

**ROXBURY TOWNSHIP BOARD OF EDUCATION
SPECIAL SERVICES BUILDING
ENERGY ASSESSMENT**

for

**NEW JERSEY
BOARD OF PUBLIC UTILITIES**

CHA PROJECT NO. 24454

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REPORT DISCLAIMER

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

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

1.0 EXECUTIVE SUMMARY

The 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
Special Services Building	25 Meeker Street, Succasunna, NJ	2,000	Original: 1952

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 \$700 for the recommended ECMs may be realized with a combined payback of 5.2 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	500	2	0	2	X
ECM-2	Lighting Replacement / Upgrades	405	200	2	300	0.5	X
ECM-3	Install Lighting Controls (Occupancy Sensors)	2,000	500	4	1,700	0.6	
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	3,000	800	4	2,000	1.3	

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 Special Services Building is an office building located in Succasunna, NJ. It is a 2,000 square foot, single story block structure with exterior brick facing. The building was constructed in 1952. The offices are served by an NG/DX Carrier hot air furnace, and two Mitsubishi Mr. Slim wall mounted AC units, with condensers located remotely on the roof. A 40 gallon hot water heater is located in a closet. Occupancy includes approximately 15 people between the hours of 8:00 am and 5:00 pm, with maintenance and cleaning personnel operating after hours.

3.0 EXISTING CONDITIONS

3.1 Building - General

Built in the 1952 with several renovations, the Special Services Building is a 2,000 square foot, single-story facility with office space. The building can be assumed to be fully occupied until 5:00 pm during the week. Custodial staff is typically in the building after hours during the week. The hours of operation are:

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

The building is constructed of block walls and brick veneer with an air space between. The interior walls are a mixture of painted block walls and framed walls filled with fiberglass insulation and finished with gypsum board. The building has two divisions of a similar nearly square shape connected by a single hallway. The north section of the building has a peaked roof with architectural asphalt shingles, while the south section and connecting hallway have flat rubber membrane roofs. The windows are vinyl double pane units, both the roofs and windows are in good condition. The building has exposed walls in all directions, and appeared to be in good condition at the time of the first site visit.



3.2 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 building has one electric meter serving the site. From June 2011 through May 2012, the electric usage for the facility was as follows:

Actual Cost & Site Usage by Utility

Electric		
Annual Usage	32,334	kWh/yr.
Annual Cost	7,760	\$
Blended Rate	0.240	\$/kWh
Supply Rate	0.18	\$/kWh
Demand Rate	1.61	\$/kW
Peak Demand	15.4	kW
Min. Demand	5.4	kW
Avg. Demand	12.7	kW
Natural Gas		
Annual Usage	2,100	therms/yr.
Annual Cost	2,447	\$
Rate	1.17	\$/Therm

See Appendix A for a detailed utility analysis.

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.

3.3 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 DX Cooling & Natural Gas Furnace

A Carrier direct expansion (DX) and hot air furnace is the only heating and cooling system for the building. It is located in the mechanical room.

3.3.2 Exhaust Systems

Exhaust system fans are integrated into the building thermostat and generally operate during building occupancy.

Common exhaust plenums serve classrooms with rooftop mounted constant volume exhaust fans. Exhaust fans are used for restrooms and custodial closets throughout the building.

3.4 Control Systems

The building is controlled by a programmable thermostat. Heating and cooling functions are programmed to relative to times when the building is occupied during the day.

3.5 Lighting/Electrical Systems

Since building construction, the facility has re-ballasted and re-lamped some of their fixtures. A mixture of T12 and T8 bulbs and compact fluorescent spiral bulbs are utilized. Older style incandescent bulbs are also used in select areas. The primary source of control for the lights is switches manually turned off at the end of the day.

3.6 Plumbing Systems

3.6.1 Domestic Hot Water System

The mechanical room contains one 40 gallon 4.5 kW electric hot water heater which serves the entire 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 have been replaced are standard plumbing fixtures. In general, lavatories are 2.5 gpm with push type faucets, water closets are 1.6 gpf, and urinals are 1.0 gpf.

4.0 ENERGY CONSERVATION MEASURES

4.1 ECM-1 Install Night Setback Thermostat

The Special Services 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 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 \$						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
1,000	1,600	0	100	500	0	500	6.7	0	2.0	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: 24,000 kWh 1,500 therms \$ 7,500

This measure is recommended.

4.2 ECM-2 Lighting Replacement

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

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

ECM 2-Lighting Replacement

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	
405	854	1	0	212	0	200	6.7	42	1.9	1.7

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

Expected Life: 15 years
 Lifetime Savings: 12,800 kWh 0 therms \$ 3,200

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

4.3 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.

Lighting controls have an expected life of 15 years, according to the manufacturer, and total energy savings over the life of the project are estimated at 34,500 kWh and \$7,500.

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 kWh	Electric kW	Nat Gas Therms	Total \$						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
2,000	2,300	0	0	500	0	500	2.4	200	4.0	3.6

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

Expected Life: 15 years
 Lifetime Savings: 34,500 kWh 0 therms \$ 7,500

This measure is not recommended in lieu of ECM-2.

4.4 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) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 3,000	3,200	0	0	800	\$ 0	\$ 800	3.0	\$ 500	3.8	3.1

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

Expected Life: 15 years
 Lifetime Savings: 48,000 kWh 0 therms \$ 12,000

This measure is not recommended in lieu of ECM-2.

5.0 PROJECT INCENTIVES

5.1 Incentives Overview

5.1.1 New Jersey Pay For Performance Program

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

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

- Incentive Amount: \$0.10/SF
- Minimum incentive: \$5,000
- Maximum Incentive: \$50,000 or 50% of Facility annual energy cost

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

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

Electric

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

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

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.

5.1.2 New Jersey Smart Start Program

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

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

5.1.3 Direct Install Program

The Direct Install Program targets small and medium sized facilities where the peak electrical demand does not exceed 150 kW in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric or 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 \$2,700, 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.

