

**ROXBURY TOWNSHIP BOARD OF EDUCATION
ADMINISTRATIVE OFFICE BUILDING
ENERGY ASSESSMENT**

for

**NEW JERSEY
BOARD OF PUBLIC UTILITIES**

CHA PROJECT NO. 24454

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Prepared by:



6 Campus Drive
Parsippany, NJ 07054

(973) 538-2120

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY 1

2.0 INTRODUCTION AND BACKGROUND 2

EXISTING CONDITIONS..... 3

 2.1 Building - General..... 3

 2.2 Utility Usage..... 4

 2.3 HVAC Systems 5

 2.4 Control Systems 5

 2.5 Lighting Systems..... 6

 2.6 Plumbing Systems 6

 2.6.1 Domestic Hot Water System..... 6

3.0 ENERGY CONSERVATION MEASURES..... 7

 3.1 ECM-1 Install Night Setback Thermostat 7

 3.2 ECM-2 Lighting Replacement..... 7

 3.3 ECM-3 Install Occupancy Sensors 8

 3.4 ECM-4 Lighting Replacements with Occupancy Sensors 8

 3.5 ECM-5 Install Low Flow Fixture..... 9

4.0 PROJECT INCENTIVES..... 10

 4.1 Incentives Overview..... 10

 4.1.1 New Jersey Pay For Performance Program..... 10

 4.1.2 New Jersey Smart Start Program 11

 4.1.3 Direct Install Program 11

 4.1.4 Energy Savings Improvement Plans (ESIP)..... 12

5.0 ALTERNATIVE ENERGY SCREENING EVALUATION..... 13

 5.1 Solar 13

 5.1.1 Photovoltaic Rooftop Solar Power Generation..... 13

 5.1.2 Solar Thermal Hot Water Plant..... 13

6.0 EPA PORTFOLIO MANAGER 15

7.0 CONCLUSIONS & RECOMMENDATIONS 17

APPENDICES

- A Utility Usage Analysis, Energy Suppliers List
- B Equipment Inventory
- C ECM Calculations
- D New Jersey Pay For Performance Incentive Program
- E ESIP Information
- F Solar Photovoltaic Analysis
- G EPA Portfolio Manager

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 Roxbury Township 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
Administration Building	42 North Hillside Avenue Succasunna, NJ 07876	7,812	Original: 1903

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 \$3,600 for the recommended ECMs may be realized with a combined payback of 5.1 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	Install Night Setback Thermostat	1,000	1,700	1	0	1	X
ECM-2	Lighting Replacement / Upgrades	12,000	2,000	6	8,100	2.0	
ECM-3	Install Lighting Controls (Occupancy Sensors)	4,000	1,900	2	2,800	0.6	X
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	16,000	3,200	5	10,900	1.6	
ECM-5	Install Low Flow Fixtures	17,000	100	>20	0	>20	

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 Administration Building for the Roxbury Township Board of Education is an office building located in Succasunna, NJ. The building is a 7,812 square foot, two story structure, with vinyl siding, a peaked slate roof and field stone basement. The building was constructed in 1903, and has been renovated several times to create office space with modern amenities. A large ramp and staircase were recently constructed on the south side of the building. Two natural gas boilers, located in the basement, provide heat to the building. Each floor is served by an air handler and two condensing units. There are two fan coil units located in the basement. Occupancy includes approximately 17 employees. The building is generally occupied Monday through Friday between 8:00 am and 5:00 pm, and on the weekend as necessary. Maintenance employees typically occupy the building after normal business hours.

EXISTING CONDITIONS

2.1 Building - General

Built in the 1903 with several renovations, the Administration building is a 7,812 square foot, two-story facility with offices for the Roxbury Township Board of Education. The building has approximately 17 employees, and appeared fully utilized during the field survey. The building can be assumed to be fully occupied until 5:00 pm during the week. Custodial staff is typically in the building until 8:00 pm during the week. The hours of operation are:

- Monday through Friday 8:00 am to 5:00 pm (employees)
- Saturday & Sunday, open as needed

The building is constructed of block walls with an exterior layer of vinyl siding. The interior walls are a mixture of painted sheetrock walls and framed walls filled with fiberglass insulation and finished with gypsum board. The building has a pitched slate roof with an attic space underneath. The second floor windows are single pane, while the first floor windows have been recently replaced. The second floor of the building is utilized as storage and office space. The first floor has been renovated for offices and meeting rooms.



2.2 Utility Usage

Utilities include electricity, natural gas, and potable water. Electricity is delivered by JCP&L and supplied by Direct Energy. Natural gas supplied by Hess and delivered by NJNG. Water is paid for through New Jersey American Water.

The Administration Building has one electric meter and one gas meter. For the 12-month period ranging from June 2011 through May 2012, the utilities usage for the building was as follows:

Actual Cost & Site Usage by Utility

Electric		
Annual Usage	127,539	kWh/yr
Annual Cost	28,490	\$
Blended Rate	0.223	\$/kWh
Supply Rate	0.214	\$/kWh
Demand Rate	4.21	\$/kW
Peak Demand	33.9	kW
Min. Demand	22.5	kW
Avg. Demand	28.33	kW
Natural Gas		
Annual Usage	4,331	therms/yr.
Annual Cost	5,600	\$
Rate	1.29	\$/Therm

Electrical usage was generally higher in the summer months when air conditioning equipment was operational. Natural gas consumption was highest in winter months for heating. See Appendix A for a detailed utility analysis.

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

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. With the supply portion open to competition, customers can shop around for the best price on their energy supplies. Their electric and natural gas distribution utilities will still deliver those supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing your energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of your service. Additional information on selecting a third party energy supplier is available here: <http://www.state.nj.us/bpu/commercial/shopping.html>. See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

2.3 HVAC Systems

The systems and equipment described below serve the school building. Specifics on the mechanical equipment can be found within the equipment inventory located in Appendix B.

3.3.1 Heating Hot Water Systems

The building is heated with hot water supplied to fin tube units by two natural gas fired Utica Boilers located in the basement. These units were installed within the last ten years and are in good condition. This heating system runs from October through April, and is shut off during the summer months.

3.3.2 Split System Direct Expansion DX Cooling Units

Two 5-ton York Condensers, model H4DH060506A are located adjacent to the south side of the building. These units serve four wall mounted AC units spread across two stages on both floors. These units are controlled by York programmable thermostats located in one of the offices.

3.3.3 Heating and Ventilating Air Handling Units

The building has two air handling units serving each of the two floors. The units are located in the basement of the building. Each unit has a capacity of 3,900 CFM and has a 2 HP fan for cooling.

3.3.4 Exhaust Systems

Exhaust system fans operate during building occupancy. Common exhaust plenums serve rooms and offices with rooftop mounted constant volume exhaust fans. Exhaust fans are used for ventilating restrooms and custodial closets throughout the building.

3.3.5 Fan Coil Units

The basement of the building is heated with two 5 kW Dayton electric unit heaters located in basement] These units are turned on when the building is being heated.

2.4 Control Systems

The heating and cooling systems are controlled by York programmable thermostats located in one of the office spaces. These are not connected to the district's EMS system. This system can be adjusted by the employees within the building at any time. During occupied hours, the building temperature is typically set at 76 degrees. During unoccupied hours, the building temperature is typically set at 82 degrees.

2.5 Lighting Systems

The majority of the lights used in the building were T12 bulbs of varying sizes. Some compact fluorescent bulbs were used, as well as incandescent bulbs in desk lamps. The building lamps are controlled by switches in each room, and turned off at the end of each day.

There were several lights on the exterior of the building and over the walkway to the rear door. These operate during the overnight hours.

2.6 Plumbing Systems

2.6.1 Domestic Hot Water System

An 30 gallon natural gas fired hot water heater is located in the basement and serves the entire building. Hot water is not in high demand as there is no cafeteria in the building. Domestic hot water temperature is maintained at 140°F, and chemical disinfection soap is provided at the toilet rooms.

3.6.2 Plumbing Fixtures

The building's lavatories, water closets, and urinals are all high flow fixtures. In general, lavatories are 2.5 gpm with push type faucets, water closets are 1.6 gpf, and urinals are 1.0 gpf.

3.0 ENERGY CONSERVATION MEASURES

3.1 ECM-1 Install Night Setback Thermostat

The Administration Building has offices used during normal working hours from 8:00 am to 5:00 pm. A programmable thermostat would allow heating and cooling functions to be programmed to operate during the hours when the building is occupied. These systems could also be programmed to operate at lower temperatures when the building is unoccupied. Energy savings could be realized by programming the heating and cooling systems to operate during normal occupied hours.

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

ECM-1 Install Night Setback Thermostat

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$		
1,000	6,400	0	200	1,700	0	1,700	24.5	0	0.6	0.6

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

Expected Life: 15 years
 Lifetime Savings: 96,000 kWh 3,000 therms \$ 25,500

This measure is recommended.

3.2 ECM-2 Lighting Replacement

The building's office spaces generally use linear fluorescent fixtures with T-12 bulbs. Most can lights and surface mounted standard bulb fixtures use compact fluorescent lights (CFLs) to replace original incandescent bulbs.

Modern fluorescent lamps convert electrical power into useful light more efficiently than an incandescent lamp or T-12 bulbs. A comprehensive fixture survey was conducted of the building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established (Appendix C). There is an opportunity to reduce consumption by upgrading the existing T-12 fixtures to T-8 or super T-8 fixtures.

