

**MILFORD BOARD OF EDUCATION  
MILFORD PUBLIC SCHOOL  
ENERGY ASSESSMENT**

**for**

**NEW JERSEY  
BOARD OF PUBLIC UTILITIES**

**CHA PROJECT NO. 25130**

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## **REPORT DISCLAIMER**

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within  $\pm 20\%$ , and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the facility was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing facility staff and spot measurements taken in the field.

## 1.0 EXECUTIVE SUMMARY

The Milford Board of Education recently engaged CHA to perform an energy audit in connection with the New Jersey Board of Public Utilities' Local Government Energy Audit Program. This report details the results of the energy audit conducted for:

Building Name	Address	Square Feet	Construction Date
Milford Public School	7 Hillside Ave Milford, NJ 08848	22,000	Original: 1923

The Energy Conservation Measures (ECMs) identified in this report will allow for a more efficient use of energy and if pursued have the opportunity to qualify for the New Jersey SmartStart Buildings Program. Potential annual savings of \$6,400 for the recommended ECMs may be realized with a combined payback of 3.5 years. A summary of the costs, savings, and paybacks for the recommended ECMs follows:

Summary of Energy Conservation Measures							
Energy Conservation Measure		Approx. Costs (\$)	Approx. Savings (\$/year)	Payback (Years) w/o Incentive	Potential Incentive (\$)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	Upgrade Attic Insulation	5,000	2,400	2	0	2	X
ECM-2	Window Replacement with Reduced Glazing	78,000	900	>20	0	>20	
ECM-3	Upgrade Heating System	638,000	-5,500	-116	0	-116	
ECM-4	Install Univent Occupancy Sensors	1,000	4	>20	0	>20	
ECM-5	Install Walk In Cooler Controls	15,000	200	>20	0	>20	
ECM-6	Lighting Replacement/Upgrade	13,000	1,900	7	0	7	
ECM-7	Lighting Controls	7,000	2,500	3	900	2	
ECM-8	Lighting Replacements with Controls	20,000	4,000	5	900	5	X

\* Incentive shown is the maximum amount potentially available per the NJ SmartStart Programs.

## **2.0 INTRODUCTION AND BACKGROUND**

New Jersey's Clean Energy Program, funded by the New Jersey Board of Public Utilities, supports energy efficiency and sustainability for Municipal and Local Government Energy Audits. Through the support of a utility trust fund, New Jersey is able to assist state and local authorities in reducing energy consumption while increasing comfort.

The Milford Public School is a 22,000 square foot building consisting of 2 floors. The original building was constructed in the 1920's with an 8,000 square foot addition of classrooms, gym, pre-K space and warming kitchen in the 1950's. The school includes the following spaces: classrooms, offices, multi-purpose room, warming kitchen, storage, toilet rooms. The school hours of operation are from 8:00 AM – 6:00 PM Monday through Friday, with various after-school activities and Saturdays 8:00AM to 3:00PM. The school has approximately 131 students and 30 faculty and staff members. The school has approximately 100 computers.

### **3.0 EXISTING CONDITIONS**

#### **3.1 Building - General**

The original building and addition are built of concrete masonry block with brick veneer. The interior walls are block walls with painted plaster. There is currently no insulation in the walls of the original school or the addition.

Windows throughout the school building are replacement custom double pane glazing with operable portions. The windows seem to be in good condition; however there are “plexi-glass” filler panels used at both the unit ventilator intakes and the window air conditioners. The amount of glazing appears to be excessive for the classrooms. The doors were installed at the same time as the windows. They are in fair condition as well.

The roof on the original section of the school is a wood framed pitched with asphalt shingles and 3.5 inches of blown in cellulose insulation. The roof on the addition is a single ply rubber membrane type with rigid foam board insulation. The roof appears to be in good condition.



### 3.2 Utility Usage

Utilities include electricity, #2 fuel oil, and potable water. Electricity is delivered by JCP&L and supplied by SJE. Oil is delivered and supplied by Allied Oil LLC. See Appendix A for a detailed utility analysis.

The school has one electric meter. For the 12-month period ranging from September 2011 through August 2012, the utilities usage for the building was as follows:

#### Actual Cost & Site Usage by Utility

<b>Electric</b>		
Annual Usage	117,600	kWh/yr.
Annual Cost	18,607	\$
Blended Rate	0.16	\$/kWh
Supply Rate	0.13	\$/kWh
Demand Rate	5.91	\$/kW
Peak Demand	68.5	kW
Min. Demand	36.0	kW
Avg. Demand	55.0	kW
<b># 2 Fuel Oil</b>		
Annual Usage	8,562	gals/yr.
Annual Cost	28,024	\$
Rate	3.27	\$/gal

#### Annual Cost & Site Energy Usage

Electrical usage was generally higher in the summer months when air conditioning equipment was operational. Fuel oil consumption was highest in winter months for heating.

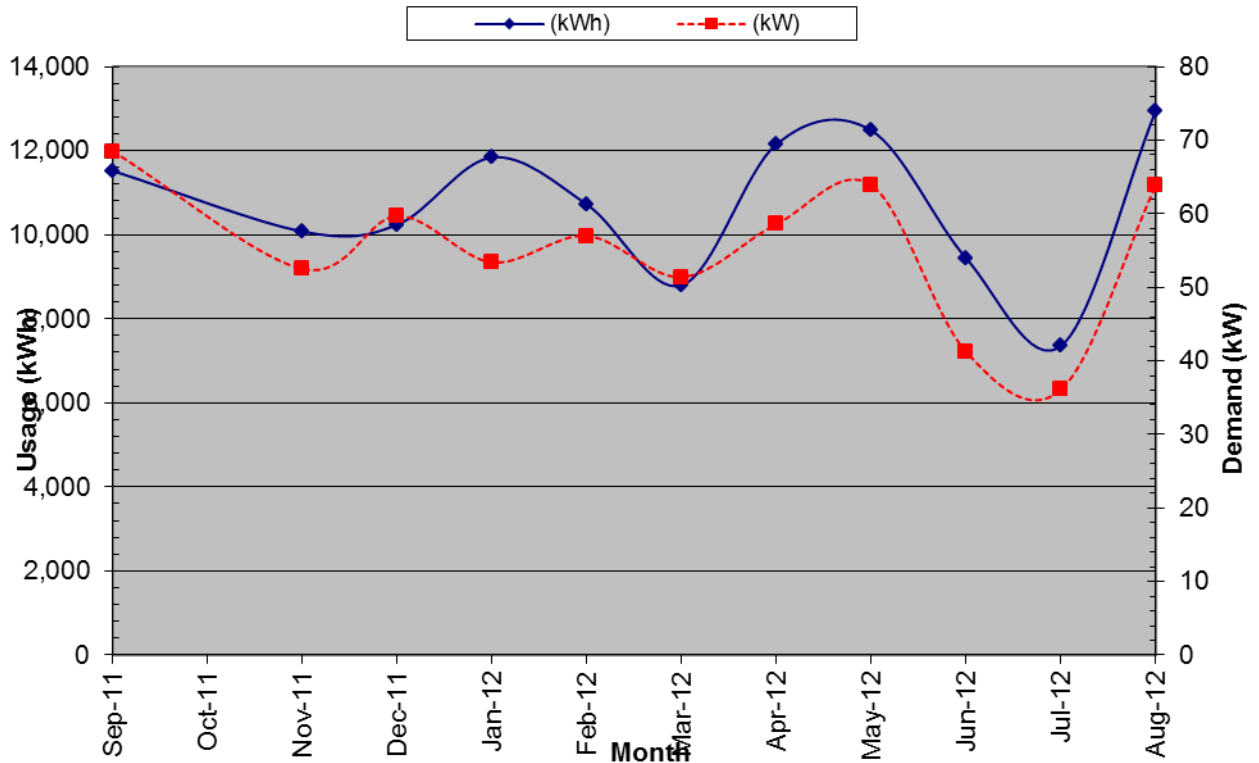
The delivery component of the electric and fuel oil bills will always be the responsibility of the utility that connects the facility to the power grid; however, the supply can be purchased from a third party; as is currently the case with electricity. The electricity commodity supply entity will require submission of one to three years of past energy bills. Contract terms can vary among suppliers.

The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis. See appendix A for further end use information.





### Electric Usage - Milford Public School



### 3.3 HVAC Systems

Two HB Smith oil fired low pressure steam boilers having 10.4 gallon/hour oil burners provide steam to the majority of the classroom unit ventilators, fin tube radiation and also to a steam to hot water heat exchanger in the boiler room. The one boiler was upgraded in 1985 and the other in 2005, both appear to be in good condition. The condensate system consists of a small duplex tank with two 1/3 hp pump motors.

The lower section of the 1920 building uses a steam to hot water heat exchanger and circulated hot water for heating. The hot water is circulated by a 3/4 hp pump to coils in the classroom unit ventilators and sections of fin tube radiation located in the first floor of the 1920 section only.

The remainder of the original school and the addition are heated directly with steam using unit ventilators and steam fin-tube radiation.

The rooms of the school are individually cooled by 30,000 Btu window units most of which are Energy Star rated and manually controlled by staff.

The pre K area has an older model GE 48,000 Btu window unit which appears to be in very good working condition

Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

### 3.3.7 Exhaust Systems

The primary source of ventilation is through the classroom unit ventilators. There are no central heating/ ventilation units used.

The multipurpose room has two large roof mounted exhaust fans. The fans are manually controlled on/off by staff on an as needed basis.

The toilet room exhaust systems are also roof mounted and manually controlled by staff. The fans are typically on at 6 am and off at 3 pm Monday thru Friday.

The warming kitchen is provided with an exhaust fan as well which is also manually controlled.

Specifics on mechanical equipment can be found within the equipment inventory located in Appendix B.

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## 3.4 Control Systems

The temperature controls for the heating system and window A/C units are a combination of pneumatic and several time clocks.

The first time clock schedules the boiler on/off or an occupied /unoccupied schedule. The boiler is in operation from 6 am to 9 pm Monday thru Friday and Saturday and Sunday from 6 am until 12 pm.

The second time clock controls the fans in the schools unit ventilators. The fans are scheduled to operate from 6 am to 3 pm Monday thru Friday.

The pneumatic stats control the hot water and steam fin tube radiation

## 3.5 Lighting/Electrical Systems

The light fixtures in the classrooms are 8' T-12 usually on two circuits with manual switches. The hallway light fixtures are 4' T-12 pendant mount type also manually switched. The lobby and a few select areas have been converted to 32 watt T-8 troffer fixtures. Smaller rooms such as storage closets and janitor rooms have 60 watt incandescent fixtures

The multi-purpose room has (16) 400 watt metal halide lamps. There are 8 manual switches with 2 fixtures per switch.

The exterior light fixtures are 250 high pressure sodium wall packs with some LED lighting at the entrance doors.

### **3.6 Plumbing Systems**

#### **3.6.1 Domestic Hot Water System**

The domestic hot water is supplied by (2) 40 gallon electric hot water heaters with one tank dedicated to the kitchen/pre K DHW areas and the other for the school lavatories.

#### **3.6.2 Plumbing Fixtures**

The school has a municipal water and sewer system. The plumbing fixtures in the school such as flush valves and water faucets are older high flow fixtures

## 4.0 ENERGY CONSERVATION MEASURES

### 4.1 ECM-1 Upgrade Attic Insulation

The original constructed portion of the school has a pitched roof with a full attic. Loose fiberglass batt insulation has been installed of the conditioned spaces. Over the years if disturbed or moved this type of insulation will lose insulating value. Installing additional insulation of (R-19) above the ceiling of the conditioned spaces was assessed for this ECM. Addition of insulation will result in a reduced heating and cooling load.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows.

#### ECM-1 Upgrade Attic Insulation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
5,000	0	0	700	2,400	0	2,400	11.9	0	2.1	2.1

Expected Life: 25 years  
 Lifetime Savings: 0 kWh      17,500 gallons      \$ 60,000

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is recommended.

### 4.2 ECM-2 Window Replacement

There are 65 existing windows which are approximately 8 feet tall and 3 feet wide for a total window area of 1,560 square feet. According to the school staff, the windows in the original section were replaced within the last 15 years and the windows in the 1950 addition were replaced within the last 3 years. The windows are in good condition; however the amount of glazing seems excessive. Blinds have been installed to minimize glare.

This ECM will consider replacing and reducing the size of the glazing in the original 1920 section of the school. Energy savings could be realized with the reduction of glazing and by installing solid sandwich panels having an increased U-value. Additional savings will result from higher efficiency tinted glazing and inert gas seals vs. the existing clear glazing.

The calculation uses bin weather data estimate the occupied and unoccupied bin hours. This is converted to existing energy for the occupied and unoccupied cases using the existing window U-factor and the heating and cooling temperature. The two are summed together to create the annual utility usage for the baseline. The same steps are done to calculate the proposed utility usage. The difference in heating losses through the windows results in annual heating #2 fuel oil and cooling electricity savings.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

**ECM-2 Window Replacement with Reduced Glazing**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$ 78,000	1,400	0	200	900	\$ 0	\$ 900	(0.8)	\$ 0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 21,000 kWh      3,000 gallons      \$ 13,500

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended.

**4.3 ECM-3 Upgrade the Heating System**

This ECM considers conversion to propane and the replacement of the existing oil boilers with high efficiency propane condensing boilers, which would require complete replacement the existing steam heating components (unit ventilators an perimeter radiation) with a new hot water equipment, pumps and piping.

CHA contacted Elizabeth Gas account representatives (which service the Milford area with #2 fuel oil). The account rep. indicated that #2 fuel oil was not nearby and would not be made available to the School.

Conversion to propane was therefore investigated but resulted in a negative payback due to the cost per gallon being \$.10 higher than # 2 fuel oil at the present time. The increase in efficiency of the propane boilers is 12% higher than the existing oil boilers, but still resulted in an annual cost increase of \$2,800 due to the increased fuel cost.

Should propane be made available in bulk at a cost lower than fuel oil, the economics would change and this may be a worthwhile alternative. Another non-energy consideration may be the environmental impact of storing 10,000 gallons of oil underground.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized as follows:

**ECM-3 Upgrade Heating System**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Gallons	Total \$						
\$	kWh	kW	Gallons	\$	\$	\$	\$	Years	Years	
638,000	0	0	0	-5,500	0	-5,500	(1.0)	0	-116.0	-116.0

Expected Life: 20 years  
 Lifetime Savings: 0 kWh 0 gallons \$ (110,000)

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended.

**4.4 ECM-4 Install UV Occupancy Sensors**

The unit ventilators are scheduled on from 6 am to 3 pm during the school day. There are periods of time during the school day when the classrooms are unoccupied for long periods of time such as lunch time, gym period or when the students are in the multipurpose room.

The fan motors in the unit ventilators are fractional horsepower therefore savings will be limited.

Savings are seen from fan motor scheduling for occupied hours.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

**ECM-4 Install Univent Occupancy Sensors**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$	kWh	kW	Gallons	\$	\$	\$	\$	Years	Years	
1,000	27	0	0	4	0	4	(0.9)	0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 400 kWh 0 gallons \$ 100

This measure is not recommended

#### 4.5 ECM-5 Walk In Cooler Controls

The existing walk in cooler is approximately 40 years old. The efficiency of the compressor and fan motor has degraded over time. The temperature controls have drifted out of calibration and the cooler door seals are leaking.