5.1.4 Energy Savings Improvement Plans (ESIP)

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

ESIP allows local units to use “energy savings obligations” to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. Energy savings obligations are not considered “new general obligation debt” of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

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

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

6.0 ALTERNATIVE ENERGY SCREENING EVALUATION

6.1 Solar

6.1.1 Photovoltaic Rooftop Solar Power Generation

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

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

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 \$65/ 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. There is insufficient roof space to justify a PV roof setup.

6.1.2 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.

7.0 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 Special Services Building are as follows:

Energy Intensity	Special Services Building	National Average
EPA Score	N/A	50
Site (kBtu/sf/year)	160.2	63
Source (kBtu/sf/year)	294.2	115

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 Special Services Building does not meet the requirements to receive a score by the EPA Portfolio Manager. The minimum gross floor area must be at least 5,000 square feet. The gross floor area of this building is 2,000 square feet. For the School to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the Special Services Building. This building is 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 G.

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.

8.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Roxbury Township Board of Education Special Services Building identified potential ECMs for night setback thermostat installation and lighting and control replacement. Potential annual savings of \$700 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 \$						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
1,000	1,600	0	100	500	0	500	6.7	0	2.0	2.0

Expected Life: 15 years
 Lifetime Savings: 24,000 kWh 1,500 therms \$ 7,500

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 \$						
\$	kWh	kW	Therms	\$	\$	\$	\$	Years	Years	
405	854	1	0	212	0	200	6.8	300	1.9	0.5

Expected Life: 15 years
 Lifetime Savings: 12,800 kWh 0 therms \$ 3,200

APPENDIX A

Utility Usage Analysis

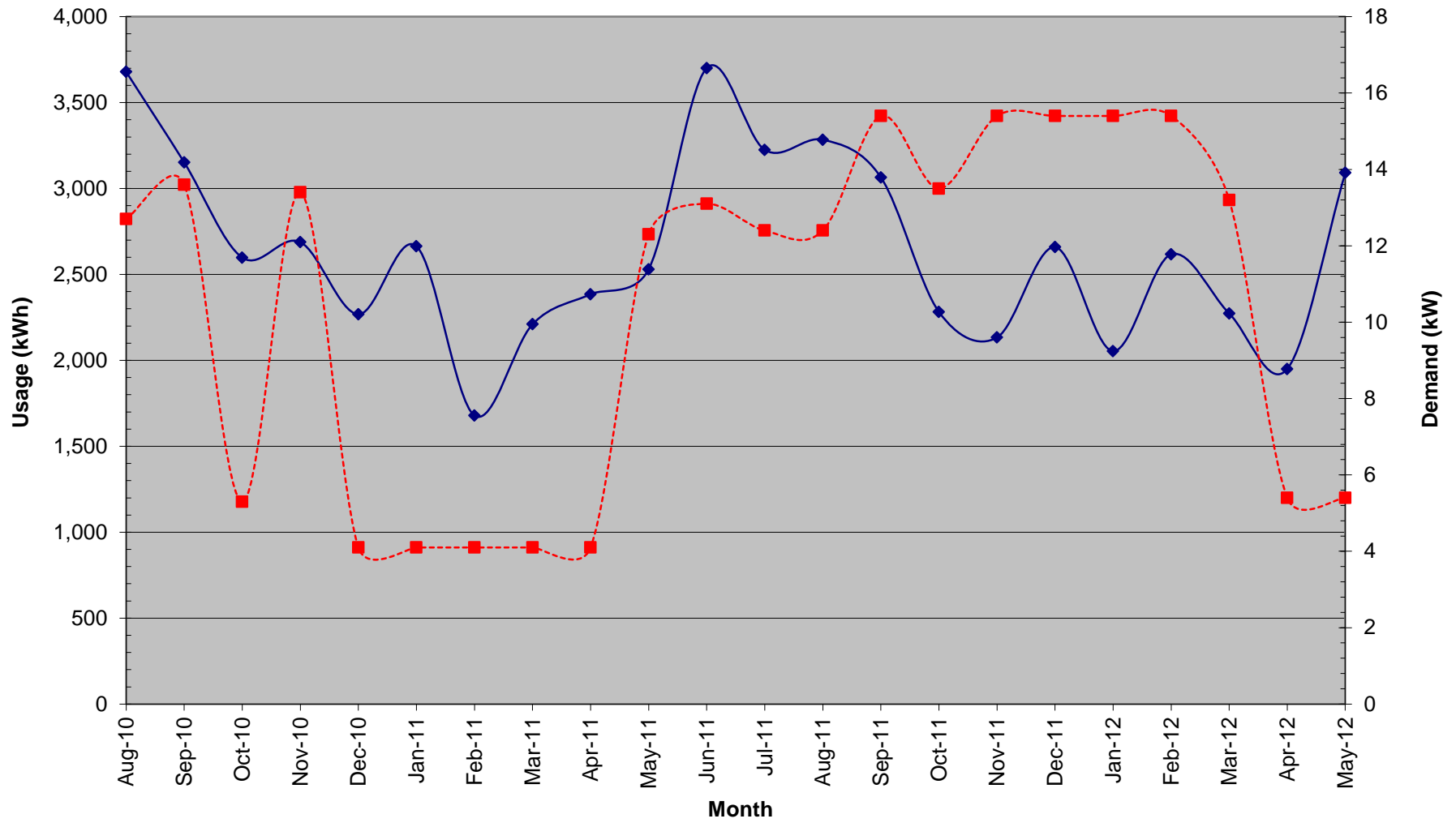
Roxbury Township BOE
 42 Hillside Ave.
 Succasunna, NJ 07876

Electric Service
 Delivery - JCP&L
 Supplier -

For Service at: Special Services Building
 Account No.: 100000-0804-89
 Meter No.: 28983630