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

ECM-2 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
12,000	8,500	0	0	2,000	0	2,000	1.6	800	6.0	2.0

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

Expected Life: 15 years
 Lifetime Savings: 127,500 kWh 0 therms \$ 30,000

This measure is not recommended in lieu of ECM-3.

3.3 ECM-3 Install Occupancy Sensors

The current office lighting is controlled by manual switches. Lights are generally turned on in the morning and shut off at night. During occupied times, there are rooms that are not occupied; however, the lights remain on. Adding occupancy controls to the individual rooms will automatically control the lights based on occupancy. The occupancy sensor can be wall mounted near the switch or placed at the ceiling for larger room coverage. All occupancy sensors are equipped with a manual override feature. These sensors are generally not recommended in public toilet rooms.

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

ECM-3 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric	Electric	Nat Gas	Total						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
4,000	8,700	0	0	1,900	0	1,900	6.2	700	2.1	0.6

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

Expected Life: 15 years
 Lifetime Savings: 130,500 kWh 0 therms \$ 28,500

This measure is recommended.

3.4 ECM-4 Lighting Replacements with Occupancy Sensors

Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative. This measure is a combination of ECM-2 and ECM-3 to reflect actual expected energy and demand reduction.

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

ECM-4 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$	kWh	kW	Therms	\$	\$	\$		\$	Years	Years
16,000	14,300	0	0	3,200	0	3,200	2.1	1,500	5.1	1.6

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

Expected Life: 15 years
 Lifetime Savings: 214,500 kWh 0 therms \$ 48,000

This measure is not recommended in lieu of ECM- 3.

3.5 ECM-5 Install Low Flow Fixtures

The existing toilet room fixtures consume more water than modern plumbing fixtures. It was determined that the current toilets and urinals with an average water use of 1.6 gal/flush for toilets and 1.6 gal/flush for urinals and 2.2 gallons per minute for faucets. Based on the number of occupants, it was estimated that each toilet and faucet is utilized approximately three times per day. The water savings associated from replacing these fixtures with low-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the number of times each fixture is used, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 gals/flush toilets and 0.5 gal/flush urinals and 0.5 gallon per minute faucets.

ECM-5 Install Low Flow Fixtures

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$	kWh	kW	Therms	\$	\$	\$		\$	Years	Years
17,000	0	0	0	100	0	100	0.0	0	>20	>20

Expected Life: 15 years
 Lifetime Savings: 0 kWh 0 therms \$ 1,500

This measure is not recommended.

4.0 PROJECT INCENTIVES

4.1 Incentives Overview

4.1.1 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.

The table below shows the summary of incentives available through the Pay for Performance program for this building. The total ECM savings did not meet the minimum 15% annual savings required to obtain incentives # 2 and #3, hence they are zero. Detailed calculations can be found in Appendix D.

	Incentives \$		
	Elec	Gas	Total
Incentive #1	\$0	\$0	\$5,000
Incentive #2	\$0	\$0	\$0
Incentive #3	\$0	\$0	\$0
Total All Incentives	\$0	\$0	\$5,000

The current ECM's does not meet the minimum savings of 15% and therefore the building will not be eligible for incentives #2 and #3. See Appendix D for additional details.

4.1.2 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.

4.1.3 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 natural gas 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, natural gas, 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 facility is potentially eligible to receive funding from the Direct Install Program. The total implementation cost for all ECMs potentially eligible for Direct Install funding is \$10,900, and includes lighting replacements, upgrades and controls in select areas. The program normally has a potential to pay 70% of the initial costs, leaving 30% to be paid out of pocket. Direct Install funding has the potential to significantly reduce the payback period of Energy Conservation Measures.

4.1.4 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.

5.0 ALTERNATIVE ENERGY SCREENING EVALUATION

5.1 Solar

5.1.1 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 \$77/ SREC per year based on current market data, and this number was utilized in the cash flow for this report.

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.

This measure is not recommended due to the layout of the building. The peaked roof design yields insufficient space to justify a PV roof setup.

5.1.2 Solar Thermal Hot Water Plant

Active solar thermal systems use solar collectors to gather the sun's energy to heat water, another fluid, or air. An absorber in the collector converts the sun's energy into heat. The heat is then transferred by circulating water, antifreeze, or sometimes air to another location for immediate use or storage for later utilization. Applications for active solar thermal energy include providing hot water, heating swimming pools, space heating, and preheating air in residential and commercial buildings.

A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed

on the roof of the building, oriented south, and tilted around the site's latitude, to maximize the amount of radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system). The most practical system would transfer the heat from the panels to thermal storage tanks and transfer solar produced thermal energy to use for domestic hot water production. DHW is presently produced by gas-fired water heaters and, therefore, this measure would offer natural gas utility savings.

6.0 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/ft²/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 natural gas 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.

$$\text{Site Energy Intensity} = \frac{\text{Electric Usage in kBtu} + \text{Natural Gas in kBtu}}{\text{Building Square Footage}}$$

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.

$$\text{Source Energy Intensity} = \frac{\text{Electric Usage in kBtu} \times \text{Site/Source Ratio} + \text{Natural Gas in kBtu} \times \text{Site/Source Ratio}}{\text{Building Square Footage}}$$

The EPA Score, Site EUI, and Source EUI for Administration Building are as follows:

Energy Intensity	Administration Building	National Average
EPA Score	12	50
Site (kBtu/sf/year)	111.1	142
Source (kBtu/sf/year)	244.1	273.5

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 Administration Building is considered a higher than average energy consumer by the EPA Portfolio Manager which gives it a lower than average EPA score. For the building 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 Administration Building. 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.

The user name (“*roxburyboe*”) and password (“*energystar*”) for the building’s EPA Portfolio Manager Account has been provided to the Roxbury Township Board of Education.

7.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Roxbury Township Board of Education Administration Building identified potential ECMs for lighting and control replacement, and installation of a Night Setback Thermostat. Potential annual savings of \$3,600 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

ECM-1 Install Night Setback Thermostat

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 1,000	6,400	0	200	1,700	\$ 0	\$ 1,700	24.5	\$ 0	0.6	0.6

Expected Life: 15 years
 Lifetime Savings: 96,000 kWh 3,000 therms \$ 25,500

ECM-3 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 4,000	8,700	0	0	1,900	\$ 0	\$ 1,900	6.2	\$ 2,800	2.1	0.6

Expected Life: 15 years
 Lifetime Savings: 130,500 kWh 0 therms \$ 28,500

APPENDIX A

Utility Usage Analysis

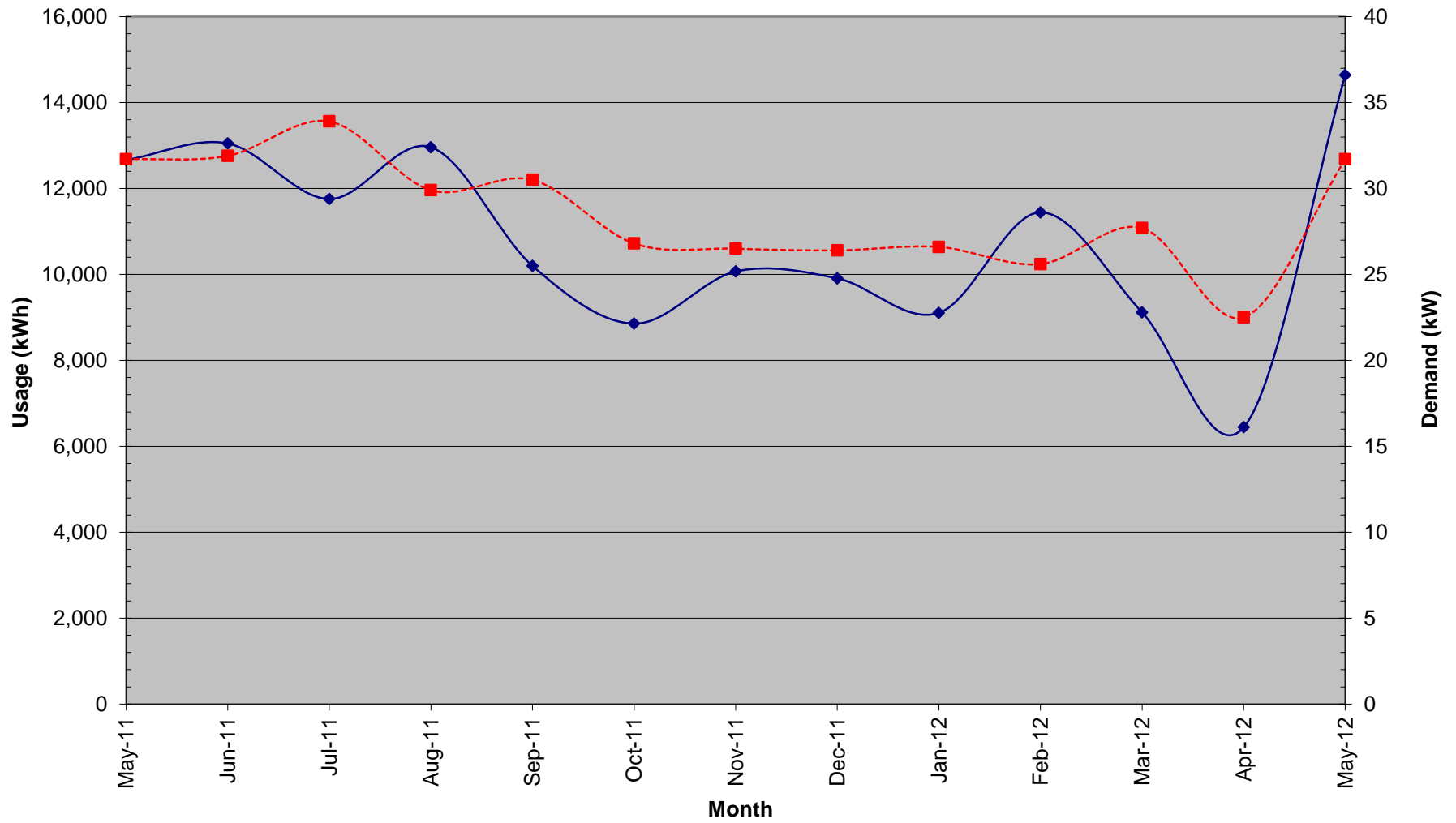
Roxbury Township BOE
 42 Hillside Ave.
 Succasunna, NJ 07876