This ECM will suggest installing new high efficiency compressor and fan motor, replacing the door seals and installing modern temperature controls.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

#### ECM-5 Install Walk In Cooler Controls

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$	kWh	kW	Gallons	\$	\$	\$	\$	Years	Years	
15,000	1,300	0	0	200	0	200	(0.8)	0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 19,500 kWh      0 gallons      \$ 3,000

This measure is not recommended

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

#### 4.6 ECM-6 Lighting Upgrade

Energy savings for this measure were calculated by applying the existing and proposed fixture wattages to estimated times of operation. These calculations are based upon 1 to 1 replacements with the fixtures. They do not take into account lumen output and square footage. A more comprehensive study may be performed to determine correct lighting levels.

Supporting calculations, including assumptions for lighting hours and annual energy usage for each fixture, are provided in Appendix C.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:



**ECM-6 Lighting Replacement/Upgrade**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$ 13,000	13,900	0	0	1,900	0	1,900	1.9	0	6.8	6.8

Expected Life: 15 years  
 Lifetime Savings: 208,500 kWh      0 gallons      \$ 28,500

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended.

**4.7 ECM-7 Lighting Controls**

Review of the comprehensive lighting survey determined that lighting in classrooms and various other spaces are typically operational, regardless of occupancy. Therefore, installing an occupancy sensor in these spaces to turn off lights when the areas are unoccupied was assessed.

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in section 4.6.1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

**ECM-7 Lighting Controls**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$ 7,000	23,700	0	0	2,500	0	2,500	7.4	900	2.8	2.4

Expected Life: 15 years  
 Lifetime Savings: 355,500 kWh      0 gallons      \$ 37,500

\* Incentive shown is per the New Jersey Smart Start Program. See section 5.0 for other incentive opportunities.

This measure is not recommended .

#### 4.8 ECM-8 Lighting Replacements with Controls ( Occupancy Sensors)

This measure is a combination of replace/upgrade the current lighting fixtures to more efficient ones and installing occupancy sensors on the new lights. Interactive effects of the higher efficiency lights and occupancy sensors lead the energy and cost savings for this measure to not be cumulative or equivalent to the sum of replacing the lighting fixtures alone and installing occupancy sensors without the lighting upgrade.

The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

#### ECM-8 Lighting Replacements with Controls

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
20,000	33,700	0	0	4,000	0	4,000	3.3	900	5.0	4.8

Expected Life: 15 years

Lifetime Savings: 505,500 kWh      0 gallons      \$ 60,000

This measure is recommended.

### 5.0 PROJECT INCENTIVES

#### 5.1 Incentives Overview

##### 5.1.1 New Jersey Pay For Performance Program

The facility will be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed for qualified energy conservation projects applied to facilities whose demand in any of the preceding 12 months exceeds 100 kW. This average minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations, however. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP).

- Incentive Amount: \$0.10/SF

- Minimum incentive: \$5,000
- Maximum Incentive: \$50,000 or 50% of Facility annual energy cost

The standard incentive pays \$0.10 per square foot, up to a maximum of \$50,000, not to exceed 50% of facility annual energy cost, paid after approval of application. For building audits funded by the New Jersey Board of Public Utilities, which receive an initial 75% incentive toward performance of the energy audit, facilities are only eligible for an additional \$0.05 per square foot, up to a maximum of \$25,000, rather than the standard incentive noted above.

Incentive #2: Installation of Recommended Measures – This incentive is based on projected energy savings as determined in Incentive #1 (Minimum 15% savings must be achieved), and is paid upon successful installation of recommended measures.

Electric

- Base incentive based on 15% savings: \$0.09/ per projected kWh saved.
- For each % over 15% add: \$0.005 per projected kWh saved.
- Maximum incentive: \$0.11/ kWh per projected kWh saved

Gas

- Base incentive based on 15% savings: \$0.90/ per projected Therm saved.
- For each % over 15% add: \$0.05 per projected Therm saved.
- Maximum incentive: \$1.25 per projected Therm saved

Incentive cap: 25% of total project cost

Incentive #3: Post-Construction Benchmarking Report – This incentive is paid after acceptance of a report proving energy savings over one year utilizing the Environmental Protection Agency (EPA) Portfolio Manager benchmarking tool.

Electric

- Base incentive based on 15% savings: \$0.09/ per projected kWh saved.
- For each % over 15% add: \$0.005 per projected kWh saved.
- Maximum incentive: \$0.11/ kWh per projected kWh saved

Gas

- Base incentive based on 15% savings: \$0.90/ per projected Therm saved.
- For each % over 15% add: \$0.05 per projected Therm saved.
- Maximum incentive: \$1.25 per projected Therm saved

Incentives #2 and #3 can be combined to yield additive savings.

Total P4P incentives are summarized below:

	Incentives \$		
	Elec	Gas	Total
<b>Incentive #1</b>	\$0	\$0	\$5,000
<b>Incentive #2</b>	\$3,039	\$670	\$3,709
<b>Incentive #3</b>	\$3,039	\$670	\$3,709
<b>Total All Incentives</b>	<b>\$6,077</b>	<b>\$1,340</b>	<b>\$12,418</b>

See Appendix D for calculations.

#### 5.1.2 New Jersey Smart Start Program

For this program, specific incentives for energy conservation measures are calculated on an individual basis utilizing the 2011 New Jersey Smart Start incentive program. This program provides incentives dependent upon mechanical and electrical equipment. If applicable, incentives from this program are reflected in the ECM summaries and attached appendices.

If the complex qualifies and enters into the New Jersey Pay for Performance Program, all energy savings will be included in the total site energy reduction, and savings will be applied towards the Pay for Performance incentive. A project is not applicable for both New Jersey incentive programs.

#### 5.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or #2 fuel oil utility companies.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, #2 fuel oil, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can significantly reduce the implementation cost of energy conservation projects.

The program pays 70% of each project cost up to \$75,000 per electrical utility account; total funding for each year is capped at \$250,000 per customer. Installations must be completed by a Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website at <http://www.njcleanenergy.com>. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this document.

The peak demand from the utility bills of 146.4 kW, therefore this building is eligible for the Direct Install Program.

#### 5.1.4 Energy Savings Improvement Plans (ESIP)

The Energy Savings Improvement Program (ESIP) allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the ESIP provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

ESIP allows local units to use "energy savings obligations" to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. Energy

savings obligations are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach. The “Local Finance Notice” outlines how local governments can develop and implement an ESIP for their facilities (see Appendix E). The ESIP can be prepared internally if the entity has qualified staff. If not, the ESIP must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs

## **6.0 ALTERNATIVE ENERGY SCREENING EVALUATION**

### **6.1 Solar**

#### **6.1.1 Photovoltaic Rooftop Solar Power Generation**

The facility was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array. All rooftop areas have been replaced, and are in good condition. It is recommended to install a permanent PV array at this time.

The PVWATTS solar power generation model was utilized to calculate PV power generation. The closest city available in the model is Newark, New Jersey and a fixed tilt array type was utilized to calculate energy production. The PVWATT solar power generation model is provided in Appendix P.

Federal tax credits are also available for renewable energy projects up to 30% of installation cost. Since the facility is a non-profit organization, federal taxes are paid and this project is eligible for this incentive.

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey solar renewable energy certificates program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. The average SREC value per credit is estimated to be about \$80/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

The existing load justifies the use of a 7 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about \$4.00 per watt or \$4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

The implementation cost and savings related to this ECM are presented in Appendix E and summarized as follows

Budgetary Cost	Annual Utility Savings				Estimated Maintenance	Total Savings	Federal Tax Credit	Payback (without incentive)
					Savings			
\$	kW	kWh	Gals/fuel	\$	\$	\$	\$	Years
\$28,000	7.0	7,106	0	\$1,137	0	\$1,137	\$0	24.6

Solar Renewable Energy Certificate Program (SREC) for 2012 is \$115/1000kwh

This measure is not recommended due to the long payback time. It is suggested, however, that the market for SREC credits is closely monitored. This market is fluctuating, and if the value per SREC is increased the measure could potentially show for a shorter payback in the near future.

## 7.0

### 8.0 EPA PORTFOLIO MANAGER

The EPA Portfolio Manager benchmarking tool was used to assess the building's energy performance. Portfolio Manager provides a Site and Source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft<sup>2</sup>/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive an Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed ECMs, the Energy Star rating will increase.

The Site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity (such as #2 fuel oil or oil), or as secondary energy, which is the product created from a raw fuel (such as electricity or district steam). Site EUI is a measure of a building's annual energy utilization per square foot. Site EUI is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types.

$$\text{Site Energy Intensity} = \frac{(\text{Electric Usage in kBtu} + \#2 \text{ fuel oil in kBtu})}{\text{Building Square Footage}}$$

To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, the Portfolio Manager uses the convention of Source EUIs. The source energy also accounts for all losses incurred in production, storage, transmission, and delivery of energy to the site; which provides an equivalent measure for various types of buildings with different energy sources.

$$\text{Source Energy Intensity} = \frac{(\text{Electric Usage in kBtu} \times \text{Site/Source Ratio} + \#2 \text{ fuel oil in kBtu} \times \text{Site/Source Ratio})}{\text{Building Square Footage}}$$

The EPA Score, Site EUI, and Source EUI for Milford Public School are as follows:

<b>Energy Intensity</b>	<b>Milford Public School</b>	<b>National Average</b>
EPA Score	33	50
Site (kBtu/sf/year)	74	64
Source (kBtu/sf/year)	121	104

**Note: The school utility consumption data was uploaded to the EPA PM website however, the data provided by Milford BOE was greater than 3 months old and outside of the PM guidelines. The date of the utility data has been adjusted to generate the EPA PM report.**

To be eligible to receive a national Energy Star score, a building must meet all three of these requirements:

1. Building designation – More than 50 percent of the building’s gross floor area must be one of the spaces eligible to receive an Energy Star score. The remainder of the building must abide by specific rules for each space type.
2. Operating characteristics – To ensure the building is consistent with the peer group used for comparison, each space in your building must meet certain minimum and maximum thresholds for key operating characteristics.
3. Energy data – At least 12 full consecutive calendar months for all active meters, accounting for all energy use (regardless of fuel type) in the building.

In addition, a Licensed Professional (meaning a Professional Engineer or Registered Architect) must verify that all energy use is accounted for accurately, that the building characteristics have been properly reported (including the square footage of the building), that the building is fully functional in accordance with industry standards, and that each of the indoor environment criteria has been met.

The Milford Public School is considered a higher than average energy consumer by the EPA Portfolio Manager which gives it a lower than average EPA score. For the School to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the Elementary School. This building does not appear to be eligible for Energy Star certification at this time.

The Portfolio Manager account can be accessed by entering the username and password shown below at the login screen of the Portfolio Manager website (<https://www.energystar.gov/istar/pmpam/>).

A full EPA Energy Star Portfolio Manager Report is located in Appendix F.





## 9.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Milford Public School identified potential ECMs for lighting control upgrades and attic insulation installation. Potential annual savings of \$6,400 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

### ECM-1 Upgrade Attic Insulation

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$	kWh	kW	Gallons	\$	\$	\$		\$	Years	Years
5,000	0	0	700	2,400	0	2,400	11.9	0	2.1	2.1

Expected Life: 25 years  
 Lifetime Savings: 0 kWh      17,500 gallons      \$ 60,000

### ECM-8 Lighting Replacements with Controls

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$	kWh	kW	Gallons	\$	\$	\$		\$	Years	Years
20,000	33,700	0	0	4,000	0	4,000	3.3	900	5.0	4.8

Expected Life: 15 years  
 Lifetime Savings: 505,500 kWh      0 gallons      \$ 60,000

**APPENDIX A**

**Utility Usage Analysis**

**Milford BOE**  
**7 Hillside Ave Milford, NJ 08848**

**Annual Utilities**  
12-month Summary

Electric		
Annual Usage	117,600	kWh/yr
Annual Cost	18,607	\$
Blended Rate	0.158	\$/kWh
Consumption Rate	0.128	\$/kWh
Demand Rate	5.91	\$/kW
Peak Demand	68.5	kW
Min. Demand	36.1	kW
Avg. Demand	55.1	kW
Fuel Oil		
Annual Usage	8,562	gallons/yr
Annual Cost	28,024	\$
Rate	3.273	\$/gallon

**Milford BOE**

7 Hillside Ave Milford, NJ 08848

**Utility Bills: Account Numbers**

<u>Account Number</u>	<u>School Building</u>	<u>Location</u>	<u>Type</u>	<u>Notes</u>
100080073206	Milford Public School	7 Hillside Ave Milford, NJ 08848	Electricity	
433225	Milford Public School	7 Hillside Ave Milford, NJ 08848	Fuel Oil #2	

Milford BOE  
 7 Hillside Ave Milford, NJ 08848

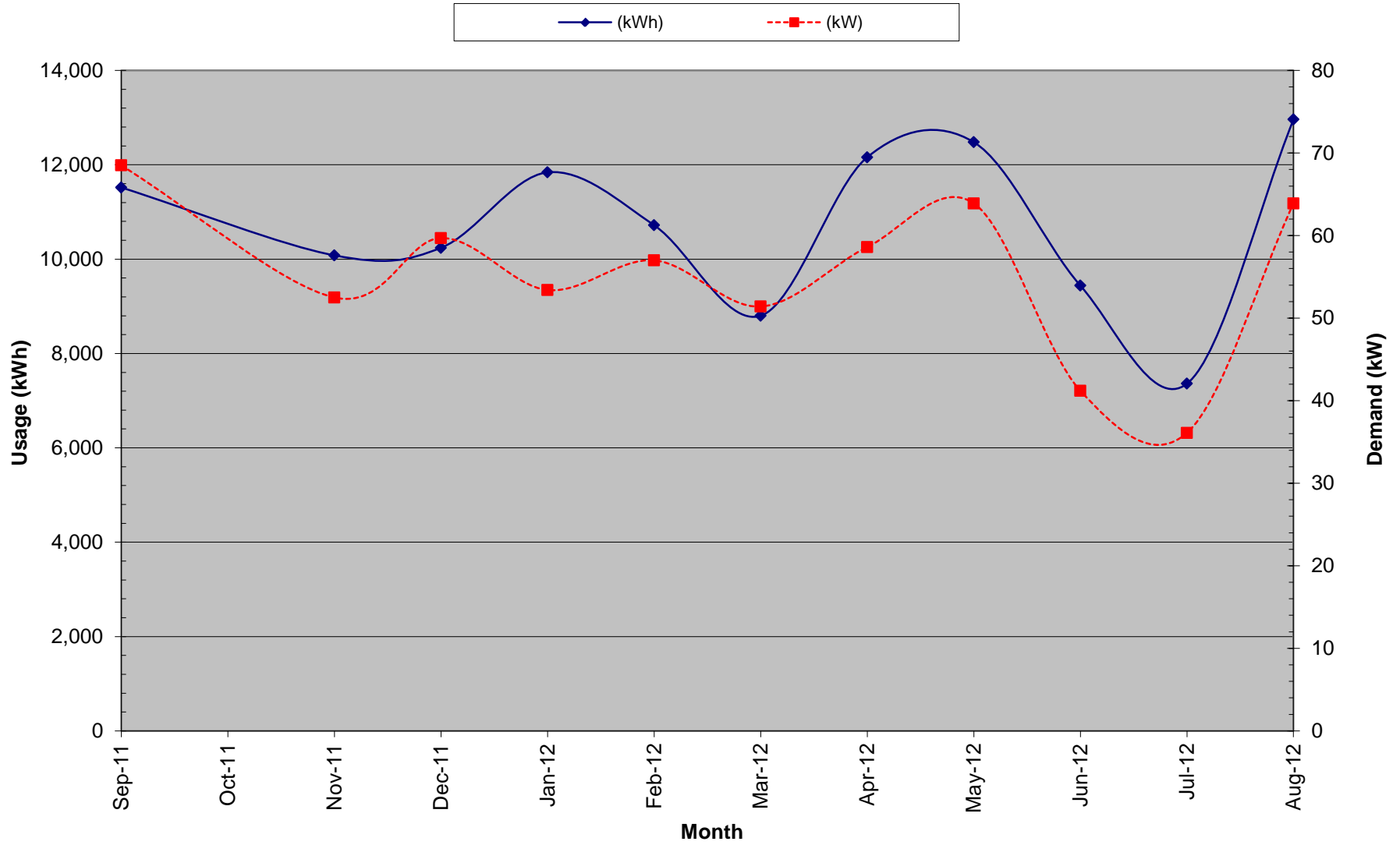
For Service at: Milford BOE  
 Account No.: 100080073206  
 Meter No.:  
 Electric Service

