

PITTSGROVE TOWNSHIP SCHOOL DISTRICT

NORMA ELEMENTARY SCHOOL

873 Gershal Avenue, Pittsgrove NJ 08318

**LOCAL GOVERNMENT ENERGY AUDIT PROGRAM
FOR
NEW JERSEY
BOARD OF PUBLIC UTILITIES**

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CHA PROJECT NO. 28484

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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 building 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 staff and spot measurements taken in the field.

List of Common Energy Audit Abbreviations

- A/C – Air Conditioning
- AHS – Air Handling Unit
- BMS – Building Management System
- Btu – British thermal unit
- CDW – Condenser Water
- CFM – Cubic feet per minute
- CHW – Chilled Water
- DCV – Demand Control Ventilation
- DDC – Direct Digital Control
- DHW – Domestic Hot Water
- DX – Direct Expansion
- EER – Energy Efficiency Ratio
- EF – Exhaust Fan
- EUI – Energy Use Intensity
- Gal – Gallon
- GPD – Gallons per day
- GPF – Gallons Per Flush
- GPH – Gallons per hour
- GPM – Gallons per minute
- GPS – Gallons per second
- HHW – Heating Hot Water
- HID – High Intensity Discharge
- HP – Horsepower
- HRU – Heat Recovery Unit
- HVAC – Heating, Ventilation, Air Conditioning
- HX – Heat Exchanger
- kbtu/mbtu – One thousand (1,000) Btu
- kW – Kilowatt (1,000 watts)
- kWh – Kilowatt-hours
- LED – Light Emitting Diode
- mbh – Thousand Btu per hour
- mmbtu – One million (1,000,000) Btu
- OCC – Occupancy Sensor
- PSI – Pounds per square inch
- RTU – Rooftop Unit
- SBC – System Benefits Charge
- SF – Square foot
- UH – Unit Heater
- V – Volts
- VAV – Variable Air Volume
- VSD – Variable Speed Drive
- W – Watt

1.0 EXECUTIVE SUMMARY

This report summarizes the energy audit performed by CHA for Pittsgrove Township School District, in connection with the New Jersey Board of Public Utilities (NJBPU) Local Government Energy Audit (LGEA) Program. The purpose of this report is to identify energy savings opportunities associated with major energy consumers and inefficient practices. Low-cost and no-cost are also identified during the study. This report details the results of the energy audit conducted for the building listed below:

Building Name	Address	Square Feet	Construction Date
Norma Elementary School	873 Gershal Avenue, Pittsgrove, NJ 08318	22,110	1953,1994

The potential total annual energy and cost savings for the energy conservation measures (ECM) recommended identified in the survey are shown below:

Building Name	Electric Savings (kWh)	NG Savings (therms)	Total Savings (\$)	Payback (years)
Norma Elementary School	28,117	221	4,676	9.9

Each individual measure's annual savings are dependent on that measure alone, there are no interactive effects calculated. There are three options shown for Lighting ECM savings; only one option can be chosen. Incentives shown (if any) are based only on the SmartStart Incentive Program. Other NJBPU or local utility incentives may also be available/ applicable and are discussed in Section 6.0.

Each measure recommended by CHA typically has a stand-alone simple payback period of 15 years or less. However, if the owner chooses to pursue an Energy Savings Improvement Plan (ESIP), high payback measures could be bundled with lower payback measures which ultimately can result in a payback which is favorable for an ESIP project to proceed. Occasionally, we will recommend an ECM that has a longer payback period, based on the need to replace that piece(s) of equipment due to its age, such as a boiler for example.

The following table provides a detailed summary of each ECM for the building surveyed, including costs, savings, SmartStart incentives and payback.

Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs (\$)	Est. Savings (\$/year)	Payback w/o Incentive	Potential Incentive (\$)*	Payback w/ Incentive	Recommended
ECM-1	Convert the Steam System to HHW System	283,478	2,969	95.5	3,500	94.3	N
ECM-2	Install Thermostatic Steam Radiator Valves	1,855	236	7.9	0	7.9	Y
ECM-3	Install Programmable Thermostats on PTHP	413	54	7.7	0	7.7	Y
ECM-4	Replace the Gas Fired DHW Heater with a Gas Fired Condensing DHW Heater	10,166	97	105.3	300	102.2	N
ECM-L1**	Lighting Replacements / Upgrades	36,875	3,767	9.8	0	9.8	N
ECM-L2**	Install Lighting Controls (Add Occupancy Sensors)	7,290	1,188	6.1	945	5.3	N
ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	44,165	4,386	10.1	945	9.9	Y
Total**		340,077	7,742	43.9	4,745	43.3	
Total (Recommended)		46,433	4,676	9.9	945	9.7	

* Incentive shown is per the New Jersey SmartStart Program.