Electric Service
 Delivery - JCP&L
 Supplier -

For Service at: Administration Building
 Account No.: 100031-4592-23
 Meter No.: 16884398

Month	Consumption (kWh)	Demand (kW)	Charges			Unit Costs		
			Total (\$)	Delivery (\$)	Supply (\$)	Blended Rate (\$/kWh)	Consumption (\$/kWh)	Demand (\$/kW)
May-11	12,663	31.70	\$ 2,834.15			\$ 0.224	\$ 0.224	\$ -
June-11	13,049	31.90	\$ 2,915.49			\$ 0.223	\$ 0.223	\$ -
July-11	11,754	33.90	\$ 2,816.68			\$ 0.240	\$ 0.226	\$ 4.89
August-11	12,961	29.90	\$ 2,882.93			\$ 0.222	\$ 0.212	\$ 4.62
September-11	10,197	30.50	\$ 2,300.34			\$ 0.226	\$ 0.226	\$ -
October-11	8,855	26.80	\$ 1,998.45			\$ 0.226	\$ 0.213	\$ 4.06
November-11	10,068	26.50	\$ 2,251.95			\$ 0.224	\$ 0.213	\$ 4.03
December-11	9,908	26.40	\$ 2,219.17			\$ 0.224	\$ 0.213	\$ 4.02
January-12	9,105	26.60	\$ 2,047.97			\$ 0.225	\$ 0.213	\$ 4.04
February-12	11,444	25.60	\$ 2,524.58			\$ 0.221	\$ 0.212	\$ 3.94
March-12	9,116	27.70	\$ 2,011.61	\$ 1,171.75	\$ 839.86	\$ 0.221	\$ 0.129	\$ 4.13
April-12	6,442	22.50	\$ 1,435.77	\$ 842.27	\$ 593.50	\$ 0.223	\$ 0.131	\$ 3.59
May-12	14,640	31.70	\$ 3,081.61	\$ 1,814.83	\$ 1,266.78	\$ 0.210	\$ 0.124	\$ 4.75
Total (12-months)	127,539	33.90	\$28,486.55	\$3,828.85	\$2,700.14	\$ 0.223	\$ 0.214	\$ 4.21

Electric Usage - Administration Building



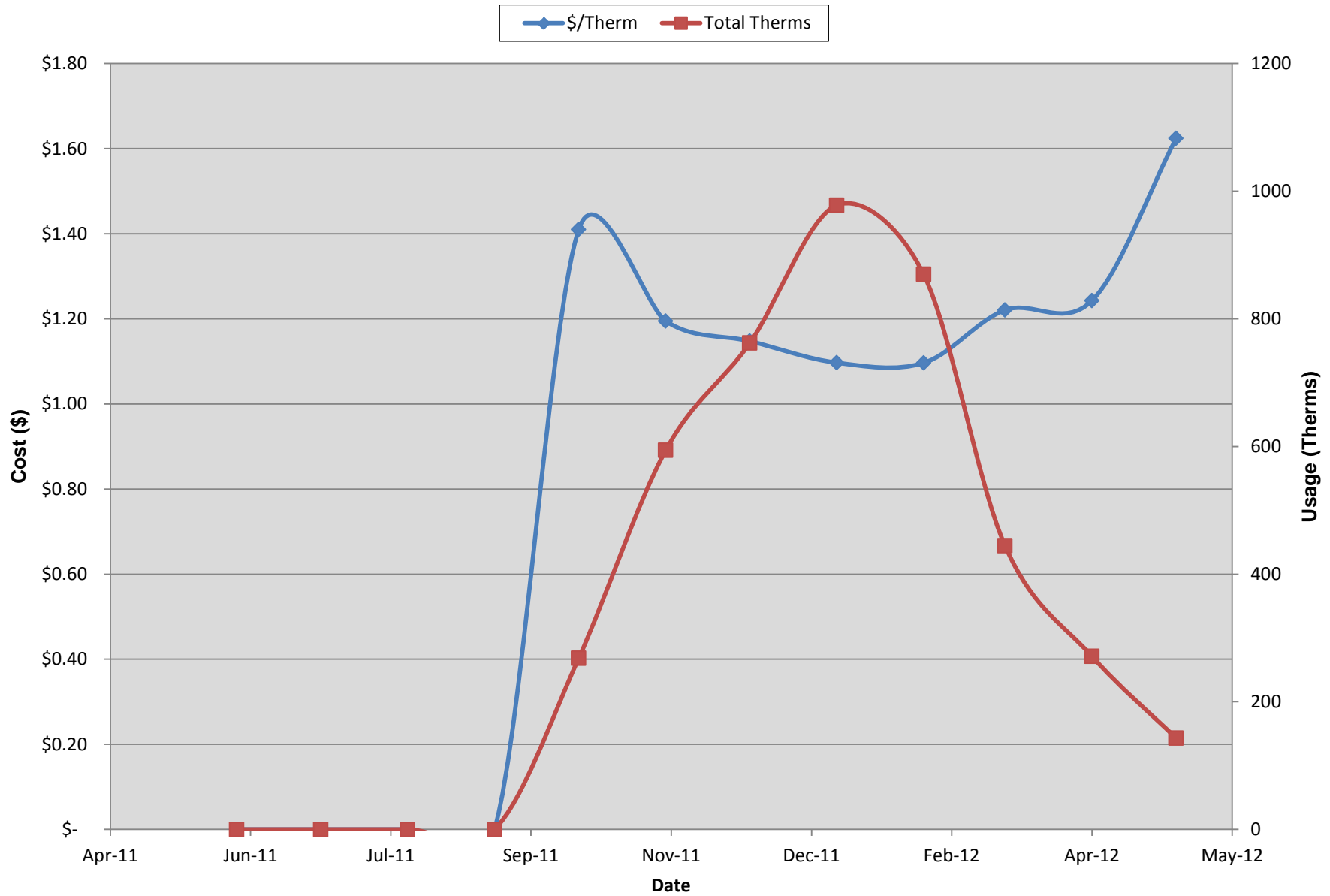
Roxbury Township BOE
 42 Hillside Ave.
 Succasunna, NJ 07876

Gas Service
 Delivery - NJNG
 Supplier -

For Service at: Administration Building
 Account No.: 22-0006-9761-27
 Meter No.: 00395878

Month	Total (\$)	Delivery (\$)	Supply (\$)	Total Therms	\$/Therm
Sep-10	\$ 125.81			2.1	\$ 59.91
Oct-10	\$ 222.23			98	\$ 2.27
Nov-10	\$ 705.26			574.1	\$ 1.23
Dec-10	\$ 1,155.87			997.9	\$ 1.16
Jan-11	\$ 1,912.89			1734.2	\$ 1.10
Feb-11	\$ 2,337.52			2015.2	\$ 1.16
Mar-11	\$ 410.47			307.4	\$ 1.34
Apr-11	\$ 133.20			99.8	\$ 1.33
May-11	\$ 123.88			0	#DIV/0!
Jun-11	\$ 123.88			0	#DIV/0!
Jul-11	\$ 123.88			0	#DIV/0!
Aug-11	\$ 123.88			0	#DIV/0!
Sep-11	\$ 123.88			0	#DIV/0!
Oct-11	\$ 378.34			268.3	\$ 1.41
Nov-11	\$ 709.54			593.9	\$ 1.19
Dec-11	\$ 874.40			762	\$ 1.15
Jan-12	\$ 1,072.74			978.1	\$ 1.10
Feb-12	\$ 953.53			869.7	\$ 1.10
Mar-12	\$ 542.47			444.4	\$ 1.22
Apr-12	\$ 337.17			271.3	\$ 1.24
May-12	\$ 232.22			143	\$ 1.62
Total (12-months)	\$ 5,595.93	\$ -	\$ -	4330.70	\$ 1.29

Natural Gas Usage - Administration Building (12 Months)



APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
 CHA #24454
 Roxbury BOE
 Administrative Building
 Original Construction Date:
 Renovation/Addtion Date:

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size/Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
CU	4	York	H4DH060506A	EMJM518854	Condensing Unit	5 Tons	Building	Building	2007	15	
AHU	2	York	K2ES120A25A		AHU Cooling Only	2 HP Motor 3900 CFM	Building	Building	2002	5	
B-1	1	Utica	MGB300HID	GY23867	Boiler / NG	Input: 300 MBH / Output: 243 MBH	Basement	Building	2005	18	
B-2	1	Utica	MGB300HID	GY23868	Boiler / NG	Input: 300 MBH / Output: 243 MBH	Basement	Building	2005	18	
FCU	2	Dayton	0G73	240AC	Fan Coil Unit	5 kW	Basement	Basement	2005	8	

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	Install Night Setback Thermostat	1,000	1,700	1	0	1	X
ECM-2	Lighting Replacement / Upgrades	12,000	2,000	6	8,100	2.0	
ECM-3	Install Lighting Controls (Occupancy Sensors)	4,000	1,900	2	2,800	0.6	X
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	16,000	3,200	5	10,900	1.6	

