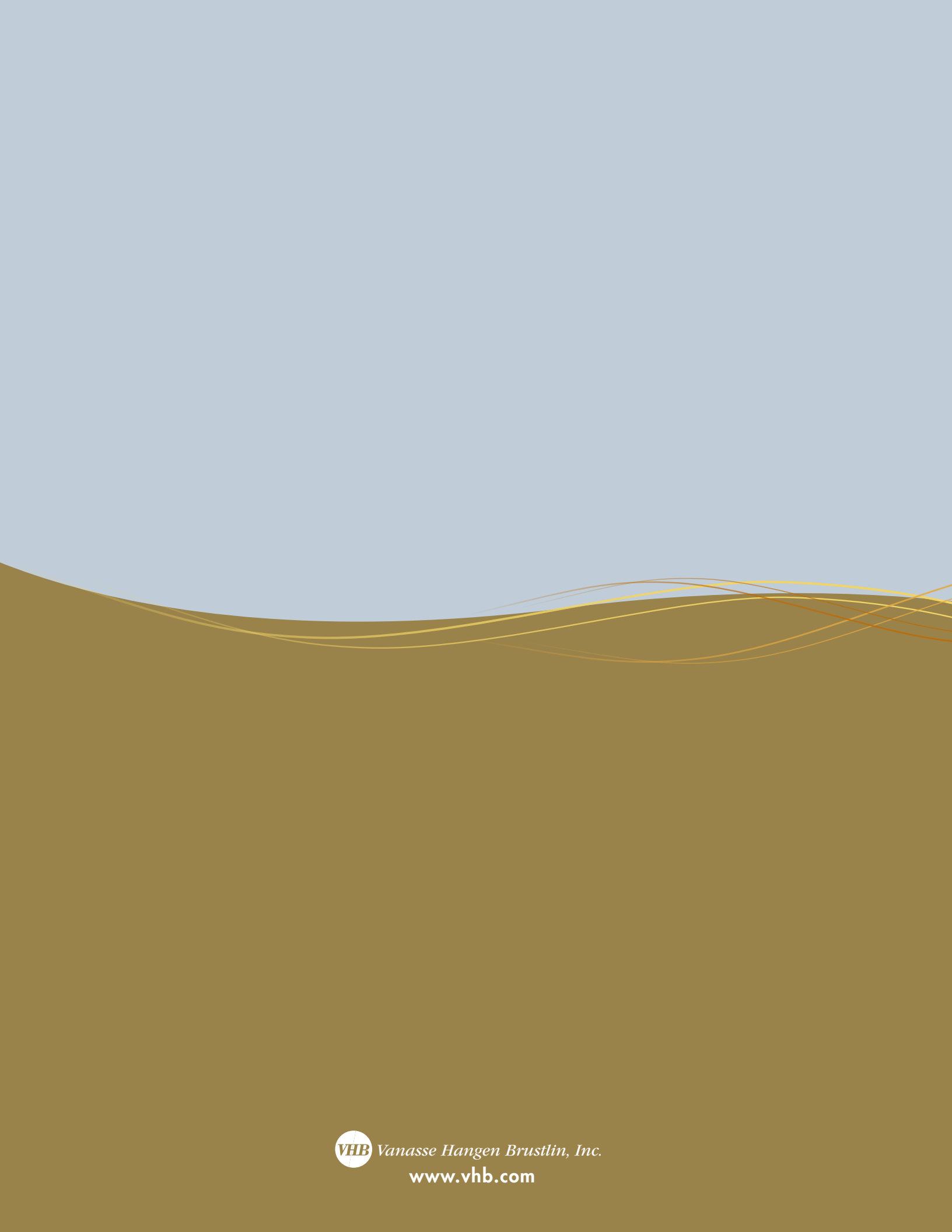
| PROGRAM | WEBSITE | TELEPHONE |
|---|---|---|
| **Small Business Program** | www.thinksmartgreen.com/smallbusiness | 800.332.3333 |

## Clean Energy Programs

In addition to participating in the GreenUp program, many clean energy companies offer other programs to promote renewable sources. Generally, customers can sign up for these programs online, by calling customer service or through their utility. Once enrolled, the cost of the program is automatically added to the customer's bill each month. Sterling Planet and Community Energy offer Renewable Energy Certificates and carbon offsets to individuals and businesses to offset their personal environmental impact. Sterling Planet offers a number of other programs to help the community decrease its environmental impact including assisting with onsite solar and other renewable energy projects. Sterling Planet works with a large number of governments to green their communities and may be a good resource for the Town of Barrington.

### Table E-4

| COMPANY | WEBSITE | TELEPHONE NUMBER |
|---|---|---|
| **Sterling Planet** | www.sterlingplanet.com | 877.457.2306 |
| **Community Energy** | www.communityenergyinc.com | 866.WIND.123 |
| **People's Power and Light** | www.ripower.org | 401.861.6111 |


VHB
Vanasse Hangen Brustlin, Inc.
www.vhb.com