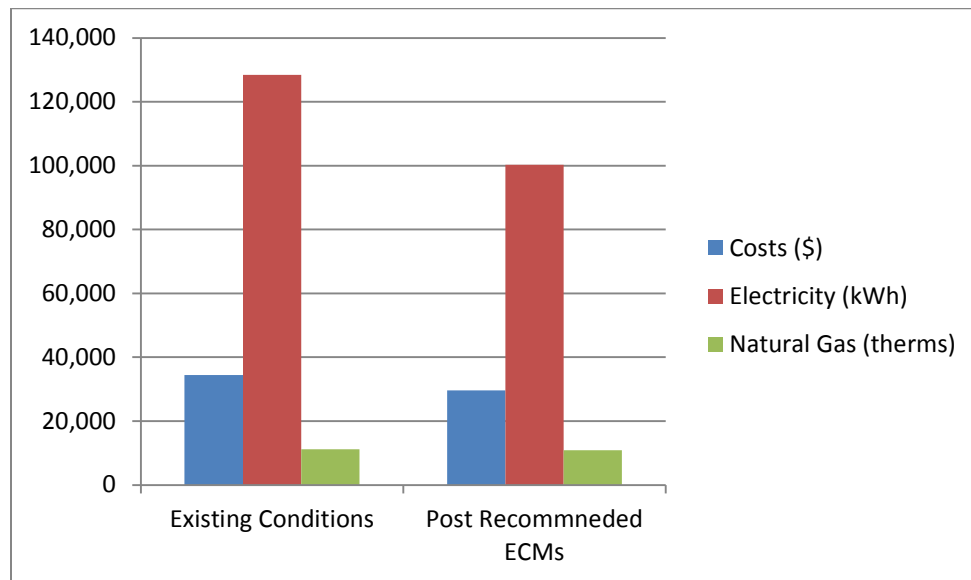
** These ECMs are not included in the Total, as they are alternate measures not recommended.

The following alternative energy measures are also recommended for further study:

- Photovoltaic (PV) Rooftop Solar Power Generation – 60kW System

If NPS implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	34,410	29,734	14%
Electricity (kWh)	128,431	100,314	22%
Natural Gas (therms)	11,140	10,919	2%
Site EUI (kbtu/SF/Yr)	70.2	64.9	



Please note that these energy conservation measures are all compatible with the school's existing electrical system if the right equipment is chosen. The only limitation found in this study is that the utility company might require the capacity of the solar PV system to be less than 250 kW in order to be connected to the electric grid. Therefore, all the solar PV systems are sized to be less than 250 kW.

2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

The following is a summary of building information related to HVAC, plumbing, building envelope, lighting, kitchen equipment and domestic hot water systems as observed during CHAs site visit. See appendix B for detailed information on mechanical equipment, including capacities, model numbers and age. See appendix F for some representative photos of some of the existing conditions observed while onsite.

Building Name: Norma Elementary School
Address: 873 Gershal Avenue, Pittsgrove, NJ 08318
Gross Floor Area: 22,110 Square Feet
Number of Floors: 2
Year Built: 1953 with addition in 1994



Description of Spaces: Classrooms, offices, cafeteria, faculty dining room, storage rooms, toilet rooms and a mechanical room.

Description of Occupancy: The school serves about 180 students from pre-K to Kindergarten. There are about 40 school faculty and staff members.

Number of Computers: The school has approximately 33 desktop and laptop computers.

Building Usage: Hours of operation are 7:00 AM – 3:30 PM Monday through Friday, with various after-school activities until 8:00 PM.

Construction Materials: The building is constructed of structural standard framing concrete masonry units (CMU) with bricks.

Façade: Brick

Roof: The building has a flat roof. The flat roof is covered with white rubber membrane. It is believed that the roof is well insulated according to the facility staff. The roof is in good condition and therefore no ECMs associated with roof replacement.