Month	Consumption (kWh)	Demand (kW)	Charges			Unit Costs		
			Total (\$)	Delivery (\$)	Supply (\$)	Blended Rate (\$/kWh)	Consumption (\$/kWh)	Demand (\$/kW)
August-10	3,679	12.70	\$ 927.82			\$ 0.252	\$ 0.252	\$ -
September-10	3,152	13.60	\$ 807.36			\$ 0.256	\$ 0.256	\$ -
October-10	2,598	5.30	\$ 674.26			\$ 0.260	\$ 0.260	\$ -
November-10	2,688	13.40	\$ 700.38			\$ 0.261	\$ 0.261	\$ -
December-10	2,268	4.10	\$ 595.40			\$ 0.263	\$ 0.263	\$ -
January-11	2,664	4.10	\$ 685.89			\$ 0.257	\$ 0.257	\$ -
February-11	1,679	4.10	\$ 460.78			\$ 0.274	\$ 0.274	\$ -
March-11	2,210	4.10	\$ 565.78			\$ 0.256	\$ 0.256	\$ -
April-11	2,385	4.10	\$ 601.68			\$ 0.252	\$ 0.252	\$ -
May-11	2,530	12.30	\$ 608.78			\$ 0.241	\$ 0.241	\$ -
June-11	3,701	13.10	\$ 856.90			\$ 0.232	\$ 0.232	\$ -
July-11	3,225	12.40	\$ 830.40			\$ 0.257	\$ 0.257	\$ -
August-11	3,284	12.40	\$ 765.54			\$ 0.233	\$ 0.228	\$ 1.34
September-11	3,065	15.40	\$ 733.85			\$ 0.239	\$ 0.228	\$ 2.27
October-11	2,282	13.50	\$ 559.37			\$ 0.245	\$ 0.235	\$ 1.68
November-11	2,133	15.40	\$ 523.81			\$ 0.246	\$ 0.238	\$ 1.11
December-11	2,659	15.40	\$ 633.28			\$ 0.238	\$ 0.232	\$ 1.11
January-12	2,054	15.40	\$ 506.36			\$ 0.247	\$ 0.238	\$ 1.11
February-12	2,617	15.40	\$ 622.62	\$ 334.50	\$ 288.12	\$ 0.238	\$ 0.128	\$ 1.11
March-12	2,273	13.20	\$ 543.91			\$ 0.239	\$ 0.230	\$ 1.57
April-12	1,950	5.40	\$ 474.39			\$ 0.243	\$ 0.243	\$ -
May-12	3,091	5.40	\$ 709.16	\$ 424.39	\$ 284.77	\$ 0.229	\$ 0.137	\$ 3.16
Total (12-months)	32,334	15.40	\$7,759.59	\$758.89	\$572.89	\$ 0.240	\$ 0.234	\$ 1.61

Electric Usage - Special Services Building



Roxbury Township BOE
 42 Hillside Ave.
 Succasunna, NJ 07876

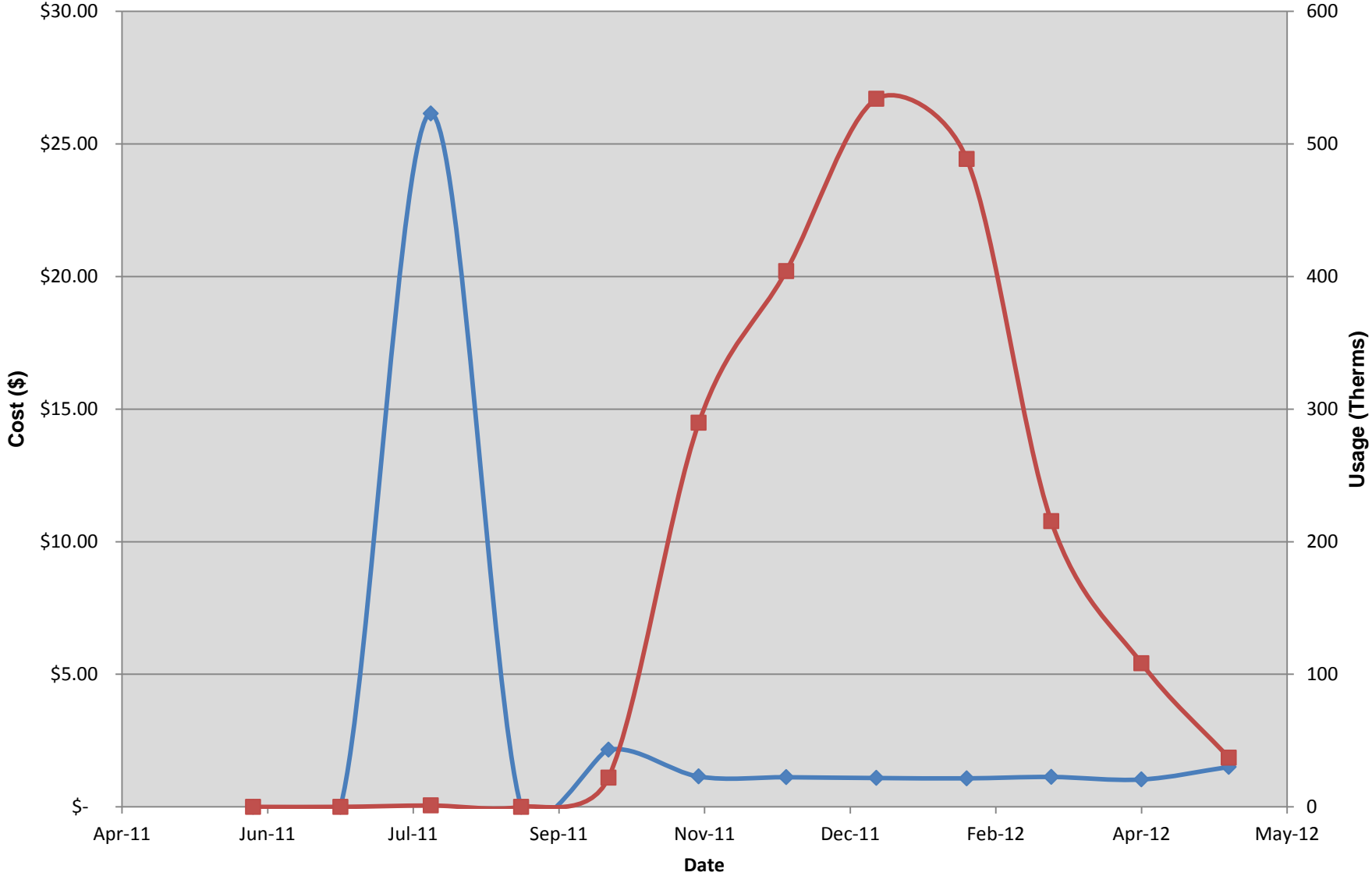
Gas Service
 Delivery - NJNG
 Supplier -

