

**ROXBURY TOWNSHIP BOARD OF EDUCATION  
KENNEDY ELEMENTARY SCHOOL  
ENERGY ASSESSMENT**

**for**

**NEW JERSEY  
BOARD OF PUBLIC UTILITIES**

**CHA PROJECT NO. 24454**

**October 2012**

Prepared by:



6 Campus Drive  
Parsippany, NJ 07054

(973) 538-2120

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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 school 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 school 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
Kennedy Elementary School	20 Pleasant Hill Road Succasunna, NJ 07876	46,970	Original: 1969

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 \$17,000 for the recommended ECMs may be realized with a combined payback of 9.0 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	Replace Roof	1,000,000	1,900	>20	0	>20	
ECM-2	Replace Windows	114,000	1,500	>20	0	>20	
ECM-3	Kitchen Hood Controls	29,000	100	>20	0	>20	
ECM-4	Replace Electric 200 Gallon DHW Heater With A Natural Gas Unit	14,000	6,900	2	300	2	X
ECM-5	Replace Electric Dishwasher Booster Heater	10,000	4,000	3	0	3	X
ECM-6	Replace Kitchen Electric 20 Gallon DHW Heater With A Natural Gas Unit	10,000	2,900	3	300	3	X
ECM-7	Lighting Replacement / Upgrades	6,000	3,200	2	2,000	1	X
ECM-8	Install Lighting Controls (Occupancy Sensors)	16,000	3,700	4	2,800	4	
ECM-9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	22,000	5,500	4	4,800	3	
ECM-10	Install Low Flow Fixtures	67,000	200	>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.

Kennedy Elementary is an elementary school located in Succasunna, NY is a 46,970 square foot, one story block structure with exterior brick veneer. The building was constructed in 1969 with additions to the building in 2006. The building is heated by a 200 gallon hot water tank, and a new boiler was installed during previous renovations. The classrooms are served by unit ventilators located along the walls. Occupancy includes approximately 300 students and 43 faculty members. The school is occupied by maintenance personnel Monday through Friday from 6:00 am to 10:00 pm during the school year. Students are typically in the school between 8:00 am and 3:00 pm.

### 3.0 EXISTING CONDITIONS

#### 3.1 Building - General

Built in the 1969 with several renovations, the Kennedy Elementary School building is a 46,970 square foot, one-story school with high bay areas for the gym, and cafeteria. The school has approximately 300 students and 38 staff, and appeared fully utilized during the field survey. The building can be assumed to be fully occupied until 3:00 pm during the week. Custodial staff is typically in the building until 10:00 pm during the week. The hours of operation are:

- Monday through Friday 7:00 am to 10:00 pm (staff)
- Monday through Friday 8:00 am to 3:00 pm (students)
- Saturday & Sunday, open as needed

The original building is constructed of a steel frame and masonry with brick veneer. The interior walls are painted block walls. Several classrooms and the gymnasium were additions to the school in 2006. All sections of the building have flat roofs, with elevated sections of the cafeteria and gymnasium. Both the gymnasium and cafeteria have ceilings that are approximately 30' tall. A new boiler was installed in 2006. All roof sections have a black membrane layer covered with a layer of stone ballast. The building windows are of single glazing with aluminum frames, and are typical for the building. The school has exposed walls facing all directions.



### 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 utility costs are listed below:

**Actual Cost & Site Usage by Utility**

<b>Electric</b>		
Annual Usage	338,800	kWh/yr
Annual Cost	79,850	\$
Blended Rate	0.236	\$/kWh
Supply Rate	0.209	\$/kWh
Demand Rate	6.09	\$/kW
Peak Demand	151.20	kW
Min. Demand	83.60	kW
Avg. Demand	125.92	kW
<b>Natural Gas</b>		
Annual Usage	10,635	therms/yr
Annual Cost	13,314	\$
Rate	1.25	\$/Therm

Electrical usage was generally higher in the winter months when heating equipment was operational. From June 2011 through May 2012, gas-fired equipment consumed about 10,600 therms of natural gas. Based on the annual cost of about \$13,300, the blended price for natural gas was \$1.25 per therm. 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. Contract terms can vary among suppliers. According to the U.S. Energy Information Administration, the average commercial unit costs of electricity and natural gas in New Jersey during the same periods as those noted above was \$0.141 per kWh and \$0.959 per therm. When compared to the average state values, it is recommended that the present electricity supplier be maintained and a third party natural gas supplier be pursued. A list of approved electrical and natural gas energy commodity suppliers can be found in Appendix A.

### 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 Heating Hot Water Systems

The building is heated with hot water supplied by a natural gas fired Buderus condensing boiler installed in 2006. The boiler is located in the mechanical equipment room, adjacent to the kitchen. The hot water system is manually turned on by a custodian at the beginning of the heating system from October to April, and shut down for the summer. The boiler is connected to a Marathon Electric 1.5 HP burner. Hot water is provided to fin tube radiators located in the hallway walls and unit ventilators in classrooms.

#### 3.3.2 Heating and Ventilating Rooftop and Air Handling Units

The building is served by four Lenox L-Series rooftop units with natural gas connections. Two Lenox rooftop units (RTU-3, RTU-4) serve the gymnasium and are installed on the elevated roof. Another Lenox unit (RTU-1) serves the cafeteria and was installed on the roof. RTU-2 serves classrooms in the newer section of the building. These units are used for both heating and cooling. Each unit is mounted on an extended roof curb. Supply and return ductwork is routed down through the roof curbs into the spaces served by each unit.

#### 3.3.3 Unit Ventilators & Airedale Units

Typically each classroom is served by a unit ventilator, which consists of heating/cooling coils, a circulation fan, outdoor air and return air dampers and temperature controls. During our audit we found that the unit ventilators are turned off due to comfort and/or noise issues. When the units are “off”, the dampers are closed and no outdoor air is being introduced through the unit, therefore the heating load on the unit is much diminished.

Replacing the existing unit ventilators with new units would require that the outside air quantity be provided to each classroom to meet the present code requirements which would result in an increase in energy use versus the current units. Although modern controls can help reduce the amount of energy used, ultimately the new unit ventilators will consume more energy than the present units.

#### 3.3.4 Hydronic Heating Systems

Corridors and some spaces with exterior wall exposures are heated by perimeter hot water fin tube radiators with wall mounted thermostats. The cafeteria, auditorium and several offices have wall mounted fin tube units along the outside of the building. Other HVAC equipment (RTUs, UVs) provide cooling/ventilation and outside air for these spaces.

Corridors, entrance vestibules, and some rooms are heated by ceiling mounted hot water cabinet UVs controlled by space thermostats.

#### 3.3.5 Exhaust Systems

Exhaust system fans are integrated into the school energy management systems (EMS) and generally operate during building occupancy.

Common exhaust plenums serve classrooms with rooftop mounted constant volume exhaust fans. Larger classrooms and spaces, including the gym and multipurpose room, have dedicated exhaust fans. Exhaust fans are used for restrooms and custodial closets throughout the building.

### **3.4 Control Systems**

The building has several rooms controlled by the school district's EMS system. The gym, all purpose room, media center and computer room have are controlled by an Automated Logic system. Rooms 19, 20, 21, 22 are also controlled by EMS. The controls for the EMS are operated from the Parks and Recreation office in the high school. The building also has several pneumatic night thermostats that control other zones of the building.

### **3.5 Lighting/Electrical Systems**

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

### **3.6 Plumbing Systems**

#### **2.6.1 Domestic Hot Water System**

The mechanical room contains one 200 gallon Patterson model PKW-80V/8V electric hot water heater that provides hot water service to the entire building. The majority of hot water piping appears to be insulated. Domestic hot water temperature is maintained at 140°F, and chemical disinfection soap is provided at the toilet rooms.

#### **2.6.2 Plumbing Fixtures**

The majority of the school's original lavatories, water closets, and urinals are 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. The toilet rooms have not been renovated since original construction.

## ENERGY CONSERVATION MEASURES

### 3.7 ECM-1 Replace Roof

The roof is constructed of metal roof decking, insulation, and a rubber mat system. The roof has surpassed its useful life and needs to be replaced. This ECM addresses replacing the roof to minimize heating and cooling energy losses.

To calculate the savings, the heat losses through the roof assembly of the school was found using the existing roof's R-value of 19.0 and bin weather data for nearby Newark, NJ. The values were totaled to determine the existing annual energy losses. Heating and cooling energy loss values were then determined with a thermal resistance which included the replacement roof R-value of 30.0. The annual energy savings of replacing the roof is detailed in the summary table below.

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

<b>ECM-1 Replace Roof</b>										
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 \$						
\$					\$	\$		\$		
1,000,000	700	0	1,400	1,900	0	1,900	(0.9)	0	>20	>20

Expected Life: 30 years  
 Lifetime Savings: 21,000 kWh    42,000 therms    \$ 57,000

This measure is not recommended.

### 3.8 ECM-2 Replace Windows

The school has approximately 1,140 square feet of exposed window space in the original construction. All windows are constructed with aluminum frames with single pane glazing. Due to age, construction type and condition, these windows can only provide average thermal resistance to heat transfer. Energy loss due to excess air infiltration occurs between the building and its surroundings. An assessment considered the installation of triple pane windows with aluminum frames.

The calculation considered the amount of time the building was occupied, in the form of lighting bin hours, and a U-factor for the existing windows. Existing annual utility usage can be used as a baseline measure to develop the proposed utility usage. The difference between the proposed utility usage and the baseline utility usage represents the annual amount of heating and cooling savings.

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

**ECM-2 Replace Windows**

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	
114,000	3,900	0	500	1,500	0	1,500	(0.6)	0	>20	>20

Expected Life: 30 years  
 Lifetime Savings: 117,000 kWh      15,000 therms      \$ 45,000

This measure is not recommended.

**3.9 ECM-3 Kitchen Hood Controls**

The cafeteria kitchens in both schools contain a 10’x4’ kitchen hood with a motor that runs continuously during the school day. Installing a control system was assessed. Upon activation, the hood lights turn on and the fans reach a preset minimum speed of between 10 and 50 percent. When cooking applications are turned on, fan speed increases based on exhaust air temperature. During actual cooking, the speed increases to 100 percent until smoke and heat are removed. The control will also send a signal to the kitchen AHU to modulate the speed on the supply fan drive based on exhaust air quantity. Energy saving is calculated from reduction of exhaust and make-up fan speed.

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

**ECM-3 Kitchen Hood Controls**

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	
29,000	0	0	100	100	0	100	(1.0)	0	>20	>20

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

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

This measure is not recommended.

**3.10 ECM-4 Replace 200 Gallon DHW Heater With A Tank-less Condensing Gas-Fired DHW Heater**

The school utilizes one 200 gallon electric water heater to produce domestic hot water. The main DHW heater is a 80 kW Patterson heater. This water heater uses a substantial amount of electricity to heat water that is not used. Based on actual usage of the areas served these units could be replaced with an instantaneous tank-less unit. Converting to lower cost natural gas will result in fuel savings. This ECM assesses replacing the electric powered DHW heaters that serve the school with high efficiency condensing gas water heaters. To implement this ECM, piping and electrical wiring will need to be modified as well as new venting installed. The electrical power currently supplied to these units could be used to power other equipment.

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

**ECM-4 Replace Electric 200 Gallon DHW Heater With A Tank-less Condensing Gas-Fired DHW Heater**

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 \$						
\$ 14,000	37,800	0	-1,200	6,900	\$ 0	\$ 6,900	4.7	\$ 300	2.0	2.0

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

Expected Life: 12 years  
 Lifetime Savings: 453,600 kWh -14,400 therms \$ 82,800

This measure is recommended.

**3.11 ECM-5 Replace Electric Dishwasher Booster Heater**

The 45 kW electric booster heater attached to the dishwasher can be replaced with booster heater that uses natural gas. This would result in fuel cost savings after the conversion, since natural gas is less expensive than electricity.

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

**ECM-5 Replace Electric Dishwasher Booster Heater**

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 \$						
\$ 10,000	5,800	0	-200	4,000	\$ 0	\$ 4,000	3.8	\$ 0	2.5	2.5

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

Expected Life: 12 years  
 Lifetime Savings: 69,600 kWh -2,400 therms \$ 48,000

This measure is recommended.

### 3.12 ECM-6 Replace Electric DHW Heater With A Natural Gas Unit

The kitchen uses one 20 gallon electric water heater to produce domestic hot water. This water heater uses a substantial amount of electricity to heat water that is not used. Based on actual usage, this unit could be replaced with an instantaneous tank-less unit. Converting to lower cost natural gas will result in fuel savings. This ECM assesses replacing the electric powered DHW heater that serves the school with a high efficiency condensing gas water heater. To implement this ECM, piping and electrical wiring will need to be modified as well as new venting installed. The electrical power currently supplied to this unit could be used to power other equipment.

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

#### ECM-6 Replace Kitchen Electric 20 Gallon DHW Heater With A Natural Gas Unit

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	
10,000	16,900	0	-600	2,900	0	2,900	2.4	300	3.4	3.3

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

Expected Life: 12 years  
 Lifetime Savings: 202,800 kWh -7,200 therms \$ 34,800

This measure is recommended.

### 3.13 ECM-7 Lighting Replacement

Many of the school's classrooms and occupied spaces have replaced existing lighting with T-8 blubs in recent years. U-tube T-8s and 2 foot T-8s are used in some fixtures. Most can lights and surface mounted standard bulb fixtures use compact fluorescent lights (CFLs) instead of original incandescent bulbs. Metal halide fixtures still exist in the gymnasium.

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 metal halide 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-7 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 \$						
\$	kWh	kW	Therms	\$	\$	\$		\$	Years	Years
6,000	18,000	0	0	3,200	0	3,200	6.8	2,000	1.9	1.3

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

Expected Life: 15 years  
 Lifetime Savings: 270,000 kWh 0 therms \$ 48,000

This measure is recommended.

**3.14 ECM-8 Install Occupancy Sensors**

The current elementary school 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-8 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 \$						
\$	kWh	kW	Therms	\$	\$	\$		\$	Years	Years
16,000	17,000	0	0	3,700	0	3,700	2.5	2,800	4.3	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: 255,000 kWh 0 therms \$ 55,500

This measure is not recommended.

**3.15 ECM-9 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-7 and ECM-8 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-9 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 \$						
\$ 22,000	35,000	0	0	5,500	\$ 0	\$ 5,500	2.7	\$ 4,800	4.0	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: 525,000 kWh 0 therms \$ 82,500

This measure is not recommended.

**3.16 ECM-10 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.

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

**ECM-10 Install Low Flow Fixtures**

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 \$						
\$ 67,000	0	0	0	200	\$ 0	\$ 200	(0.9)	\$ 0	>20	>20

Expected Life: 15 years  
 Lifetime Savings: 0 kWh 0 therms \$ 3,000

This measure is not recommended.