Site Name - Roxbury Township Board of Education-Administration Building
CHA Project #24454
Administration Building

ECM Summary Sheet

ECM-1 Install Night Setback Thermostat

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$	Years	Years
1,000	6,400	0	200	1,700	0	1,700	24.5	0	0.6	0.6

Expected Life: 15 years

Lifetime Savings: 96,000 kWh 3,000 therms \$ 25,500

ECM-2 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$	Years	Years
12,000	8,500	0	0	2,000	0	2,000	1.6	8,100	6.0	2.0

Expected Life: 15 years

Lifetime Savings: 127,500 kWh 0 therms \$ 30,000

ECM-3 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$	Years	Years
4,000	8,700	0	0	1,900	0	1,900	6.2	2,800	2.1	0.6

Expected Life: 15 years

Lifetime Savings: 130,500 kWh 0 therms \$ 28,500

ECM-4 Lighting Replacements with Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$					\$	\$		\$	Years	Years
16,000	14,300	0	0	3,200	0	3,200	2.1	10,900	5.0	1.6

Expected Life: 15 years

Lifetime Savings: 214,500 kWh 0 therms \$ 48,000

Site Name - Roxbury Township Board of Education-Administration Building
 CHA Project #24454

Utility Costs	Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
\$ 0.223 \$/kWh blended		0.00042021	7812	Electric	Natural Gas
\$ 0.214 \$/kWh supply	127,539	0.00042021		28486.55	5595.93
\$ 4.21 \$/kW	28.33	0			
\$ 1.29 \$/Therm	4,331	0.00533471			
\$ - \$/kgals	-	0			

Administration Building																							
Item	Savings						Cost	Simple Payback	MTCDE	Life Expectancy	NJ Smart Start Incentives	Direct Install Eligible (Y/N)*	Direct Install Incentives**	Max Incentives	Payback w/ Incentives***	Simple Projected Lifetime Savings						ROI	
	kW	kWh	therms	cooling kWh	kgal/yr	\$										kW	kWh	therms	cooling	kgal/yr	\$		
ECM-1	Install Night Setback Thermostat	0.0	6,377	217	0	0	\$ 1,700	\$ 1,000	0.6	3.8	15						0.0	95,654	3,248	0	0	\$ 25,521	24.5
ECM-2	Lighting Replacement / Upgrades	3.9	8,526	0	0	0	\$ 2,020	\$ 11,525	5.7	3.6	15.0	\$ 840	Y	\$ 8,100	\$ 8,100	1.7	58.1	127,889	0	0	0	\$ 30,304	1.6
ECM-3	Install Lighting Controls (Occupancy Sensors)	0.0	8,690	0	0	0	\$ 1,860	\$ 4,050	2.2	3.7	15.0	\$ 700	Y	\$ 2,800	\$ 2,800	0.7	0.0	130,356	0	0	0	\$ 29,069	6.2
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	3.9	14,268	0	0	0	\$ 3,249	\$ 15,575	4.8	6.0	15.0	\$ 1,540	Y	\$ 10,900	\$ 10,900	1.4	58.1	214,019	0	0	0	\$ 48,736	2.1
Total (Does Not Include ECM-2 & ECM-3)		3.9	20,645	217	0	0	\$ 4,949	\$ 16,575	3.3		15.0	\$ 1,540		\$ 10,900	\$ 10,900	1.1	58.1	309,674	3,248	0	0	\$ 74,257	3.5
Total Measures with Payback <10		3.9	20,645	217	0	0	\$ 4,949	\$ 16,575	3.3		15.0	\$ 1,540		\$ 10,900	\$ 10,900	1.1	58.1	309,674	3,248	0	0	\$ 74,257	3.5
% of Existing		14%	16%	5%	0%	0%																	

Site Name - Roxbury Township Board of Education-Administration Building
CHA Project #24454
Administration Building

Add VSD's to the HV unit fans

EXISTING CONDITIONS		
Existing Facility Total Electric usage	127,539	kWh
Existing Facility Natural Gas Usage	4,331	therms
Cost of Electricity	\$ 0.21	\$/kWh
	\$ 1.29	\$/therm
SAVINGS		
TOD Electric savings	6,377	kWh ²
TOD Natural Gas savings	217	therms ³
Total Cost Savings	\$ 1,644	
Estimated Total Project Cost	\$ 1,000	⁴
Simple Payback	0.6	years

Assumptions

- 1 5% Approximate electric savings due to night setback
- 2 5% Approximate natural gas savings due to night setback
- 3 Project cost is an estimate, includes cost of replacing non- programmable thermostats with programmable thermostats
- 4 control work cost

**Energy Audit of Roxbury BOE Administration Building
CHA Project No.24454**

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
\$11,525	3.9	8,526	0	\$2,020	0	\$2,020	\$840	5.7	5.3

*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
\$4,050	0.0	8,690	0	\$1,860	0	\$1,860	\$700	2.2	1.8

*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
\$15,575	3.9	14,268	0	\$3,249	0	\$3,249	\$1,540	4.8	4.3

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Energy Audit of Roxbury BOE Administration Building
 CHA Project No.24454
 Existing Lighting

Cost of Electricity: \$0.214 \$/kWh
\$4.21 \$/kW

EXISTING CONDITIONS											
Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Retrofit Control	Annual kWh	
22	Entranceway	Offices	1	1T 34 R F 4 (MAG)	F44EE	144	0.14	SW	2400	C-OCC	346
22	1st Floor Main Office Area	Offices	8	1T 34 R F 4 (MAG)	F44EE	144	1.15	SW	2400	C-OCC	2,765
22	1st Floor Main Office Area	Offices	4	1T 34 R F 4 (MAG)	F44EE	144	0.58	SW	2400	C-OCC	1,382
22	Assistant B.A.	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	Kitchen	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
4	Kitchen	Offices	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.07	SW	2400	C-OCC	173
22	B.A. Secretary	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	B.A. Office	Offices	3	1T 34 R F 4 (MAG)	F44EE	144	0.43	SW	2400	C-OCC	1,037
22	1st Floor Conference Room	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	1st Floor Conference Room	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	1st Floor Men's Bathroom	Bath Room	1	1T 34 R F 4 (MAG)	F44EE	144	0.14	SW	2000	SW	288
22	1st Floor Women's Bathroom	Bath Room	1	1T 34 R F 4 (MAG)	F44EE	144	0.14	SW	2000	SW	288
22	1st Floor Hallway	Hallways	3	1T 34 R F 4 (MAG)	F44EE	144	0.43	SW	2280	SW	985
123	1st Floor Hallway	Hallways	1	F20 T12/4	F24SE	102	0.10	SW	2280	SW	233
123	1st Floor Hallway	Hallways	1	F20 T12/4	F24SE	102	0.10	SW	2280	SW	233
111	N. Stairwell	Hallways	2	W 34 C F 1 (MAG)	F41EE	43	0.09	SW	2280	SW	196
4	N. Stairwell	Hallways	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.14	SW	2280	SW	328
111	S. Stairwell	Hallways	2	W 34 C F 1 (MAG)	F41EE	43	0.09	SW	2280	SW	196
4	S. Stairwell	Hallways	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.14	SW	2280	SW	328
61	2nd Floor Main Office Area	Offices	6	T 34 R F 3 (MAG)	F43EE	115	0.69	SW	2400	C-OCC	1,656
22	N.E. Office A	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	N.E. Office B	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	N.E. Office C	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	N.E. Office D	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	N.E. Office D	Offices	1	1T 34 R F 4 (MAG)	F44EE	144	0.14	SW	2400	C-OCC	346
61	S.E. Room	Storage Areas	2	T 34 R F 3 (MAG)	F43EE	115	0.23	SW	1000	SW	230
22	2nd Floor Conference Room	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	2nd Floor Conference Room	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
22	W. Office A	Offices	4	1T 34 R F 4 (MAG)	F44EE	144	0.58	SW	2400	C-OCC	1,382
22	W. Office B	Offices	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2400	C-OCC	691
123	N.W. Room	Storage Areas	1	F20 T12/4	F24SE	102	0.10	SW	1000	SW	102
4	N.W. Room	Storage Areas	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.07	SW	1000	SW	72
22	2nd Floor Men's Bathroom	Bath Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2000	SW	576
22	2nd Floor Women's Bathroom	Bath Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.29	SW	2000	SW	576
22	2nd Floor Hallway	Hallways	4	1T 34 R F 4 (MAG)	F44EE	144	0.58	SW	2280	SW	1,313
4	2nd Floor Hallway	Hallways	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.07	SW	2280	SW	164
4	2nd Floor Hallway	Hallways	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.07	SW	2280	SW	164
11	Basement	Storage Areas	8	S 34 P F 2 (MAG)	F42EE	72	0.58	SW	1000	SW	576
117	Basement	Storage Areas	1	CF 23	CFS23/1	23	0.02	SW	1000	SW	23
117	Basement	Storage Areas	1	CF 23	CFS23/1	23	0.02	SW	1000	SW	23
11	Basement Room 1	Storage Areas	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	1000	SW	72
11	Basement Room 1	Storage Areas	1	S 34 P F 2 (MAG)	F42EE	72	0.07	SW	1000	SW	72
117	Basement Room 2	Storage Areas	2	CF 23	CFS23/1	23	0.05	SW	1000	SW	46
Total			95				11				24,465