For Service at: Special Services Building
 Account No.: 22-0006-9760-71
 Meter No.: 0071973

Month	Total (\$)	Delivery (\$)	Supply (\$)	Total Therms	\$/Therm
Sep-10	\$ 25.00			0	#DIV/0!
Oct-10	\$ 35.00			9.4	\$ 3.72
Nov-10	\$ 298.25			253.2	\$ 1.18
Dec-10	\$ 729.36			639.9	\$ 1.14
Jan-11	\$ 794.10			700.4	\$ 1.13
Feb-11	\$ 660.34			578.9	\$ 1.14
Mar-11	\$ 553.09			476.7	\$ 1.16
Apr-11	\$ 247.34			202.6	\$ 1.22
May-11	\$ 28.32			3.1	\$ 9.14
Jun-11	\$ 25.00			0	#DIV/0!
Jul-11	\$ 25.00			0	#DIV/0!
Aug-11	\$ 26.15			1	\$ 26.15
Sep-11	\$ 25.00			0	#DIV/0!
Oct-11	\$ 47.42			22	\$ 2.16
Nov-11	\$ 330.94			289.6	\$ 1.14
Dec-11	\$ 451.43			404.1	\$ 1.12
Jan-12	\$ 580.48			534	\$ 1.09
Feb-12	\$ 525.13			488.6	\$ 1.07
Mar-12	\$ 242.90			215.4	\$ 1.13
Apr-12	\$ 111.70			108.3	\$ 1.03
May-12	\$ 55.68			37	\$ 1.50
Total (12-months)	\$ 2,446.83	\$ -	\$ -	2100.00	\$ 1.17

Natural Gas Usage - Special Services Building (12 Months)

◆ \$/Therm ■ Total Therms



APPENDIX B

Equipment Inventory

New Jersey BPU Energy Audit Program
 CHA #24454
 Roxbury BOE
 Special Services 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.
Furnace	1	Carrier			DX Hot Air / NG		Building	Building	1990	-4	
DHW-1	1				DHW / Electric	4.5 kW / 40 Gal.	Building	Building	1990	3	
AC-1	2	Mitsubishi	MS09NW		Wall Mounted Units w/ Remote Condenser	8200 BTU/hr	Building/Roof	Building	1998	1	

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	500	2	0	2	X
ECM-2	Lighting Replacement / Upgrades	405	200	2	300	0.5	X
ECM-3	Install Lighting Controls (Occupancy Sensors)	2,000	500	4	1,700	0.6	
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	3,000	800	4	2,000	1.3	

Site Name - Special Services Building Roxbury Township BOE
CHA Project #24454
Special Services 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) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 1,000	1,600	0	100	500	0	500	6.7	0	2.0	2.0

Expected Life: 15 years

Lifetime Savings: 24,000 kWh 1,500 therms \$ 7,500

ECM-2 Lighting Replacement / Upgrades

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 \$						
\$ 405	854	1	0	212	0	200	6.8	300	1.9	0.5

Expected Life: 15 years

Lifetime Savings: 12,800 kWh 0 therms \$ 3,200

ECM-3 Install Lighting Controls (Occupancy Sensors)

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 \$						
\$ 2,000	2,300	0	0	500	0	500	2.4	1,700	4.0	0.6

Expected Life: 15 years

Lifetime Savings: 34,500 kWh 0 therms \$ 7,500

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

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kWh	Electric kW	Nat Gas Therms	Total \$						
\$ 3,000	3,200	0	0	800	0	800	3.0	2,000	3.8	1.3

Expected Life: 15 years

Lifetime Savings: 48,000 kWh 0 therms \$ 12,000

Site Name - Special Services Building Roxbury Township BOE
 CHA Project #24454

Utility Costs	Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
\$ 0.240 \$/kWh blended		0.00042021	2000	Electric	Natural Gas
\$ 0.234 \$/kWh supply	32,334	0.00042021		7759.59	2446.83
\$ 1.61 \$/kW	152.4	0			
\$ 1.17 \$/Therm	2,100	0.00533471			
\$ - \$/kgals	-	0			

Special Services 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	1,617	105	0	0	\$ 500	\$ 1,000	2.0	1.2	15						2.0	0.0	24,251	1,575	0	0	\$ 7,663	6.7
ECM-2	Lighting Replacement / Upgrades	0.6	854	0	0	0	\$ 212	\$ 405	1.9	0.4	15.0	\$ 42	Y	\$ 300	\$ 300		0.5	9.0	12,810	0	0	0	\$ 3,171	6.8
ECM-3	Install Lighting Controls (Occupancy Sensors)	0.0	2,304	0	0	0	\$ 539	\$ 2,430	4.5	1.0	15.0	\$ 420	Y	\$ 1,700	\$ 1,700		1.4	0.0	34,560	0	0	0	\$ 8,294	2.4
ECM-4	Lighting Replacements with Lighting Controls (Occupancy Sensors)	0.6	3,158	0	0	0	\$ 751	\$ 2,835	3.8	1.3	15.0	\$ 462	Y	\$ 2,000	\$ 2,000		1.1	9.2	47,370	0	0	0	\$ 11,263	3.0
Total (Does Not Include ECM-2 & ECM-3)		0.6	4,775	105	0	0	\$ 1,251	\$ 3,835	3.1		15.0	\$ 462		\$ 2,000	\$ 2,000		1.5	9.2	71,621	1,575	0	0	\$ 18,925	3.9
Total Measures with Payback <10		0.6	4,775	105	0	0	\$ 1,251	\$ 3,835	3.1		15.0	\$ 462		\$ 2,000	\$ 2,000		1.5	9.2	71,621	1,575	0	0	\$ 18,925	3.9
% of Existing		0%	15%	5%	0%	0%																		