## 4.0 PROJECT INCENTIVES

### 4.1 Incentives Overview

#### 4.1.1 New Jersey Pay For Performance Program

The school 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 School annual energy cost

The standard incentive pays \$0.10 per square foot, up to a maximum of \$50,000, not to exceed 50% of school 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
<b>Incentive #1</b>	\$0	\$0	\$5,000
<b>Incentive #2</b>	\$0	\$0	\$0
<b>Incentive #3</b>	\$0	\$0	\$0
<b>Total All Incentives</b>	<b>\$0</b>	<b>\$0</b>	<b>\$5,000</b>

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.

Due to the peak demand observed from the utility bills of 151.2 kW in March of 2012, this building is not eligible for the direct install program.

#### 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 school 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 school 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 existing load justifies the use of a 160 kW PV solar array. The system costs for PV installations were derived from contractor budgetary pricing in the state of New Jersey for estimates of total cost of system installation. It should be noted that the cost of installation is currently about \$4.00 per watt or \$4,000 per kW of installed system. Other cost considerations will also need to be considered. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will need to be replaced multiple times during the useful life of the PV system.

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

**Photovoltaic (PV) Rooftop Solar Power Generation – 160 kW System**

Budgetary	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable **SREC	Payback (without incentive)	Payback (with incentive)
	\$	kW	kWh	therms						
<b>\$640,000</b>	<b>160.0</b>	<b>199,834</b>	<b>0</b>	<b>\$47,093</b>	<b>0</b>	<b>\$47,093</b>	<b>\$0</b>	<b>\$12,989</b>	<b>13.6</b>	<b>10.7</b>

\* No federal tax credit currently available.

\*\* Solar Renewable Energy Certificate Program (SREC) for 2012 is \$65/1000kwh

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

**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.

## EPA PORTFOLIO MANAGER

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

The Site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a school 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 Kennedy Elementary School are as follows:

Energy Intensity	Kennedy Elementary School	National Average
EPA Score	74	50
Site (kBtu/sf/year)	47.3	63
Source (kBtu/sf/year)	105.9	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 Kennedy Elementary School is considered a lower than average energy consumer by the EPA Portfolio Manager which gives it a higher than average EPA score. For the School to qualify for the Energy Star label the EPA score is required to be above 75. There are several energy conservation measures recommended in this report, that if implemented will further reduce the energy use intensity and increase the EPA score of the Elementary School. This building does not appear to be eligible for Energy Star certification at this time.

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

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

## 6.0 CONCLUSIONS & RECOMMENDATIONS

The energy audit conducted by CHA at the Kennedy Elementary School identified potential ECMs for lighting and control replacement, attic insulation installation, heating hot water pump motor replacement and VSD installation, network controller installation, demand controlled ventilation, and air sealing. Potential annual savings of \$17,000 may be realized for the recommended ECMs, with a summary of the costs, savings, and paybacks as follows:

### ECM-4 Replace Electric 200 Gallon DHW Heater With A Tank-less Condensing Gas Fired DHW Heater

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	
14,000	37,800	0	-1,200	6,900	0	6,900	4.7	300	2.0	2.0

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

### ECM-5 Replace Electric Dishwasher Booster Heater

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	
10,000	5,800	0	-200	4,000	0	4,000	3.8	0	2.5	2.5

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

### ECM-6 Replace Kitchen Electric 20 Gallon DHW Heater With A Natural Gas Unit

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	
10,000	16,900	0	-600	2,900	0	2,900	2.4	300	3.4	3.3

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

### ECM-7 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	
6,000	18,000	0	0	3,200	0	3,200	6.8	2,000	1.9	1.3

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

**APPENDIX A**

**Utility Usage Analysis**

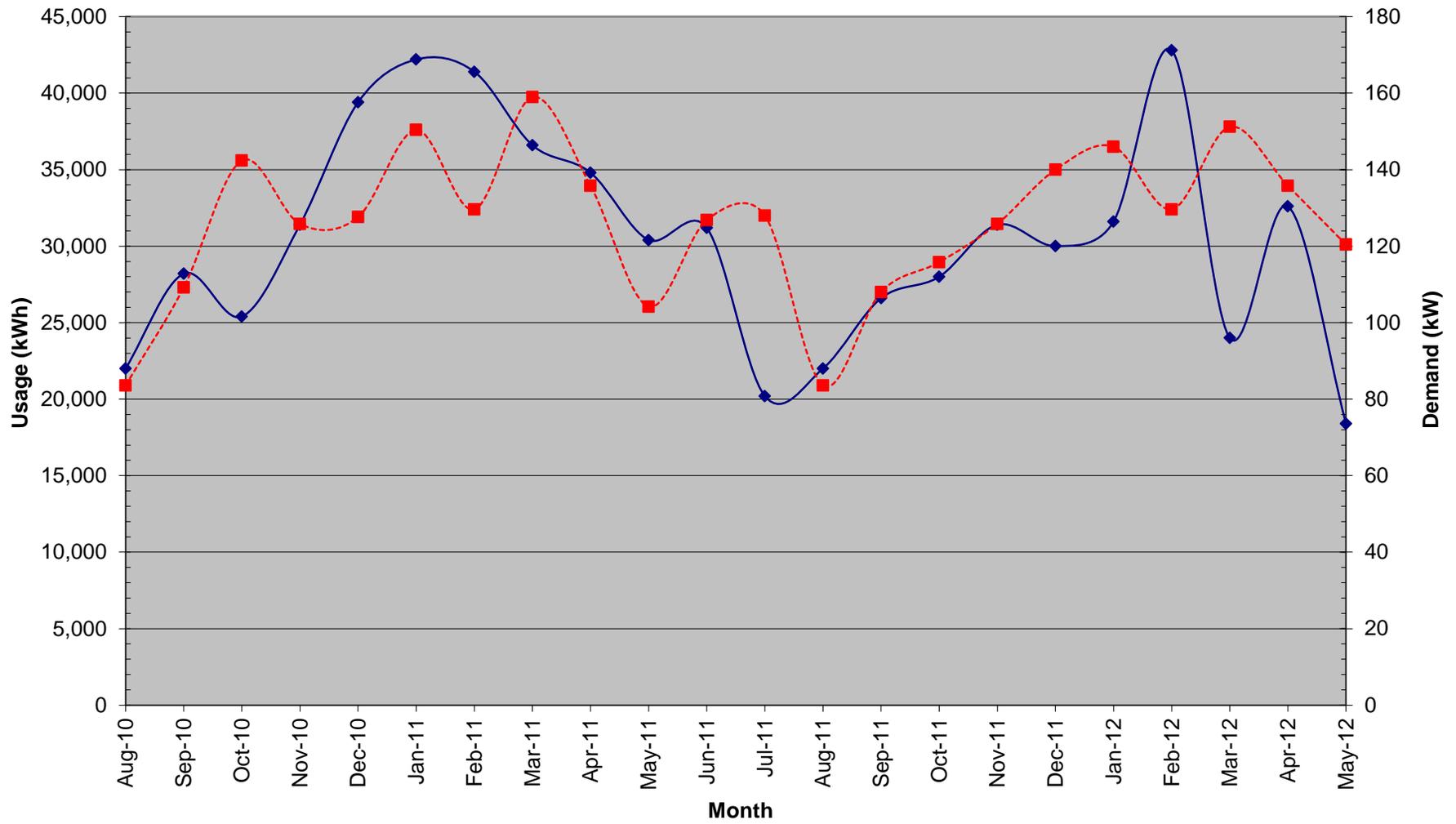
Roxbury Township BOE  
 42 Hillside Ave.  
 Succasunna, NJ 07876

Electric Service  
 Delivery - JCP&L  
 Supplier -

For Service at: Kennedy Elementary School  
 Account No.: 100000-2455-46  
 Meter No.: 23579968

Month	Consumption (kWh)	Demand (kW)	Charges			Unit Costs		
			Total (\$)	Delivery (\$)	Supply (\$)	Blended Rate (\$/kWh)	Consumption (\$/kWh)	Demand (\$/kW)
August-10	22,000	83.60	\$ 5,607.53			\$ 0.255	\$ 0.255	\$ -
September-10	28,200	109.20	\$ 7,201.45			\$ 0.255	\$ 0.255	\$ -
October-10	25,400	142.40	\$ 6,725.40			\$ 0.265	\$ 0.265	\$ -
November-10	31,400	125.80	\$ 7,990.96			\$ 0.254	\$ 0.254	\$ -
December-10	39,400	127.60	\$ 9,832.61			\$ 0.250	\$ 0.250	\$ -
January-11	42,200	150.40	\$ 10,620.09			\$ 0.252	\$ 0.252	\$ -
February-11	41,400	129.60	\$ 10,302.66			\$ 0.249	\$ 0.249	\$ -
March-11	36,600	159.00	\$ 9,200.31			\$ 0.251	\$ 0.251	\$ -
April-11	34,800	135.80	\$ 8,535.92			\$ 0.245	\$ 0.245	\$ -
May-11	30,400	104.20	\$ 6,973.83			\$ 0.229	\$ 0.209	\$ 5.85
June-11	31,200	126.80	\$ 7,345.31			\$ 0.235	\$ 0.209	\$ 6.39
July-11	20,200	128.00	\$ 5,074.47			\$ 0.251	\$ 0.211	\$ 6.40
August-11	22,000	83.60	\$ 5,138.86			\$ 0.234	\$ 0.210	\$ 6.11
September-11	26,600	108.00	\$ 6,260.95			\$ 0.235	\$ 0.210	\$ 6.30
October-11	28,000	115.80	\$ 6,550.70			\$ 0.234	\$ 0.210	\$ 5.91
November-11	31,400	125.80	\$ 7,329.01			\$ 0.233	\$ 0.210	\$ 5.96
December-11	30,000	140.00	\$ 7,137.36			\$ 0.238	\$ 0.210	\$ 6.01
January-12	31,600	146.00	\$ 7,494.51			\$ 0.237	\$ 0.209	\$ 6.03
February-12	42,800	129.60	\$ 9,696.65	\$ 5,783.49	\$ 3,913.16	\$ 0.227	\$ 0.135	\$ 5.97
March-12	24,000	151.20	\$ 5,867.05	\$ 3,655.93	\$ 2,211.12	\$ 0.244	\$ 0.152	\$ 6.04
April-12	32,600	135.80	\$ 7,455.04	\$ 4,451.60	\$ 3,003.44	\$ 0.229	\$ 0.137	\$ 5.99
May-12	18,400	120.40	\$ 4,492.07	\$ 2,796.88	\$ 1,695.19	\$ 0.244	\$ 0.152	\$ 5.93
<b>Total (12-months)</b>	<b>338,800</b>	<b>151.20</b>	<b>\$79,841.98</b>	<b>\$16,687.90</b>	<b>\$10,822.91</b>	<b>\$ 0.236</b>	<b>\$ 0.209</b>	<b>\$ 6.08</b>

### Electric Usage - Kennedy Elementary School



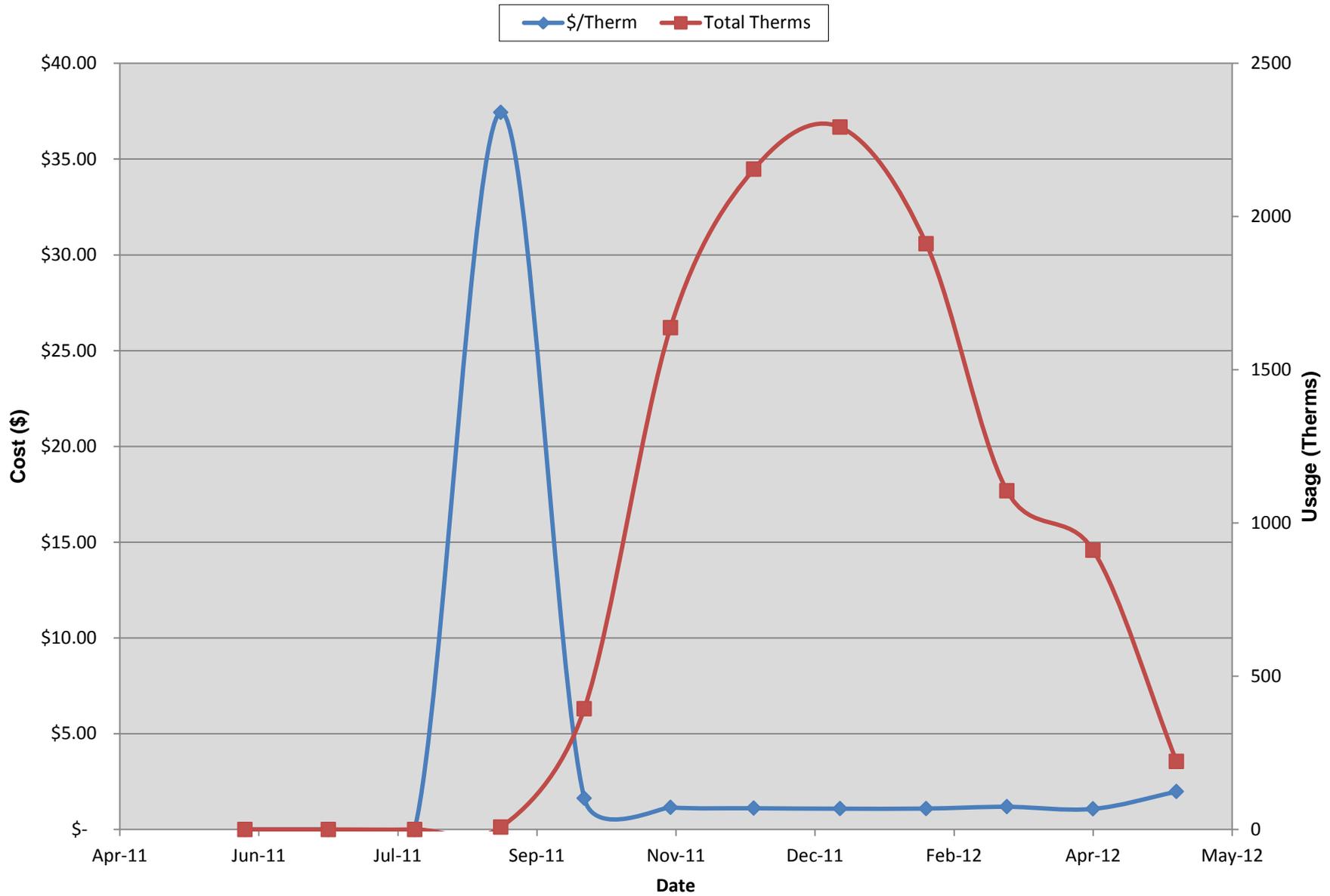
Roxbury Township BOE  
 42 Hillside Ave.  
 Succasunna, NJ 07876