Delivery - JCP&L  
 Supplier - South Jersey Energy

Month	Consumption (kWh)	Demand (kW)	Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
			Delivery (\$)	Supplier (\$)	Total (\$)	Consumption (\$)	Demand (\$)	Blended Rate (\$/kWh)	Consumption (\$/kWh)	Demand (\$/kW)
September-11	11,520	68.50	488.03	1,499.81	1,987.84	1,609.34	378.50	0.17	0.14	5.53
November-11	10,080	52.50	377.37	1,412.00	1,789.37	1,514.39	274.98	0.18	0.15	5.24
December-11	10,240	59.70	424.74	1,409.58	1,834.32	1,512.76	321.56	0.04	0.15	5.39
January-12	11,840	53.40	391.91	1,611.46	2,003.37	1,722.57	280.80	0.17	0.15	5.26
February-12	10,720	57.00	409.65	1,445.71	1,855.36	1,551.27	304.09	0.17	0.14	5.33
March-12	8,800	51.40	267.86	1,280.76	1,548.62	1,280.76	267.86	0.18	0.15	5.21
April-12	12,160	58.60	427.14	1,607.27	2,034.41	1,719.97	314.44	0.17	0.14	5.37
May-12	12,480	63.90	795.67	844.65	1,640.32	1,196.85	443.47	0.13	0.10	6.94
June-12	9,440	41.20	584.24	638.90	1,223.14	937.21	285.93	0.13	0.10	6.94
July-12	7,360	36.10	512.58	498.13	1,010.71	760.18	250.53	0.14	0.10	6.94
August-12	12,960	63.90	802.72	877.13	1,679.85	1,216.91	462.94	0.13	0.09	7.24
<b>Total (All)</b>	<b>117,600</b>	<b>68.50</b>	<b>\$5,481.91</b>	<b>\$13,125.40</b>	<b>\$18,607.31</b>	<b>\$15,022.21</b>	<b>\$3,585.10</b>	<b>\$0.16</b>	<b>\$0.13</b>	<b>\$5.91</b>
<b>Total (last 12-months)</b>	<b>117,600</b>	<b>68.50</b>	<b>\$5,481.91</b>	<b>\$13,125.40</b>	<b>\$18,607.31</b>	<b>\$15,022.21</b>	<b>\$3,585.10</b>	<b>\$0.16</b>	<b>\$0.13</b>	<b>\$5.91</b>
Notes	1	2	3	4	5	6	7	8	9	10

- 1.) Number of kWh of electric energy used per month
- 2.) Number of kW of power measured
- 3.) Electric charges from Delivery provider
- 4.) Electric charges from Supply provider
- 5.) Total charges (Delivery + Supplier)
- 6.) Charges based on the number of kWh of electric energy used
- 7.) Charges based on the number of kW of power measured
- 8.) Total Charges (\$) / Consumption (kWh)
- 9.) Consumption Charges (\$) / Consumption (kWh)
- 10.) Demand Charges (\$) / Demand (kW)

### Electric Usage - Milford Public School



**Milford BOE**  
**7 Hillside Ave Milford, NJ 08848**

**For Service at: Milford BOE**  
**Account No.: 433225**  
**Fuel Oil Service**  
**Delivery - Allied Oil LLC**  
**Supplier - Allied Oil LLC**

<b>Month</b>	<b>Total (\$)</b>	<b>Gallons</b>	<b>\$/Gallon</b>
7/14/2011	\$ 2,009.68	620.10	\$ 3.24
7/14/2011	\$ 19,254.51	5,941.10	\$ 3.24
2/9/2012	\$ 6,760.18	2,001.00	\$ 3.38
<b>Total</b>	<b>\$ 28,024.37</b>	<b>8,562.20</b>	<b>\$ 3.27</b>

**APPENDIX B**

**Equipment Inventory**





## **APPENDIX C**

### **ECM Calculations**

**Summary of Energy Conservation Measures**

Energy Conservation Measure		Approx. Costs (\$)	Approx. Savings (\$/year)	Payback (Years) w/o Incentive	Potential Incentive (\$)*	Payback (Years) w/ Incentive	Recommended For Implementation
ECM-1	Upgrade Attic Insulation	5,000	2,400	2	0	2	X
ECM-2	Window Replacement with Reduced Glazing	78,000	900	>20	0	>20	
ECM-3	Upgrade Heating System	638,000	-5,500	-116	0	-116	
ECM-4	Install Univent Occupancy Sensors	1,000	4	>20	0	>20	
ECM-5	Install Walk In Cooler Controls	15,000	200	>20	0	>20	
ECM-6	Lighting Replacement/Upgrade	13,000	1,900	7	0	7	
ECM-7	Lighting Controls	7,000	2,500	3	900	2	
ECM-8	Lighting Replacements with Controls	20,000	4,000	5	900	5	X

**Milford BOE - NJBPU**  
**CHA Project # 25130**  
**Milford BOE**

**ECM Summary Sheet**

**ECM-1 Upgrade Attic Insulation**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
5,000	0	0	700	2,400	0	2,400	11.9	0	2.1	2.1

Expected Life: 25 years  
 Lifetime Savings: 0 kWh 17,500 gallons \$ 60,000

**ECM-2 Window Replacement with Reduced Glazing**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
78,000	1,400	0	200	900	0	900	(0.8)	0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 21,000 kWh 3,000 gallons \$ 13,500

**ECM-3 Upgrade Heating System**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Gallons	Total \$						
\$					\$	\$		\$	Years	Years
638,000	0	0	0	-5,500	0	-5,500	(1.0)	0	-116.0	-116.0

Expected Life: 20 years  
 Lifetime Savings: 0 kWh 0 gallons #####

**ECM-4 Install Univent Occupancy Sensors**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
1,000	27	0	0	4	0	4	(0.9)	0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 400 kWh 0 gallons \$ 100

**ECM-5 Install Walk In Cooler Controls**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
15,000	1,300	0	0	200	0	200	(0.8)	0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 19,500 kWh 0 gallons \$ 3,000

**ECM-6 Lighting Replacement/Upgrade**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
13,000	13,900	0	0	1,900	0	1,900	1.9	0	6.8	6.8

Expected Life: 15 years  
 Lifetime Savings: 208,500 kWh 0 gallons \$ 28,500

**ECM-7 Lighting Controls**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
7,000	23,700	0	0	2,500	0	2,500	7.4	900	2.8	2.4

Expected Life: 15 years  
 Lifetime Savings: 355,500 kWh 0 gallons \$ 37,500

**ECM-8 Lighting Replacements with Controls**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	# 2 Fuel Oil Gallons	Total \$						
\$					\$	\$		\$	Years	Years
20,000	33,700	0	0	4,000	0	4,000	3.3	900	5.0	4.8

Expected Life: 15 years  
 Lifetime Savings: 505,500 kWh 0 gallons \$ 60,000

**Milford BOE - NJBPU  
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Rate of Discount (used for NPV) **3.0%**

Utility Costs		Yearly Usage	Building Area	Annual Utility Cost	
\$ 0.160	\$/kWh blended		22,000	Electric	#2 Fuel Oil
\$ 0.130	\$/kWh supply	117,600		18,607	8,562
\$ 5.91	\$/kW	606.2			
\$ 3.27	\$/Gallon	8,562			
\$ -	\$/kgals	-			

**Milford BOE**

Item	Savings					Cost	Simple Payback	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings					ROI	NPV	IRR	
	kW	kWh	gallons	Water kgal	\$									kW	kWh	therms	kgal/vr	\$				
ECM-1	Upgrade Attic Insulation	0.0	0	743	0	\$ 2,400	\$ 4,700	2.0	25		N	\$ -	\$ -	2.0	0.0	0	18,575	0	\$ 60,740	11.9	\$37,092	51.1%
ECM-2	Window Replacement with Reduced Glazing	0.0	1445	209	0	\$916	\$ 78,000	85.1	15		N	\$ -	\$ -	85.1	0.0	21,682	3,142	0	\$ 13,744	(0.8)	(\$67,062)	-16.6%
ECM-3	Upgrade Heating System	0.0	0	0	0	\$ (5,464)	\$ 638,052	-116.8	20		N	\$ -	\$ -	-116.8	0.0	0	0	0	\$ -	(1.0)	(\$719,345)	N/A
ECM-4	Install Univent Occupancy Sensors	0.0	27	0	0	\$ 4.37	\$ 900	206.1	15		N	\$ -	\$ -	206.1	0.0	409	0	0	\$ 66	(0.9)	(\$848)	-22.7%
ECM-5	Install Walk In Cooler Controls	0.0	1,270	0	0	\$ 203	\$ 15,000	73.8	15		N	\$ -	\$ -	73.8	0.0	19,051	0	0	\$ 3,048	(0.8)	(\$12,574)	-15.5%
ECM-6	Lighting Replacement/Upgrade	5.1	13,869	0	0	\$ 1,896	\$ 13,352	7.0	15		N	\$ -	\$ -	7.0	76.5	208,035	0	0	\$ 38,711	1.9	\$9,282	11.4%
ECM-7	Lighting Controls	0.0	23,667	0	0	\$ 2,532	\$ 6,750	2.7	15	\$ 875	N	\$ -	\$ 875	2.3	0.0	355,005	0	0	\$ 56,801	7.4	\$24,352	42.9%
ECM-8	Lighting Replacements with Controls	5.1	33,674	0	0	\$ 4,015	\$ 20,102	5.0	15	\$ 875	N	\$ -	\$ 875	4.8	76.5	505,110	0	0	\$ 86,243	3.3	\$28,704	19.4%
<b>Total (Does Not Include ECM-6 &amp; ECM-7)</b>		<b>10.2</b>	<b>36,417</b>	<b>952</b>	<b>0</b>	<b>\$ 2,075</b>	<b>\$ 756,754</b>	<b>364.8</b>	<b>17</b>	<b>\$ 1,750</b>		<b>\$ -</b>	<b>\$ 1,750</b>	<b>363.9</b>	<b>153.0</b>	<b>1,109,293</b>	<b>21,717</b>	<b>0</b>	<b>#####</b>	<b>(0.7)</b>	<b>(\$728,944)</b>	<b>-24.5%</b>
<b>Total Measures with Payback &lt;15 % of Existing</b>		<b>10.2</b>	<b>33,674</b>	<b>743</b>	<b>0</b>	<b>\$ 951</b>	<b>\$ 662,854</b>	<b>697.1</b>	<b>18.0</b>	<b>\$ 1,750</b>		<b>\$ -</b>	<b>\$ 1,750</b>	<b>695.3</b>	<b>153.0</b>	<b>1,068,150</b>	<b>18,575</b>	<b>0</b>	<b>#####</b>	<b>(0.6)</b>	<b>(\$648,027)</b>	<b>-24.9%</b>

City:	Newark, NJ		Occupied Hours/Week				
Temp	Enthalpy h (Btu/lb)	Bin Hours	Occupied Hours	Occupied Hours	Occupied Hours	Occupied Hours	Occupied Hours
95.0	39.4	3	1	1	0	0	0
90.0	38.6	34	10	12	4	2	1
85.0	38.5	131	39	47	17	6	2
80.0	37.5	500	149	179	64	23	8
75.0	34.8	620	185	221	79	28	10
70.0	32.4	664	198	237	85	30	11
65.0	31.3	854	254	305	109	39	14
60.0	27.8	927	276	331	118	42	15
55.0	24.7	600	179	214	77	27	10
50.0	21.8	610	182	218	78	28	10
45.0	19.0	611	182	218	78	28	10
40.0	17.0	656	195	234	84	30	11
35.0	15.0	1,023	304	365	130	47	17
30.0	12.8	734	218	262	94	33	12
25.0	10.7	334	99	119	43	15	5
20.0	8.7	252	75	90	32	11	4
15.0	7.1	125	37	45	16	6	2
10.0	5.4	47	14	17	6	2	1
5.0	4.1	22	7	8	3	1	0
0.0	2.5	13	4	5	2	1	0
2.5	1.3	0	0	0	0	0	0
-2.5	-1.3	0	0	0	0	0	0
-7.5	-2.5	0	0	0	0	0	0

8,760

Multipliers	
Material:	1.1
Labor:	1.35
Equipment:	1.1

Exist Heating Efficiency	80%
Cooling Eff (kW/ton)	1.2

Milford BOE - NJBPU  
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ECM-1: Upgrade Insulation 1920's Section

Add R-19 fiberglass batt on top of R-6 fiberglass batt

Area of ceiling	4,500 SF	Cooling System Efficiency	0 kW/ton	Heating System Efficiency	80%
Existing Infiltration Factor	0.00 cfm/SF	Ex Occupied Cing Temp.	74 *F	Heating On Point	55 *F
Proposed Infiltration Factor	0.00 cfm/SF	Ex Unoccupied Cing Temp.	85 *F	Ex Occupied Htg Temp.	72 *F
Existing U Value	0.160 Btuh/SF°F	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb	Ex Unoccupied Htg Temp.	65 *F
Proposed U Value	0.050 Btuh/SF°F	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb	Electricity	\$ 0.16 \$/kWh
				# 2 Fuel Oil	\$ 3.27 \$/Gallon

Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	EXISTING LOADS			PROPOSED LOADS				COOLING ENERGY		HEATING ENERGY	
		Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Occupied		Unoccupied		Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy Gallons	Proposed Heating Energy Gallons
					Wall Infiltration & Heat Load BTUH	BTUH	Wall Infiltration & Heat Load BTUH	BTUH				
A		B	C	D	E	F	G	H	I	J	K	L
95.0		3	0	3	-15,120	-7,200	-4,725	-2,250	0	0	0	0
90.0		34	0	34	-11,520	-3,600	-3,600	-1,125	0	0	0	0
85.0		131	3	128	-7,920	0	-2,475	0	0	0	0	0
80.0		500	13	487	-4,320	0	-1,350	0	0	0	0	0
75.0		620	66	554	-720	0	-225	0	0	0	0	0
70.0		664	88	576	0	0	0	0	0	0	0	0
65.0		854	114	740	0	0	0	0	0	0	0	0
60.0		927	221	706	0	0	0	0	0	0	0	0
55.0		600	296	304	12,240	7,200	3,825	2,250	0	0	73	23
50.0		610	214	396	15,840	10,800	4,950	3,375	0	0	96	30
45.0		611	218	393	19,440	14,400	6,075	4,500	0	0	95	30
40.0		656	218	438	23,040	18,000	7,200	5,625	0	0	124	39
35.0		1,023	234	789	26,640	21,600	8,325	6,750	0	0	224	70
30.0		734	365	369	30,240	25,200	9,450	7,875	0	0	196	61
25.0		334	262	72	33,840	28,800	10,575	9,000	0	0	105	33
20.0		252	119	133	37,440	32,400	11,700	10,125	0	0	84	26
15.0		125	90	35	41,040	36,000	12,825	11,250	0	0	48	15
10.0		47	45	2	44,640	39,600	13,950	12,375	0	0	20	6
5.0		22	17	5	48,240	43,200	15,075	13,500	0	0	10	3
0.0		13	8	5	51,840	46,800	16,200	14,625	0	0	6	2
2.5		0	5	-5	50,040	45,000	15,638	14,063	0	0	0	0
-2.5		0	0	0	53,640	48,600	16,763	15,188	0	0	0	0
-7.5		0	0	0	57,240	52,200	17,888	16,313	0	0	0	0
<b>TOTALS</b>		<b>8,760</b>	<b>2,597</b>	<b>6,163</b>					<b>0</b>	<b>0</b>	<b>1,081</b>	<b>338</b>