Energy Audit of Roxbury BOE Administration Building

CHA Project No.24454

ECM-1 Lighting Replacements

Cost of Electricity: \$0.214 \$/kWh

\$4.21 \$/kW

EXISTING CONDITIONS									RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS								
Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	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	
22	Entranceway	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2400	346	1	1T 28 R F 4	F44SSILL	96	0.096	SW	2400	230.4	115.20	0.05	\$ 27.08	\$ 141.75	\$ 10.00	5.2	1.1
22	1st Floor Main Office Area	8	1T 34 R F 4 (MAG)	F44EE	144	1.2	SW	2400	2,765	8	1T 28 R F 4	F44SSILL	96	0.768	SW	2400	1843.2	921.60	0.38	\$ 216.62	\$ 1,134.00	\$ 80.00	5.2	1.1
22	1st Floor Main Office Area	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	1T 28 R F 4	F44SSILL	96	0.384	SW	2400	921.6	460.80	0.19	\$ 108.31	\$ 567.00	\$ 40.00	5.2	1.1
22	Assistant B.A.	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	Kitchen	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
4	Kitchen	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2400	173	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	SW	2400	79.2	93.60	0.04	\$ 22.00	\$ 101.25	\$ 10.00	4.6	1.0
22	B.A. Secretary	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	B.A. Office	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	SW	2400	1,037	3	1T 28 R F 4	F44SSILL	96	0.288	SW	2400	691.2	345.60	0.14	\$ 81.23	\$ 425.25	\$ 30.00	5.2	1.1
22	1st Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	1st Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	1st Floor Men's Bathroom	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288	1	1T 28 R F 4	F44SSILL	96	0.096	SW	2000	192	96.00	0.05	\$ 22.97	\$ 141.75	\$ 10.00	6.2	1.4
22	1st Floor Women's Bathroom	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288	1	1T 28 R F 4	F44SSILL	96	0.096	SW	2000	192	96.00	0.05	\$ 22.97	\$ 141.75	\$ 10.00	6.2	1.4
22	1st Floor Hallway	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	SW	2280	985	3	1T 28 R F 4	F44SSILL	96	0.288	SW	2280	656.64	328.32	0.14	\$ 77.54	\$ 425.25	\$ 30.00	5.5	1.2
123	1st Floor Hallway	1	F20 T12/4	F24SE	102	0.1	SW	2280	233	1	0	FU2LL	60	0.06	SW	2280	136.8	95.76	0.04	\$ 22.61	\$ -	\$ -	0.0	0.0
123	1st Floor Hallway	1	F20 T12/4	F24SE	102	0.1	SW	2280	233	1	0	FU2LL	60	0.06	SW	2280	136.8	95.76	0.04	\$ 22.61	\$ -	\$ -	0.0	0.0
111	N. Stairwell	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196	2	W 28 C F 1	F41SSILL	26	0.052	SW	2280	118.56	77.52	0.03	\$ 18.31	\$ 202.50	\$ -	11.1	2.6
4	N. Stairwell	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328	2	2T 17 R F 2 (ELE)	F22ILL	33	0.066	SW	2280	150.48	177.84	0.08	\$ 42.00	\$ 202.50	\$ 20.00	4.8	1.0
111	S. Stairwell	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196	2	W 28 C F 1	F41SSILL	26	0.052	SW	2280	118.56	77.52	0.03	\$ 18.31	\$ 202.50	\$ -	11.1	2.6
4	S. Stairwell	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328	2	2T 17 R F 2 (ELE)	F22ILL	33	0.066	SW	2280	150.48	177.84	0.08	\$ 42.00	\$ 202.50	\$ 20.00	4.8	1.0
61	2nd Floor Main Office Area	6	T 34 R F 3 (MAG)	F43EE	115	0.7	SW	2400	1,656	6	T 28 R F 3	F43SSILL	72	0.432	SW	2400	1036.8	619.20	0.26	\$ 145.54	\$ 769.50	\$ 60.00	5.3	1.1
22	N.E. Office A	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	N.E. Office B	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	N.E. Office C	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	N.E. Office D	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	N.E. Office D	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2400	346	1	1T 28 R F 4	F44SSILL	96	0.096	SW	2400	230.4	115.20	0.05	\$ 27.08	\$ 141.75	\$ 10.00	5.2	1.1
61	S.E. Room	2	T 34 R F 3 (MAG)	F43EE	115	0.2	SW	1000	230	2	T 28 R F 3	F43SSILL	72	0.144	SW	1000	144	86.00	0.09	\$ 22.75	\$ 256.50	\$ 20.00	11.3	2.8
22	2nd Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	2nd Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
22	W. Office A	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	1T 28 R F 4	F44SSILL	96	0.384	SW	2400	921.6	460.80	0.19	\$ 108.31	\$ 567.00	\$ 40.00	5.2	1.1
22	W. Office B	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2400	460.8	230.40	0.10	\$ 54.16	\$ 283.50	\$ 20.00	5.2	1.1
123	N.W. Room	1	F20 T12/4	F24SE	102	0.1	SW	1000	102	1	0	FU2LL	60	0.06	SW	1000	60	42.00	0.04	\$ 11.11	\$ -	\$ -	0.0	0.0
4	N.W. Room	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1000	72	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	SW	1000	33	39.00	0.04	\$ 10.32	\$ 101.25	\$ 10.00	9.8	2.3
22	2nd Floor Men's Bathroom	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2000	384	192.00	0.10	\$ 45.94	\$ 283.50	\$ 20.00	6.2	1.4
22	2nd Floor Women's Bathroom	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2000	384	192.00	0.10	\$ 45.94	\$ 283.50	\$ 20.00	6.2	1.4
22	2nd Floor Hallway	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2280	1,313	4	1T 28 R F 4	F44SSILL	96	0.384	SW	2280	875.52	437.76	0.19	\$ 103.38	\$ 567.00	\$ 40.00	5.5	1.2
4	2nd Floor Hallway	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	SW	2280	75.24	88.92	0.04	\$ 21.00	\$ 101.25	\$ 10.00	4.8	1.0
4	2nd Floor Hallway	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	SW	2280	75.24	88.92	0.04	\$ 21.00	\$ 101.25	\$ 10.00	4.8	1.0
11	Basement	8	S 34 P F 2 (MAG)	F42EE	72	0.6	SW	1000	576	8	C 28 P F 2	F42SSILL	48	0.384	SW	1000	384	192.00	0.19	\$ 50.79	\$ 850.00	\$ 80.00	16.7	4.0
117	Basement	1	CF 23	CFS23/1	23	0.0	SW	1000	23	1	CF 23	CFS23/1	23	0.023	SW	1000	23	0.00	0.00	\$ -	\$ -	\$ -	-	-
117	Basement	1	CF 23	CFS23/1	23	0.0	SW	1000	23	1	CF 23	CFS23/1	23	0.023	SW	1000	23	0.00	0.00	\$ -	\$ -	\$ -	-	-
11	Basement Room 1	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	C 28 P F 2	F42SSILL	48	0.048	SW	1000	48	24.00	0.02	\$ 6.35	\$ 106.25	\$ 10.00	16.7	4.0
11	Basement Room 1	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	C 28 P F 2	F42SSILL	48	0.048	SW	1000	48	24.00	0.02	\$ 6.35	\$ 106.25	\$ 10.00	16.7	4.0
117	Basement Room 2	2	CF 23	CFS23/1	23	0.0	SW	1000	46	2	CF 23	CFS23/1	23	0.046	SW	1000	46	0.00	0.00	\$ -	\$ -	\$ -	-	-
	Total	95			11			24,465	95			3,091	7			15939.32	8,526	4	\$ 2,020.27	\$ 11,525.00	\$ 840.00			
																				\$ 3.9	\$ 195.71			
																				\$ 8,526	\$ 1,824.56			
																							5.7	5.3