Gas Service  
 Delivery - NJNG  
 Supplier -

For Service at: Kennedy Elementary School  
 Account No.: 01-1102-7348-19  
 Meter No.: 00786205

Month	Total (\$)	Delivery (\$)	Supply (\$)	Total Therms	\$/Therm
Sep-10	\$ 274.84			5.3	\$ 51.86
Oct-10	\$ 960.14			680.1	\$ 1.41
Nov-10	\$ 2,129.54			1835.5	\$ 1.16
Dec-10	\$ 3,365.48			2952.8	\$ 1.14
Jan-11	\$ 3,499.38			3165.4	\$ 1.11
Feb-11	\$ 2,959.59			2609	\$ 1.13
Mar-11	\$ 2,338.52			2006.5	\$ 1.17
Apr-11	\$ 1,524.97			1217.3	\$ 1.25
May-11	\$ 343.89			73.9	\$ 4.65
Jun-11	\$ 270.03			0	#DIV/0!
Jul-11	\$ 270.03			0	#DIV/0!
Aug-11	\$ 270.03			0	#DIV/0!
Sep-11	\$ 277.04			7.4	\$ 37.44
Oct-11	\$ 642.97			393.4	\$ 1.63
Nov-11	\$ 1,886.93			1637.4	\$ 1.15
Dec-11	\$ 2,388.33			2154.3	\$ 1.11
Jan-12	\$ 2,489.72			2291.7	\$ 1.09
Feb-12	\$ 2,088.53			1911.2	\$ 1.09
Mar-12	\$ 1,311.18			1105.3	\$ 1.19
Apr-12	\$ 980.49			911.1	\$ 1.08
May-12	\$ 438.39			222	\$ 1.97
<b>Total (12-months)</b>	<b>\$ 13,313.67</b>	<b>\$ -</b>	<b>\$ -</b>	<b>10633.80</b>	<b>\$ 1.25</b>

# Natural Gas Usage - Kennedy Elementary School (12 Months)



**APPENDIX B**

**Equipment Inventory**

Jersey BPU Energy Audit Program  
 CHA #24454  
 Roxbury BOE  
 Kennedy Elementary School  
 Original Construction Date: 1969  
 Renovation/Addition Date:

1969

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.
DHW-1	1	Patterson Kelley Co	PKW-80V/8V	200724	HW Tank	150 PSI	MER	School	1969	-18	
RTU-1	1	Lennox	LGA090H2BH2G	5604B00790	NG/DX Unit	2 HP ev fan. 1/3 HP cd fan.	Roof	School	2001	4	
RTU-2	1	Lennox	LGA060H2BH2G	5604B00907	NG/DX Unit	2 HP ev fan. 1/3 HP cd fan.	Roof	School	2001	4	
RTU-3	1	Lennox	LGA240H2BH2G	5604B00446	NG/DX Unit	7.5 HP ev fan. 1/3 HP cd fan.	Roof	School	2001	4	
RTU-4	1	Lennox	LGA060H2BH2G	5604B00905	NG/DX Unit	1.5 HP ev fan. 1/3 HP cd fan.	Roof	School	2001	4	
B-1	1	Buderus	GE515/7	05086701-00-3199-0005	Boiler		MER	School	2006	19	
B-2	1	Marathon	AVJ56T34D5326DP		Burner		MER	School	2001	10	
MAU-1	1	Unknown			Makeup Air Unit		Kitchen Office	Kitchen			INACCESSIBLE
	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	Replace Roof	1,000,000	1,900	>20	0	>20	
ECM-2	Replace Windows	114,000	1,500	>20	0	>20	
ECM-3	Kitchen Hood Controls	29,000	100	>20	0	>20	
ECM-4	Replace Electric 200 Gallon DHW Heater With A Natural Gas Unit	14,000	6,900	2	300	2	X
ECM-5	Replace Electric Dishwasher Booster Heater	10,000	4,000	3	0	3	X
ECM-6	Replace Kitchen Electric 20 Gallon DHW Heater With A Natural Gas Unit	10,000	2,900	3	300	3	X
ECM-7	Lighting Replacement / Upgrades	6,000	3,200	2	2,000	1	X
ECM-8	Install Lighting Controls (Occupancy Sensors)	16,000	3,700	4	2,800	4	
ECM-9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	22,000	5,500	4	4,800	3	

**Roxbury BOE - NJBPU**  
**CHA Project #24454**  
**Kennedy Elementary School**

**ECM Summary Sheet**

**ECM-1 Replace Roof**

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
1,000,000	700	0	1,400	1,900	0	1,900	(0.9)	0	>20	>20

Expected Life: 30 years  
 Lifetime Savings: 21,000 kWh      42,000 therms      \$ 57,000

**ECM-2 Replace Windows**

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
114,000	3,900	0	500	1,500	0	1,500	(0.6)	0	>20	>20

Expected Life: 30 years  
 Lifetime Savings: 117,000 kWh      15,000 therms      \$ 45,000

**ECM-3 Kitchen Hood Controls**

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
29,000	0	0	100	100	0	100	(1.0)	0	>20	>20

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

**ECM-4 Replace Electric 200 Gallon DHW Heater With A Natural Gas Unit**

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
14,000	37,800	0	-1,200	6,900	0	6,900	4.7	300	2.0	2.0

Expected Life: 12 years  
 Lifetime Savings: 453,600 kWh      -14,400 therms      \$ 82,800

**ECM-5 Replace Electric Dishwasher Booster Heater**

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
10,000	5,800	0	-200	4,000	0	4,000	3.8	0	2.5	2.5

Expected Life: 12 years  
 Lifetime Savings: 69,600 kWh      -2,400 therms      \$ 48,000

**ECM-6 Replace Kitchen Electric 20 Gallon DHW Heater With A Natural Gas Unit**

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
10,000	16,900	0	-600	2,900	0	2,900	2.4	300	3.4	3.3

Expected Life: 12 years  
 Lifetime Savings: 202,800 kWh      -7,200 therms      \$ 34,800

**ECM-7 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
6,000	18,000	0	0	3,200	0	3,200	6.8	2,000	1.9	1.3

Expected Life: 15 years  
 Lifetime Savings: 270,000 kWh      0 therms      \$ 48,000

**ECM-8 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
16,000	17,000	0	0	3,700	0	3,700	2.5	2,800	4.3	3.6

Expected Life: 15 years  
 Lifetime Savings: 255,000 kWh      0 therms      \$ 55,500

**ECM-9 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
22,000	35,000	0	0	5,500	0	5,500	2.7	4,800	4.0	3.1

Expected Life: 15 years  
 Lifetime Savings: 525,000 kWh      0 therms      \$ 82,500

Roxbury BOE - NJBPU  
CHA Project #24454

Utility Costs		Yearly Usage	MTCDE	Building Area	Annual Utility Cost	
\$ 0.220	\$/kWh blended		0.00042021	46,970	Electric	Natural Gas
\$ 0.140	\$/kWh supply	338,800	0.00042021		\$ 79,841	\$ 13,313
\$ 6.08	\$/kW	151	0			
\$ 1.25	\$/Therm	54,819	0.00533471			
\$ -	\$/kgals	10,663	0			

**Kennedy Elementary School**

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	Replace Roof	0.0	0	1,429	722	0	\$ 1,900	\$ 1,000,000	526.3	7.9	30	\$ -	N	\$ -	\$ -	526.3	0.0	0	42,860	21,654	0	\$ 58,339	(0.9)
ECM-2	Replace Windows	0.0	0	505	3918	0	\$ 1,500	\$ 114,000	76.0	4.3	30	\$ -	N	\$ -	\$ -	76.0	0.0	0	15,139	117,526	0	\$ 44,780	(0.6)
ECM-3	Kitchen Hood Controls	0.0	0	52	0	0	\$ 100	\$ 28,624	286.2	0.3	15	\$ -	N	\$ -	\$ -	286.2	0.0	0	775	0	0	\$ 969	(1.0)
ECM-4	Replace Electric 200 Gallon DHW Heater With A Natural Gas Unit	0.0	37,827	(1,158)	0	0	\$ 6,900	\$ 14,428	2.1	9.7	12	\$ 300	N	\$ -	\$ 300	2.0	0.0	453,920	(13,892)	0	0	\$ 82,497	4.7
ECM-5	Replace Electric Dishwasher Booster Heater	48.0	5,760	(246)	0	0	\$ 4,000	\$ 10,000	2.5	1.1	12	\$ -	N	\$ -	\$ -	2.5	576.0	69,120	(2,949)	0	0	\$ 48,016	3.8
ECM-6	Replace Kitchen Electric 20 Gallon DHW Heater With A Natural Gas Unit	0.0	16,930	(621)	0	0	\$ 2,900	\$ 10,468	3.6	3.8	12	\$ 300	N	\$ -	\$ 300	3.5	0.0	203,163	(7,449)	0	0	\$ 35,385	2.4
ECM-7	Lighting Replacement / Upgrades	9.0	18,049	0	0	0	\$ 3,200	\$ 6,122	1.9	7.6	15	\$ 2,000	N	\$ -	\$ 2,000	1.3	134.8	270,734	0	0	0	\$ 47,739	6.8
ECM-8	Install Lighting Controls (Occupancy Sensors)	0.0	16,957	0	0	0	\$ 3,700	\$ 16,200	4.4	7.1	15	\$ 2,800	N	\$ -	\$ 2,800	3.6	0.0	254,362	0	0	0	\$ 55,960	2.5
ECM-9	Lighting Replacements with Lighting Controls (Occupancy Sensors)	9.0	34,952	0	0	0	\$ 5,500	\$ 22,322	4.1	14.7	15	\$ 4,800	N	\$ -	\$ 4,800	3.2	134.8	524,275	0	0	0	\$ 83,235	2.7
<b>Total (Does Not Include ECM-7&amp; ECM-8)</b>		<b>57.0</b>	<b>95,469</b>	<b>(39)</b>	<b>4,639</b>	<b>0</b>	<b>\$ 22,800</b>	<b>\$ 1,199,841</b>	<b>52.6</b>		<b>18.0</b>	<b>\$ 5,400</b>		<b>\$ -</b>	<b>\$ 5,400</b>	<b>52.4</b>	<b>710.8</b>	<b>1,250,478</b>	<b>34,485</b>	<b>139,180</b>	<b>0</b>	<b>\$ 353,221</b>	<b>(0.7)</b>
<b>Total Measures with Payback &lt;10</b>		<b>57.0</b>	<b>95,469</b>	<b>(2,024)</b>	<b>0</b>	<b>0</b>	<b>\$ 19,300</b>	<b>\$ 57,217</b>	<b>3.0</b>		<b>13.5</b>	<b>\$ 5,400</b>		<b>\$ -</b>	<b>\$ 5,400</b>	<b>2.7</b>	<b>710.8</b>	<b>1,250,478</b>	<b>(24,290)</b>	<b>0</b>	<b>0</b>	<b>\$ 249,133</b>	<b>3.4</b>
<b>% of Existing</b>		<b>38%</b>	<b>28%</b>	<b>0%</b>	<b>1%</b>	<b>0%</b>																	

**ECM-M3A: Boiler Replacement**

Existing Fuel

**ECM-1 Replace Roof and Upgrade Insulation**

Area of Roof	50,000 SF	Cooling System Efficiency	1.4 kW/ton	Heating System Efficiency	88%
Existing Infiltration Factor	0.20 cfm/SF	Ex Occupied Cng Temp.	72 *F	Heating On Point	55 *F
Proposed Infiltration Factor	0.20 cfm/SF	Ex Unoccupied Cng Temp.	78 *F	Ex Occupied Htg Temp.	72 *F
Existing U Value	0.053 Btuh/SF/*F	Cooling Occ Enthalpy Setpoint	26.5 Btu/lb	Ex Unoccupied Htg Temp.	65 *F
Proposed U Value	0.033 Btuh/SF/*F	Cooling Unocc Enthalpy Setpoint	26.5 Btu/lb	Electricity	\$ 0.220 \$/kWh
				Natural Gas	\$ 1.25 \$/Therm

Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	EXISTING LOADS			PROPOSED LOADS				COOLING ENERGY		HEATING ENERGY	
		Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Occupied		Unoccupied		Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy therms	Proposed Heating Energy therms
					Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH				
A		B	C	D	E	F	G	H	I	J	K	L
97.5	55.7	9	3	6	-1,381,105	-1,365,316	-1,356,500	-1,346,500	1440	1418	0	0
92.5	49.1	69	25	44	-1,070,947	-1,055,158	-1,051,167	-1,041,167	8539	8410	0	0
87.5	42.5	132	47	85	-760,789	-745,000	-745,833	-735,833	11560	11387	0	0
82.5	39.5	344	123	221	-612,632	-596,842	-602,500	-592,500	24180	23922	0	0
77.5	36.6	566	202	364	-468,974	0	-463,667	0	11060	10935	0	0
72.5	34.0	755	270	485	-338,816	0	-338,333	0	10659	10643	0	0
67.5	31.6	780	279	501	0	0	0	0	0	0	0	0
62.5	29.2	889	318	572	0	0	0	0	0	0	0	0
57.5	27.0	742	265	477	0	0	0	0	0	0	0	0
52.5	24.5	627	224	403	261,916	167,895	243,100	155,833	0	0	1,436	1,332
47.5	21.4	725	259	466	329,074	235,053	305,433	218,167	0	0	2,213	2,054
42.5	18.7	795	284	511	396,232	302,211	367,767	280,500	0	0	3,034	2,816
37.5	16.2	784	280	504	463,389	369,368	430,100	342,833	0	0	3,590	3,332
32.5	14.4	682	244	438	530,547	436,526	492,433	405,167	0	0	3,643	3,382
27.5	12.6	345	123	222	597,705	503,684	554,767	467,500	0	0	2,106	1,955
22.5	10.7	229	82	147	664,863	570,842	617,100	529,833	0	0	1,573	1,460
17.5	8.6	189	68	122	732,021	638,000	679,433	592,167	0	0	1,442	1,339
12.5	6.8	70	25	45	799,179	705,158	741,767	654,500	0	0	588	545
7.5	5.5	20	7	13	866,337	772,316	804,100	716,833	0	0	183	170
2.5	4.1	8	3	5	933,495	839,474	866,433	779,167	0	0	79	74
<b>TOTALS</b>		<b>8,760</b>	<b>3,129</b>	<b>5,631</b>					<b>67437</b>	<b>66715</b>	<b>19,887</b>	<b>18,458</b>

Existing Ceiling Infiltration	10,000 cfm
Existing Ceiling Heat Transfer	2,632 Btuh/*F
Proposed Ceiling Infiltration	10,000 cfm
Proposed Ceiling Heat Transfer	1,667 Btuh/*F