Windows: The windows throughout the building are double pane aluminum framed windows except the cafeteria which has old single pane windows. Window replacement in the cafeteria was evaluated.

Exterior Doors: Exterior doors are steel doors with safety glass. Sweeps on exterior doors are still in good condition and therefore no ECMs are evaluated.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: The original building (1953 section) is heated by a steam heating system and the addition (1994 section) is heated by a heating hot water (HHW) system. The steam is provided by a H. B. Smith boiler which is original to the building having a new Power Flame Burner which was installed in 2013. The burner has a rated energy input of 1,854 MBH. The classrooms, offices and cafeteria in the 1953 section building are heated by the fan coil units equipped with steam coils and steam radiators. The HHW is produced by using a small shell-tube steam to hot water heat exchanger located in the mechanical room. The HHW is circulated to the classrooms in the 1994 section by using two inline ITT Bell & Gossett pumps. Each classroom in the 1994 section has a floor mounted fan coil unit equipped with a HHW coil and HHW baseboard heaters. In addition to the central heating systems, the nurse office has a packaged terminal heat pump (PTHP) unit which has a gas fired burner inside to provide heat for the nurse office during the winter season. This unit has a rated heating capacity of 12.15 MBH and efficiency of 81%.

Cooling: The classrooms are cooled by the same fan coil units equipped with chilled water (CHW) coils. The chilled water is provided by an air cooled Trane chiller located on the ground in the west side of the building. This chiller has about 20 ton of cooling capacity and the chilled water is circulated by a Bell & Gossett pump driven by a 2 HP electric motor. In discussions with the facility staff, it was noted that glycol was added to the chilled water for freezing protection; however, the percentage of the glycol is unknown. The nurse office is cooled by a n Islandaire packaged terminal heat pump (PTHP) unit. This PTHP has a rated cooling capacity of 0.8 ton and rated EER of 11.2.

An ECM is included to converting the whole steam system to a HHW system.

Ventilation: The building is ventilated by the fan coil (FC) units. Each FC unit has a vent opening covered with louver to bring in fresh air for ventilation in the rooms. The ventilation system appears to be in good condition; therefore, no energy measure associated with the ventilation is evaluated.

Exhaust: The restrooms are exhausted by two exhaust fans located on the roof. However the capacities of the fan motors are unknown because the fans are all enclosed in the ductwork.

Controls Systems

Pittsgrove Township Schools have a central CM3 direct digital control (DDC) system for most of the HVAC. However, only the chiller is controlled by the DDC system in this school. The rest of the building is still controlled by manual switches or thermostats. The fan coil units are controlled by manually adjusted thermostats on the wall and the PTHP is controlled by the built in manual control. In discussions with the school staff, it was noted that the steam radiators and baseboard heaters are not controlled by any methods and the classrooms become too hot when the boiler is running due to the lack of control.

ECMs relative to upgrading the controls to be included in the DDC system are evaluated.

Domestic Hot Water Systems

The domestic hot water in the school is provided by a Bradford White natural gas DHW heater. This heater has a rated 50 MBH heating capacity and 50 gallon storage. An ECM relative to replacing the DHW heater with condensing DHW heater is evaluated in the report.

Kitchen Equipment

This school does not have a kitchen. all the meals are prepared elsewhere. In cafeteria, a Powers cooler and a regular household refrigerator are used for food storage. There are no ECMs associated with kitchen equipment included.

Plumbing Systems

The toilets and urinals appear to be low flow plumbing fixtures. The lavatory faucets are double handle faucet types having low flow aerators. The school has its own well water system for the water usage. There are no ECMs associated with water conservation.

Plug Load

This school has computers, copiers, residential appliances (microwave, refrigerator) and printers which contribute to the plug load in the building and minor relative to other loads. No ECMs are associated with plug load.

Lighting Systems

The school uses 32W T8 fixtures throughout the building. All of the lights in this building are controlled by manual switches or key switches. After discussion with facility staff, it was noted that the classroom lights are typically turned off after the janitor cleaning the rooms and the hallway lights are on 24/7. There are about 9 wall mounted metal halide exterior lights and 2 LED pole lights, which according to the facility staff, are on a timer control. We have provided three alternatives for lighting that include adding occupancy sensors to the existing lights, replacing the lights with LED lights and a third ECM that evaluates adding occupancy sensors to the proposed LED lights.