Area Description	EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS							
	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	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	
22	Entranceway	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2400	345.6	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	C-OCC	1200	172.8	172.80	0.00	\$ 36.98	\$ 202.50	\$ 35.00	5.5	4.5
22	1st Floor Main Office Area	8	1T 34 R F 4 (MAG)	F44EE	144	1.2	SW	2400	2,764.8	8	1T 34 R F 4 (MAG)	F44EE	144	1.2	C-OCC	1200	1382.40	1382.40	0.00	\$ 295.83	\$ 202.50	\$ 35.00	0.7	0.6
22	1st Floor Main Office Area	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382.4	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	C-OCC	1200	691.20	691.20	0.00	\$ 147.92	\$ 202.50	\$ 35.00	1.4	1.1
22	Assistant B.A.	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	Kitchen	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
4	Kitchen	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2400	172.8	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	C-OCC	1200	86.40	86.40	0.00	\$ 18.49	\$ 202.50	\$ 35.00	11.0	9.1
22	B.A. Secretary	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	B.A. Office	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	SW	2400	1,036.8	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	C-OCC	1200	518.40	518.40	0.00	\$ 110.94	\$ 202.50	\$ 35.00	1.8	1.5
22	1st Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	1st Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	1st Floor Men's Bathroom	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288.0	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288	0.00	0.00	\$ -	\$ -	\$ -	-	-
22	1st Floor Women's Bathroom	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288.0	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288	0.00	0.00	\$ -	\$ -	\$ -	-	-
22	1st Floor Hallway	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	SW	2280	985.0	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	SW	2280	984.96	0.00	0.00	\$ -	\$ -	\$ -	-	-
123	1st Floor Hallway	1	F20 T12/4	F24SE	102	0.1	SW	2280	232.6	1	F20 T12/4	F24SE	102	0.1	SW	2280	232.56	0.00	0.00	\$ -	\$ -	\$ -	-	-
123	1st Floor Hallway	1	F20 T12/4	F24SE	102	0.1	SW	2280	232.6	1	F20 T12/4	F24SE	102	0.1	SW	2280	232.56	0.00	0.00	\$ -	\$ -	\$ -	-	-
111	N. Stairwell	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196.1	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196.08	0.00	0.00	\$ -	\$ -	\$ -	-	-
4	N. Stairwell	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328.3	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328.32	0.00	0.00	\$ -	\$ -	\$ -	-	-
111	S. Stairwell	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196.1	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196.08	0.00	0.00	\$ -	\$ -	\$ -	-	-
4	S. Stairwell	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328.3	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328.32	0.00	0.00	\$ -	\$ -	\$ -	-	-
61	2nd Floor Main Office Area	6	1T 34 R F 3 (MAG)	F43EE	115	0.7	SW	2400	1,656.0	6	1T 34 R F 3 (MAG)	F43EE	115	0.7	C-OCC	1200	828	828.00	0.00	\$ 177.19	\$ 202.50	\$ 35.00	1.1	0.9
22	N.E. Office A	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	N.E. Office B	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	N.E. Office C	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	N.E. Office D	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	N.E. Office D	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2400	345.6	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	C-OCC	1200	172.80	172.80	0.00	\$ 36.98	\$ 202.50	\$ 35.00	5.5	4.5
61	S.E. Room	2	1T 34 R F 3 (MAG)	F43EE	115	0.2	SW	1000	230.0	2	1T 34 R F 3 (MAG)	F43EE	115	0.2	SW	1000	230	0.00	0.00	\$ -	\$ -	\$ -	-	-
22	2nd Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	2nd Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
22	W. Office A	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382.4	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	C-OCC	1200	691.20	691.20	0.00	\$ 147.92	\$ 202.50	\$ 35.00	1.4	1.1
22	W. Office B	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691.2	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	C-OCC	1200	345.60	345.60	0.00	\$ 73.96	\$ 202.50	\$ 35.00	2.7	2.3
123	N.W. Room	1	F20 T12/4	F24SE	102	0.1	SW	1000	102.0	1	F20 T12/4	F24SE	102	0.1	SW	1000	102	0.00	0.00	\$ -	\$ -	\$ -	-	-
4	N.W. Room	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1000	72.0	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1000	72	0.00	0.00	\$ -	\$ -	\$ -	-	-
22	2nd Floor Men's Bathroom	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576.0	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	0.00	0.00	\$ -	\$ -	\$ -	-	-
22	2nd Floor Women's Bathroom	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576.0	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	0.00	0.00	\$ -	\$ -	\$ -	-	-
22	2nd Floor Hallway	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2280	1,313.3	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2280	1313.28	0.00	0.00	\$ -	\$ -	\$ -	-	-
4	2nd Floor Hallway	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164.2	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164.16	0.00	0.00	\$ -	\$ -	\$ -	-	-
4	2nd Floor Hallway	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164.2	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164.16	0.00	0.00	\$ -	\$ -	\$ -	-	-
11	Basement	8	S 34 P F 2 (MAG)	F42EE	72	0.6	SW	1000	576.0	8	S 34 P F 2 (MAG)	F42EE	72	0.6	SW	1000	576	0.00	0.00	\$ -	\$ -	\$ -	-	-
117	Basement	1	CF 23	CFS23/1	23	0.0	SW	1000	23.0	1	CF 23	CFS23/1	23	0.0	SW	1000	23	0.00	0.00	\$ -	\$ -	\$ -	-	-
117	Basement	1	CF 23	CFS23/1	23	0.0	SW	1000	23.0	1	CF 23	CFS23/1	23	0.0	SW	1000	23	0.00	0.00	\$ -	\$ -	\$ -	-	-
11	Basement Room 1	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72	0.00	0.00	\$ -	\$ -	\$ -	-	-
11	Basement Room 1	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72.0	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72	0.00	0.00	\$ -	\$ -	\$ -	-	-
117	Basement Room 2	2	CF 23	CFS23/1	23	0.0	SW	1000	46.0	2	CF 23	CFS23/1	23	0.0	SW	1000	46	0.00	0.00	\$ -	\$ -	\$ -	-	-
Total																	15,775	8,690	0	\$ 1,859.75	\$ 4,050.00	\$ 700.00		
Demand Savings																	0.0							
kWh Savings																	8,690			\$ 1,859.75				
Total Savings																				\$ 1,859.75		2.2	1.8	

Area Description	No. of Fixtures	EXISTING CONDITIONS							RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS										
		Standard Fixture Code	Fixture Code	Watts per Fixture	kWh/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kWh/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			
22 Entranceway	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2400	346	1	1T 28 R F 4	F44SSILL	96	0.096	C-OCC	1,200	115.2	230.40	0.05	\$ 51.73	\$ 344.25	\$ 45.00	6.7	5.8			
22 1st Floor Main Office Area	8	1T 34 R F 4 (MAG)	F44EE	144	1.2	SW	2400	2,765	8	1T 28 R F 4	F44SSILL	96	0.768	C-OCC	1,200	921.6	1843.20	0.38	\$ 413.84	\$ 1,336.50	\$ 115.00	3.2	3.0			
22 1st Floor Main Office Area	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	1T 28 R F 4	F44SSILL	96	0.384	C-OCC	1,200	460.8	921.60	0.19	\$ 206.92	\$ 769.50	\$ 75.00	3.7	3.4			
22 Assistant B.A.	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 Kitchen	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
4 Kitchen	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2400	173	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	C-OCC	1,200	39.6	133.20	0.04	\$ 30.48	\$ 303.75	\$ 45.00	10.0	8.5			
22 B.A. Secretary	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 B.A. Office	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	SW	2400	1,037	3	1T 28 R F 4	F44SSILL	96	0.288	C-OCC	1,200	345.6	691.20	0.14	\$ 155.19	\$ 627.75	\$ 65.00	4.0	3.6			
22 1st Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 1st Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 1st Floor Men's Bathroom	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288	1	1T 28 R F 4	F44SSILL	96	0.096	SW	2,000	192	96.00	0.05	\$ 22.97	\$ 141.75	\$ 10.00	6.2	5.7			
22 1st Floor Women's Bathroom	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2000	288	1	1T 28 R F 4	F44SSILL	96	0.096	SW	2,000	192	96.00	0.05	\$ 22.97	\$ 141.75	\$ 10.00	6.2	5.7			
22 1st Floor Hallway	3	1T 34 R F 4 (MAG)	F44EE	144	0.4	SW	2280	985	3	1T 28 R F 4	F44SSILL	96	0.288	SW	2,280	656.64	328.32	0.14	\$ 77.54	\$ 425.25	\$ 30.00	5.5	5.1			
123 1st Floor Hallway	1	F20 T12/4	F24SE	102	0.1	SW	2280	233	1	0	FU2LL	60	0.06	SW	2,280	136.8	95.76	0.04	\$ 22.61	\$ -	\$ -	0.0	0.0			
123 1st Floor Hallway	1	F20 T12/4	F24SE	102	0.1	SW	2280	233	1	0	FU2LL	60	0.06	SW	2,280	136.8	95.76	0.04	\$ 22.61	\$ -	\$ -	0.0	0.0			
111 N. Stairwell	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196	2	W 28 C F 1	F41SSILL	26	0.052	SW	2,280	118.56	77.52	0.03	\$ 18.31	\$ 202.50	\$ -	11.1	11.1			
4 N. Stairwell	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328	2	2T 17 R F 2 (ELE)	F22ILL	33	0.066	SW	2,280	150.48	177.84	0.08	\$ 42.00	\$ 202.50	\$ 20.00	4.8	4.3			
111 S. Stairwell	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	2280	196	2	W 28 C F 1	F41SSILL	26	0.052	SW	2,280	118.56	77.52	0.03	\$ 18.31	\$ 202.50	\$ -	11.1	11.1			
4 S. Stairwell	2	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	328	2	2T 17 R F 2 (ELE)	F22ILL	33	0.066	SW	2,280	150.48	177.84	0.08	\$ 42.00	\$ 202.50	\$ 20.00	4.8	4.3			
61 2nd Floor Main Office Area	6	T 34 R F 3 (MAG)	F43EE	115	0.7	SW	2400	1,656	6	T 28 R F 3	F43SSILL	72	0.432	C-OCC	1,200	518.4	1137.60	0.26	\$ 256.48	\$ 972.00	\$ 95.00	3.8	3.4			
22 N.E. Office A	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 N.E. Office B	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 N.E. Office C	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 N.E. Office D	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 N.E. Office D	1	1T 34 R F 4 (MAG)	F44EE	144	0.1	SW	2400	346	1	1T 28 R F 4	F44SSILL	96	0.096	C-OCC	1,200	115.2	230.40	0.05	\$ 51.73	\$ 344.25	\$ 45.00	6.7	5.8			
61 S.E. Room	2	T 34 R F 3 (MAG)	F43EE	115	0.2	SW	1000	230	2	T 28 R F 3	F43SSILL	72	0.144	SW	1,000	144	86.00	0.09	\$ 22.75	\$ 256.50	\$ 20.00	11.3	10.4			
22 2nd Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 2nd Floor Conference Room	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
22 W. Office A	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2400	1,382	4	1T 28 R F 4	F44SSILL	96	0.384	C-OCC	1,200	460.8	921.60	0.19	\$ 206.92	\$ 769.50	\$ 75.00	3.7	3.4			
22 W. Office B	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2400	691	2	1T 28 R F 4	F44SSILL	96	0.192	C-OCC	1,200	230.4	460.80	0.10	\$ 103.46	\$ 486.00	\$ 55.00	4.7	4.2			
123 N.W. Room	1	F20 T12/4	F24SE	102	0.1	SW	1000	102	1	0	FU2LL	60	0.06	SW	1,000	60	42.00	0.04	\$ 11.11	\$ -	\$ -	0.0	0.0			
4 N.W. Room	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	1000	72	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	SW	1,000	33	39.00	0.04	\$ 10.32	\$ 101.25	\$ 10.00	9.8	8.8			
22 2nd Floor Men's Bathroom	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2,000	384	192.00	0.10	\$ 45.94	\$ 283.50	\$ 20.00	6.2	5.7			
22 2nd Floor Women's Bathroom	2	1T 34 R F 4 (MAG)	F44EE	144	0.3	SW	2000	576	2	1T 28 R F 4	F44SSILL	96	0.192	SW	2,000	384	192.00	0.10	\$ 45.94	\$ 283.50	\$ 20.00	6.2	5.7			
22 2nd Floor Hallway	4	1T 34 R F 4 (MAG)	F44EE	144	0.6	SW	2280	1,313	4	1T 28 R F 4	F44SSILL	96	0.384	SW	2,280	875.52	437.76	0.19	\$ 103.38	\$ 567.00	\$ 40.00	5.5	5.1			
4 2nd Floor Hallway	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	SW	2,280	75.24	88.92	0.04	\$ 21.00	\$ 101.25	\$ 10.00	4.8	4.3			
4 2nd Floor Hallway	1	2B 34 R F 2 (u) (MAG)	FU2EE	72	0.1	SW	2280	164	1	2T 17 R F 2 (ELE)	F22ILL	33	0.033	SW	2,280	75.24	88.92	0.04	\$ 21.00	\$ 101.25	\$ 10.00	4.8	4.3			
11 Basement	8	S 34 P F 2 (MAG)	F42EE	72	0.6	SW	1000	576	8	C 28 P F 2	F42SSILL	48	0.384	SW	1,000	384	192.00	0.19	\$ 50.79	\$ 850.00	\$ 80.00	16.7	15.2			
117 Basement	1	CF 23	CFS23/1	23	0.0	SW	1000	23	1	CF 23	CFS23/1	23	0.023	SW	1,000	23	0.00	0.00	\$ -	\$ -	\$ -	-	-			
117 Basement	1	CF 23	CFS23/1	23	0.0	SW	1000	23	1	CF 23	CFS23/1	23	0.023	SW	1,000	23	0.00	0.00	\$ -	\$ -	\$ -	-	-			
11 Basement Room 1	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	C 28 P F 2	F42SSILL	48	0.048	SW	1,000	48	24.00	0.02	\$ 6.35	\$ 106.25	\$ 10.00	16.7	15.2			
11 Basement Room 1	1	S 34 P F 2 (MAG)	F42EE	72	0.1	SW	1000	72	1	C 28 P F 2	F42SSILL	48	0.048	SW	1,000	48	24.00	0.02	\$ 6.35	\$ 106.25	\$ 10.00	16.7	15.2			
117 Basement Room 2	2	CF 23	CFS23/1	23	0.0	SW	1000	46	2	CF 23	CFS23/1	23	0.046	SW	1,000	46	0.00	0.00	\$ -	\$ -	\$ -	-	-			
Total	95				11.1			24,465	95			7.3				10,197	3.9	\$ 3,249.06	\$ 15,575.00	\$ 1,540.00						
																Demand Savings		3.9	\$ 195.71							
																kWh Savings		14268	\$ 3,053.34							
																Total Savings		\$ 3,249.06		4.8	4.3					