Savings	1,429 Therms	\$ 1,786
	722 kWh	\$ 159
		<b>\$ 1,945</b>

Roxbury BOE - NJBPU  
CHA Project #24454  
Kennedy Elementary School

Window Replacement

Window Area	1,140 SF	Prop Occupied Htg Temp.	72 °F
Internal Balance Temp.	55 °F	Prop Unoccupied Htg Temp.	65 °F
Heating System Efficiency	88%	Prop Occupied Clng Temp.	74 °F
Cooling EER	1.2 (Btu/Watt)	Prop Unoccupied Clng Temp.	78 °F
Existing U factor	0.87 Btu/(h*sqft*degf)	\$/ kWh	\$0.22
Proposed U factor	0.45 Btu/(h*sqft*degf)	\$/ Therm	\$1.25

Avg Outdoor Air Temp. Bins °F	Proposed Occupied Bin Hours	Unoccupied Bin Hours	Existing Occupied Energy Mbtu	Existing Unoccupied Energy Mbtu	Proposed Occupied Energy Mbtu	Proposed Unoccupied Energy Mbtu	Heating Energy Savings (Therms)	Cooling Energy Savings (kWh)	Total Cost Savings
102.5	0	0	0	0	0	0	0	-	\$0
97.5	0	0	0	0	0	0	0	-	\$0
92.5	3	6	59	83	31	43	0	57	\$13
87.5	13	24	177	224	92	116	0	161	\$35
82.5	66	120	560	534	290	276	0	440	\$97
77.5	88	159	306	0	158	0	0	123	\$27
72.5	114	206	0	0	0	0	0	-	\$0
67.5	221	397	985	0	510	0	0	396	\$87
62.5	296	532	2,786	1,320	1,441	683	0	1,652	\$363
57.5	214	386	3,082	2,869	1,594	1,484	0	2,394	\$527
52.5	218	392	4,213	4,862	2,179	2,515	36	-	\$44
47.5	218	393	5,302	6,817	2,743	3,526	47	-	\$59
42.5	234	422	6,855	9,411	3,546	4,868	64	-	\$80
37.5	365	658	12,501	17,937	6,466	9,278	119	-	\$149
32.5	262	472	10,270	15,210	5,312	7,867	100	-	\$125
27.5	119	215	5,265	7,986	2,723	4,131	52	-	\$65
22.5	90	162	4,418	6,829	2,285	3,532	44	-	\$55
17.5	45	80	2,413	3,786	1,248	1,958	24	-	\$30
12.5	17	30	991	1,573	512	814	10	-	\$13
7.5	8	14	503	807	260	417	5	-	\$6
2.5	5	8	320	518	166	268	3	-	\$4
-2.5	0	0	0	0	0	0	0	-	\$0
-7.5	0	0	0	0	0	0	0	-	\$0
<b>TOTALS</b>	<b>2,597</b>	<b>4,675</b>	<b>61,006</b>	<b>80,764</b>	<b>31,555</b>	<b>41,774</b>	<b>505</b>	<b>5,224</b>	<b>\$1,780</b>

Window Breakdown

Location	# of	Total Sqft.
S	20	380
W	20	380
N	20	380
E	0	0
		1140
Replacement Cost		\$ 100 / Sqft
Total Cost		\$114,000

**ECM-3: Kitchen Hood Control**

**Motor Operating Savings**

Hours of Operation (per day)	4	A
Days/Year	180	B
Weeks/Year	36	C
Motor HP	3	D
Equivalent KW	1.87 KW	E
Cost of Electricity	\$0.22 KWh	F
Total Time/Year	720 hrs/year	G
Total KWH/YR	1343 KWh	H

% Rated RPM I	% Run Time J	Time K J * G	Output L I * E ^ 2.5	KWH/YR M L * K
100%	9%	65	1.865	121
90%	11%	79	1.433	114
80%	14%	101	1.068	108
70%	35%	252	0.765	193
60%	18%	130	0.520	67
50%	13%	94	0.330	31
40%	0%	0	0.189	0
30%	0%	0	0.092	0
20%	0%	0	0.033	0
10%	0%	0	0.006	0

633 N

Total Savings = H - N      710      KWh

**Conditioned Make Up Air: Heating**

Previous Net Exhaust Volume	3,000 CFM	
New Net Exhaust Volume	2,157 CFM	Note 1
Previous net heat load	144,180 BTU/hr	
new net heat load	103,665 BTU/hr	
Design Indoor Conditions	72 F	
Average Outdoor Air Temp (during Heating)	27.5 F	
Heating Hours	1,552 hrs/yr	
Total Therms Savings	52 Therms	

% Rated RPM I	% Run Time J	H * J
100%	9%	9.00%
90%	11%	9.90%
80%	14%	11.20%
70%	35%	24.50%
60%	18%	10.80%
50%	13%	6.50%
40%	0%	0.00%
30%	0%	0.00%
20%	0%	0.00%
10%	0%	0.00%

Avg RPM      71.90%

Cost of Fuel =      / therm

Reduced Electricity Savings =	710 kWh
Reduced Fuel Savings =	52 therms
Reduced Financial Savings =	\$156

Multipliers	
Material:	1.00
Labor:	1.00
Equipment:	1.00

**ECM-3: Kitchen Hood Control - Cost**

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Me-Link Kitchen Hood Control System	1	ea	\$ 15,000	\$ 2,000		\$ 15,000	\$ 2,000	\$ -	\$ 17,000	
3.0 HP VFDs (1-exhaust fan)	1	ea	\$ 1,485	\$ 490		\$ 1,485	\$ 490	\$ -	\$ 1,975	
3.0 HP Motor	1	ea	\$ 525	\$ 85		\$ 525	\$ 85	\$ -	\$ 610	
Electrical - misc.	1	ls	\$ 200	\$ 500		\$ 200	\$ 500	\$ -	\$ 700	
Remote bulb thermostat	2	ea	\$ 500	\$ 200		\$ 1,000	\$ 400	\$ -	\$ 1,400	

\$ 21,685	Subtotal
\$ 2,169	10% Contingency
\$ 4,771	20% Contractor O&P
\$ -	
<b>\$ 28,624</b>	<b>Total</b>

**ECM-4: Replace Electric DHW Heater w/ Tankless Condensing Gas-Fired DHW Heater**

**Summary**

\* Replace Electric DHW Heater w/ Instantaneous, Condensing, Gas-Fired DHW Heater

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	55	°F	Temperature of water coming into building
Hot Water Temperature	140	°F	
Hot Water Usage per day	563	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	103,552	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	200	Gallons	Per manufacturer nameplate
Hot Water Temperature	140	°F	Per building personnel
Average Room Temperature	70	°F	
Standby Losses (% by Volume)	2.5%		( 2.5% of stored capacity per hour, per U.S. Department of Energy )
Standby Losses (Heat Loss)	2.9	MBH	
Annual Standby Hot Water Load	25,550	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	129,102	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	100%		Per Manufacturer
Total Annual Energy Required	129,102	Mbtu/yr	
<b>Total Annual Electric Required</b>	<b>37,827</b>	<b>kWh/yr</b>	<b>Electrical Savings</b>
Average Annual Electric Demand	4.32	kW	
<b>Peak Electric Demand</b>	<b>80.00</b>	<b>kW</b>	<b>Per Manufacturer's Nameplate (Demand Savings)</b>
New Tank Size	5	Gallons	
Hot Water Temperature	140	°F	
Average Room Temperature	70	°F	
Standby Losses (% by Volume)	2.5%		( 2.5% of stored capacity per hour, per U.S. Department of Energy )
Standby Losses (Heat Loss)	0.1	MBH	
Annual Standby Hot Water Load	639	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	104,191	MBTU/yr	
Proposed Avg. Hot water heater efficiency	90%		
Proposed Total Annual Energy Required	115,768	MBTU/yr	
Proposed Fuel Use	1,158	Therms/yr	Standby Losses and inefficient DHW heater eliminated
Elec Utility Demand Unit Cost	\$6.08	\$/kW	
Elec Utility Supply Unit Cost	\$0.14	\$/kWh	
NG Utility Unit Cost	\$1.25	\$/Therm	
Existing Operating Cost of DHW	\$11,133	\$/yr	
Proposed Operating Cost of DHW	\$1,447	\$/yr	
<b>Annual Utility Cost Savings</b>	<b>\$9,685</b>	<b>\$/yr</b>	

**Daily Hot Water Demand**

FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	#USES PER DAY		FULL TIME OCCUPANTS**		TOTAL GAL/DAY	% HOT WATER	TOTAL HW GAL/DAY
			MALE	FEMALE	MALE	FEMALE			
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2.5	0.25	3	3	300	300	1125	50%	563
SHOWER	2.5	5	1	1			0	75%	0
KITCHEN SINK	2.5	0.5	1	1			0	75%	0
MOP SINK	2.5	2	1	1			0	75%	0
Dishwasher (gal per u	10	60	1	0			0	100%	0
<b>TOTAL</b>							1125		<b>563</b>

Multipliers	
Material:	1.00
Labor:	1.00
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Gas-Fired DHW Heater Removal	1	LS		\$ 50		\$ -	\$ 50	\$ -	\$ 50	
High Efficiency Gas-Fired DHW Heater	1	LS	\$ 9,000	\$ 280		\$ 9,000	\$ 280	\$ -	\$ 9,280	
Miscellaneous Electrical	1	LS	\$ 300			\$ 300	\$ -	\$ -	\$ 300	
Venting Kit	1	EA	\$ 450	\$ 650		\$ 450	\$ 650	\$ -	\$ 1,100	
Miscellaneous Piping and Valves	1	LS	\$ 200			\$ 200	\$ -	\$ -	\$ 200	

\$ 10,930	Subtotal
\$ 1,093	10% Contingency
\$ 2,405	20% Contractor O&P
\$ -	
<b>\$ 14,428</b>	<b>Total</b>

**TITLE: Booster Heater Conversion (Electric to Gas)**

**PROJECT:** Roxbury BOE - NJBPU

**SITE:** Kennedy Elementary School

**DESCRIPTION:** When fuel costs are less expensive than electric, converting from electric to fuel heating results in reduce cost.

**GIVEN:**

Electrical Energy Cost	=	\$0.220	\$/kWh
Electrical Demand Cost	=	\$ 6.08	\$/kW
Fuel Energy Cost	=	\$1.25	\$/Therm (Nat'l Gas)
Booster Heater Capacity	=	20	Kw
Operation (Hours/Day)	=	4.00	Hours/Day
Operation (Days/Year)	=	180.00	Day/Year
Operation (Hours/Year)	=	720	Hours/Year

**ASSUMPTION:**

Efficiency (Fuel)	=	80%
Efficiency (Electric)	=	100%
Operating Months per Year	=	10
Scheduled Usage	=	50%
Utilization Factor (Demand)	=	30%

**FORMULA:**  
 Energy Use (Kwh) = (Capacity(Kw)) x (Hours of Operation/Year) x (Scheduled Usage) / (Efficiency)  
 Fuel Use (Unit) = (Electrical Use(Kwh)) x (3413 btu/kw) x (Electrical Efficiency) / (Fuel Efficiency) / (Heating Value of Fuel)  
 Energy Demand (Kw) = (Capacity (Kw)) x (Months/Year) x (Demand Utilization Factor)  
 Electrical Energy Cost (\$) = (Energy Cost (Kwh) x (\$/Kwh)) + (Demand (Kw) x (\$/Kw))  
 Fuel Energy Cost (\$) = ((Fuel Use(Unit) x Fuel Cost(\$/Unit))

**CALCULATION:**

Electric Usage =	(	<table border="1"><tr><td>Capacity</td><td>Hours/Year</td><td>Scheduled Usage</td><td>Efficiency</td></tr><tr><td>20</td><td>720</td><td>50%</td><td>100%</td></tr></table> )	Capacity	Hours/Year	Scheduled Usage	Efficiency	20	720	50%	100%	) / (	100%) =	<b>7,200 Kwh</b>	
Capacity	Hours/Year	Scheduled Usage	Efficiency											
20	720	50%	100%											
Fuel Usage =	(	<table border="1"><tr><td>Electrical Use Conversion</td><td>Efficiency (Electric)</td><td>Efficiency (Fuel)</td><td>Conversion</td></tr><tr><td>7,200</td><td>3,413</td><td>100%</td><td>80%</td></tr></table> )	Electrical Use Conversion	Efficiency (Electric)	Efficiency (Fuel)	Conversion	7,200	3,413	100%	80%	) / (	100,000) =	<b>307 Therm</b>	
Electrical Use Conversion	Efficiency (Electric)	Efficiency (Fuel)	Conversion											
7,200	3,413	100%	80%											
Electric Demand =	(	<table border="1"><tr><td>Capacity</td><td>Months/Year</td><td>Utilization Factor</td></tr><tr><td>20</td><td>10</td><td>30%</td></tr></table> )	Capacity	Months/Year	Utilization Factor	20	10	30%	) =		<b>60 Kw</b>			
Capacity	Months/Year	Utilization Factor												
20	10	30%												
Existing Energy Cost =	(	<table border="1"><tr><td>Kwh</td><td>\$/kwh</td><td>Kw</td><td>\$/Kw</td></tr><tr><td>7,200</td><td>\$0.220</td><td>60</td><td>\$6.08</td></tr></table> )	Kwh	\$/kwh	Kw	\$/Kw	7,200	\$0.220	60	\$6.08	) + (	60) * (	\$6.08) =	<b>\$ 1,949</b>
Kwh	\$/kwh	Kw	\$/Kw											
7,200	\$0.220	60	\$6.08											
Proposed Energy Cost =	(	<table border="1"><tr><td>Therm</td><td>\$/fuel unit</td></tr><tr><td>307</td><td>\$1.250</td></tr></table> )	Therm	\$/fuel unit	307	\$1.250	) * (	\$1.250) =		<b>\$ 384</b>				
Therm	\$/fuel unit													
307	\$1.250													

**Result**

<b>Existing Annual Use=</b>	<b>7,200 Kwh</b>	<b>60 Kw</b>	<b>\$ 1,949</b>
<b>Proposed Annual Use=</b>		<b>307 Therm</b>	<b>\$ 384</b>
<b>100% Annual Savings=</b>	<b>7,200 Kwh</b>	<b>60 Kw</b>	<b>\$ 1,565</b>
<b>Savings as Percent of Existing =</b>		<b>(307) Therm</b>	<b>80%</b>
<b>80% Annual Savings=</b>	<b>5,760 Kwh</b>	<b>48 Kw</b>	<b>\$ 1,252</b>
<b>Savings as Percent of Existing =</b>		<b>(246) Therm</b>	<b>64%</b>