3.0 UTILITIES

Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas
Deliverer	Atlantic City Electric	South Jersey Gas
Supplier	Constellation	Woodruff Energy

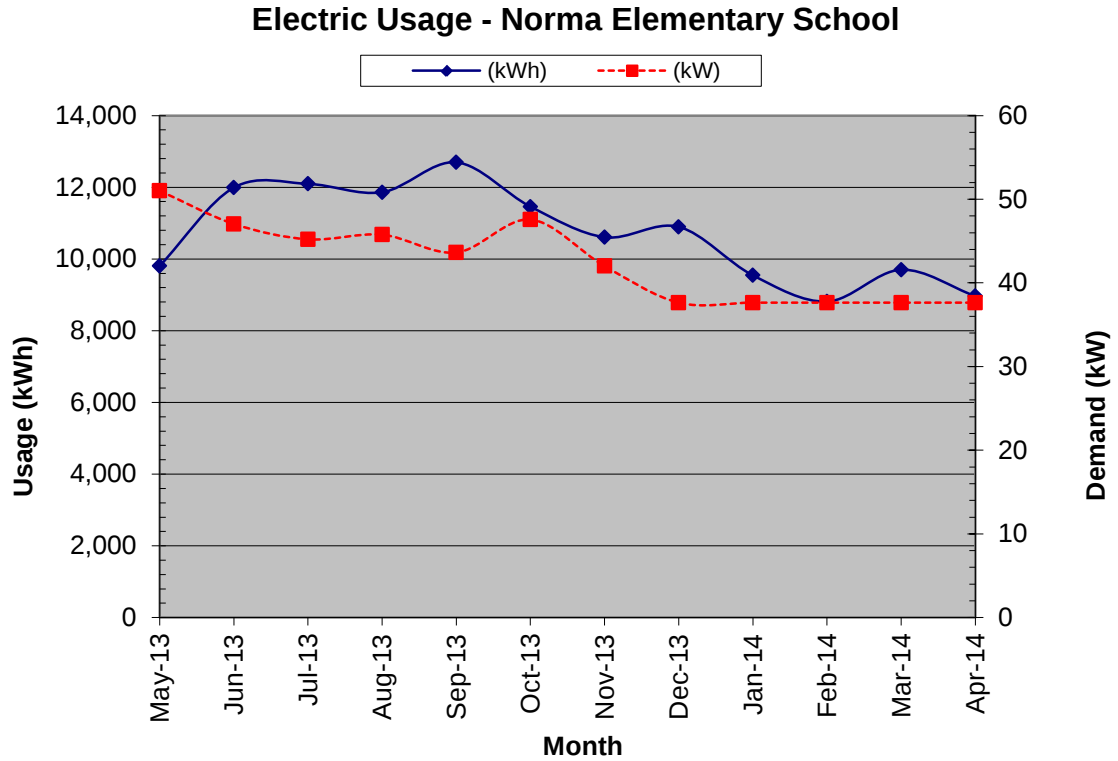
For the 12-month period ending in April 2014, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	128,431	kWh
Annual Cost	\$20,755	\$
Blended Unit Rate	\$0.16	\$/kWh
Supply Rate	\$0.13	\$/kWh
Demand Rate	\$7.13	\$/kW
Peak Demand	51.0	kW
Natural Gas		
Annual Consumption	11,140	Therms
Annual Cost	\$13,655	\$
Unit Rate	\$1.23	\$/therm