Existing Ceiling Infiltration	0 cfm
Existing Ceiling Heat Transfer	720 Btuh/°F
Proposed Ceiling Infiltration	0 cfm
Proposed Ceiling Heat Transfer	225 Btuh/°F

<b>Savings</b>	<b>743 Gallons</b>	<b>\$ 2,430</b>
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**Milford BOE - NJBPU**  
**CHA Project # 25130**

**Install Attic Insulation Cost**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Fiberglass Blakcet R-38 Insulation (12" Thick, 23" wide)	6,000	SF	\$ 0.47	\$ 0.32		\$ 2,820	\$ 1,920	\$ -	\$ 4,700	
						\$ -	\$ -	\$ -	\$ -	

Note: Costs are used for energy savings calculations only- do not use for procurement  
 Note: Costs provided are for work to be self performed using school maintenance personnel

**Blanket Insulation - Fiberglass (kraft faced)**

R-19 (6" thick)

11" wide \$ 0.47 \$ 0.32  
 15" wide \$ 0.47 \$ 0.24  
 23" wide \$ 0.47 \$ 0.20

R-38 (12" thick)

15" wide \$ 0.99 \$ 0.32  
 23" wide \$ 0.99 \$ 0.24

**Blown Insulation - Cellulose or Fiberglass**

3 1/2" thick \$ 0.23 \$ 0.15 \$ 0.06  
 6 1/2" thick \$ 0.44 \$ 0.26 \$ 0.10  
 10 7/8" thic \$ 0.76 \$ 0.43 \$ 0.17

**Board Insulation**

3 lb density

(\$/sf)

Fiberglass

1" - R4.3 \$ 0.54 \$ 0.32  
 1 1/2" - R-6 \$ 1.03 \$ 0.32

**Milford BOE - NJBPU  
CHA Project # 25130  
Milford BOE**

**ECM-2: Window Replacement**

Window Area	780 SF	Prop Occupied Htg Temp.	72 °F
Internal Balance Temp.	55 °F	Prop Unoccupied Htg Temp.	65 °F
Heating System Efficiency	75%	Prop Occupied Cng Temp.	74 °F
Cooling Efficiency	1.2 (Btu/Watt)	Prop Unoccupied Cng Temp.	85 °F
Existing U factor	0.45 Btu/(h*sqft*degf)	\$/ kWh	\$0.16
Proposed U factor	0.26 Btu/(h*sqft*degf)	\$/ Gallon	\$3.27

Avg Outdoor Air Temp. Bins °F	Proposed Occupied Bin Hours	Unoccupied Bin Hours	Existing Occupied Energy Mbtu	Existing Unoccupied Energy Mbtu	Proposed Occupied Energy Mbtu	Proposed Unoccupied Energy Mbtu	Heating Energy Savings Gallons	Cooling Energy Savings (kWh)	Total Cost Savings
95.0	1	2	8	7	6	4	0	4	\$1
90.0	12	22	68	38	39	22	0	37	\$6
85.0	47	84	181	0	104	0	0	64	\$10
80.0	179	321	376	0	217	0	0	132	\$21
75.0	221	399	78	0	45	0	0	27	\$4
70.0	237	427	166	0	96	0	0	59	\$9
65.0	305	549	749	0	433	0	0	264	\$42
60.0	331	596	1,394	1,046	806	604	0	859	\$137
55.0	214	386	1,279	1,354	739	782	11	-	\$35
50.0	218	392	1,682	2,065	972	1,193	15	-	\$49
45.0	218	393	2,068	2,757	1,195	1,593	19	-	\$63
40.0	234	422	2,631	3,701	1,520	2,138	25	-	\$83
35.0	365	658	4,745	6,925	2,741	4,001	47	-	\$153
30.0	262	472	3,865	5,797	2,233	3,349	39	-	\$127
25.0	119	215	1,968	3,015	1,137	1,742	20	-	\$66
20.0	90	162	1,643	2,559	949	1,478	17	-	\$55
15.0	45	80	893	1,410	516	815	9	-	\$30
10.0	17	30	365	583	211	337	4	-	\$12
5.0	8	14	185	298	107	172	2	-	\$6
0.0	5	8	117	191	68	110	1	-	\$4
2.5	0	0	0	0	0	0	0	-	\$0
-2.5	0	0	0	0	0	0	0	-	\$0
-7.5	0	0	0	0	0	0	0	-	\$0
<b>TOTALS</b>	<b>3,129</b>	<b>5,631</b>	<b>24,462</b>	<b>31,745</b>	<b>14,135</b>	<b>18,341</b>	<b>209</b>	<b>1,445</b>	<b>\$916</b>

8,760

**Window Breakdown**

Location	# of	Total Sqft.
S	12	144
W	28	336
N	13	156
E	12	144
Total Sqft.		780
Replacement Cost		\$ 100 / Sqft
Total Cost		\$78,000



Milford BOE - NJBPU  
 CHA Project # 25130  
 Milford BOE

**ECM: Upgrade Heating System**

Existing Fuel  
 Proposed Fuel

#2 Oil	▼
Propane	▼

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	\$ 3.27	Gals #2	
Proposed Fuel Cost	\$ 3.37	Gals LPG	
Baseline Fuel Use	8,562	Gals #2	Based on historical utility data
Existing Boiler Plant Efficiency	70%		Estimated Steam system losses
Baseline Boiler Load	831,285	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 138.7 Mbtu/Gals #2
Baseline Fuel Cost	\$ 27,998		
Proposed Boiler Plant Efficiency	92%		Proposed Boiler Efficiency
Proposed Fuel Use	9,929	Gals LPG	Baseline Boiler Load / Proposed Efficiency / 91 Mbtu/Gals LPG
Proposed Fuel Cost	\$ 33,462		
Estimated Annual Savings	8,562	Gals #2	

**Fuel Table**

	Fuel Type	HHV	Units
1	Nat.Gas	100	Therms
2	Propane	91	Gals LPG
3	#2 Oil	138.7	Gals #2
4	#4 Oil	148.1	Gals # 4
5	#6 Oil	155.9	Gals # 6
6	Electric	3.413	kWh

3                      2

\*Note to engineer: Link savings back to summary sheet in appropriate column.

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

**ECM: Upgrade Heating System - Cost**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
1.4 mmBtu/hr Propane Fired Condensing Boiler	2	EA	\$ 100,000	\$ 1,000		\$ 220,000	\$ 2,700	\$ -	\$ 222,700	
Flue Installation	100	LF	\$ 10	\$ 50		\$ 1,100	\$ 6,750	\$ -	\$ 7,850	
Miscellaneous Electrical	1	LS	\$ 1,000	\$ 50		\$ 1,100	\$ 68	\$ -	\$ 1,168	
HW Piping	1500	LF	\$ 50	\$ 50		\$ 82,500	\$ 101,250	\$ -	\$ 183,750	
Replace Uni Vents	9	EA	\$ 1,500	\$ 750		\$ 14,850	\$ 9,113	\$ -	\$ 23,963	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

\$ 439,430	Subtotal
\$ 43,943.00	10% Contingency
\$ 96,674.60	20% Contractor O&P
\$ 58,005	10% Engineering Fees
<b>\$ 638,052</b>	<b>Total</b>

Milford BOE - NJBPU  
 CHA Project # 25130  
 Milford BOE

**ECM: Unoccupied Fan Shutdown**

EXISTING CONDITIONS	
Existing Facility Total Ventilator Fan Electric Usage/School Day	91 kWh
Cost of Electricity	\$ 0.16 \$/kWh
SAVINGS	
TOD Electric savings	27 kWh <sup>1</sup>
Total Cost Savings	\$ 4.37
Estimated Total Project Cost	\$ 900 <sup>4</sup>
Simple Payback	206.1 years

Assumptions

- 1 30% Approximate percent of total electric savings during unoccupied periods
- 2 Project cost is an estimate, includes cost of installing occupancy sensors

**ECM: Walk-in Cooler & Freezer Controls**

**ECM Description Summary**

For kitchens that contain walk-in coolers and freezers, CoolTrol is a controller that reduces energy consumption by controlling off of dewpoint temperature. Compressor cycling is reduced and the evaporator fans run 25% to 80% less. Door and frame heaters are also installed and controlled by store dew point temperature; this can reduce run time by up to 95% in coolers and 60% in freezers. The evaporator fan motors are also replaced with hi-efficiency fan motors saving 40% to 70% in energy. The proposed system comprises of an anti-sweat door controller, evaporator fan motor replacement and CoolTrol Cooler Control System.

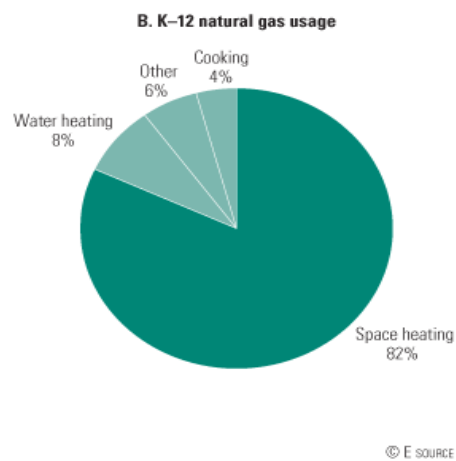
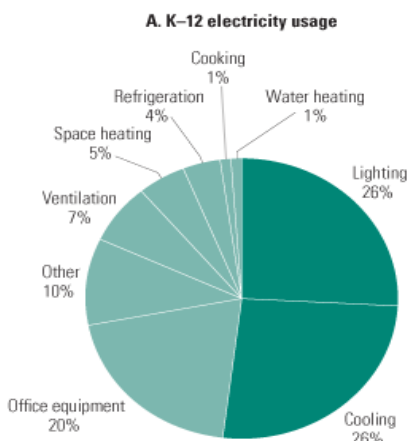
**Utility Cost**

\$0.16 \$/kWh Blended

EXISTING CONDITIONS	
Existing Facility Total Electric usage	117,600 kWh
Existing Facility Refrigeration Electric usage	7,056 kWh <sup>1</sup>
Existing Facility Walk-In Electric usage	4,234 kWh <sup>2</sup>
Walk-In Controls System Annual Electric savings	1,270 kWh <sup>3</sup>
SAVINGS	
Walk-In Controls Electric Usage Savings	1,270 kWh
Total cost savings	\$ 203.21
Estimated Total Project Cost	\$ 15,000 <sup>4</sup>
Simple Payback	73.8 years

**Assumptions**

- 1 6% of facility total electricity; Source: E source, data from U.S. Energy Information Administration
- 2 60% of refrigeration attributable to walk-in based on site observations
- 3 30% Electric load reduction typical for walk-in controllers
- 4 Based on (2) "Cooltrol" walk-in controls systems



**Milford BOE - NJBPU  
CHA Project # 25130  
Milford BOE**

**New Jersey Pay For Performance Incentive Program**

**Note:** The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012. Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governments or non-profit organizations. Values used in this calculation are for measures with a payback of 15 years or less only.

Total Building Area (Square Feet)	22,000
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilities (BPU)

Incentive #1		
Audit is funded by NJ BPU	\$0.10	\$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	\$18,607	\$8,562
Existing Usage (from utility)	117,600	8,562
Proposed Savings	33,674	743
Existing Total MMBtus	1,258	
Proposed Savings MMBtus	189	
% Energy Reduction	15.0%	
Proposed Annual Savings	\$951	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm
Incentive #2	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.09	\$0.90
Incentive #3	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.09	\$0.90

	Incentives \$		
	Elec	Gas	Total
Incentive #1	\$0	\$0	\$5,000
Incentive #2	\$3,039	\$670	\$3,709
Incentive #3	\$3,039	\$670	\$3,709
<b>Total All Incentives</b>	<b>\$6,077</b>	<b>\$1,341</b>	<b>\$12,418</b>

<b>Total Project Cost</b>	\$662,854
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		Allowable Incentive
% Incentives #1 of Utility Cost*	18.4%	\$5,000
% Incentives #2 of Project Cost**	0.6%	\$3,709
% Incentives #3 of Project Cost**	0.6%	\$3,709
<b>Total Eligible Incentives***</b>		<b>\$12,418</b>
<b>Project Cost w/ Incentives</b>		<b>\$650,436</b>

Project Payback (years)	
w/o Incentives	w/ Incentives
697.1	684.1

\* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

\*\* Maximum allowable amount of Incentive #2 is 25% of total project cost.

Maximum allowable amount of Incentive #3 is 25% of total project cost.

\*\*\* Maximum allowable amount of Incentive #1 is \$50,000 if not funded by NJ BPU, and \$25,000 if it is.