**COMMENTS:**

**ECM-6: Replace Electric DHW Heater w/ Tankless Condensing Gas-Fired DHW Heater**

**Summary**

\* Replace Electric DHW Heater w/ Instantaneous, Condensing, Gas-Fired DHW Heater

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Water supply Temperature	55	°F	Temperature of water coming into building
Hot Water Temperature	140	°F	
Hot Water Usage per day	300	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	55,228	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	20	Gallons	Per manufacturer nameplate
Hot Water Temperature	140	°F	Per building personnel
Average Room Temperature	70	°F	
Standby Losses (% by Volume)	2.5%		( 2.5% of stored capacity per hour, per U.S. Department of Energy )
Standby Losses (Heat Loss)	0.3	MBH	
Annual Standby Hot Water Load	2,555	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	57,783	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	100%		Per Manufacturer
Total Annual Energy Required	57,783	Mbtu/yr	
<b>Total Annual Electric Required</b>	<b>16,930</b>	<b>kWh/yr</b>	<b>Electrical Savings</b>
Average Annual Electric Demand	1.93	kW	
<b>Peak Electric Demand</b>	<b>45.00</b>	<b>kW</b>	<b>Per Manufacturer's Nameplate (Demand Savings)</b>
New Tank Size	5	Gallons	
Hot Water Temperature	140	°F	
Average Room Temperature	70	°F	
Standby Losses (% by Volume)	2.5%		( 2.5% of stored capacity per hour, per U.S. Department of Energy )
Standby Losses (Heat Loss)	0.1	MBH	
Annual Standby Hot Water Load	639	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	55,867	MBTU/yr	
Proposed Avg. Hot water heater efficiency	90%		
Proposed Total Annual Energy Required	62,074	MBTU/yr	
Proposed Fuel Use	621	Therms/yr	Standby Losses and inefficient DHW heater eliminated
Elec Utility Demand Unit Cost	\$6.08	\$/kW	
Elec Utility Supply Unit Cost	\$0.14	\$/kWh	
NG Utility Unit Cost	\$1.25	\$/Therm	
Existing Operating Cost of DHW	\$5,653	\$/yr	
Proposed Operating Cost of DHW	\$776	\$/yr	
<b>Annual Utility Cost Savings</b>	<b>\$4,878</b>	<b>\$/yr</b>	

**Daily Hot Water Demand**

FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	#USES PER DAY		FULL TIME OCCUPANTS**		TOTAL GAL/DAY	% HOT WATER	TOTAL HW GAL/DAY
			MALE	FEMALE	MALE	FEMALE			
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2.5	0.25	3	3	0	0	0	50%	0
SHOWER	2.5	5	1	1			0	75%	0
KITCHEN SINK	2.5	0.5	1	1			0	75%	0
MOP SINK	2.5	2	1	1			0	75%	0
Dishwasher (gal per u	10	30	1	0			300	100%	300
<b>TOTAL</b>							0		<b>300</b>

Multipliers	
Material:	1.00
Labor:	1.00
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Gas-Fired DHW Heater Removal	1	LS		\$ 50		\$ -	\$ 50	\$ -	\$ 50	
High Efficiency Gas-Fired DHW Heater	1	LS	\$ 6,000	\$ 280		\$ 6,000	\$ 280	\$ -	\$ 6,280	
Miscellaneous Electrical	1	LS	\$ 300			\$ 300	\$ -	\$ -	\$ 300	
Venting Kit	1	EA	\$ 450	\$ 650		\$ 450	\$ 650	\$ -	\$ 1,100	
Miscellaneous Piping and Valves	1	LS	\$ 200			\$ 200	\$ -	\$ -	\$ 200	

\$ 7,930	Subtotal
\$ 793	10% Contingency
\$ 1,745	20% Contractor O&P
\$ -	
<b>\$ 10,468</b>	<b>Total</b>

**Rev. 8** *issued: 12/01/09*

make summary sheet a overall reference, move hours and occ hours to sheet  
can delete pages, eliminated cross page references  
add economizer to reconcile sheet  
separate cost estimates onto separate tabs  
dark tabs are not to be used  
add ECO-M18 Replace Window Units, modified % runtime calc  
add ECO-M21 Hot Water Reset  
add ECO-M22 Kitchen Hood Control  
ECO-E9 add sensor count column  
converted to therms and cooling kWh  
broke supply and demand charges where appropriate (lighting)  
do not delete colored tabs  
corrected window calcs - occ not included  
fixed WCO-1 D22 calc  
modified DCV calcs to include Heating "on" and proper cooling calc

**Rev. 9** *issued: 8/1/2010*

corrected ECO-E1 delamp calc  
added more inputs on partition walls in block load  
added occ and unoccupied forced ventilation  
corrected issues with WCOs  
added existing R-values to wall and roof insulation ECOs  
added building volume calculator (walls, doors, and windows spreadsheet)  
added air changes per hour calc to block load spreadsheet  
added Infrared Heaters ECM to workbook (ECO-M7)  
added "Heating On" points to Insulation calcs  
added yearly usage to summary page and % checks  
added stand alone Door Seals calcs (ECO-M19) - does not require block load  
added electric DHW heater replacement calc (ECO-M20)  
added HW reset with boiler replacement (ECO-M21)  
added wire-to-shaft efficiency for VFD calcs ECO-M5  
added U-value calculator for block load

**Energy Audit of Kennedy Elementary School**  
**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
<b>\$6,122</b>	<b>9.0</b>	<b>18,049</b>	<b>0</b>	<b>\$4,627</b>	<b>0</b>	<b>\$4,627</b>	<b>\$2,000</b>	<b>1.3</b>	<b>0.9</b>

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

**ECM-2 Install Occupancy Sensors**

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$16,200</b>	<b>0.0</b>	<b>16,957</b>	<b>0</b>	<b>\$3,731</b>	<b>0</b>	<b>\$3,731</b>	<b>\$2,800</b>	<b>4.3</b>	<b>3.6</b>

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

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

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
					Savings				
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
<b>\$22,322</b>	<b>9.0</b>	<b>34,952</b>	<b>0</b>	<b>\$8,345</b>	<b>0</b>	<b>\$8,345</b>	<b>\$4,800</b>	<b>2.7</b>	<b>2.1</b>

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

Energy Audit of Kennedy Elementary School  
 CHA Project No.24454  
 Existing Lighting

Cost of Electricity: **\$0.220** \$/kWh  
**\$6.08** \$/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	
20	Main Office	Offices	13	S 32 C F 1 (ELE)	F41LL	32	0.42	SW	2400	C-OCC	998
20	Main Office	Offices	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	2400	C-OCC	384
20	Principal's Office	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
20	Principal's Office Closet	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Nurse	Offices	9	S 32 C F 1 (ELE)	F41LL	32	0.29	SW	2400	C-OCC	691
20	Nurse's Office	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
20	Nurse Storage	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
198	Nurse Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
20	Central Mechanical	Storage Areas	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	1000	SW	128
20	Central Storage	Storage Areas	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	1000	SW	192
20	All Purpose Room	Classrooms	24	S 32 C F 1 (ELE)	F41LL	32	0.77	SW	2400	C-OCC	1,843
20	All Purpose Room	Classrooms	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	2400	C-OCC	77
20	All Purpose Room Storage Large	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64
20	All Purpose Room Storage Small	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Cafeteria	Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	1600	C-OCC	1,024
20	Cafeteria	Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	1600	C-OCC	1,024
20	Cafeteria	Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1600	C-OCC	51
20	Cafeteria Storage Large	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	SW	96
20	Cafeteria Storage Small	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Central Boy's Bathroom	Bath Room	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2000	SW	128
15	Central Boy's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
20	Central Girl's Bathroom	Bath Room	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2000	SW	128
15	Central Girl's Bathroom	Bath Room	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	SW	120
20	Central Closet	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64
20	Kitchen	Cafeteria	22	S 32 C F 1 (ELE)	F41LL	32	0.70	SW	1600	C-OCC	1,126
20	Kitchen Office	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	Kitcehn Storage 1	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Kitcehn Storage 2	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Library	Classrooms	21	S 32 C F 1 (ELE)	F41LL	32	0.67	SW	2400	C-OCC	1,613
20	Library	Classrooms	8	S 32 C F 1 (ELE)	F41LL	32	0.26	SW	2400	C-OCC	614
15	Library	Classrooms	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	C-OCC	144
5	Library	Classrooms	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.18	SW	2400	C-OCC	432
20	Library Office 1	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	Library Office 2	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	C-OCC	307
20	Library Office 2	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
20	Library Office 3	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	Library Storage	Storage Areas	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	1000	SW	192
20	Custodian Room	Offices	8	S 32 C F 1 (ELE)	F41LL	32	0.26	SW	2400	C-OCC	614
20	Custodian Room Vestibule	Offices	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	2400	C-OCC	384
20	Custodian Room Closet 1	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	SW	32
20	Custodian Room Closet 2	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	SW	64
20	Custodian Room Storage	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	SW	96
245	Computer Room	Classrooms	11	T 32 R F 3 (ELE)	F43LE	110	1.21	SW	2400	C-OCC	2,904
245	Computer Room	Classrooms	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2400	C-OCC	528
20	Faculty Room	Offices	7	S 32 C F 1 (ELE)	F41LL	32	0.22	SW	2400	C-OCC	538
15	Faculty Room Men's Bathroom	Bath Room	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2000	SW	240
198	Faculty Room Men's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
15	Faculty Room Women's Bathroom	Bath Room	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2000	SW	240
198	Faculty Room Women's Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
146	Gym	Gynasium	4	High Bay MH 400	MH400/1	458	1.83	SW	2000	C-OCC	3,664
15	Gym	Gynasium	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	C-OCC	120

Energy Audit of Kennedy Elementary School  
 CHA Project No.24454  
 Existing Lighting

Cost of Electricity: **\$0.220** \$/kWh  
**\$6.08** \$/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		
15	Gym Storage	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
210	Gym Office	Offices	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.36	SW	2400	C-OCC	854	
15	Gym Office Storage	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	SW	120	
15	Stage	Storage Areas	10	S 32 C F 2 (ELE)	F42LL	60	0.60	SW	1000	SW	600	
15	Stage	Storage Areas	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	1000	SW	420	
15	Stage	Storage Areas	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	1000	SW	300	
15	Gym Hall Boy's Bathroom	Bath Room	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	SW	360	
20	Gym Hall Boy's Bathroom	Bath Room	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2000	SW	128	
15	Gym Hall Girl's Bathroom	Bath Room	3	S 32 C F 2 (ELE)	F42LL	60	0.18	SW	2000	SW	360	
20	Gym Hall Girl's Bathroom	Bath Room	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2000	SW	128	
15	Gym Hall Storage 1	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
15	Gym Hall Closet	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
254	Room 19A	Classrooms	4	T 32 R F 4 (ELE)	F44LL	118	0.47	SW	2400	C-OCC	1,133	
254	Room 19A	Classrooms	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	2400	C-OCC	566	
254	Room 20A	Classrooms	4	T 32 R F 4 (ELE)	F44LL	118	0.47	SW	2400	C-OCC	1,133	
254	Room 20A	Classrooms	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	2400	C-OCC	566	
254	Room 21A	Classrooms	5	T 32 R F 4 (ELE)	F44LL	118	0.59	SW	2400	C-OCC	1,416	
254	Room 21A	Classrooms	1	T 32 R F 4 (ELE)	F44LL	118	0.12	SW	2400	C-OCC	283	
198	Room 21A Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
1	Room 21A Bathroom	Bath Room	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.03	SW	2000	SW	62	
254	Room 22A	Classrooms	4	T 32 R F 4 (ELE)	F44LL	118	0.47	SW	2400	C-OCC	1,133	
254	Room 22A	Classrooms	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	2400	C-OCC	566	
15	Room "23"	Classrooms	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	2400	C-OCC	720	
198	Room "23" Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
1	Room "23" Bathroom	Bath Room	1	SQ 13 W CF 2 (MAG)	CFQ13/2	31	0.03	SW	2000	SW	62	
15	Gym Hall Storage 2	Storage Areas	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	1000	SW	60	
20	Room 1	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922	
20	Room 1	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 2	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922	
20	Room 2	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 3	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922	
20	Room 3	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 4	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922	
20	Room 4	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
20	Room 5	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 5	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
198	Room 5 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
20	Room 6	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 6	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
198	Room 6 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
20	Room 7	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 7	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
198	Room 7 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
20	Room 8	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 8	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
198	Room 8 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
20	Room 9	Classrooms	33	S 32 C F 1 (ELE)	F41LL	32	1.06	SW	2400	C-OCC	2,534	
108	Room 9/10 Vestibule	Classrooms	2	I 65	I65/1	65	0.13	SW	2400	C-OCC	312	
198	Room 9/10 Bathroom 1	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
198	Room 9/10 Bathroom 2	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
20	Room 10	Classrooms	33	S 32 C F 1 (ELE)	F41LL	32	1.06	SW	2400	C-OCC	2,534	
20	Room 11	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	
20	Room 11	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461	
198	Room 11 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62	
20	Room 12	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845	

Energy Audit of Kennedy Elementary School  
 CHA Project No.24454  
 Existing Lighting

Cost of Electricity: \$0.220 \$/kWh  
\$6.08 \$/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
20	Room 12	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
198	Room 12 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
20	Room 13	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845
20	Room 13	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
198	Room 13 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
20	Room 14	Classrooms	11	S 32 C F 1 (ELE)	F41LL	32	0.35	SW	2400	C-OCC	845
20	Room 14	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
198	Room 14 Bathroom	Bath Room	1	2T 17 R F 2 (ELE)	F22LL	31	0.03	SW	2000	SW	62
20	Room 15	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922
20	Room 15	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
20	Room 16	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922
20	Room 16	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
20	Central Office 1	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
20	Central Office 2	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	Central Office 3	Offices	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	2400	C-OCC	230
20	Central Office 4	Offices	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	2400	C-OCC	154
20	Room 17	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922
20	Room 17	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
20	Room 18	Classrooms	12	S 32 C F 1 (ELE)	F41LL	32	0.38	SW	2400	C-OCC	922
20	Room 18	Classrooms	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	2400	C-OCC	461
5	Main Entrance Lobby	Hallways	8	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.48	SW	2280	SW	1,094
108	Main Entrance Lobby	Hallways	4	I 65	I65/1	65	0.26	SW	2280	SW	593
15	Gym Hallway	Hallways	17	S 32 C F 2 (ELE)	F42LL	60	1.02	SW	2280	SW	2,326
15	S. Hallway	Hallways	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2280	SW	1,094
254	S. Hallway	Hallways	1	T 32 R F 4 (ELE)	F44LL	118	0.12	SW	2280	SW	269
15	Main Hallway	Hallways	20	S 32 C F 2 (ELE)	F42LL	60	1.20	SW	2280	SW	2,736
254	Main Hallway	Hallways	2	T 32 R F 4 (ELE)	F44LL	118	0.24	SW	2280	SW	538
245	Main Hallway	Hallways	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2280	SW	502
15	Main Hallway Exit Hall	Hallways	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2280	SW	137
15	N. Hallway	Hallways	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2280	SW	821
	<b>Total</b>		<b>783</b>				<b>41</b>				<b>86,966</b>