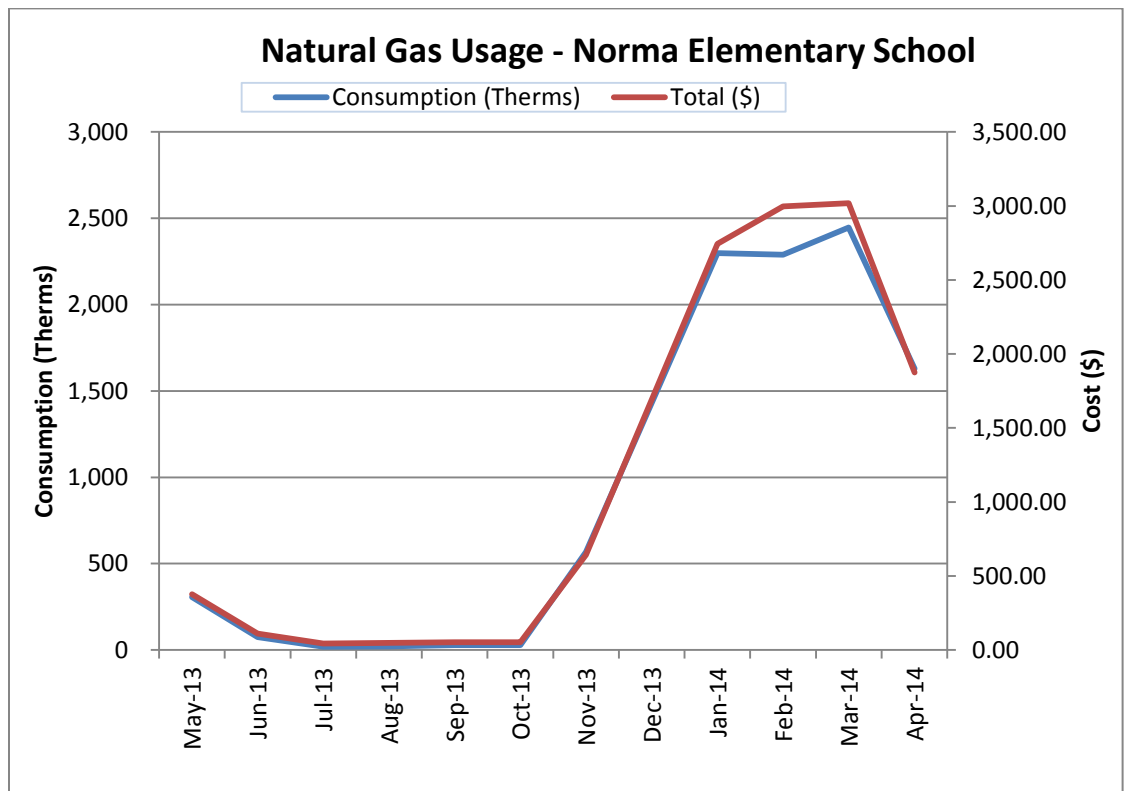
Blended Rate: Average rate charged determined by the annual cost / annual usage

Supply Rate: Actual rate charged for electricity usage in kWh (based on most recent electric bill)

Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)



The school has higher demand and electricity usage during the cooling season due to the chiller. The electric remains fairly constant during the remaining months.



Natural gas is consumed by the steam boiler, PTHP gas heater and domestic hot water heaters. The usage is higher during heating months due to the building heating and is very small in summer months as expected for an elementary school. The natural gas usage is correlated to winter weather conditions

See Appendix A for a utility analysis.

Under New Jersey's energy deregulation law, the supply portion of the electric (or natural gas) bill is separated from the delivery portion. The supply portion is open to competition, and customers can shop around for the best price for their energy suppliers. The electric and natural gas distribution utilities will still deliver the gas/ electric supplies through their wires and pipes – and respond to emergencies, should they arise – regardless of where those supplies are purchased. Purchasing the energy supplies from a company other than your electric or gas utility is purely an economic decision; it has no impact on the reliability or safety of the service.

Comparison of Utility Rates to NJ State Average Rates*				Recommended to Shop for Third Party Supplier?
Utility	Units	School Average Rate	NJ Average Rate	
Electricity	\$/kWh	\$0.16	\$0.13	Y
Natural Gas	\$/Therm	\$1.23	\$0.96	Y

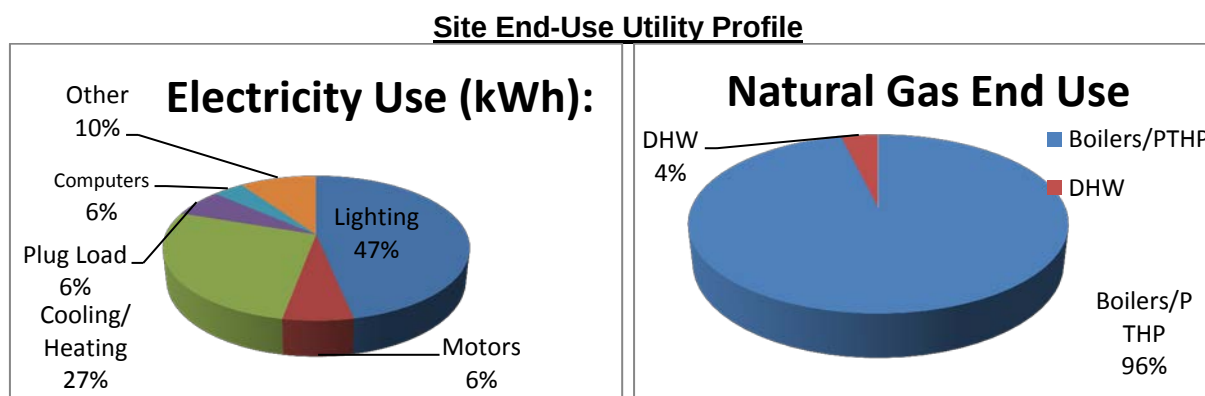
* Per U.S. Energy Information Administration (2013 data – Electricity and Natural Gas, 2012 data – Fuel Oil)