Maximum allowable amount of Incentive #2 & #3 is \$1 million per gas account and \$1 million per electric account; maximum 2 million per project

Energy Audit of Milford BOE  
CHA Project No. 25130

**ECM-1 Lighting Replacements**

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$13,352</b>	<b>5.1</b>	<b>13,869</b>	<b>0</b>	<b>\$1,896</b>	<b>0</b>	<b>\$1,896</b>	<b>\$0</b>	<b>7.0</b>	<b>7.0</b>

\*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

**ECM-2 Install Occupancy Sensors**

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$6,750</b>	<b>0.0</b>	<b>23,667</b>	<b>0</b>	<b>\$2,532</b>	<b>0</b>	<b>\$2,532</b>	<b>\$875</b>	<b>2.7</b>	<b>2.3</b>

\*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

**ECM-3 Lighting Replacements with Occupancy Sensors**

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$20,102</b>	<b>5.1</b>	<b>33,674</b>	<b>0</b>	<b>\$4,015</b>	<b>0</b>	<b>\$4,015</b>	<b>\$875</b>	<b>5.0</b>	<b>4.8</b>

\*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Cost of Electricity: \$0.107 \$/kWh  
\$6.74 \$/kW

EXISTING CONDITIONS												
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	Usage Describe Usage Type using Operating Hours	No. of Fixtures No. of fixtures before the retrofit	Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated annual hours for the usage group	Retrofit Control Retrofit control device	Annual kWh (kW/Space) * (Annual Hours)	Notes
11	Classroom # 2	Classroom	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2912	C-OCC	1,258	
11	Classroom # 1	Classroom	4	S 34 P F 2 (MAG)	F42EE	72	0.29	SW	2912	C-OCC	839	
42	Stairway	Stairway	1	T 32 R F 1 (ELE) 2 Sw./2 Lamp/1 2'x4' Fix.	F41LL	32	0.03	SW	3200	C-OCC	102	
11	Lobby	Hallway	4	S 34 P F 2 (MAG)	F42EE	72	0.29	SW	2000	C-OCC	576	
214	Classroom	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.36	SW	2912	C-OCC	3,966	
214	Classroom	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.36	SW	2912	C-OCC	3,966	
11	Girls Toilet	Restroom	2	S 34 P F 2 (MAG)	F42EE	72	0.14	SW	4300	C-OCC	619	
11	Corridor # 1	Hallway	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2000	None	864	
11	Boys Toilet	Restroom	2	S 34 P F 2 (MAG)	F42EE	72	0.14	SW	4300	C-OCC	619	
11	Boiler Room	Mechanical Room	7	S 34 P F 2 (MAG)	F42EE	72	0.50	SW	1000	C-OCC	504	
51	Music Room	Classroom	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.14	SW	2912	C-OCC	419	
11	Storage	Storage Area	7	S 34 P F 2 (MAG)	F42EE	72	0.50	SW	3200	C-OCC	1,613	
71	Boiler Room	Mechanical Room	1	I 60	I60/1	60	0.06	SW	1000	None	60	
214	Classroom # 8	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.36	SW	2912	C-OCC	3,966	
214	Classroom # 4	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.36	SW	2912	C-OCC	3,966	
214	Classroom # 3	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.36	SW	2912	C-OCC	3,966	
214	Classroom # 5	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.36	SW	2912	C-OCC	3,966	
51	Principal Office	Office	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.14	SW	3000	C-OCC	432	
51	Foyer	Office	9	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.30	SW	3000	C-OCC	3,888	
51	Nurse	Office	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.14	SW	3000	None	432	
51	Office	Office	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.14	SW	3000	C-OCC	432	
51	Teachers Lounge	Staff Lounge	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.14	SW	5000	C-OCC	720	
11	Corridor # 2	Hallway	8	S 34 P F 2 (MAG)	F42EE	72	0.58	SW	2000	None	1,152	
11	Classroom # 7	Classroom	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2912	C-OCC	1,258	
11	Classroom # 6	Classroom	6	S 34 P F 2 (MAG)	F42EE	72	0.43	SW	2912	C-OCC	1,258	
214	Office	Office	5	S 60 P F 2 8' T-12	F82EHS	227	1.14	SW	3000	C-OCC	3,405	
71	Stage	Multi Purpose	2	I 60	I60/1	60	0.12	SW	1500	None	180	
77	Stage	Multi Purpose	12	I 150	I150/1	150	1.80	SW	1500	None	2,700	
71	Stage Locker Room # 1	Restroom	3	I 60	I60/1	60	0.18	SW	4300	C-OCC	774	
71	Stage Locker Room # 2	Restroom	3	I 60	I60/1	60	0.18	SW	4300	C-OCC	774	
51	Stage	Multi Purpose	5	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.72	SW	1500	None	1,080	
169	Multi Purpose Room	Multi Purpose	16	SP 250 MH ROOF	MH250/1	295	4.72	SW	1500	None	7,080	
11	Pre K	Classroom	20	S 34 P F 2 (MAG)	F42EE	72	1.44	SW	2912	C-OCC	4,193	
51	PTA Kitchen	Staff Lounge	8	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.15	SW	5000	None	5,760	
4	Exterior Lights	Side Lighting	4	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.29	SW	8760	PHC	2,523	

Cost of Electricity:

\$0.107	\$/kWh
\$6.74	\$/kW

EXISTING CONDITIONS												Notes
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	Usage Describe Usage Type using Operating Hours	No. of Fixtures No. of fixtures before the retrofit	Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated annual hours for the usage group	Retrofit Control Retrofit control device	Annual kWh (kW/space) * (Annual Hours)	
			188				26.19				69,312	
<b>Total</b>												



		EXISTING CONDITIONS										RETROFIT CONDITIONS						COST & SAVINGS ANALYSIS						
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 Lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fix) * (Fix No.)	Exist. Control Pre-inst. control device	Annual Hours Estimated daily hours for the usage group	Annual kWh (kW/Space) * (Annual Hours)	Number of Fixtures after the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 21 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fix) * (Number of Fixtures)	Retrofit Control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/Space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual \$ Saved (kWh Saved) * (\$/kWh)	Retrofit Cost Cost for renovations to lighting system	NJ Smart Start Lighting Incentive Measures	Simple Payback With Out Incentive Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered
11	Classroom # 2	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258	6	C 28 P F 2	F42SSILL	48	0.3	SW	2,912	839	419	0.1	\$ 56.51	\$ 688.50	\$0	12.2	12.2
11	Classroom # 1	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2912	839	4	C 28 P F 2	F42SSILL	48	0.2	SW	2,912	559	280	0.1	\$ 37.68	\$ 459.00	\$0	12.2	12.2
42	Starway	1	T 32 R F 1 (ELE) 2 Sw./2 Lamp/1 2'x4' Fix.	F41LL	32	0.0	SW	3200	102	1	T 32 R F 1 (ELE) 2 Sw./2 Lamp/1 2'x4' Fix.	F41LL	32	0.0	SW	3,200	102	-0.0	\$ -	\$ -	\$0		#DIV/0!	
11	Lobby	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2912	576	4	C 28 P F 2	F42SSILL	48	0.2	SW	2,000	384	192	0.1	\$ 28.31	\$ 459.00	\$0	16.2	16.2
214	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2,912	3,966	-0.0	\$ -	\$ -	\$0		#DIV/0!	
214	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2,912	3,966	-0.0	\$ -	\$ -	\$0		#DIV/0!	
11	Girls Toilet	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4300	619	2	C 28 P F 2	F42SSILL	48	0.1	SW	4,300	413	206	0.0	\$ 25.97	\$ 229.50	\$0	8.8	8.8
11	Corridor # 1	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2000	864	6	C 28 P F 2	F42SSILL	48	0.3	SW	2,000	576	288	0.1	\$ 42.46	\$ 688.50	\$0	16.2	16.2
11	Boys Toilet	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4300	619	2	C 28 P F 2	F42SSILL	48	0.1	SW	4,300	413	206	0.0	\$ 25.97	\$ 229.50	\$0	8.8	8.8
11	Boiler Room	7	S 34 P F 2 (MAG)	F42EE	72	0.5	SW	1000	504	7	C 28 P F 2	F42SSILL	48	0.3	SW	1,000	336	168	0.2	\$ 31.56	\$ 803.25	\$0	25.4	25.4
11	Music Room	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	2912	419	1	W 28 F 4	F44SSILL	96	0.1	SW	2,912	280	140	0.0	\$ 18.84	\$ 141.75	\$0	7.5	7.5
11	Storage	7	S 34 P F 2 (MAG)	F42EE	72	0.5	SW	3200	1,613	7	C 28 P F 2	F42SSILL	48	0.3	SW	3,200	1,075	538	0.2	\$ 71.11	\$ 803.25	\$0	11.3	11.3
71	Boiler Room	1	I 60	I60/1	60	0.1	SW	1000	60	1	CF 26	CFQ26+L	27	0.0	SW	1,000	27	33	0.0	\$ 6.20	\$ 6.75	\$0	1.1	1.1
214	Classroom # 8	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2,912	3,966	-0.0	\$ -	\$ -	\$0		#DIV/0!	
214	Classroom # 4	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2,912	3,966	-0.0	\$ -	\$ -	\$0		#DIV/0!	
214	Classroom # 3	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2,912	3,966	-0.0	\$ -	\$ -	\$0		#DIV/0!	
214	Classroom # 5	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2,912	3,966	-0.0	\$ -	\$ -	\$0		#DIV/0!	
51	Principal Office	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	3000	432	1	W 28 F 4	F44SSILL	96	0.1	SW	3,000	288	144	0.0	\$ 19.29	\$ 141.75	\$0	7.3	7.3
51	Foyer	9	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.3	SW	3000	3,888	9	W 28 F 4	F44SSILL	96	0.9	SW	3,000	2,592	1,296	0.4	\$ 173.61	\$ 1,275.75	\$0	7.3	7.3
51	Nurse	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	3000	432	1	W 28 F 4	F44SSILL	96	0.1	SW	3,000	288	144	0.0	\$ 19.29	\$ 141.75	\$0	7.3	7.3
51	Office	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	3000	432	1	W 28 F 4	F44SSILL	96	0.1	SW	3,000	288	144	0.0	\$ 19.29	\$ 141.75	\$0	7.3	7.3
51	Teachers Lounge	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	5000	720	1	W 28 F 4	F44SSILL	96	0.1	SW	5,000	480	240	0.0	\$ 29.56	\$ 141.75	\$0	4.8	4.8
11	Corridor # 2	8	S 34 P F 2 (MAG)	F42EE	72	0.6	SW	2000	1,152	8	C 28 P F 2	F42SSILL	48	0.4	SW	2,000	768	384	0.2	\$ 56.62	\$ 918.00	\$0	16.2	16.2
11	Classroom # 7	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258	6	C 28 P F 2	F42SSILL	48	0.3	SW	2,912	839	419	0.1	\$ 56.51	\$ 688.50	\$0	12.2	12.2
11	Classroom # 6	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258	6	C 28 P F 2	F42SSILL	48	0.3	SW	2,912	839	419	0.1	\$ 56.51	\$ 688.50	\$0	12.2	12.2
214	Office	5	S 60 P F 2 8' T-12	F82EHS	227	1.1	SW	3000	3,405	5	S 60 P F 2 8' T-12	F82EHS	227	1.1	SW	3,000	3,405	-0.0	\$ -	\$ -	\$0		#DIV/0!	
71	Stage	2	I 60	I60/1	60	0.1	SW	1500	180	2	CF 26	CFQ26+L	27	0.1	SW	1,500	81	99	0.1	\$ 15.93	\$ 13.50	\$0	0.8	0.8
77	Stage	12	I 150	I150/1	150	1.8	SW	1500	2,700	12	CF 26	CFQ26+L	27	0.3	SW	1,500	486	2,214	1.5	\$ 356.28	\$ 81.00	\$0	0.2	0.2
71	Stage Locker Room # 1	3	I 60	I60/1	60	0.2	SW	4300	774	3	CF 26	CFQ26+L	27	0.1	SW	4,300	348	426	0.1	\$ 53.56	\$ 20.25	\$0	0.4	0.4
71	Stage Locker Room # 2	3	I 60	I60/1	60	0.2	SW	4300	774	3	CF 26	CFQ26+L	27	0.1	SW	4,300	348	426	0.1	\$ 53.56	\$ 20.25	\$0	0.4	0.4
71	Stage	5	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.7	SW	1500	1,080	5	W 28 F 4	F44SSILL	96	0.5	SW	1,500	720	360	0.2	\$ 57.93	\$ 708.75	\$0	12.2	12.2
169	Multi Purpose Room	16	SP 250 MH ROOF	MH250/1	295	4.7	SW	1500	7,080	16	SP 250 MH ROOF	MH250/1	295	4.7	SW	1,500	7,080	-0.0	\$ -	\$ -	\$0		#DIV/0!	
11	Pre K	20	S 34 P F 2 (MAG)	F42EE	72	1.4	SW	2912	4,193	20	C 28 P F 2	F42SSILL	48	1.0	SW	2,912	2,796	1,398	0.5	\$ 188.38	\$ 2,295.00	\$0	12.2	12.2
51	PTA Kitchen	8	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.2	SW	5000	5,760	8	W 28 F 4	F44SSILL	96	0.8	SW	5,000	3,840	1,920	0.4	\$ 236.50	\$ 1,134.00	\$0	4.8	4.8
4	Exterior Lights	4	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.3	SW	8760	2,523	4	2T 17 R F 2 (ELE)	F22ILL	33	0.1	SW	8,760	1,156	1,367	0.2	\$ 158.84	\$ 432.00	\$0	2.7	2.7