**Site Name - Special Services Building Roxbury Township BOE
CHA Project #24454
Special Services Building**

Add VSD's to the HV unit fans

EXISTING CONDITIONS		
Existing Facility Total Electric usage	32,334	kWh
Existing Facility Natural Gas Usage	2,100	Therms
Cost of Electricity	\$ 0.24	\$/kWh
	\$ 1.17	\$/Therms
SAVINGS		
TOD Electric savings	1,617	kWh ²
TOD Natural Gas savings	105	Therms ³
Total Cost Savings	\$ 511	
Estimated Total Project Cost	\$ 1,000	⁴
Simple Payback	2.0	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 thermost
- 4 control work cost

tats with programmable thermostats

Energy Audit of Roxbury BOE Special Services 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
\$405	0.6	854	0	\$212	0	\$212	\$42	1.9	1.7

*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
\$2,430	0.0	2,304	0	\$539	0	\$539	\$420	4.5	3.7

*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
\$2,835	0.6	3,158	0	\$751	0	\$751	\$462	3.8	3.2

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

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

Cost of Electricity: \$0.234 \$/kWh
\$1.61 \$/kW

6.74

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
20	Entranceway	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
129	Men's Bathroom	Bath Room	1	SP 75 I	I75/1	75	0.08	SW	2000	SW	150
129	Women's Bathroom	Bath Room	4	SP 75 I	I75/1	75	0.30	SW	2000	SW	600
20	W. Sitting Area	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	W. Large Office Area	Offices	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
20	S.W. Office	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
20	W. Office	Offices	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
20	N.W. Office	Offices	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
20	E. Large Office Area	Offices	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	C-OCC	768
20	E. Large Office Area	Offices	9	S 32 C F 1 (ELE)	F41LL	32	0.29	SW	2400	C-OCC	691
20	E. Large Office Area	Offices	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
20	E. Office A	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
20	E. Office B	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	E. Office C	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
129	Boiler Room	Storage Areas	1	SP 75 I	I75/1	75	0.08	SW	1000	SW	75
1	Boiler Room	Storage Areas	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.03	SW	1000	SW	31
15	Attic	Storage Areas	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	SW	240
111	Attic	Storage Areas	2	W 34 C F 1 (MAG)	F41EE	43	0.09	SW	1000	SW	86
79	Basement	Storage Areas	4	SP I 100	I100/1	100	0.40	SW	1000	SW	400
	Total		77				3				6,190

Cost of Electricity: \$0.234 \$/kWh
 \$1.61 \$/kW

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		
20	Entranceway	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
129	Men's Bathroom	SP 75 I	I75/1	75	0.1	SW	2000	150	1	CF 26	CFQ26/1-L	27	0.027	SW	2000	54	96.00	0.05	\$ 23.39	\$ 20.25	\$ 7.00	0.9	0.1		
129	Women's Bathroom	SP 75 I	I75/1	75	0.3	SW	2000	600	4	CF 26	CFQ26/1-L	27	0.108	SW	2000	216	384.00	0.19	\$ 93.57	\$ 81.00	\$ 28.00	0.9	0.1		
20	W. Sitting Area	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	W. Large Office Area	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	S.W. Office	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	2400	307.2	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	W. Office	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	N.W. Office	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	E. Large Office Area	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768	10	S 32 C F 1 (ELE)	F41LL	32	0.32	SW	2400	768	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	E. Large Office Area	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	SW	2400	691.2	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	E. Large Office Area	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	E. Office A	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	2400	307.2	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	E. Office B	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
20	E. Office C	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	2400	230.4	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
129	Boiler Room	SP 75 I	I75/1	75	0.1	SW	1000	75	1	CF 26	CFQ26/1-L	27	0.027	SW	1000	27	48.00	0.05	\$ 12.16	\$ 20.25	\$ 7.00	1.7	0.3		
1	Boiler Room	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.0	SW	1000	31	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.031	SW	1000	31	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
15	Attic	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-	-	
111	Attic	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	1000	86	2	W 28 C F 1	F41SSILL	26	0.052	SW	1000	52	34.00	0.03	\$ 8.61	\$ 202.50	\$ -	23.5	6.0		
79	Basement	SP I 100	I100/1	100	0.4	SW	1000	400	4	CF 26	CFQ26/1-L	27	0.108	SW	1000	108	292.00	0.29	\$ 73.97	\$ 81.00	\$ -	1.1	0.3		
Total																	5336	854	1	\$ 211.70	\$ 405.00	\$ 42.00			
Demand Savings																				0.6	\$ 11.86				
kWh Savings																				854	\$ 199.84				
Total savings																					\$ 211.70		1.9	1.7	