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
20 Main Office	13	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	998	13	S 32 C F 1 (ELE)	F41LL	32	0.416	SW	2400	998.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Main Office	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	384	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	2400	384	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Principal's Office	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	SW	2400	230.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Principal's Office Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Nurse	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	SW	2400	691.2	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Nurse's 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	SW	2400	307.2	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Nurse Storage	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Nurse Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Mechanical	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	1000	192	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room	24	S 32 C F 1 (ELE)	F41LL	32	0.8	SW	2400	1,843.2	24	S 32 C F 1 (ELE)	F41LL	32	0.768	SW	2400	1843.2	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	77	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	2400	76.8	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room Storage Large	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1000	64	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	1,024	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	1600	1024	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	1,024	20	S 32 C F 1 (ELE)	F41LL	32	0.64	SW	1600	1024	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1600	51	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1600	51.2	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria Storage Large	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1000	96	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Boy's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Central Boy's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Girl's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Central Girl's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Closet	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1000	64	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitchen	22	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	1600	1,126.2	22	S 32 C F 1 (ELE)	F41LL	32	0.704	SW	1600	1126.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitchen Office	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	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitcehn Storage 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitcehn Storage 2	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library	21	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	2400	1,613	21	S 32 C F 1 (ELE)	F41LL	32	0.672	SW	2400	1612.8	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614	8	S 32 C F 1 (ELE)	F41LL	32	0.256	SW	2400	614.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Library	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2400	144	0.00	0.00	\$ -	\$ -	\$ -	-	-
5 Library	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	432	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.18	SW	2400	432	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library Office 1	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	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library Office 2	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	SW	2400	307.2	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library Office 2	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	SW	2400	230.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library Office 3	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	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	1000	192	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614	8	S 32 C F 1 (ELE)	F41LL	32	0.256	SW	2400	614.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Vestibule	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	384	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	2400	384	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Closet 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Closet 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1000	64	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Storage	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1000	96	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 Computer Room	11	T 32 R F 3 (ELE)	F43LE	110	1.2	SW	2400	2,904	11	T 32 R F 3 (ELE)	F43LE	110	1.21	SW	2400	2904	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 Computer Room	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2400	528	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2400	528	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Faculty Room	7	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	538	7	S 32 C F 1 (ELE)	F41LL	32	0.224	SW	2400	537.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Faculty Room Men's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Faculty Room Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Faculty Room Women's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Faculty Room Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	P 54 C F 4	FC20	20	0.08	SW	2000	160	3504.00	1.75	\$ 898.71	\$ 1,200.00	\$ 400.00	1.3	0.2
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	P 54 C F 4	FC20	20	0.08	SW	2000	160	3504.00	1.75	\$ 898.71	\$ 1,200.00	\$ 400.00	1.3	0.2
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	P 54 C F 4	FC20	20	0.08	SW	2000	160	3504.00	1.75	\$ 898.71	\$ 1,200.00	\$ 400.00	1.3	0.2
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	P 54 C F 4	FC20	20	0.08	SW	2000	160	3504.00	1.75	\$ 898.71	\$ 1,200.00	\$ 400.00	1.3	0.2
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	P 54 C F 4	FC20	20	0.08	SW	2000	160	3504.00	1.75	\$ 898.71	\$ 1,200.00	\$ 400.00	1.3	0.2
15 Gym	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Gym Storage	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
210 Gym Office	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.4	SW	2400	854	4	2T 32 R F 3 (ELE) THIN TUBE	FU3ILL	89	0.356	SW	2400	854.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Gym Office Storage	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	1000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Stage	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1000	600	10	S 32 C F 2 (ELE)	F42LL	60	0.6	SW	1000	600	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Stage	7	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	1000	420	7	S 32 C F 2 (ELE)	F42LL	60	0.42	SW	1000	420	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Stage																							

Energy Audit of Kennedy Elementary School

CHA Project No.24454

ECM-1 Lighting Replacements

Cost of Electricity: \$0.220 \$/kWh

\$6.08 \$/kW

Area Description	No. of Fixtures	EXISTING CONDITIONS							RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS							
		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 Room 6	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 6 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 7	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 7	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 7 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 8	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 8 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 9	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	S 32 C F 1 (ELE)	F41LL	32	1.056	SW	2400	2,534.4	0.00	0.00	\$ -	\$ -	\$ -		
108 Room 9/10 Vestibule	2	I 65	I65/1	65	0.1	SW	2400	312	2	CF 26	CFQ26/1-L	27	0.054	SW	2400	129.6	182.40	0.08	\$ 45.67	\$ 40.50	\$ -	0.9	0.2
198 Room 9/10 Bathroom 1	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 9/10 Bathroom 2	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 10	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	S 32 C F 1 (ELE)	F41LL	32	1.056	SW	2400	2,534.4	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 11	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 11	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 11 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 12	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 12	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 12 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 13	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 13	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 13 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 14	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	SW	2400	844.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 14	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
198 Room 14 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 15	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	SW	2400	921.6	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 15	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 16	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	SW	2400	921.6	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 16	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Central Office 1	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	SW	2400	230.4	0.00	0.00	\$ -	\$ -	\$ -		
20 Central Office 2	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	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -		
20 Central Office 3	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	SW	2400	230.4	0.00	0.00	\$ -	\$ -	\$ -		
20 Central Office 4	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	SW	2400	153.6	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 17	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	SW	2400	921.6	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 17	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 18	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	SW	2400	921.6	0.00	0.00	\$ -	\$ -	\$ -		
20 Room 18	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	SW	2400	460.8	0.00	0.00	\$ -	\$ -	\$ -		
5 Main Entrance Lobby	8	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	2280	1,094	8	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.48	SW	2280	1,094.4	0.00	0.00	\$ -	\$ -	\$ -		
108 Main Entrance Lobby	4	I 65	I65/1	65	0.3	SW	2280	593	4	CF 26	CFQ26/1-L	27	0.108	SW	2280	246.24	346.56	0.15	\$ 87.33	\$ 81.00	\$ -	0.9	0.2
15 Gym Hallway	17	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2280	2,326	17	S 32 C F 2 (ELE)	F42LL	60	1.02	SW	2280	2,325.6	0.00	0.00	\$ -	\$ -	\$ -		
15 S. Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2280	1,094.4	0.00	0.00	\$ -	\$ -	\$ -		
254 S. Hallway	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269	1	T 32 R F 4 (ELE)	F44LL	118	0.118	SW	2280	269.04	0.00	0.00	\$ -	\$ -	\$ -		
15 Main Hallway	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	0.00	0.00	\$ -	\$ -	\$ -		
254 Main Hallway	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538	2	T 32 R F 4 (ELE)	F44LL	118	0.236	SW	2280	538.08	0.00	0.00	\$ -	\$ -	\$ -		
245 Main Hallway	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2280	502	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2280	501.6	0.00	0.00	\$ -	\$ -	\$ -		
15 Main Hallway Exit Hall	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	137	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2280	136.8	0.00	0.00	\$ -	\$ -	\$ -		
15 N. Hallway	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	821	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2280	820.8	0.00	0.00	\$ -	\$ -	\$ -		
<b>Total</b>	<b>783</b>				<b>41</b>			<b>86,966</b>	<b>783</b>			<b>6,216</b>	<b>32</b>			<b>68916.96</b>	<b>18,049</b>	<b>9</b>	<b>\$ 4,626.54</b>	<b>\$ 6,121.50</b>	<b>\$ 2,000.00</b>		
																<b>Demand Savings</b>			<b>9.0</b>	<b>\$ 655.76</b>			
																<b>kWh Savings</b>			<b>18,049</b>	<b>\$ 3,970.77</b>			
																<b>Total savings</b>			<b>\$ 4,626.54</b>		<b>1.3</b>	<b>0.9</b>	

Area Description	EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	No. of Fixtures	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
20 Main Office	13	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	998.4	13	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1200	499.2	499.20	0.00	\$ 109.82	\$ 202.50	\$ 35.00	1.8	1.5
20 Main Office	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	384.0	5	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	192.0	192.00	0.00	\$ 42.24	\$ 202.50	\$ 35.00	4.8	4.0
20 Principal's Office	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6
20 Principal's Office Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Nurse	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	\$ 76.03	\$ 202.50	\$ 35.00	2.7	2.2
20 Nurse's 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	\$ 33.79	\$ 202.50	\$ 35.00	6.0	5.0
20 Nurse Storage	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Nurse Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Mechanical	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192.0	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room	24	S 32 C F 1 (ELE)	F41LL	32	0.8	SW	2400	1,843.2	24	S 32 C F 1 (ELE)	F41LL	32	0.8	C-OCC	1680	1,290.24	552.96	0.00	\$ 121.65	\$ 202.50	\$ 35.00	1.7	1.4
20 All Purpose Room	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	76.8	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	1680	53.76	23.04	0.00	\$ 5.07	\$ 202.50	\$ 35.00	40.0	33.0
20 All Purpose Room Storage Large	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	1,024.0	20	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1200	768.0	256.00	0.00	\$ 56.32	\$ 202.50	\$ 35.00	3.6	3.0
20 Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	1,024.0	20	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1200	768.0	256.00	0.00	\$ 56.32	\$ 202.50	\$ 35.00	3.6	3.0
20 Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1600	51.2	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	1200	38.4	12.80	0.00	\$ 2.82	\$ 202.50	\$ 35.00	71.9	59.5
20 Cafeteria Storage Large	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Boy's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Central Boy's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Girl's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Central Girl's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Closet	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitchen	22	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	1600	1,126.4	22	S 32 C F 1 (ELE)	F41LL	32	0.7	C-OCC	1200	844.8	281.60	0.00	\$ 61.95	\$ 202.50	\$ 35.00	3.3	2.7
20 Kitchen Office	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Kitchn Storage 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitchn Storage 2	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library	21	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	2400	1,612.8	21	S 32 C F 1 (ELE)	F41LL	32	0.7	C-OCC	1680	1,128.96	483.84	0.00	\$ 106.44	\$ 202.50	\$ 35.00	1.9	1.6
20 Library	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614.4	8	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1680	430.08	184.32	0.00	\$ 40.55	\$ 202.50	\$ 35.00	5.0	4.1
15 Library	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	1680	100.8	43.20	0.00	\$ 9.50	\$ 202.50	\$ 35.00	21.3	17.6
5 Library	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	432.0	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	C-OCC	1680	302.4	129.60	0.00	\$ 28.51	\$ 202.50	\$ 35.00	7.1	5.9
20 Library Office 1	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Library Office 2	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	\$ 33.79	\$ 202.50	\$ 35.00	6.0	5.0
20 Library Office 2	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6
20 Library Office 3	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Library Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192.0	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614.4	8	S 32 C F 1 (ELE)	F41LL	32	0.3	C-OCC	1200	307.2	307.20	0.00	\$ 67.58	\$ 202.50	\$ 35.00	3.0	2.5
20 Custodian Room Vestibule	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	384.0	5	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	192.0	192.00	0.00	\$ 42.24	\$ 202.50	\$ 35.00	4.8	4.0
20 Custodian Room Closet 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Closet 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Storage	3	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	96.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 Computer Room	11	T 32 R F 3 (ELE)	F43LE	110	1.2	SW	2400	2,904.0	11	T 32 R F 3 (ELE)	F43LE	110	1.2	C-OCC	1680	2,032.8	871.20	0.00	\$ 191.66	\$ 202.50	\$ 35.00	1.1	0.9
245 Computer Room	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2400	528.0	2	T 32 R F 3 (ELE)	F43LE	110	0.2	C-OCC	1680	369.6	158.40	0.00	\$ 34.85	\$ 202.50	\$ 35.00	5.8	4.8
20 Faculty Room	7	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	537.6	7	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	1200	268.8	268.80	0.00	\$ 59.14	\$ 202.50	\$ 35.00	3.4	2.8
15 Faculty Room Men's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Faculty Room Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Faculty Room Women's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Faculty Room Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	0.00	0.00	\$ -	\$ -	\$ -	-	-
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664.0	4	High Bay MH 400	MH400/1	458	1.8	C-OCC	2000	3,664.0	0.00	0.00	\$ -	\$ 202.50	\$ 35.00	-	-
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664															

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 Room 6	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
198 Room 6 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 7	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0
20 Room 7	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
198 Room 7 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0
20 Room 8	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
198 Room 8 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 9	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534.4	33	S 32 C F 1 (ELE)	F41LL	32	1.1	C-OCC	1680	1774.08	760.32	0.00	\$ 167.27	\$ 202.50	\$ 35.00	1.2	1.0
108 Room 9/10 Vestibule	2	I 65	I65/1	65	0.1	SW	2400	312.0	2	I 65	I65/1	65	0.1	C-OCC	1680	218.4	93.60	0.00	\$ 20.59	\$ 202.50	\$ 35.00	9.8	8.1
198 Room 9/10 Bathroom 1	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Room 9/10 Bathroom 2	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 10	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534.4	33	S 32 C F 1 (ELE)	F41LL	32	1.1	C-OCC	1680	1774.08	760.32	0.00	\$ 167.27	\$ 202.50	\$ 35.00	1.2	1.0
20 Room 11	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0
20 Room 11	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
198 Room 11 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 12	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0
20 Room 12	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
198 Room 12 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 13	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0
20 Room 13	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
198 Room 13 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 14	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	844.8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0
20 Room 14	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
198 Room 14 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62.0	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Room 15	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	921.6	12	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8
20 Room 15	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
20 Room 16	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	921.6	12	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8
20 Room 16	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
20 Central Office 1	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6
20 Central Office 2	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Central Office 3	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6
20 Central Office 4	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Room 17	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	921.6	12	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8
20 Room 17	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
20 Room 18	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	921.6	12	S 32 C F 1 (ELE)	F41LL	32	0.4	C-OCC	1680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8
20 Room 18	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	1680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5
5 Main Entrance Lobby	8	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	2280	1,094.4	8	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	2280	1,094.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
108 Main Entrance Lobby	4	I 65	I65/1	65	0.3	SW	2280	592.8	4	I 65	I65/1	65	0.3	SW	2280	592.8	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Gym Hallway	17	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2280	2,325.6	17	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2280	2,325.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 S. Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094.4	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094.4	0.00	0.00	\$ -	\$ -	\$ -	-	-
254 S. Hallway	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269.0	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269.04	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Main Hallway	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736.0	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	0.00	0.00	\$ -	\$ -	\$ -	-	-
254 Main Hallway	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538.1	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538.08	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 Main Hallway	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2280	501.6	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2280	501.6	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Main Hallway Exit Hall	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	136.8	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	136.8	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 N. Hallway	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	820.8	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	820.8	0.00	0.00	\$ -	\$ -	\$ -	-	-
<b>Total</b>	<b>783</b>				<b>41</b>			<b>86,966</b>	<b>783</b>				<b>41</b>			<b>16,957</b>	<b>0</b>	<b>\$ 3,730.64</b>	<b>\$ 16,200.00</b>	<b>\$ 2,800.00</b>			
																	<b>Demand Savings</b>		<b>0.0</b>	<b>\$ -</b>			
																	<b>kWh Savings</b>		<b>16,957</b>	<b>\$ 3,730.64</b>			
																	<b>Total Savings</b>			<b>\$ 3,730.64</b>		<b>4.3</b>	<b>3.6</b>