APPENDIX D

**New Jersey Pay For Performance
Incentive Program**

HOME **RESIDENTIAL** **COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT** **RENEWABLES**



COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

PROGRAMS

[NJ SMARTSTART BUILDINGS](#)

[PAY FOR PERFORMANCE](#)

[EXISTING BUILDINGS](#)

[PARTICIPATION STEPS](#)

[APPLICATIONS AND FORMS](#)

[APPROVED PARTNERS](#)

[NEW CONSTRUCTION](#)

[FAQS](#)

[BECOME A PARTNER](#)

[COMBINED HEAT & POWER AND FUEL CELLS](#)

[LOCAL GOVERNMENT ENERGY AUDIT](#)

[LARGE ENERGY USERS PILOT](#)

[ENERGY SAVINGS IMPROVEMENT PLAN](#)

[DIRECT INSTALL](#)

[ARRA](#)

[ENERGY BENCHMARKING](#)

[OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS](#)

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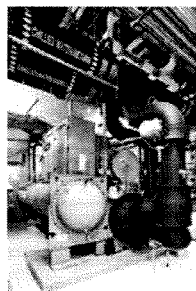
Home » Commercial & Industrial » Programs » Pay for Performance

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings. Pay for Performance relies on a network of program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop an energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation.



Eligibility

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100 kW demand in order

to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profits, affordable multifamily housing, and local governmental entities. Your energy reduction plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

Exceptions to the 15% threshold requirement may be made for certain industrial, manufacturing, water treatment and datacenter building types whose annual energy consumption is heavily weighted on process loads. Details are available in the high energy intensity section of the FAQ page.

ENERGY STAR Portfolio Manager

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.



This rating system assesses building performance by tracking and scoring energy use in your facilities and comparing it to similar buildings. That can be a big help in locating opportunities for cost-justified energy efficiency upgrades. And, based on our findings, you may be invited to participate in the Building Performance with ENERGY STAR initiative and receive special recognition as an industry leader in energy efficiency.

Incentives

Pay for Performance incentives are awarded upon the satisfactory completion of three program milestones:

Incentive #1 - Submittal of complete energy reduction plan prepared by an approved program partner - Contingent on moving forward, incentives will be between \$5,000 and \$50,000 based on approximately \$.10 per square foot, not to exceed 50% of the facility's annual energy expense.

Incentive #2 - Installation of recommended measures - Incentives are based on the projected level of electricity and natural gas savings resulting from the installation of comprehensive energy-efficiency measures.

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum performance threshold of 15% savings has been achieved.



Program

[Large Scale CHI Program Annour](#)

[2012 Large Ene Announcement](#)

[Economic Devel Introduces Revc Pay for Perform](#)

[Incentives Now, Screw-in Lamps](#)

[Other updates pos](#)

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A detailed Incentive Structure document is available on the applications and forms page.

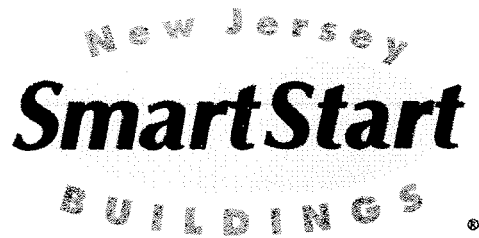
Energy Efficiency Revolving Loan Fund (EE RLF)

New Jersey-based commercial, institutional or industrial entities (including 501(c)(3) organizations) that have received an approved energy reduction plan under Pay for Performance may be eligible for supplemental financing through the EE RLF. The financing, in the form of low-interest loans, can be used to support up to 80% of total eligible project costs, not to exceed \$2.5 million or 100% of total eligible project costs from all public state funding sources. Visit the NJ EDA website for details.

Steps to Participation

[Click here](#) for a step-by-step description of the program.

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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.

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 positive return on investment (ROI) only.

Total Building Area (Square Feet)	7,812
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)	\$28,487	\$5,596
Existing Usage (from utility)	127,539	4,331
Proposed Savings	20,645	217
Existing Total MMBtus	868	
Proposed Savings MMBtus	92	
% Energy Reduction	10.6%	
Proposed Annual Savings	\$4,949	

	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	\$0.00	\$0.00
Incentive #3	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.00	\$0.00

	Incentives \$		
	Elec	Gas	Total
Incentive #1	\$0	\$0	\$5,000
Incentive #2	\$0	\$0	\$0
Incentive #3	\$0	\$0	\$0
Total All Incentives	\$0	\$0	\$5,000

Total Project Cost	\$16,575
---------------------------	----------

		Allowable Incentive
% Incentives #1 of Utility Cost*	14.7%	\$5,000
% Incentives #2 of Project Cost**	0.0%	\$0
% Incentives #3 of Project Cost**	0.0%	\$0
Total Eligible Incentives***		\$5,000
Project Cost w/ Incentives		\$11,575

Project Payback (years)	
w/o Incentives	w/ Incentives
3.3	2.3

* 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

APPENDIX E

Energy Savings Improvement Plan Information



Your Power to Save
At Home, for Business, and for the Future

HOME

RESIDENTIAL

COMMERCIAL, INDUSTRIAL
AND LOCAL GOVERNMENT

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 PLAN
- ▶ DIRECT INSTALL
- ENERGY BENCHMARKING
- T-12 SCHOOLS LIGHTING INITIATIVE
- OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
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Energy Savings Improvement Plan

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. 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

- ▶ [Board Order - Standby Charges for Distributed Generation Customers](#)
 - ▶ [T-12 Schools Lighting Replacement Initiative - Funding Allocation Reached](#)
- [Other updates posted.](#)

Featured Success Story

Rutgers University:
Continued Commitment to Saving Energy



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APPENDIX F

Photovoltaic (PV) Rooftop Solar Power Generation

Photovoltaic (PV) Solar Power Generation - Screening Assessment

**Roxbury Township Board Of Education
Administrative Building**

Cost of Electricity	\$0.223	/kWh
Electricity Usage	127,539	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
\$135,600	33.9	6,319	0	\$1,409	0	\$1,409	\$0	\$487	96.2	71.5