EXISTING CONDITIONS														RETROFIT CONDITIONS										COST & SAVINGS ANALYSIS					
Field Code	Area Description	No. of Fixtures before the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exisit Control	Annual Hours	Annual kWh	No. of fixtures after the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	Smart Start Incentive	Simple Payback	Simple Payback					
	Unique description of the location - Room number/Room name: Floor number (if applicable)		Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fix) * (Fix No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kWh/Space) * (Annual Hours)		"Lighting Fixture Code" Example 21 40 R F(U) Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fix) * (Number of Fixtures)	device	Estimated annual hours for the usage group	(kWh/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kWh) - (Retrofit Annual kWh)	(\$/kWh)	Cost for renovations to lighting system	Lighting Incentive	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered					
11	Classroom # 2	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258.0	6	S 34 P F 2 (MAG)	F42EE	72	0.4	C-OCC	1456	629.0	629.0	0.0	\$67.30	\$270.00	\$35.00	4.0	3.5					
11	Classroom # 1	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2912	838.7	4	S 34 P F 2 (MAG)	F42EE	72	0.3	C-OCC	1456	419.3	419.3	0.0	\$44.87	\$270.00	\$35.00	6.0	5.2					
42	Stairway	1	T 32 R F 1 (ELE) 2 Sw/2 Lamp/1 2'x4' Fix.	F41LL	32	0.0	SW	3200	102.4	1	T 32 R F 1 (ELE) 2 Sw/2 Lamp/1 2'x4' Fix.	F41LL	32	0.0	C-OCC	3200	102.4	0.0	\$0.00	\$270.00	\$35.00	0.0	#DIV/0!						
11	Lobby	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2912	838.7	4	S 34 P F 2 (MAG)	F42EE	72	0.3	C-OCC	1456	419.3	419.3	0.0	\$44.87	\$270.00	\$35.00	6.0	5.2					
214	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966.1	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1456	1,983.1	1,983.1	0.0	\$212.19	\$270.00	\$35.00	1.3	1.1					
214	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966.1	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1456	1,983.1	1,983.1	0.0	\$212.19	\$270.00	\$35.00	1.3	1.1					
11	Girls Toilet	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4300	619.2	2	S 34 P F 2 (MAG)	F42EE	72	0.1	C-OCC	3000	432.0	187.2	0.0	\$20.03	\$270.00	\$35.00	13.5	11.7					
11	Corridor # 1	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2000	864.0	6	S 34 P F 2 (MAG)	F42EE	72	0.4	None	2000	864.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
11	Boys Toilet	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4300	619.2	2	S 34 P F 2 (MAG)	F42EE	72	0.1	C-OCC	3000	432.0	187.2	0.0	\$20.03	\$270.00	\$35.00	13.5	11.7					
11	Boiler Room	2	S 34 P F 2 (MAG)	F42EE	72	0.5	SW	1000	504.0	7	S 34 P F 2 (MAG)	F42EE	72	0.5	C-OCC	1000	504.0	0.0	\$0.00	\$270.00	\$35.00	0.0	#DIV/0!						
51	Music Room	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	2912	419.3	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	C-OCC	1456	209.7	209.7	0.0	\$22.43	\$270.00	\$35.00	12.0	10.5					
11	Storage	7	S 34 P F 2 (MAG)	F42EE	72	0.5	SW	3200	1,612.8	7	S 34 P F 2 (MAG)	F42EE	72	0.5	C-OCC	3200	1,612.8	0.0	\$0.00	\$270.00	\$35.00	0.0	#DIV/0!						
71	Boiler Room	1	I 60	I60'1	60	0.1	SW	1000	60.0	1	I 60	I60'1	60	0.1	None	1000	60.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
214	Classroom # 8	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966.1	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1456	1,983.1	1,983.1	0.0	\$212.19	\$270.00	\$35.00	1.3	1.1					
214	Classroom # 4	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966.1	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1456	1,983.1	1,983.1	0.0	\$212.19	\$270.00	\$35.00	1.3	1.1					
214	Classroom # 3	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966.1	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1456	1,983.1	1,983.1	0.0	\$212.19	\$270.00	\$35.00	1.3	1.1					
214	Classroom # 5	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966.1	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1456	1,983.1	1,983.1	0.0	\$212.19	\$270.00	\$35.00	1.3	1.1					
51	Principal Office	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	3000	432.0	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	C-OCC	1500	216.0	216.0	0.0	\$23.11	\$270.00	\$35.00	11.7	10.2					
51	Foyer	9	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.3	SW	3000	3,888.0	9	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.3	C-OCC	1500	1,944.0	1,944.0	0.0	\$208.91	\$270.00	\$35.00	1.3	1.1					
51	Nurse	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	3000	432.0	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	None	3000	432.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
51	Office	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	3000	432.0	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	C-OCC	1500	216.0	216.0	0.0	\$23.11	\$270.00	\$35.00	11.7	10.2					
51	Teachers Lounge	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	SW	5000	720.0	1	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.1	C-OCC	3000	432.0	288.0	0.0	\$30.82	\$270.00	\$35.00	8.8	7.6					
11	Corridor # 2	8	S 34 P F 2 (MAG)	F42EE	72	0.6	SW	2000	1,152.0	8	S 34 P F 2 (MAG)	F42EE	72	0.6	None	2000	1,152.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
11	Classroom # 7	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258.0	6	S 34 P F 2 (MAG)	F42EE	72	0.4	None	1456	629.0	629.0	0.0	\$67.30	\$270.00	\$35.00	4.0	3.5					
11	Classroom # 6	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258.0	6	S 34 P F 2 (MAG)	F42EE	72	0.4	C-OCC	1456	629.0	629.0	0.0	\$67.30	\$270.00	\$35.00	4.0	3.5					
214	Office	5	S 60 P F 2 8' T-12	F82EHS	227	1.1	SW	3000	3,405.0	5	S 60 P F 2 8' T-12	F82EHS	227	1.1	C-OCC	1500	1,702.5	1,702.5	0.0	\$182.17	\$270.00	\$35.00	1.5	1.3					
71	Stage	2	I 60	I60'1	60	0.1	SW	1500	180.0	2	I 60	I60'1	60	0.1	None	1500	180.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
71	Stage	12	I 150	I150'1	150	1.8	SW	1500	2,700.0	12	I 150	I150'1	150	1.8	None	1500	2,700.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
71	Stage Locker Room # 1	3	I 60	I60'1	60	0.2	SW	4300	774.0	3	I 60	I60'1	60	0.2	C-OCC	3000	430.0	340.0	0.0	\$60.00	\$270.00	\$35.00	10.8	9.4					
71	Stage Locker Room # 2	3	I 60	I60'1	60	0.2	SW	4300	774.0	3	I 60	I60'1	60	0.2	C-OCC	3000	430.0	340.0	0.0	\$60.00	\$270.00	\$35.00	10.8	9.4					
51	Stage	5	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.7	SW	1500	1,080.0	5	W 34 F 4 (MAG) 1'x8'	F44EE	144	0.7	None	1500	1,080.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
169	Multi Purpose Room	16	SP 250 MH ROOF	MH250'1	295	4.7	SW	1500	7,080.0	16	SP 250 MH ROOF	MH250'1	295	4.7	None	1500	7,080.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
11	Pra K	20	S 34 P F 2 (MAG)	F42EE	72	1.4	SW	2912	4,193.3	20	S 34 P F 2 (MAG)	F42EE	72	1.4	C-OCC	1456	2,096.6	2,096.6	0.0	\$224.34	\$270.00	\$35.00	1.2	1.0					
51	PTA Kitchen	8	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.2	SW	5000	5,760.0	8	W 34 F 4 (MAG) 1'x8'	F44EE	144	1.2	None	5000	5,760.0	0.0	\$0.00	\$0.00	\$0.00	0.0	#DIV/0!						
4	Exterior Lights	4	28 34 R F 2 (u) (MAG)	FU2EE	72	0.3	SW	8760	2,322.9	4	28 34 R F 2 (u) (MAG)	FU2EE	72	0.3	PHC	2000	276.0	1,966.9	0.0	\$208.32	\$0.00	\$0.00	0.0	0.0					





EXISTING CONDITIONS															RETROFIT CONDITIONS						COST & SAVINGS ANALYSIS					
Field Code	Area Description	No. of Fixtures before the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures after the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback		
	Unique description of the location - Room number/Room name: Floor number (if applicable)		Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/Space) * (Annual Hours)		Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered		
11	Classroom # 2	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258	6	C 28 P F 2	F42SSILL	48	0.3	C-OCC	1,456	419	839	0.1	\$ 101.38	\$ 968.50	35	9.5	9.1		
11	Classroom # 1	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2912	839	4	C 28 P F 2	F42SSILL	48	0.2	C-OCC	1,456	280	559	0.1	\$ 67.59	\$ 729.00	35	10.8	10.3		
42	Starway	1	T 32 R F 1 (ELE) 2 Sw/2 Lamp/1 2x4' Fix.	F41LL	32	0.0	SW	3200	102	1	T 32 R F 1 (ELE) 2 Sw/2 Lamp/1 2x4' Fix.	F41LL	32	0.0	C-OCC	3,200	102	-	0.0	\$ -	\$ 270.00	35	-	-		
11	Lobby	4	S 34 P F 2 (MAG)	F42EE	72	0.3	SW	2000	576	4	C 28 P F 2	F42SSILL	48	0.2	C-OCC	2,000	384	192	0.1	\$ 28.31	\$ 729.00	35	25.8	24.5		
214	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1,456	1,983	1,983	0.0	\$ 212.19	\$ 270.00	35	1.3	1.1		
11	Classroom	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1,456	1,983	1,983	0.0	\$ 212.19	\$ 270.00	35	1.3	1.1		
11	Girls Toilet	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4300	619	2	C 28 P F 2	F42SSILL	48	0.1	C-OCC	3,000	288	331	0.0	\$ 39.32	\$ 499.50	35	12.7	11.8		
11	Corridor # 1	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2000	864	6	C 28 P F 2	F42SSILL	48	0.3	None	2,000	576	288	0.1	\$ 42.46	\$ 688.50	35	16.2	16.2		
11	Boys Toilet	2	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	4300	619	2	C 28 P F 2	F42SSILL	48	0.1	C-OCC	3,000	288	331	0.0	\$ 39.32	\$ 499.50	35	12.7	11.8		
11	Boiler Room	7	S 34 P F 2 (MAG)	F42EE	72	0.5	SW	1000	504	7	C 28 P F 2	F42SSILL	48	0.3	C-OCC	1,000	336	168	0.2	\$ 31.56	\$ 1,073.25	35	34.0	32.9		
51	Music Room	1	W 34 F 4 (MAG) 1x8'	F44EE	144	0.1	SW	2912	419	1	W 28 F 4	F44SSILL	96	0.1	C-OCC	1,456	140	280	0.0	\$ 37.79	\$ 411.75	35	12.2	11.1		
11	Storage	7	S 34 P F 2 (MAG)	F42EE	72	0.5	SW	3200	1,613	7	C 28 P F 2	F42SSILL	48	0.3	C-OCC	3,200	1,075	538	0.2	\$ 71.11	\$ 1,073.25	35	15.1	14.6		
71	Boiler Room	1	I 60	I 60	60	0.1	SW	1000	60	1	CF 26	CFQ26+L	27	0.0	None	1,000	27	33	0.0	\$ 6.20	\$ 6.75	35	1.1	1.1		
214	Classroom # 3	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1,456	1,983	1,983	0.0	\$ 212.19	\$ 270.00	35	1.3	1.1		
214	Classroom # 4	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1,456	1,983	1,983	0.0	\$ 212.19	\$ 270.00	35	1.3	1.1		
214	Classroom # 5	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	SW	2912	3,966	6	S 60 P F 2 8' T-12	F82EHS	227	1.4	C-OCC	1,456	1,983	1,983	0.0	\$ 212.19	\$ 270.00	35	1.3	1.1		
51	Principal Office	1	W 34 F 4 (MAG) 1x8'	F44EE	144	0.1	SW	3000	432	1	W 28 F 4	F44SSILL	96	0.1	C-OCC	1,500	144	288	0.0	\$ 34.70	\$ 411.75	35	11.9	10.9		
51	Foyer	9	W 34 F 4 (MAG) 1x8'	F44EE	144	1.3	SW	3000	3,888	9	W 28 F 4	F44SSILL	96	0.9	C-OCC	1,500	1,296	2,592	0.4	\$ 342.28	\$ 1,545.75	35	4.8	4.8		
51	Nurse	1	W 34 F 4 (MAG) 1x8'	F44EE	144	0.1	SW	3000	432	1	W 28 F 4	F44SSILL	96	0.1	None	3,000	288	144	0.0	\$ 19.29	\$ 141.75	35	7.3	7.3		
51	Office	1	W 34 F 4 (MAG) 1x8'	F44EE	144	0.1	SW	3000	432	1	W 28 F 4	F44SSILL	96	0.1	C-OCC	1,500	144	288	0.0	\$ 34.70	\$ 411.75	35	11.9	10.9		
51	Teachers Lounge	1	W 34 F 4 (MAG) 1x8'	F44EE	144	0.1	SW	5000	720	1	W 28 F 4	F44SSILL	96	0.1	C-OCC	3,000	288	432	0.0	\$ 50.11	\$ 411.75	35	8.2	7.5		
11	Corridor # 2	8	S 34 P F 2 (MAG)	F42EE	72	0.6	SW	2000	1,152	8	C 28 P F 2	F42SSILL	48	0.4	None	2,000	768	384	0.2	\$ 56.62	\$ 918.00	35	16.2	16.2		
11	Classroom # 7	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258	6	C 28 P F 2	F42SSILL	48	0.3	C-OCC	1,456	419	839	0.1	\$ 101.38	\$ 968.50	35	9.5	9.1		
11	Classroom # 6	6	S 34 P F 2 (MAG)	F42EE	72	0.4	SW	2912	1,258	6	C 28 P F 2	F42SSILL	48	0.3	C-OCC	1,456	419	839	0.1	\$ 101.38	\$ 968.50	35	9.5	9.1		
214	Office	5	S 60 P F 2 8' T-12	F82EHS	227	1.1	SW	3000	3,405	5	S 60 P F 2 8' T-12	F82EHS	227	1.1	C-OCC	1,500	1,703	1,703	0.0	\$ 182.17	\$ 270.00	35	1.5	1.3		
71	Stage	2	I 60	I 60	60	0.1	SW	1500	180	2	CF 26	CFQ26+L	27	0.1	None	1,500	81	99	0.1	\$ 15.93	\$ 13.50	35	0.8	0.8		
77	Stage	12	I 150	I 150	150	1.8	SW	1500	2,700	12	CF 26	CFQ26+L	27	0.3	None	1,500	486	2,214	1.5	\$ 366.28	\$ 81.00	35	0.2	0.2		
71	Stage Locker Room # 1	3	I 60	I 60	60	0.2	SW	4300	774	3	CF 26	CFQ26+L	27	0.1	C-OCC	3,000	243	531	0.1	\$ 64.82	\$ 280.25	35	4.5	3.9		
71	Stage Locker Room # 2	3	I 60	I 60	60	0.2	SW	4300	774	3	CF 26	CFQ26+L	27	0.1	C-OCC	3,000	243	531	0.1	\$ 64.82	\$ 280.25	35	4.5	3.9		
51	Stage	5	W 34 F 4 (MAG) 1x8'	F44EE	144	0.7	SW	1500	1,080	5	W 28 F 4	F44SSILL	96	0.5	None	1,500	720	360	0.2	\$ 57.93	\$ 708.75	35	12.2	12.2		
169	Multi Purpose Room	16	SP 250 MH ROOF	MH250/1	295	4.7	SW	1500	7,080	16	SP 250 MH ROOF	MH250/1	295	4.7	None	1,500	7,080	-	0.0	\$ -	\$ -	35	-	-		
11	Pre K	20	S 34 P F 2 (MAG)	F42EE	72	1.4	SW	2912	4,193	20	C 28 P F 2	F42SSILL	48	1.0	C-OCC	1,456	1,398	2,796	0.5	\$ 337.94	\$ 2,565.00	35	7.6	7.5		
51	PTA Kitchen	8	W 34 F 4 (MAG) 1x8'	F44EE	144	1.2	SW	5000	5,760	8	W 28 F 4	F44SSILL	96	0.8	None	5,000	3,840	1,920	0.4	\$ 238.50	\$ 1,134.00	35	4.8	4.8		
4	Exterior Lights	4	28 34 R F 2 (u) (MAG)	FU2EE	72	0.3	SW	8760	2,523	4	T 17 R F 2 (ELE)	F22ILL	33	0.1	PHC	2,000	284	2,259	0.2	\$ 254.32	\$ 432.00	35	1.7	1.7		



**APPENDIX D**

**NJBPU Incentive Programs**

## I. SMART START



HOME	RESIDENTIAL	COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT	RENEWABLE ENERGY
------	-------------	---	------------------



Home » Commercial & Industrial » Programs

## NJ SmartStart Buildings

### Program Overview



#### With New Jersey SmartStart Buildings ...

... A smart start now means better performance later! Whether you're starting a commercial or industrial project from the ground up, renovating existing space, or upgrading equipment, you have unique opportunities to upgrade the energy efficiency of the project.

New Jersey SmartStart Buildings can provide a range of support — at no cost to you — to yield substantial energy savings, both now and for the future. Learn more about:

- Project Categories
- Custom Measures
- Incentives for Qualifying Equipment and Projects
- Program Terms and Conditions
- Find a Trade Ally

**Please note: pre-approval is required for almost all energy efficiency incentives.** This means you must submit an application form (and applicable worksheets) and receive an approval letter from the program before any equipment is installed (click here for complete Terms and Conditions.) Upon receipt of an approval letter, you may proceed to install the equipment listed on your approved application. Equipment installed prior to the date of the approval letter is not eligible for an incentive. **Any customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

#### Getting Started

Submit your project application form as soon as you know you will be doing a construction project, or replacing/adding equipment.

**Smart-Growth Eligibility:** Check to make sure your project is eligible for incentives.

Incentives for new construction are available only for projects in areas designated for growth in the NJ State Development and Redevelopment Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for incentives throughout the State.

Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Site Evaluator Tool available from the HMFA website. Contact a program representative if you are uncertain about project eligibility. The Smart Growth policies will be implemented consistent with Board Orders as described more fully in the C&I Operational Procedure Manual.

Apply for pre-approval by submitting an application for the type of equipment you have chosen to install. The application should be accompanied by a related worksheet, where applicable, and a manufacturer's specification sheet (refer to the specific program requirements on the back of the application for specs needed for your project) for the equipment you are planning to install. (Program representatives will review your application package and approve it, reject it, and/or advise you of upgrades in equipment that will save energy costs and/or increase your incentives.)

#### Support for Custom Energy-Efficiency Measures

Custom measures allows program participants the opportunity to receive an incentive for unique energy-efficiency measures that are not on the prescriptive equipment Incentive list, but are project/facility specific.

#### Incentives for Qualifying Equipment and Projects

Financial incentives are available for large and small projects. These incentives offset some — or maybe even all! — of the added cost to purchase qualifying energy-efficient equipment, which provides significant long-term energy savings. Ranges of incentives are available for qualifying equipment (depending on type, size, and efficiency) in several categories.