Energy Audit of Kennedy Elementary School

CHA Project No.24454

ECM-3 Lighting Replacements with Occupancy Sensors

Cost of Electricity: \$0.220 \$/kWh  
\$6.08 \$/kWh

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
20 Main Office	13	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	998	13	S 32 C F 1 (ELE)	F41LL	32	0.416	C-OCC	1,200	499.2	499.20	0.00	\$ 109.82	\$ 202.50	\$ 35.00	1.8	1.5
20 Main Office	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	384	5	S 32 C F 1 (ELE)	F41LL	32	0.16	C-OCC	1,200	192	192.00	0.00	\$ 42.24	\$ 202.50	\$ 35.00	4.8	4.0
20 Principal's Office	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6
20 Principal's Office Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Nurse	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	\$ 76.03	\$ 202.50	\$ 35.00	2.7	2.2
20 Nurse's 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	\$ 33.79	\$ 202.50	\$ 35.00	6.0	5.0
20 Nurse Storage	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Nurse Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Mechanical	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	128	4	S 32 C F 1 (ELE)	F41LL	32	0.128	SW	1,000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	1,000	192	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room	24	S 32 C F 1 (ELE)	F41LL	32	0.8	SW	2400	1,843	24	S 32 C F 1 (ELE)	F41LL	32	0.768	C-OCC	1,680	1,290.24	552.96	0.00	\$ 121.65	\$ 202.50	\$ 35.00	1.7	1.4
20 All Purpose Room	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	2400	77	1	S 32 C F 1 (ELE)	F41LL	32	0.032	C-OCC	1,680	53.76	23.04	0.00	\$ 5.07	\$ 202.50	\$ 35.00	40.0	33.0
20 All Purpose Room Storage Large	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1,000	64	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 All Purpose Room Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	1,024	20	S 32 C F 1 (ELE)	F41LL	32	0.64	C-OCC	1,200	768	256.00	0.00	\$ 56.32	\$ 202.50	\$ 35.00	3.6	3.0
20 Cafeteria	20	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1600	1,024	20	S 32 C F 1 (ELE)	F41LL	32	0.64	C-OCC	1,200	768	256.00	0.00	\$ 56.32	\$ 202.50	\$ 35.00	3.6	3.0
20 Cafeteria	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1600	51	1	S 32 C F 1 (ELE)	F41LL	32	0.032	C-OCC	1,200	38.4	12.80	0.00	\$ 2.82	\$ 202.50	\$ 35.00	71.9	59.5
20 Cafeteria Storage Large	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1,000	96	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Cafeteria Storage Small	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Boy's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2,000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Central Boy's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Girl's Bathroom	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2000	128	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	2,000	128	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Central Girl's Bathroom	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,000	120	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Central Closet	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1,000	64	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitchen	22	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	1600	1,126	22	S 32 C F 1 (ELE)	F41LL	32	0.704	C-OCC	1,200	844.8	281.60	0.00	\$ 61.95	\$ 202.50	\$ 35.00	3.3	2.7
20 Kitchen Office	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Kitcehn Storage 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Kitcehn Storage 2	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Library	21	S 32 C F 1 (ELE)	F41LL	32	0.7	SW	2400	1,613	21	S 32 C F 1 (ELE)	F41LL	32	0.672	C-OCC	1,680	1,128.96	483.84	0.00	\$ 106.44	\$ 202.50	\$ 35.00	1.9	1.6
20 Library	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614	8	S 32 C F 1 (ELE)	F41LL	32	0.256	C-OCC	1,680	430.08	184.32	0.00	\$ 40.55	\$ 202.50	\$ 35.00	5.0	4.1
15 Library	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	S 32 C F 2 (ELE)	F42LL	60	0.06	C-OCC	1,680	100.8	43.20	0.00	\$ 9.50	\$ 202.50	\$ 35.00	21.3	17.6
5 Library	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.2	SW	2400	432	3	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.18	C-OCC	1,680	302.4	129.60	0.00	\$ 28.51	\$ 202.50	\$ 35.00	7.1	5.9
20 Library Office 1	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Library Office 2	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	\$ 33.79	\$ 202.50	\$ 35.00	6.0	5.0
20 Library Office 2	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6
20 Library Office 3	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9
20 Library Storage	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	S 32 C F 1 (ELE)	F41LL	32	0.192	SW	1,000	192	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room	8	S 32 C F 1 (ELE)	F41LL	32	0.3	SW	2400	614	8	S 32 C F 1 (ELE)	F41LL	32	0.256	C-OCC	1,200	307.2	307.20	0.00	\$ 67.58	\$ 202.50	\$ 35.00	3.0	2.5
20 Custodian Room Vestibule	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	384	5	S 32 C F 1 (ELE)	F41LL	32	0.16	C-OCC	1,200	192	192.00	0.00	\$ 42.24	\$ 202.50	\$ 35.00	4.8	4.0
20 Custodian Room Closet 1	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	S 32 C F 1 (ELE)	F41LL	32	0.032	SW	1,000	32	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Closet 2	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	S 32 C F 1 (ELE)	F41LL	32	0.064	SW	1,000	64	0.00	0.00	\$ -	\$ -	\$ -	-	-
20 Custodian Room Storage	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	S 32 C F 1 (ELE)	F41LL	32	0.096	SW	1,000	96	0.00	0.00	\$ -	\$ -	\$ -	-	-
245 Computer Room	11	T 32 R F 3 (ELE)	F43LE	110	1.2	SW	2400	2,904	11	T 32 R F 3 (ELE)	F43LE	110	1.21	C-OCC	1,680	2,032.8	871.20	0.00	\$ 191.66	\$ 202.50	\$ 35.00	1.1	0.9
245 Computer Room	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2400	528	2	T 32 R F 3 (ELE)	F43LE	110	0.22	C-OCC	1,680	369.6	158.40	0.00	\$ 34.85	\$ 202.50	\$ 35.00	5.8	4.8
20 Faculty Room	7	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	2400	538	7	S 32 C F 1 (ELE)	F41LL	32	0.224	C-OCC	1,200	268.8	268.80	0.00	\$ 59.14	\$ 202.50	\$ 35.00	3.4	2.8
15 Faculty Room Men's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2,000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Faculty Room Men's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
15 Faculty Room Women's Bathroom	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2,000	240	0.00	0.00	\$ -	\$ -	\$ -	-	-
198 Faculty Room Women's Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-
146 Gym	4	High Bay MH 400	MH400/1	458	1.8	SW	2000	3,664	4	P 54 C F 4	FC20	20	0.08	C-OCC	2,000	160	3504.00	1.75	\$ 898.71	\$ 1,402.50	\$ 435.00	1.6	1.1
146 Gym	4	High Bay MH 400																					

Energy Audit of Kennedy Elementary School

CHA Project No.24454

ECM-3 Lighting Replacements with Occupancy Sensors

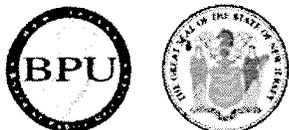
Cost of Electricity: \$0.220 \$/kWh  
\$6.08 \$/kWh

Area Description	No. of Fixtures	EXISTING CONDITIONS							RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS								
		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 Room 6	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
198 Room 6 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 7	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0	
20 Room 7	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
198 Room 7 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 8	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0	
20 Room 8	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
198 Room 8 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 9	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	S 32 C F 1 (ELE)	F41LL	32	1.056	C-OCC	1,680	1774.08	760.32	0.00	\$ 167.27	\$ 202.50	\$ 35.00	1.2	1.0	
108 Room 9/10 Vestibule	2	I 65	I 65/1	65	0.1	SW	2400	312	2	CF 26	CFQ26/1-L	27	0.054	C-OCC	1,680	90.72	221.28	0.08	\$ 54.23	\$ 243.00	\$ 35.00	4.5	3.8	
198 Room 9/10 Bathroom 1	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
198 Room 9/10 Bathroom 2	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 10	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	S 32 C F 1 (ELE)	F41LL	32	1.056	C-OCC	1,680	1774.08	760.32	0.00	\$ 167.27	\$ 202.50	\$ 35.00	1.2	1.0	
20 Room 11	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0	
20 Room 11	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
198 Room 11 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 12	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0	
20 Room 12	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
198 Room 12 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 13	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0	
20 Room 13	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
198 Room 13 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 14	11	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	845	11	S 32 C F 1 (ELE)	F41LL	32	0.352	C-OCC	1,680	591.36	253.44	0.00	\$ 55.76	\$ 202.50	\$ 35.00	3.6	3.0	
20 Room 14	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
198 Room 14 Bathroom	1	2T 17 R F 2 (ELE)	F22LL	31	0.0	SW	2000	62	1	2T 17 R F 2 (ELE)	F22LL	31	0.031	SW	2,000	62	0.00	0.00	\$ -	\$ -	\$ -	-	-	
20 Room 15	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	C-OCC	1,680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8	
20 Room 15	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
20 Room 16	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	C-OCC	1,680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8	
20 Room 16	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
20 Central Office 1	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6	
20 Central Office 2	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9	
20 Central Office 3	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	\$ 25.34	\$ 202.50	\$ 35.00	8.0	6.6	
20 Central Office 4	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	\$ 16.90	\$ 202.50	\$ 35.00	12.0	9.9	
20 Room 17	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	C-OCC	1,680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8	
20 Room 17	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
20 Room 18	12	S 32 C F 1 (ELE)	F41LL	32	0.4	SW	2400	922	12	S 32 C F 1 (ELE)	F41LL	32	0.384	C-OCC	1,680	645.12	276.48	0.00	\$ 60.83	\$ 202.50	\$ 35.00	3.3	2.8	
20 Room 18	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	1,680	322.56	138.24	0.00	\$ 30.41	\$ 202.50	\$ 35.00	6.7	5.5	
5 Main Entrance Lobby	8	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.5	SW	2280	1,094	8	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.48	SW	2,280	1094.4	0.00	0.00	\$ -	\$ -	\$ -	-	-	
108 Main Entrance Lobby	4	I 65	I 65/1	65	0.3	SW	2280	593	4	CF 26	CFQ26/1-L	27	0.108	SW	2,280	246.24	346.56	0.15	\$ 87.33	\$ 81.00	\$ -	0.9	0.9	
15 Gym Hallway	17	S 32 C F 2 (ELE)	F42LL	60	1.0	SW	2280	2,326	17	S 32 C F 2 (ELE)	F42LL	60	1.02	SW	2,280	2325.6	0.00	0.00	\$ -	\$ -	\$ -	-	-	
15 S. Hallway	8	S 32 C F 2 (ELE)	F42LL	60	0.5	SW	2280	1,094	8	S 32 C F 2 (ELE)	F42LL	60	0.48	SW	2,280	1094.4	0.00	0.00	\$ -	\$ -	\$ -	-	-	
254 S. Hallway	1	T 32 R F 4 (ELE)	F44LL	118	0.1	SW	2280	269	1	T 32 R F 4 (ELE)	F44LL	118	0.118	SW	2,280	269.04	0.00	0.00	\$ -	\$ -	\$ -	-	-	
15 Main Hallway	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2280	2,736	20	S 32 C F 2 (ELE)	F42LL	60	1.2	SW	2,280	2736	0.00	0.00	\$ -	\$ -	\$ -	-	-	
254 Main Hallway	2	T 32 R F 4 (ELE)	F44LL	118	0.2	SW	2280	538	2	T 32 R F 4 (ELE)	F44LL	118	0.236	SW	2,280	538.08	0.00	0.00	\$ -	\$ -	\$ -	-	-	
245 Main Hallway	2	T 32 R F 3 (ELE)	F43LE	110	0.2	SW	2280	502	2	T 32 R F 3 (ELE)	F43LE	110	0.22	SW	2,280	501.6	0.00	0.00	\$ -	\$ -	\$ -	-	-	
15 Main Hallway Exit Hall	1	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2280	137	1	S 32 C F 2 (ELE)	F42LL	60	0.06	SW	2,280	136.8	0.00	0.00	\$ -	\$ -	\$ -	-	-	
15 N. Hallway	6	S 32 C F 2 (ELE)	F42LL	60	0.4	SW	2280	821	6	S 32 C F 2 (ELE)	F42LL	60	0.36	SW	2,280	820.8	0.00	0.00	\$ -	\$ -	\$ -	-	-	
<b>Total</b>	<b>783</b>				<b>40.6</b>			<b>86,966</b>	<b>783</b>				<b>31.6</b>					<b>9.0</b>	<b>\$ 8,345.13</b>	<b>\$ 22,321.50</b>	<b>\$ 4,800.00</b>			
																	<b>Demand Savings</b>		<b>9.0</b>	<b>\$ 655.76</b>				
																	<b>kWh Savings</b>		<b>34952</b>	<b>\$ 7,689.37</b>				
																	<b>Total Savings</b>			<b>\$ 8,345.13</b>		<b>2.7</b>	<b>2.1</b>	

**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

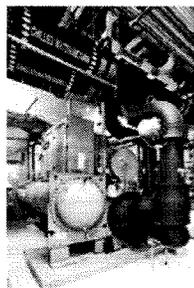
Home » Commercial & Industrial » Programs » Pay for Performance

**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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## CONTACT US

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

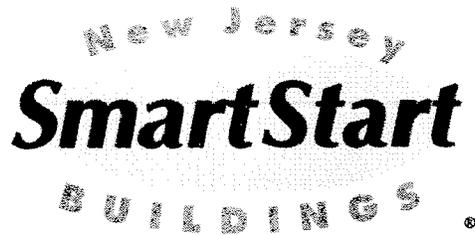
**Energy Efficiency Revolving Loan Fund (EE RLF)**

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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[About Us](#) | [Press Room](#) | [Library](#) | [FAQs](#) | [Calendar](#) | [Newsletters](#) | [Contact Us](#) | [Site Map](#)



# 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)	46,970
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)	\$79,841	\$13,313
Existing Usage (from utility)	338,800	54,819
Proposed Savings	95,469	-2,024
Existing Total MMBtus	6,638	
Proposed Savings MMBtus	123	
% Energy Reduction	1.9%	
Proposed Annual Savings	\$19,300	

	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
<b>Total All Incentives</b>	<b>\$0</b>	<b>\$0</b>	<b>\$5,000</b>

<b>Total Project Cost</b>	\$57,217
---------------------------	----------

		Allowable Incentive
% Incentives #1 of Utility Cost*	5.4%	\$5,000
% Incentives #2 of Project Cost**	0.0%	\$0
% Incentives #3 of Project Cost**	0.0%	\$0
<b>Total Eligible Incentives***</b>		<b>\$5,000</b>
<b>Project Cost w/ Incentives</b>		<b>\$52,217</b>

Project Payback (years)	
w/o Incentives	w/ Incentives
3.0	2.7

\* 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
- EDA PROGRAMS
- ▶ TEACH
- ▶ ARRA
- ▶ TECHNOLOGIES
- ▶ TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

[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](mailto:ESIP@bpu.state.nj.us). Please limit the file size to 3MB (or break it into smaller files).