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= \$77 /1000kwh

Area Output*

23.051 m2
248 ft2

Perimeter Output*

17.423 m
57 ft

Available Roof Space for PV:

(Area Output - 10 ft x Perimeter) x 85%
-275 ft2

Approximate System Size:

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

11.5 watt/ft2
-3,162 DC watts
34 kW

Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle **40** Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
 Array Azimuth **180** Enter into PV Watts (default)
 Zip Code **07876** Enter into PV Watts
 DC/AC Derate Factor **0.83** Enter into PV Watts



PV Watts Output

6,319 annual kWh calculated in PV Watts program

% Offset Calc

Usage 127,539 (from utilities)
 PV Generation 6,319 (generated using PV Watts)
 % offset 5%

* <http://www.freemaptools.com/area-calculator.htm>
 ** <http://www.fletexchange.com>
 *** http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html



AC Energy & Cost Savings



Station Identification	
City:	Newark
State:	New Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	34.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	26.2 kW
Array Type:	Fixed Tilt
Array Tilt:	40.7°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	0.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	3.36	2815	6.19
2	4.05	3039	6.69
3	4.58	3687	8.11
4	4.84	3603	7.93
5	5.30	3970	8.73
6	5.33	3744	8.24
7	5.27	3781	8.32
8	5.25	3742	8.23
9	5.06	3630	7.99
10	4.46	3419	7.52
11	3.15	2440	5.37
12	2.87	2353	5.18
Year	4.46	40222	88.49

[About the Hourly Performance Data](#)

[Saving Text from a Browser](#)

Run [PVWATTS v.1](#) for another US location or an International location
Run [PVWATTS v.2](#) (US only)

Please send questions and comments regarding PVWATTS to [Webmaster](#)

[Disclaimer and copyright notice](#)

[Return to RReDC home page \(http://www.nrel.gov/rredc\)](http://www.nrel.gov/rredc)

APPENDIX G

EPA Portfolio Manager



STATEMENT OF ENERGY PERFORMANCE

Roxbury Board of Education Administrative Building

Building ID: 3210033
For 12-month Period Ending: May 31, 2012¹
Date SEP becomes ineligible: N/A

Date SEP Generated: August 17, 2012

Facility	Facility Owner	Primary Contact for this Facility
Roxbury Board of Education Administrative Building 42 North Hillside Ave Succasunna, NJ 07876	N/A	N/A

Year Built: 1903
Gross Floor Area (ft²): 7,812

Energy Performance Rating² (1-100) 12

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	435,163
Natural Gas (kBtu) ⁴	433,070
Total Energy (kBtu)	868,233

Energy Intensity⁴

Site (kBtu/ft ² /yr)	111
Source (kBtu/ft ² /yr)	244

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	85
---	----

Electric Distribution Utility

Jersey Central Power & Light Co [FirstEnergy Corp]

National Median Comparison

National Median Site EUI	70
National Median Source EUI	154
% Difference from National Median Source EUI	58%
Building Type	Office

Meets Industry Standards⁵ for Indoor Environmental Conditions:

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

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.

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.

ENERGY STAR[®] Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) or a Registered Architect (RA) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE or RA in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.

NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Building Name	Roxbury Board of Education Administrative Building	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
Type	Office	Is this an accurate description of the space in question?		<input type="checkbox"/>
Location	42 North Hillside Ave, Succasunna, NJ 07876	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of a hospital, k-12 school, hotel and senior care facility) nor can they be submitted as representing only a portion of a building.		<input type="checkbox"/>
Building (Office)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
Gross Floor Area	7,812 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		<input type="checkbox"/>
Weekly operating hours	50 Hours	Is this the total number of hours per week that the Office space is 75% occupied? This number should exclude hours when the facility is occupied only by maintenance, security, or other support personnel. For facilities with a schedule that varies during the year, "operating hours/week" refers to the total weekly hours for the schedule most often followed.		<input type="checkbox"/>
Workers on Main Shift	17	Is this the number of employees present during the main shift? Note this is not the total number of employees or visitors who are in a building during an entire 24 hour period. For example, if there are two daily 8 hour shifts of 100 workers each, the Workers on Main Shift value is 100. The normal worker density ranges between 0.3 and 5.3 workers per 1000 square feet (92.8 square meters)		<input type="checkbox"/>
Number of PCs	17 (Default)	Is this the number of personal computers in the Office?		<input type="checkbox"/>
Percent Cooled	100 (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		<input type="checkbox"/>
Percent Heated	100 (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		<input type="checkbox"/>

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Jersey Central Power & Light Co [FirstEnergy Corp]

Fuel Type: Electricity		
Meter: Electricity (kWh (thousand Watt-hours)) Space(s): Entire Facility Generation Method: Grid Purchase		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
05/01/2012	05/31/2012	14,640.00
04/01/2012	04/30/2012	6,442.00
03/01/2012	03/31/2012	9,116.00
02/01/2012	02/29/2012	11,444.00
01/01/2012	01/31/2012	9,105.00
12/01/2011	12/31/2011	9,908.00
11/01/2011	11/30/2011	10,068.00
10/01/2011	10/31/2011	8,855.00
09/01/2011	09/30/2011	10,197.00
08/01/2011	08/31/2011	12,961.00
07/01/2011	07/31/2011	11,754.00
06/01/2011	06/30/2011	13,049.00
Electricity Consumption (kWh (thousand Watt-hours))		127,539.00
Electricity Consumption (kBtu (thousand Btu))		435,163.07
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		435,163.07
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
Meter: Natural Gas (therms) Space(s): Entire Facility		
Start Date	End Date	Energy Use (therms)
05/01/2012	05/31/2012	143.00
04/01/2012	04/30/2012	271.30
03/01/2012	03/31/2012	444.40
02/01/2012	02/29/2012	869.70
01/01/2012	01/31/2012	978.10
12/01/2011	12/31/2011	762.00
11/01/2011	11/30/2011	593.90
10/01/2011	10/31/2011	268.30
09/01/2011	09/30/2011	0.00
08/01/2011	08/31/2011	0.00

07/01/2011	07/31/2011	0.00
06/01/2011	06/30/2011	0.00
Natural Gas Consumption (therms)		4,330.70
Natural Gas Consumption (kBtu (thousand Btu))		433,070.00
Total Natural Gas Consumption (kBtu (thousand Btu))		433,070.00
Is this the total Natural Gas consumption at this building including all Natural Gas meters?		<input type="checkbox"/>

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	<input type="checkbox"/>

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	<input type="checkbox"/>

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

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
Roxbury Board of Education
Administrative Building
42 North Hillside Ave
Succasunna, NJ 07876

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Roxbury Board of Education Administrative Building	
Gross Floor Area Excluding Parking: (ft ²)	7,812
Year Built	1903
For 12-month Evaluation Period Ending Date:	May 31, 2012

Facility Space Use Summary

Building	
Space Type	Office
Gross Floor Area (ft ²)	7,812
Weekly operating hours	50
Workers on Main Shift	17
Number of PCs ^d	17
Percent Cooled ^d	100
Percent Heated ^d	100

Energy Performance Comparison

Performance Metrics	Evaluation Periods		Comparisons		
	Current (Ending Date 05/31/2012)	Baseline (Ending Date 07/31/2011)	Rating of 75	Target	National Median
Energy Performance Rating	12	7	75	N/A	50
Energy Intensity					
Site (kBtu/ft ²)	111	142	52	N/A	70
Source (kBtu/ft ²)	244	287	114	N/A	154
Energy Cost					
\$/year	\$ 34,082.48	\$ 40,502.94	\$ 15,912.72	N/A	\$ 21,515.45
\$/ft ² /year	\$ 4.36	\$ 5.18	\$ 2.04	N/A	\$ 2.75
Greenhouse Gas Emissions					
MtCO ₂ e/year	85	101	40	N/A	54
kgCO ₂ e/ft ² /year	11	13	5	N/A	7

More than 50% of your building is defined as Office. 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.

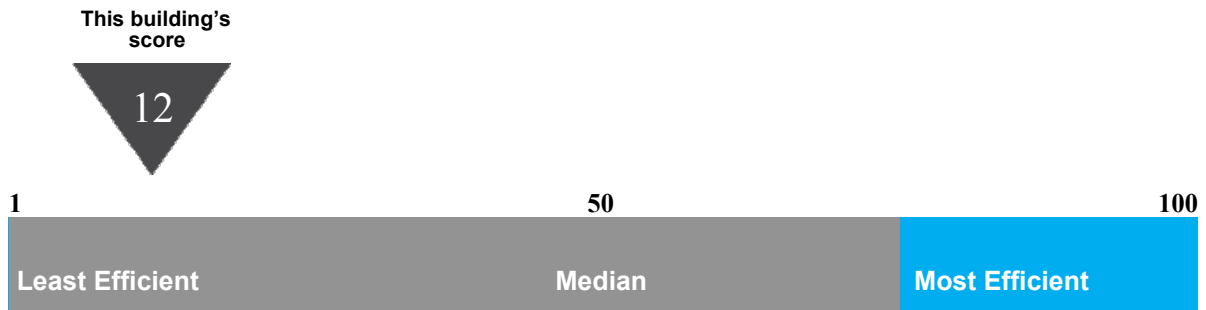
Statement of Energy Performance

2012

Roxbury Board of Education Administrative Building
42 North Hillside Ave
Succasunna, NJ 07876

Portfolio Manager Building ID: 3210033

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.



This building uses 244 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending May 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

Date of certification