Find out more about equipment incentives!

For **specific details** on equipment requirements and financial incentives, including incentives for equipment not listed here, contact a program representative. Annual financial incentives may be

#### Program Updates

Notice of 2013 Changes to C&I Programs

Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years

Large Combined Heat & Power/Fuel Cell Program Update

Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.

### COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PILOT

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

T-12 SCHOOLS LIGHTING INITIATIVE

TEACH

ARRA

TECHNOLOGIES

TOOLS AND RESOURCES

PROGRAM UPDATES

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Featured Success Story

## Mannington Mills:

NJ SmartStart Buildings custom measures case study presented at Globalcon Conference

Applications and Brochures

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**COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT PROGRAMS**

- NJ SMARTSTART BUILDINGS
- EQUIPMENT INCENTIVES
- APPLICATION FORMS
- TOOLS AND RESOURCES
- PAY FOR PERFORMANCE
- COMBINED HEAT & POWER AND FUEL CELLS
- LOCAL GOVERNMENT ENERGY AUDIT
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- EDA PROGRAMS
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- TEACH
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Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

**Equipment Incentives**

**More reasons for a smart start on your next project!**

New Jersey SmartStart Buildings provides **financial incentives for qualifying equipment**. These incentives were developed to help our customers offset some of the added cost to purchase qualifying energy-efficient equipment, which provides significant long-term energy savings. A wide range of incentives are available for qualifying equipment (depending on type, size and efficiency).

Listed below are the types of qualifying equipment and ranges of incentives. For details on equipment requirements and full listings of incentives, refer to the [online application forms](#).

**Please note that almost all equipment incentives require pre-approval before equipment is installed.** (click for exceptions) To start the pre-approval process, submit an Equipment Application, and appropriate Equipment Worksheets, for the type or types of equipment you are planning to install along with equipment specification sheets (refer to the specific program requirements on the back of the application for specifications needed for your project) and a current utility bill(s).

In order to be eligible to receive financial incentives under this Program, Applicants must receive electric and/or gas service from one of the regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.



**Electric Chillers**

- Water-cooled chillers (\$12 - \$170 per ton)
- Air-cooled chillers (\$8 - \$52 per ton)

**Gas Cooling**

- Gas absorption chillers (\$185-\$450 per ton)
- Gas Engine-Driven Chillers (Calculated through Custom Measure Path)

**Desiccant Systems** (\$1.00 per cfm - gas or electric)

**Electric Unitary HVAC**

- Unitary AC and split systems (\$73 - \$92 per ton)
- Air-to-air heat pumps (\$73 - \$92 per ton)
- Water-source heat pumps (\$81 per ton)
- Packaged terminal AC & HP (\$65 per ton)
- Central DX AC Systems (\$40 - \$72 per ton)
- Dual Enthalpy Economizer Controls (\$250)
- Occupancy Controlled Thermostats (\$75 each)

**Ground Source Heat Pumps**

- Closed Loop (\$450-750 per ton)

**Gas Heating**

- Gas-fired boilers < 300 MBH (\$300 per unit)
- Gas-fired boilers ≥ 300 MBH - 1500 MBH (\$1.75 per MBH)
- Gas-fired boilers ≥ 1500 MBH - ≤ 4000 MBH (\$1.00 per MBH)
- Gas-fired boilers > 4000 MBH (Calculated through Custom Measure Path)
- Gas furnaces (\$300-\$400 per unit)

**Variable Frequency Drives**

- Variable air volume (\$65 - \$155 per hp)
- Chilled-water pumps (\$60 per hp)
- Compressors (\$5,250 to \$12,500 per drive)

**Natural Gas Water Heating**

**Program Updates**

- Notice of 2013 Changes to C&I Programs
- Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years
- Large Combined Heat & Power/Fuel Cell Program Update
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- Other updates posted.

**Featured Success Story**

**Mannington Mills:**  
NJ SmartStart Buildings custom measures case study presented at Globalcon Conference

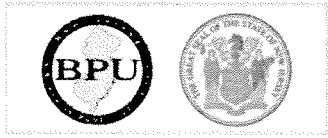
**Applications and Brochures**  
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## II. DIRECT INSTALL

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- RENEWABLE ENERGY

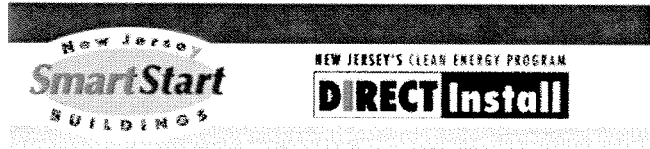


**COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT PROGRAMS**

- NJ SMARTSTART BUILDINGS
- PAY FOR PERFORMANCE
- COMBINED HEAT & POWER AND FUEL CELLS
- LOCAL GOVERNMENT ENERGY AUDIT
- LARGE ENERGY USERS PILOT
- ENERGY SAVINGS IMPROVEMENT PROGRAM
- DIRECT INSTALL
  - PARTICIPATION STEPS
  - PARTICIPATING CONTRACTORS
  - SUSTAINABLE JERSEY
- ENERGY BENCHMARKING
- OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
- EDA PROGRAMS
- T-12 SCHOOLS LIGHTING INITIATIVE
- TEACH
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Home » Commercial & Industrial » Programs » Direct Install

## Direct Install - Steps to Participation



### SIX SIMPLE STEPS TO PARTICIPATION

#### CONTACT THE PARTICIPATING CONTRACTOR IN YOUR AREA

Identify the contractor assigned and trained to provide Direct Install services in the county where your project is located. Using the contact information provided, call or send an e-mail to the participating contractor to discuss your project. The contractor will schedule an energy assessment and work with you to complete the program application and participation agreement.

If you're unable to contact the participating contractor or have questions, you may contact us at 866-NJSMART or send an e-mail to [DirectInstall@NJCleanEnergy.com](mailto:DirectInstall@NJCleanEnergy.com).

#### REVIEW RESULTS

After the energy assessment, the contractor will review the results with you, including what measures qualify and your share of the project cost.

#### MOVE FORWARD

You will sign a scope of work document to proceed with implementation of qualifying measures.

#### ARRANGE INSTALLATION

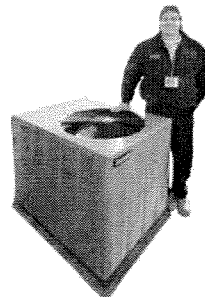
You and the participating contractor will set a convenient start date for the installation.

#### CONFIRM INSTALLATION

Once the participating contractor completes the installation, you accept the work by signing a project completion form.

#### COMPLETE TRANSACTION

You pay the participating contractor your share of the project cost and New Jersey's Clean Energy Program pays the rest.



#### Program Updates

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Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years

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Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.

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**Stony Brook Regional Sewerage Authority:**

Innovative Regenerative Afterburner

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### III. PAY FOR PERFORMANCE (P4P)



# 2012 PAY FOR PERFORMANCE PROGRAM Existing Buildings Incentive Structure

## Incentive #1: Energy Reduction Plan

Incentive Amount:.....\$0.10 per sq ft  
Minimum Incentive:..... \$5,000  
Maximum Incentive::..... \$50,000 or 50% of facility annual energy cost (whichever is less)

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

## Incentive #2: Installation of Recommended Measures

Minimum Performance Target:.....15%

### Electric Incentives

Base Incentive based on 15% savings: .....\$0.09 per projected kWh saved  
For each % over 15% add:.....\$0.005 per projected kWh saved  
Maximum Incentive:.....\$0.11 per projected kWh saved

### Gas Incentives

Base Incentive based on 15% savings: .....\$0.90 per projected Therm saved  
For each % over 15% add:.....\$0.05 per projected Therm saved  
Maximum Incentive: .....\$1.25 per projected Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

## Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target:.....15%

### Electric Incentives

Base Incentive based on 15% savings: .....\$0.09 per actual kWh saved  
For each % over 15% add:.....\$0.005 per actual kWh saved  
Maximum Incentive:.....\$0.11 per actual kWh saved

### Gas Incentives

Base Incentive based on 15% savings: .....\$0.90 per actual Therm saved  
For each % over 15% add:.....\$0.05 per actual Therm saved  
Maximum Incentive:.....\$1.25 per actual Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to \$1 million per gas and electric account per building; maximum of \$2 million per project. See Participation Agreement for details.

#### IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

HOME RESIDENTIAL **COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT** RENEWABLE ENERGY



Home » Commercial & Industrial » Programs

## Energy Savings Improvement Program

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

This Local Finance Notice outlines how local governments can develop and implement an ESIP for their facilities. Below are two sample RFPs:

- Local Government
- School Districts (K-12)

The Board also adopted protocols to measure energy savings.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Local units considering an ESIP should carefully review the Local Finance Notice, the law, and consult with qualified professionals to determine how they should approach the task.

### FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. As explained in the Local Finance Notice, this may be done internally if an agency has qualified staff to conduct the audit. If not, the audit must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach - and it's free. **Incentives provide 100% of the cost of the audit.**

### ENERGY REDUCTION PLANS

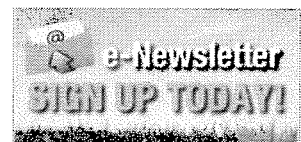
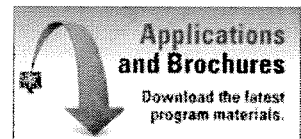
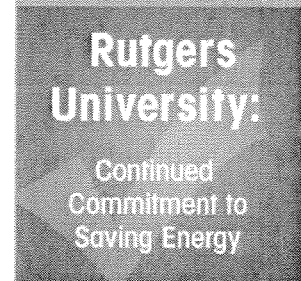
If you have an ESIP plan you would like to submit to the Board of Public Utilities, please email it to [ESIP@bpu.state.nj.us](mailto:ESIP@bpu.state.nj.us). Please limit the file size to 3MB (or break it into smaller files).

- Frankford Township School District
- Northern Hunterdon-Voorhees Regional High School
- Manalapan Township (180 MB - Right Click, Save As)

### Program Updates

- Notice of 2013 Changes to C&I Programs
- Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years
- Large Combined Heat & Power/Fuel Cell Program Update
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- Other updates posted.

### Featured Success Story



## COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

### PROGRAMS

- NJ SMARTSTART BUILDINGS
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**LFN 2011-17**

**June 16, 2011**

**Contact Information**

**Director's Office**

V. 609.292.6613  
F. 609.292.9073

**Local Government Research**

V. 609.292.6110  
F. 609.292.9073

**Financial Regulation  
and Assistance**

V. 609.292.4806  
F. 609.984.7388

**Local Finance Board**

V. 609.292.0479  
F. 609.633.6243

**Local Management Services**

V. 609.292.7842  
F. 609.633.6243

**Authority Regulation**

V. 609.984.0132  
F. 609.984.7388

**Mail and Delivery**

101 South Broad St.  
PO Box 803  
Trenton, New Jersey  
08625-0803

**Web:** [www.nj.gov/dca/lgs](http://www.nj.gov/dca/lgs)

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# Local Finance Notice

Chris Christie  
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Director

## Update on Implementing Energy Savings Improvement Programs

This Local Finance Notice provides guidance concerning Energy Savings Improvement Program (ESIP) matters that affect local units covered under the Local Public Contracts Law (LPCL, N.J.S.A. 40A:11) and the Public School Contracts Law (PSCL, N.J.S.A. 18A:18A).

The Notice covers a model ESCO (Energy Services Company) Request for Proposal document and provides information on using the "Do-It-Yourself" process for implementing an ESIP. This Notice supplements Local Finance Notice 2009-11 concerning ESIPs.

### Model ESCO Request for Proposal Document

#### General Issues

The Division of Local Government Services and the Board of Public Utilities have completed development of a model ESCO Request for Proposal Document. It is designed to assist all organizations (contracting units) covered by the LPCL and PSCL hire an energy services company (ESCO) to develop and implement an Energy Savings Plan (ESP) as part of an Energy Savings Improvement Program as authorized under N.J.S.A. 40A:11-4.6 and 18A:18A-4.6.

Specifically, the document serves as the starting point for these government agencies to select an ESCO through the competitive contracting procedure (N.J.S.A. 40A:11-4.1 et seq. and 18A:18A-4.1 et seq.).

Notwithstanding the efforts of the State agencies to ensure that the RFP is consistent with all relevant procurement procedures, laws, and regulations, there are several issues contracting unit personnel should keep in mind:

- 1) Local legal advisors should review the document to ensure it is consistent with any allowable local practices and legal considerations.
- 2) The individual responsible for managing the project should review the entire RFP in order to be able to answer questions and ensure the document meets local needs.
- 3) Forms have been carefully designed to meet the need of this specific process. Care should be taken if proposed forms are removed and replaced with ones normally used by the contracting unit.

The RFP also uses a formal process for potential proposers to submit questions and requests for clarifications. Appendix B is a form for the submission of these requests and is referred to throughout the text.

Contracting units are also reminded the Competitive Contracting process does not allow for negotiating proposals. While legal elements of the contract (project development agreement) may require legal determinations and modifications, the process does not allow for negotiation of price or related substantive elements and any element that would have provided less than a level playing field for proposers.

Contracting units are also cautioned that setting qualification standards that arbitrarily limit competition is inconsistent with public bidding requirements.

**Office of State Comptroller Filing:** Contracting units are also reminded of their obligations to meet State Comptroller requirements for public contracts. In accordance with N.J.S.A 52:15C-10, contracting units must notify OSC as early as practicable, but no later than 30 days before advertisement, of any negotiation or solicitation of a contract that may exceed \$10 million. Contracting units must also provide post-award notification for any contract for an amount exceeding \$2 million. Notification must be given within 20 days of the award.

#### **Substantive Edits:**

Several sections are highlighted in green. These sections should be carefully edited to meet contracting unit needs. This has important application to evaluation criteria in Section D. Once finalized, the green highlight should be removed.

Section B-16; Insurance should be reviewed by the contracting unit's Risk Management professionals to be sure the standards are appropriate to the contracting unit and the work to be done.

The following Sections also require local decisions and editing:

- A-3: # of copies of proposal and # of CDs to be submitted
- A-4: Web posting address, if desired
- A-5: If extra credit is to be provided on evaluation scoring for attending site walk through
- B-11: Delete LPCL or PSCL section as appropriate
- B-34: Use only if PSCL
- C-1: Explanation of type of audit information
- C-3(k): Include if ESCO is to provide financing option
- Use of Appendix F and Proposal Requirements #8: These forms are related to submission of Political Contribution Disclosure forms. Only PSCL agencies are required to use these forms as pursuant to Public School Fiscal Accountability Procedures (N.J.A.C. 6A23A-6.3). The forms and references to it should be removed for all LPCL users.

Under the ESIP DIY approach, there would be no conflict in a properly procured single organization conducting the audit, developing the ESP, then preparing plans and specifications. This does not apply when using the ESCO approach, where the auditor and ESCO must be independent.

Once construction plans and specifications are complete, the contracting unit would then conduct the bidding process as it would any public works construction project: manage the project as it sees fit (the firm that did the plans could also serve as construction manager), and then contract as necessary for commissioning and final third party verification. The two verification steps (the ESP and verifying implementation) must be performed by an organization independent of the ones preparing the ESP, overseeing construction and commissioning.

By following this process, the contracting unit can then apply to the Local Finance Board for the issuance of ESIP-based energy saving obligations or enter into appropriate lease financing.