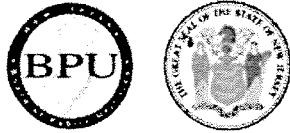
Area Description	EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS							
	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit 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	
20 Entranceway	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	76.8	76.80	0.00	\$ 17.97	\$ 202.50	\$ 35.00	11.3	9.3	
129 Men's Bathroom	1	SP 75 I	I75/1	75	0.1	SW	2000	150.0	1	SP 75 I	I75/1	75	0.1	SW	2000	150	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
129 Women's Bathroom	4	SP 75 I	I75/1	75	0.3	SW	2000	600.0	4	SP 75 I	I75/1	75	0.3	SW	2000	600	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
20 W. Sitting Area	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	76.8	76.80	0.00	\$ 17.97	\$ 202.50	\$ 35.00	11.3	9.3	
20 W. Large Office Area	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1	
20 S.W. Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307.2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	153.6	153.60	0.00	\$ 35.94	\$ 202.50	\$ 35.00	5.6	4.7	
20 W. Office	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1	
20 N.W. Office	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1	
20 E. Large Office Area	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768.0	10	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1200	384	384.00	0.00	\$ 89.86	\$ 202.50	\$ 35.00	2.3	1.9	
20 E. Large Office Area	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691.2	9	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1200	345.6	345.60	0.00	\$ 80.87	\$ 202.50	\$ 35.00	2.5	2.1	
20 E. Large Office Area	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	460.8	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1	
20 E. Office A	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307.2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	153.6	153.60	0.00	\$ 35.94	\$ 202.50	\$ 35.00	5.6	4.7	
20 E. Office B	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	153.6	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	76.8	76.80	0.00	\$ 17.97	\$ 202.50	\$ 35.00	11.3	9.3	
20 E. Office C	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230.4	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1200	115.2	115.20	0.00	\$ 26.96	\$ 202.50	\$ 35.00	7.5	6.2	
129 Boiler Room	1	SP 75 I	I75/1	75	0.1	SW	1000	75.0	1	SP 75 I	I75/1	75	0.1	SW	1000	75	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
1 Boiler Room	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.0	SW	1000	31.0	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.0	SW	1000	31	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
15 Attic	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
111 Attic	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	1000	86.0	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	1000	86	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
79 Basement	4	SP I 100	I100/1	100	0.4	SW	1000	400.0	4	SP I 100	I100/1	100	0.4	SW	1000	400	0.00	0.00	\$ -	\$ -	\$ -	-	-	-
Total	77				3			6,190	77				3			3,886	2,304	0	\$ 539.14	\$ 2,430.00	\$ 420.00			
																	Demand Savings		0.0	\$ -				
																	kWh Savings		2,304	\$ 539.14				
																	Total Savings			\$ 539.14		4.5	3.7	

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	
20	Entranceway	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	C-OCC	1,200	76.8	76.80	0.00	\$ 17.97	\$ 202.50	\$ 35.00	11.3	9.3
129	Men's Bathroom	1	SP 75 I	I75/1	75	0.1	SW	2000	150	1	CF 26	27	0.027	SW	2,000	54	96.00	0.05	\$ 23.39	\$ 20.25	\$ 7.00	0.9	0.6	
129	Women's Bathroom	4	SP 75 I	I75/1	75	0.3	SW	2000	600	4	CF 26	27	0.108	SW	2,000	216	384.00	0.19	\$ 93.57	\$ 81.00	\$ 28.00	0.9	0.6	
20	W. Sitting Area	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	C-OCC	1,200	76.8	76.80	0.00	\$ 17.97	\$ 202.50	\$ 35.00	11.3	9.3
20	W. Large Office Area	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1
20	S.W. Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	C-OCC	1,200	153.6	153.60	0.00	\$ 35.94	\$ 202.50	\$ 35.00	5.6	4.7
20	W. Office	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1
20	N.W. Office	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1
20	E. Large Office Area	10	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	768	10	S 32 C F 1 (ELE)	F41LL	32	0.32	C-OCC	1,200	384	384.00	0.00	\$ 89.86	\$ 202.50	\$ 35.00	2.3	1.9
20	E. Large Office Area	9	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	691	9	S 32 C F 1 (ELE)	F41LL	32	0.288	C-OCC	1,200	345.6	345.60	0.00	\$ 80.87	\$ 202.50	\$ 35.00	2.5	2.1
20	E. Large Office Area	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	461	6	S 32 C F 1 (ELE)	F41LL	32	0.192	C-OCC	1,200	230.4	230.40	0.00	\$ 53.91	\$ 202.50	\$ 35.00	3.8	3.1
20	E. Office A	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	S 32 C F 1 (ELE)	F41LL	32	0.128	C-OCC	1,200	153.6	153.60	0.00	\$ 35.94	\$ 202.50	\$ 35.00	5.6	4.7
20	E. Office B	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	154	2	S 32 C F 1 (ELE)	F41LL	32	0.064	C-OCC	1,200	76.8	76.80	0.00	\$ 17.97	\$ 202.50	\$ 35.00	11.3	9.3
20	E. Office C	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	230	3	S 32 C F 1 (ELE)	F41LL	32	0.096	C-OCC	1,200	115.2	115.20	0.00	\$ 26.96	\$ 202.50	\$ 35.00	7.5	6.2
129	Boiler Room	1	SP 75 I	I75/1	75	0.1	SW	1000	75	1	CF 26	27	0.027	SW	1,000	27	48.00	0.05	\$ 12.16	\$ 20.25	\$ 7.00	1.7	1.1	
1	Boiler Room	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.0	SW	1000	31	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.031	SW	1,000	31	0.00	0.00	\$ -	\$ -	\$ -	-	-
15	Attic	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	1,000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-
111	Attic	2	W 34 C F 1 (MAG)	F41EE	43	0.1	SW	1000	86	2	W 28 C F 1	F41SSILL	26	0.052	SW	1,000	52	34.00	0.03	\$ 8.61	\$ 202.50	\$ -	23.5	23.5
79	Basement	4	SPT 100	I100/1	100	0.4	SW	1000	400	4	CF 26	27	0.108	SW	1,000	108	292.00	0.29	\$ 73.97	\$ 81.00	\$ -	1.1	1.1	
Total		77			3.1			6,190	77			2.5			3,032		0.6	\$ 750.83	\$ 2,835.00	\$ 462.00				
																	Demand Savings		0.6	\$ 11.86				
																	kWh Savings		3158	\$ 738.97				
																	Total Savings			\$ 750.83		3.8	3.2	

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

TEACH

EDA PROGRAMS

TECHNOLOGIES

TOOLS AND RESOURCES

PROGRAM UPDATES

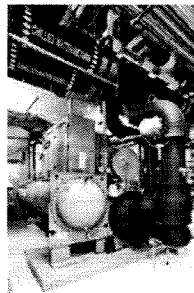
Home » Commercial & Industrial » Programs » Pay for Performance