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

### Program Updates

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

### Featured Success Story



## **APPENDIX F**

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

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

**Roxbury Township Board of Education  
Kennedy Elementary School**

Cost of Electricity	\$0.236	/kWh
Electricity Usage	338,800	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
\$640,000	160.0	199,834	0	\$47,093	0	\$47,093	\$0	\$12,989	13.6	10.7

\*\* Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= \$65 /1000kwh

**Area Output\***

2,795 m2  
30,090 ft2

**Perimeter Output\***

171 m  
561 ft

**Available Roof Space for PV:**

(Area Output - 10 ft x Perimeter) x 85%  
20,810 ft2

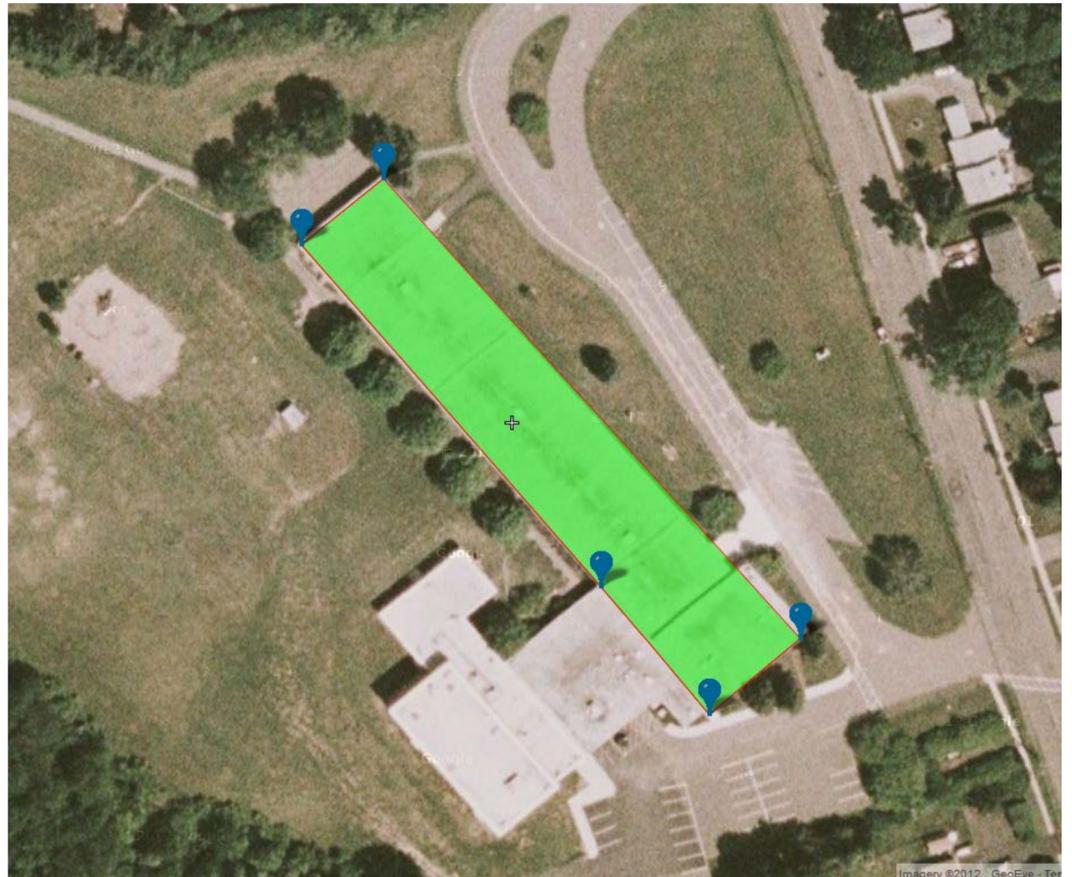
**Approximate System Size:**

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

8 watt/ft2  
166,483 DC watts  
160 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**

199,834 annual kWh calculated in PV Watts program

**% Offset Calc**

Usage 338,800 (from utilities)  
PV Generation 199,834 (generated using PV Watts )  
% offset 59%

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



\*\*\*

# AC Energy & Cost Savings



(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	160.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	132.8 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	23.6 ¢/kWh

Results			
Month	Solar Radiation (kWh/m <sup>2</sup> /day)	AC Energy (kWh)	Energy Value (\$)
1	2.78	11687	2758.13
2	3.54	13466	3177.98
3	4.35	17827	4207.17
4	4.95	18897	4459.69
5	5.69	21940	5177.84
6	5.86	21222	5008.39
7	5.73	21188	5000.37
8	5.47	20016	4723.78
9	4.91	17932	4231.95
10	3.99	15554	3670.74
11	2.68	10440	2463.84
12	2.35	9667	2281.41
Year	4.36	199834	47160.82

Output Hourly Performance Data

Output Results as Text

\*

[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

## Kennedy Elementary School

Building ID: 3210014  
 For 12-month Period Ending: May 31, 2012<sup>1</sup>  
 Date SEP becomes ineligible: N/A

Date SEP Generated: August 17, 2012

**Facility**  
 Kennedy Elementary School  
 20 Pleasant Hill Rd  
 Succasunna, NJ 07876

**Facility Owner**  
 N/A

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

**Year Built:** 1969  
**Gross Floor Area (ft<sup>2</sup>):** 46,970

**Energy Performance Rating<sup>2</sup> (1-100)** 86

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

Electricity - Grid Purchase(kBtu)	1,155,986
Natural Gas (kBtu) <sup>4</sup>	1,063,380
Total Energy (kBtu)	2,219,366

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

Site (kBtu/ft <sup>2</sup> /yr)	47
Source (kBtu/ft <sup>2</sup> /yr)	106

### Emissions (based on site energy use)

Greenhouse Gas Emissions (MtCO <sub>2</sub> e/year)	220
---	-----

### Electric Distribution Utility

Jersey Central Power & Light Co [FirstEnergy Corp]

### National Median Comparison

National Median Site EUI	71
National Median Source EUI	159
% Difference from National Median Source EUI	-33%
Building Type	K-12 School

Stamp of Certifying Professional

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

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

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

### Certifying Professional

N/A

#### Notes:

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"/>
<b>Building Name</b>	Kennedy Elementary School	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		<input type="checkbox"/>
<b>Type</b>	K-12 School	Is this an accurate description of the space in question?		<input type="checkbox"/>
<b>Location</b>	20 Pleasant Hill Rd, Succasunna, NJ 07876	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		<input type="checkbox"/>
<b>Single Structure</b>	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"/>
School (K-12 School)				
CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	<input checked="" type="checkbox"/>
<b>Gross Floor Area</b>	46,970 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"/>
<b>Open Weekends?</b>	No (Default)	Is this building normally open at all on the weekends? This includes activities beyond the work conducted by maintenance, cleaning, and security personnel. Weekend activity could include any time when the space is used for classes, performances or other school or community activities. If the building is open on the weekend as part of the standard schedule during one or more seasons, the building should select ?yes? for open weekends. The ?yes? response should apply whether the building is open for one or both of the weekend days.		<input type="checkbox"/>
<b>Number of PCs</b>	82 (Default)	Is this the number of personal computers in the K12 School?		<input type="checkbox"/>
<b>Number of walk-in refrigeration/freezer units</b>	0 (Default)	Is this the total number of commercial walk-in type freezers and coolers? These units are typically found in storage and receiving areas.		<input type="checkbox"/>
<b>Presence of cooking facilities</b>	Yes (Default)	Does this school have a dedicated space in which food is prepared and served to students? If the school has space in which food for students is only kept warm and/or served to students, or has only a galley that is used by teachers and staff then the answer is "no".		<input type="checkbox"/>
<b>Percent Cooled</b>	100 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		<input type="checkbox"/>
<b>Percent Heated</b>	100 % (Default)	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		<input type="checkbox"/>
<b>Months</b>	N/A(Optional)	Is this school in operation for at least 8 months of the year?		<input type="checkbox"/>

<b>High School?</b>	No	Is this building a high school (teaching grades 10, 11, and/or 12)? If the building teaches to high school students at all, the user should check 'yes' to 'high school'. For example, if the school teaches to grades K-12 (elementary/middle and high school), the user should check 'yes' to 'high school'.		<input type="checkbox"/>
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## 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		
<b>Meter: Electricity (kWh (thousand Watt-hours))</b> <b>Space(s): Entire Facility</b> <b>Generation Method: Grid Purchase</b>		
Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
05/01/2012	05/31/2012	18,400.00
04/01/2012	04/30/2012	32,600.00
03/01/2012	03/31/2012	24,000.00
02/01/2012	02/29/2012	42,800.00
01/01/2012	01/31/2012	31,600.00
12/01/2011	12/31/2011	30,000.00
11/01/2011	11/30/2011	31,400.00
10/01/2011	10/31/2011	28,000.00
09/01/2011	09/30/2011	26,600.00
08/01/2011	08/31/2011	22,000.00
07/01/2011	07/31/2011	20,200.00
06/01/2011	06/30/2011	31,200.00
<b>Electricity Consumption (kWh (thousand Watt-hours))</b>		<b>338,800.00</b>
<b>Electricity Consumption (kBtu (thousand Btu))</b>		<b>1,155,985.60</b>
<b>Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))</b>		<b>1,155,985.60</b>
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		<input type="checkbox"/>
Fuel Type: Natural Gas		
<b>Meter: Natural Gas (therms)</b> <b>Space(s): Entire Facility</b>		
Start Date	End Date	Energy Use (therms)
05/01/2012	05/31/2012	222.00
04/01/2012	04/30/2012	911.10
03/01/2012	03/31/2012	1,105.30
02/01/2012	02/29/2012	1,911.20
01/01/2012	01/31/2012	2,291.70
12/01/2011	12/31/2011	2,154.30
11/01/2011	11/30/2011	1,637.40
10/01/2011	10/31/2011	393.40
09/01/2011	09/30/2011	7.40
08/01/2011	08/31/2011	0.00

07/01/2011	07/31/2011	0.00
06/01/2011	06/30/2011	0.00
<b>Natural Gas Consumption (therms)</b>		<b>10,633.80</b>
<b>Natural Gas Consumption (kBtu (thousand Btu))</b>		<b>1,063,380.00</b>
<b>Total Natural Gas Consumption (kBtu (thousand Btu))</b>		<b>1,063,380.00</b>
<b>Is this the total Natural Gas consumption at this building including all Natural Gas meters?</b>		<input type="checkbox"/>

<b>Additional Fuels</b>	
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"/>

<b>On-Site Solar and Wind Energy</b>	
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**  
Kennedy Elementary School  
20 Pleasant Hill Rd  
Succasunna, NJ 07876

**Facility Owner**  
N/A

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

## General Information

Kennedy Elementary School	
Gross Floor Area Excluding Parking: (ft <sup>2</sup> )	46,970
Year Built	1969
For 12-month Evaluation Period Ending Date:	May 31, 2012

## Facility Space Use Summary

School	
Space Type	K-12 School
Gross Floor Area (ft <sup>2</sup> )	46,970
Open Weekends? <sup>d</sup>	No
Number of PCs <sup>d</sup>	82
Number of walk-in refrigeration/freezer units <sup>d</sup>	0
Presence of cooking facilities <sup>d</sup>	Yes
Percent Cooled <sup>d</sup>	100
Percent Heated <sup>d</sup>	100
Months <sup>o</sup>	N/A
High School?	No
School District <sup>o</sup>	N/A

## 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	86	73	75	N/A	50
Energy Intensity					
Site (kBtu/ft <sup>2</sup> )	47	62	55	N/A	71
Source (kBtu/ft <sup>2</sup> )	106	128	124	N/A	159
Energy Cost					
\$/year	\$ 93,155.65	\$ 113,346.95	\$ 109,223.77	N/A	\$ 139,684.19
\$/ft <sup>2</sup> /year	\$ 1.98	\$ 2.41	\$ 2.32	N/A	\$ 2.97
Greenhouse Gas Emissions					
MtCO <sub>2</sub> e/year	220	270	258	N/A	330
kgCO <sub>2</sub> e/ft <sup>2</sup> /year	5	6	6	N/A	8

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

Notes:

<sup>o</sup> - This attribute is optional.

<sup>d</sup> - A default value has been supplied by Portfolio Manager.

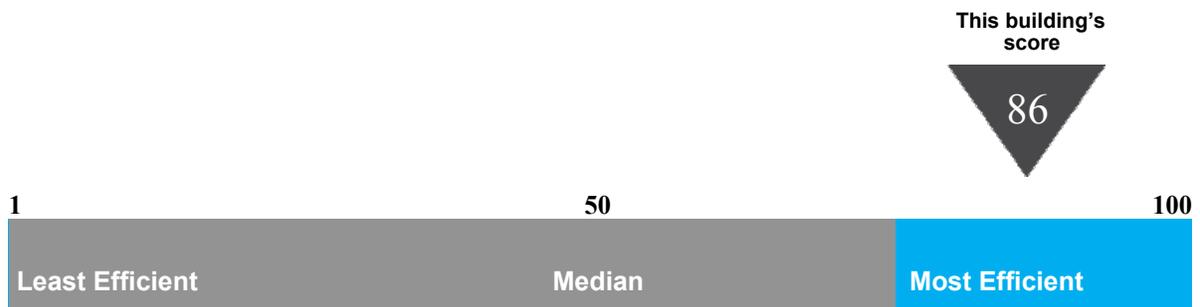
# Statement of Energy Performance

## 2012

Kennedy Elementary School  
20 Pleasant Hill Rd  
Succasunna, NJ 07876

Portfolio Manager Building ID: 3210014

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



This building uses 106 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](http://energystar.gov)

Date of certification