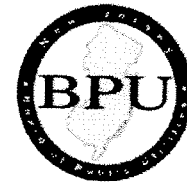
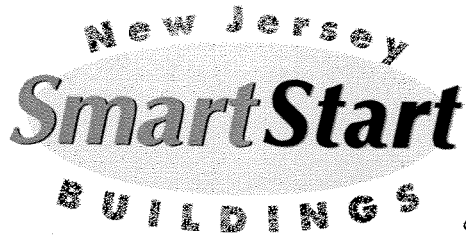
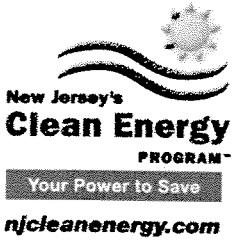
The ESIP approach to energy improvement provides a range of options for contracting units to accrue energy savings while improving the environment, taking advantage of low-cost financing and state and federal incentives. DLGS and the BPU encourage comments and questions (through the ESIP web page) on this new opportunity so we can improve it as time goes on.

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Approved: Thomas H. Neff, Director, Division of Local Government Services

### Table of Web Links

Page	Shortcut text	Internet Address
1, 4	Local Finance Notice 2009-11	<a href="http://www.nj.gov/dca/lgs/lfns/09lfns/2009-11.doc">http://www.nj.gov/dca/lgs/lfns/09lfns/2009-11.doc</a>
2	ESIP webpage	<a href="http://www.nj.gov/dca/lgs/lpcl/esip.htm">http://www.nj.gov/dca/lgs/lpcl/esip.htm</a>
2	email comments	<a href="mailto:lpcl@dca.state.nj.us">mailto:lpcl@dca.state.nj.us</a>
2	to register (via email	<a href="mailto:lpcl@dca.state.nj.us">mailto:lpcl@dca.state.nj.us</a>
2	GovConnect Local Procurement	<a href="http://www.nj.gov/dca/surveys/ppsurvey.htm">http://www.nj.gov/dca/surveys/ppsurvey.htm</a>
3	State Comptroller requirements.	<a href="http://www.nj.gov/comptroller/compliance/index.html">http://www.nj.gov/comptroller/compliance/index.html</a>



# 2012 PAY FOR PERFORMANCE PROGRAM Existing Buildings Incentive Structure

## Incentive #1: Energy Reduction Plan

Incentive Amount:.....\$0.10 per sq ft  
Minimum Incentive:.....\$5,000  
Maximum Incentive:.....\$50,000 or 50% of facility annual energy cost (whichever is less)

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

## Incentive #2: Installation of Recommended Measures

Minimum Performance Target:.....15%

### Electric Incentives

Base Incentive based on 15% savings: .....\$0.09 per projected kWh saved  
For each % over 15% add:.....\$0.005 per projected kWh saved  
Maximum Incentive:.....\$0.11 per projected kWh saved

### Gas Incentives

Base Incentive based on 15% savings: .....\$0.90 per projected Therm saved  
For each % over 15% add:.....\$0.05 per projected Therm saved  
Maximum Incentive: .....\$1.25 per projected Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

## Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target:.....15%

### Electric Incentives

Base Incentive based on 15% savings: .....\$0.09 per actual kWh saved  
For each % over 15% add:.....\$0.005 per actual kWh saved  
Maximum Incentive: .....\$0.11 per actual kWh saved

### Gas Incentives

Base Incentive based on 15% savings: .....\$0.90 per actual Therm saved  
For each % over 15% add:.....\$0.05 per actual Therm saved  
Maximum Incentive: .....\$1.25 per actual Therm saved

Incentive Cap: ..... 25% of total project cost

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to \$1 million per gas and electric account per building; maximum of \$2 million per project. See Participation Agreement for details.

## **APPENDIX E**

### **Photovoltaic (PV) Rooftop Solar Power Generation**

**Photovoltaic (PV) Solar Power Generation - Screening Assessment**

**Milford BOE  
Milford Public School**

Cost of Electricity	\$0.160	/kWh
Electricity Usage	117,600	kWh/yr
System Unit Cost	\$4,000	/kW

**Photovoltaic (PV) Solar Power Generation - Screening Assessment**

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
	\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
\$28,000	7.0	7,106	0	\$1,137	0	\$1,137	\$0	\$817	24.6	14.3

\*\* Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= \$115 /1000kwh

**Area Output\***

201 m2  
2,164 ft2

**Perimeter Output\***

41 m  
135 ft

**Available Roof Space for PV:**

(Area Output - 10 ft x Perimeter) x 85%  
696 ft2

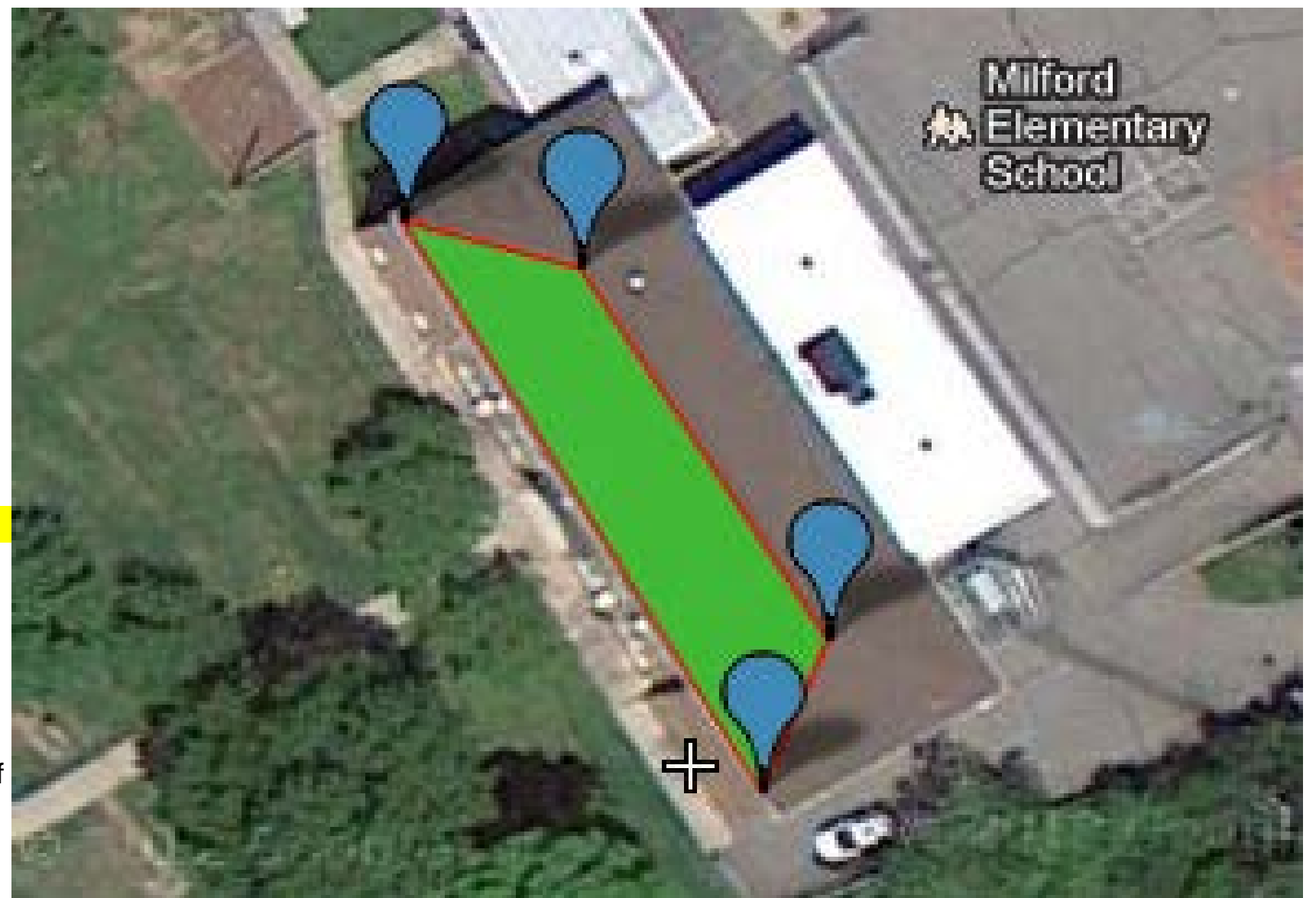
**Approximate System Size:**

Is the roof flat? (Yes/No) **Yes**

8 watt/ft2  
5,565 DC watts  
7 kW Enter into PV Watts

**PV Watts Inputs\*\*\***

Array Tilt Angle 20 Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)  
Array Azimuth 180 Enter into PV Watts (default)  
Zip Code 8848 Enter into PV Watts  
DC/AC Derate Factor 0.83 Enter into PV Watts



**PV Watts Output**

7,106 annual kWh calculated in PV Watts program

**% Offset Calc**

Usage 117,600 (from utilities)  
PV Generation 7,106 (generated using PV Watts )  
% offset 6%

\* <http://www.freemaptools.com/area-calculator.htm>  
\*\* <http://www.fletexchange.com>  
\*\*\* [http://gisatnrel.nrel.gov/PVWatts\\_Viewer/index.html](http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html)



## AC Energy & Cost Savings



Station Identification		Results			
Cell ID:	0266371	Month	Solar Radiation (kWh/m <sup>2</sup> /day)	AC Energy (kWh)	Energy Value (\$)
State:	Pennsylvania				
Latitude:	40.6 ° N				
Longitude:	75.3 ° W				
<b>PV System Specifications</b>		1	3.10	536	0.70
DC Rating:	7.00 kW	2	3.78	583	0.76
DC to AC Derate Factor:	0.770	3	4.95	824	1.07
AC Rating:	5.39 kW	4	5.04	779	1.01
Array Type:	Fixed Tilt	5	5.39	827	1.08
Array Tilt:	40.6 °	6	5.48	788	1.02
Array Azimuth:	180.0 °	7	5.44	799	1.04
<b>Energy Specifications</b>		8	5.17	761	0.99
Cost of Electricity:	0.1 ¢/kWh	9	4.92	725	0.94
		10	4.25	673	0.87
		11	3.11	492	0.64
		12	2.78	467	0.61
		Year	4.45	7106	10.73
		Saving Text from a Browser			
Run <a href="#">PVWATTS v.2</a> for another location		Run <a href="#">PVWATTS v.1</a>			

*(Gridded data is monthly, hourly output not available.)*

Please send questions and comments to [Webmaster](#)  
[Disclaimer and copyright notice.](#)



**APPENDIX F**

**EPA Portfolio Manager**





# STATEMENT OF ENERGY PERFORMANCE

## MilfordBOE

Building ID: 3435120  
 For 12-month Period Ending: August 31, 2012<sup>1</sup>  
 Date SEP becomes ineligible: N/A

Date SEP Generated: April 29, 2013

<b>Facility</b> MilfordBOE 7 Hillside Ave Milford, NJ 08848	<b>Facility Owner</b> N/A	<b>Primary Contact for this Facility</b> N/A
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Year Built: 1960  
 Gross Floor Area (ft<sup>2</sup>): 22,000

Energy Performance Rating<sup>2</sup> (1-100) 33

### Site Energy Use Summary<sup>3</sup>

Electricity - Grid Purchase(kBtu)	436,552
Natural Gas - (kBtu) <sup>4</sup>	0
Total Energy (kBtu)	436,552

### Energy Intensity<sup>4</sup>

Site (kBtu/ft <sup>2</sup> /yr)	74
Source (kBtu/ft <sup>2</sup> /yr)	121

### Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year)	149
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### Electric Distribution Utility

Jersey Central Power & Light Co [FirstEnergy Corp]

### National Median Comparison

National Median Site EUI	64
National Median Source EUI	104
% Difference from National Median Source EUI	16%
Building Type	K-12 School

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

### Meets Industry Standards<sup>5</sup> for Indoor Environmental Conditions:

Ventilation for Acceptable Indoor Air Quality	N/A
Acceptable Thermal Environmental Conditions	N/A
Adequate Illumination	N/A

### Certifying Professional

N/A

#### Notes:

- Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
- The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
- Values represent energy consumption, annualized to a 12-month period.
- Values represent energy intensity, annualized to a 12-month period.
- Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

# FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

**Facility**  
MilfordBOE  
7 Hillside Ave  
Milford, NJ 08848

**Facility Owner**  
N/A

**Primary Contact for this Facility**  
N/A

## General Information

MilfordBOE	
Gross Floor Area Excluding Parking: (ft <sup>2</sup> )	22,000
Year Built	1960
For 12-month Evaluation Period Ending Date:	August 31, 2012

## Facility Space Use Summary

Milford School	
Space Type	K-12 School
Gross Floor Area (ft <sup>2</sup> )	22,000
Open Weekends?	No
Number of PCs	40
Number of walk-in refrigeration/freezer units	0
Presence of cooking facilities	No
Percent Cooled	10
Percent Heated	100
Months °	10
High School?	No
School District °	N/A

## Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 08/31/2012)	Baseline (Ending Date 08/31/2012)	Rating of 75	Target	National Median
Energy Performance Rating	33	33	75	N/A	50
Energy Intensity					
Site (kBtu/ft <sup>2</sup> )	74	74	50	N/A	64
Source (kBtu/ft <sup>2</sup> )	121	121	81	N/A	104
Energy Cost					
\$/year	\$ 47,883.15	\$ 47,883.15	\$ 32,342.41	N/A	\$ 41,357.47
\$/ft <sup>2</sup> /year	\$ 2.18	\$ 2.18	\$ 1.47	N/A	\$ 1.88
Greenhouse Gas Emissions					
MtCO <sub>2</sub> e/year	149	149	101	N/A	129
kgCO <sub>2</sub> e/ft <sup>2</sup> /year	7	7	5	N/A	6

More than 50% of your building is defined as K-12 School. Please note that your rating accounts for all of the spaces listed. The National Median column presents energy performance data your building would have if your building had a median rating of 50.

Notes:

o - This attribute is optional.

d - A default value has been supplied by Portfolio Manager.

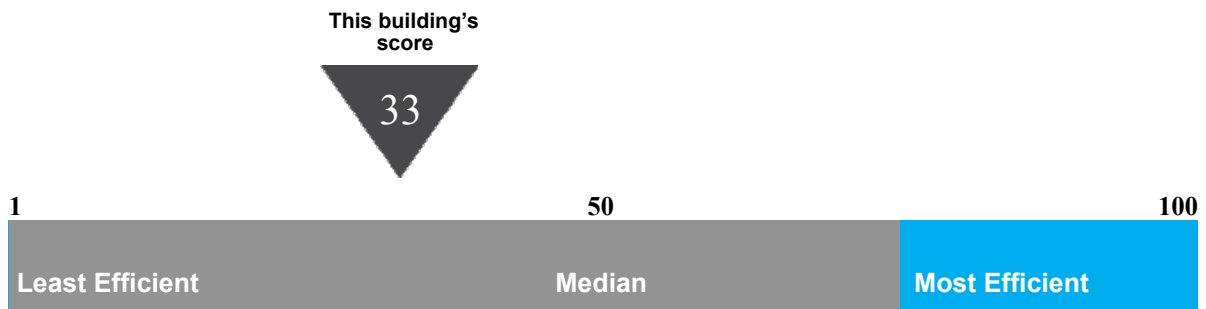
# Statement of Energy Performance

## 2012

MilfordBOE  
7 Hillside Ave  
Milford, NJ 08848

Portfolio Manager Building ID: 3435120

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit [energystar.gov/benchmark](http://energystar.gov/benchmark).



This building uses 121 kBtu per square foot per year.\*

\*Based on source energy intensity for the 12 month period ending August 2012

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at [energystar.gov](http://energystar.gov)

Date of certification