Additional information on selecting a third party energy supplier is available here:

<http://www.state.nj.us/bpu/commercial/shopping.html>.

See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

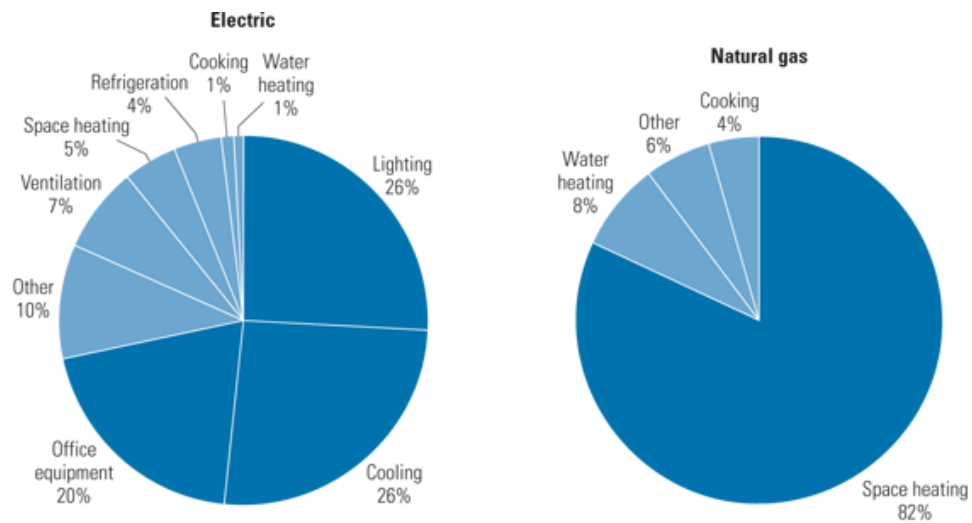
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.



Most of the electricity consumed by educational facilities is used to for lighting, cooling, and plug loads such as computers and copiers; most of the natural gas is used for space heating. Each

school's energy profile is different, and the following charts represent typical utility profiles for K-12 schools per U.S. Department of Energy.

Typical End-Use Utility Profile for Educational Facilities



Courtesy: E SOURCE; from Commercial Building Energy Consumption Survey, 1999 data

4.0 BENCHMARKING

The EPA Portfolio Manager benchmarking tool provides a site and source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft²/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive an Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed measures, the Energy Star rating will increase.

The site EUI is the amount of heat and electricity consumed by a building as reflected in utility bills. Site energy may be delivered to a facility in the form of primary energy, which is raw fuel burned to create heat or electricity, such as natural gas or oil; or as secondary energy, which is the product created from a raw fuel such as electricity or district steam. To provide an equitable comparison for different buildings with varying proportions of primary and secondary energy consumption, Portfolio Manager uses the convention of source EUIs. The source energy also accounts for losses incurred in production, storage, transmission, and delivery of energy to the site, which provide an equivalent measure for various types of buildings with differing energy sources. The results of the benchmarking are contained in the table below. Copies of the benchmarking report are available in Appendix G.

Site EUI kBtu/ft ² /yr	Source EUI kBtu/ft ² /yr	Energy Star Rating (1-100)
70.2	115.1	66

The school has an above average Energy Star Rating Score (50 being the median score), and is considered an energy efficient building.