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

Featured Story

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

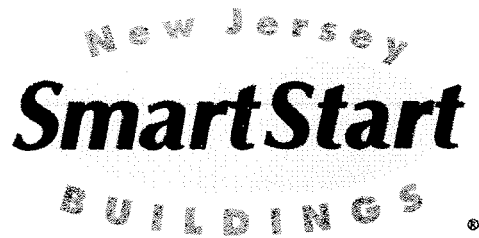
Energy Efficiency Revolving Loan Fund (EE RLF)

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)	2,000
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilities (BPU)

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

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	\$7,760	\$2,447
Existing Usage (from utility)	32,334	2,100
Proposed Savings	4,775	105
Existing Total MMBtus	320	
Proposed Savings MMBtus	27	
% Energy Reduction	8.4%	
Proposed Annual Savings	\$1,251	

	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	\$3,835
---------------------------	----------------

		Allowable Incentive
% Incentives #1 of Utility Cost*	49.0%	\$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		-\$1,165

Project Payback (years)	
w/o Incentives	w/ Incentives
3.1	-0.9

* 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



[Home](#) » [Commercial & Industrial](#) » [Programs](#)

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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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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APPENDIX F

Photovoltaic (PV) Rooftop Solar Power Generation

Photovoltaic (PV) Solar Power Generation - Screening Assessment

**Roxbury Board of Education
Special Services Building**

Cost of Electricity	\$0.240	/kWh
Electricity Usage	32,334	kWh/yr
System Unit Cost	\$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without incentive)	Payback (with incentive)
	kW	kWh	therms	\$	\$	\$	\$	Years	Years	
\$0	0.0	5,404	0	\$1,297	0	\$1,297	\$0	\$416	0.0	0.0

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

Area Output*

32 m2
345 ft2

Perimeter Output*

20 m
64 ft

Available Roof Space for PV:

(Area Output - 10 ft x Perimeter) x 85%
-251 ft2

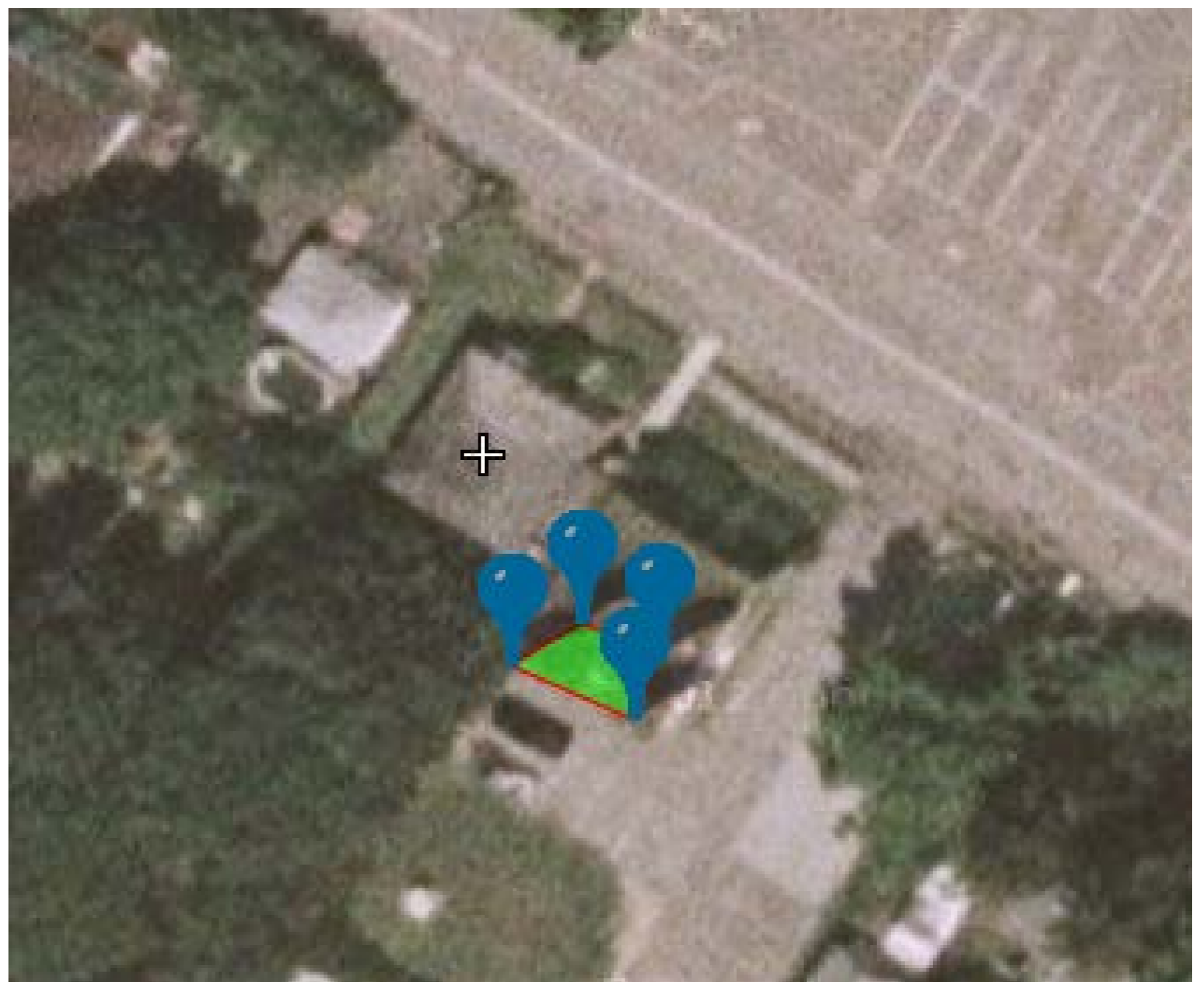
Approximate System Size:

Is the roof flat? (Yes/No) no

11.5 watt/ft2
-2,888 DC watts
0 kW Enter into PV Watts

PV Watts Inputs***

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



PV Watts Output

5,404 annual kWh calculated in PV Watts program

DC RATING ROUNDED TO 4.00 KW. PV SETUP NOT FEASIBLE FOR THIS BUILDING.

% Offset Calc

Usage 32,334 (from utilities)
PV Generation 5,404 (generated using PV Watts)
% offset 17%

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



AC Energy & Cost Savings



(Type comments here to appear on printout; maximum 1 row of 90 characters.)

Station Identification		Results			
Cell ID:	0267370	Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
State:	New Jersey	1	3.13	336	80.64
Latitude:	40.9 ° N	2	3.93	378	90.72
Longitude:	74.7 ° W	3	5.04	514	123.36
PV System Specifications		4	5.30	504	120.96
DC Rating:	4.00 kW *	5	5.57	535	128.40
DC to AC Derate Factor:	0.830	6	5.80	526	126.24
AC Rating:	3.32 kW	7	5.48	503	120.72
Array Type:	Fixed Tilt	8	5.46	505	121.20
Array Tilt:	40.9 °	9	5.29	486	116.64
Array Azimuth:	180.0 °	10	4.74	467	112.08
Energy Specifications		11	3.43	336	80.64
Cost of Electricity:	24.0 ¢/kWh	12	2.98	313	75.12
		Year	4.68	5404	1296.96
<input type="button" value="Output Hourly Performance Data"/>		<input type="button" value="Output Results as Text"/>			
<i>(Gridded data is monthly, hourly output not available.)</i>		Saving Text from a Browser			
<input type="button" value="Run PVWATTS v.2 for another location"/>		<input type="button" value="Run PVWATTS v.1"/>			

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

[Disclaimer and copyright notice.](#)



RReDC home page (<http://rredc.nrel.gov>)

APPENDIX G

EPA Portfolio Manager



STATEMENT OF ENERGY PERFORMANCE

Roxbury Board of Education Special Services Building

Building ID: 3210007
For 12-month Period Ending: May 31, 2012¹
Date SEP becomes ineligible: N/A

Date SEP Generated: August 17, 2012

Facility Roxbury Board of Education Special Services Building 25 Meeker St Succasunna, NJ 07876	Facility Owner N/A	Primary Contact for this Facility N/A
--	------------------------------	---

Year Built: 1952
Gross Floor Area (ft²): 2,000

Energy Performance Rating² (1-100) N/A

Site Energy Use Summary³

Electricity - Grid Purchase(kBtu)	110,324
Natural Gas (kBtu) ⁴	210,000
Total Energy (kBtu)	320,324

Energy Intensity⁴

Site (kBtu/ft ² /yr)	160
Source (kBtu/ft ² /yr)	294

Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO ₂ e/year)	27
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Electric Distribution Utility

Jersey Central Power & Light Co [FirstEnergy Corp]

National Median Comparison

National Median Site EUI	68
National Median Source EUI	164
% Difference from National Median Source EUI	79%
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:

1. 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.
2. 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.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. 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 Special Services 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	25 Meeker St, 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	2,000 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	65 Hours (Default)	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	5 (Default)	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	4 (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	3,091.00
04/01/2012	04/30/2012	1,950.00
03/01/2012	03/31/2012	2,273.00
02/01/2012	02/29/2012	2,617.00
01/01/2012	01/31/2012	2,054.00
12/01/2011	12/31/2011	2,659.00
11/01/2011	11/30/2011	2,133.00
10/01/2011	10/31/2011	2,282.00
09/01/2011	09/30/2011	3,065.00
08/01/2011	08/31/2011	3,284.00
07/01/2011	07/31/2011	3,225.00
06/01/2011	06/30/2011	3,701.00
Electricity Consumption (kWh (thousand Watt-hours))		32,334.00
Electricity Consumption (kBtu (thousand Btu))		110,323.61
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		110,323.61
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	37.00
04/01/2012	04/30/2012	108.30
03/01/2012	03/31/2012	215.40
02/01/2012	02/29/2012	488.60
01/01/2012	01/31/2012	534.00
12/01/2011	12/31/2011	404.10
11/01/2011	11/30/2011	289.60
10/01/2011	10/31/2011	22.00
09/01/2011	09/30/2011	0.00
08/01/2011	08/31/2011	1.00

07/01/2011	07/31/2011	0.00
06/01/2011	06/30/2011	0.00
Natural Gas Consumption (therms)		2,100.00
Natural Gas Consumption (kBtu (thousand Btu))		210,000.00
Total Natural Gas Consumption (kBtu (thousand Btu))		210,000.00
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 Special
Services Building
25 Meeker St
Succasunna, NJ 07876

Facility Owner
N/A

Primary Contact for this Facility
N/A

General Information

Roxbury Board of Education Special Services Building	
Gross Floor Area Excluding Parking: (ft ²)	2,000
Year Built	1952
For 12-month Evaluation Period Ending Date:	May 31, 2012

Facility Space Use Summary

Building	
Space Type	Office
Gross Floor Area (ft ²)	2,000
Weekly operating hours ^d	65
Workers on Main Shift ^d	5
Number of PCs ^d	4
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	N/A	N/A	75	N/A	N/A
Energy Intensity					
Site (kBtu/ft ²)	160	212	50	N/A	68
Source (kBtu/ft ²)	294	351	92	N/A	164
Energy Cost					
\$/year	\$ 10,206.42	\$ 11,736.23	\$ 3,202.89	N/A	\$ 4,333.40
\$/ft ² /year	\$ 5.10	\$ 5.87	\$ 1.60	N/A	\$ 2.17
Greenhouse Gas Emissions					
MtCO ₂ e/year	27	32	8	N/A	11
kgCO ₂ e/ft ² /year	13	16	4	N/A	6

More than 50% of your building is defined as Office. This building is currently ineligible for a rating. Please note the National Median column represents the CBECS national median data for Office. This building uses 79% more energy per square foot than the CBECS national median for Office.

Notes:

- o - This attribute is optional.
- d - A default value has been supplied by Portfolio Manager.