5.0 ENERGY CONSERVATION MEASURES

The following types of energy savings opportunities are identified in this section of the report:

- Energy conservation measures (ECMs) are energy savings recommendations that typically require a financial investment. For these areas of opportunity, CHA prepared detailed calculations, as summarized in this section and in Appendix C. In general, additional savings may exist from reductions in maintenance activities associated with new equipment or better controls; however for conservatism, maintenance savings are not accounted for in this report; instead the only savings which are reported are those derived directly from reductions in energy which can be tracked by the utility bills.
- Operational and Maintenance measures (O&M) consist of low- or no-cost operational opportunities, which if implemented would have positive impacts on overall building operation, comfort levels, and/or energy usage. There are no estimated savings, costs or paybacks associated with the O&M measures included as part of this study.

Energy savings were quantified in the form of:

- electrical usage (kWh=Kilowatt-hour),
- electrical demand (kW=kilowatts),
- natural gas (therms=100,000 Btu),
- propane gas (gallons=91,650 Btu),
- fuel oil (gallons =138,700 Btu), and
- water (kgal=1,000 gallons).

These recommendations are influenced by the time period that it takes for a proposed project to “break even” referred to as “Simple Payback”. Simple payback is calculated by dividing the estimated cost of implementing the ECM by the energy cost savings (in dollars) of that ECM.

Another financial indicator of the performance of a particular ECM is the Return on Investment or ROI, which represents the benefit (annual savings over the life of a project) of an investment divided by the cost of the investment. The result is expressed as a percentage or ratio.

Two other financial analyses included in this report are Internal Rate of Return (IRR) and Net Present Value (NPV). Internal Rate of Return is the discount rate at which the present value of a project costs equals the present value of the project savings. Net Present Value is the difference between present value of an investment's future net cash flows and the initial investment. If the NPV equals “0”, the project would equate to investing the same amount of dollars at the desired rate. NPV is sometimes referred to as Net Present Worth. These values are provided in the Summary Tab in Appendix C.

5.1 ECM-1 Convert the Steam System to HHW System

The existing steam boiler is original to the building with a recently replaced burner. The steam boiler has maximum combustion efficiencies in the 80% range. The low pressure steam system is difficult to control and does not have capacity of temperature reset. Therefore, it is suggested to replace the steam system with a heating hot water system and replace the steam boiler with a HHW condensing boiler. New modulating condensing gas boilers are available that minimally operate at 88%, and can operate as high as 96%. This ECM assesses the replacement of the boiler with two centrally located modulating condensing gas boilers which will provide the same amount of hot water for the heat pump water loop in the building.

To implement this ECM, The boiler and the heat exchanger would be removed it is suggested to install the new condensing boiler would be installed in the mechanical room at the same location of the old boiler. Redesigning the piping system, terminal units and wiring would be needed.

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

ECM-2 Replace Boilers with Condensing Boilers

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
283,478	0	0	2,422	2,969	(0.7)	3,500	95.5	94.3

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended due to the high cost of implementation and long payback period.

5.2 ECM-2 Install Thermostatic Steam Radiator Valves

The existing steam radiators in the old section classrooms do not have control on them and the classrooms are overheated when the steam system is running. It is suggested thermostatic control valves be installed on the steam radiators to control the room temperature when the steam system is running.

The cost of implementing this measure includes the control valves and the labor cost.

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

ECM-2 Install Thermostatic Steam Radiator Valves

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
1,855	0	0	193	236	2.2	0	7.9	7.9

* Does not qualify for incentive from the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities

This measure is recommended.

5.3 ECM-3 Install Programmable Thermostats on PTHP

The existing PTHP unit in the nurse office is controlled by a built-in manual thermostat and it was noted by the facility staff that this unit was kept running after the office hours. It is suggested that a programmable digital thermostat be installed to control the PTHP unit and reset the temperature during unoccupied hours. The new thermostat will be able to set a schedule for occupied and unoccupied setpoints. Savings are seen from temperature scheduling for occupied and unoccupied hours.

The cost of implementing this measure includes installing the programmable thermostats, wiring and disconnecting the old thermostats, and the labor cost on doing programming on these new thermostats.

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

ECM-3 Install Programmable Thermostats on PTHP

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
413	0	120	28	54	1.6	0	7.7	7.7

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is recommended.

5.4 ECM-4 Replace the Gas Fired DHW Heater with a Gas Fired Condensing DHW Heater

The building has one gas fired domestic hot water (DHW) heater to provide the DHW for sinks. This heater has a rated 50 MBH heating capacity and 50 gallon storage. The heater efficiency is in the range of 80%. Energy savings could be realized by replacing this heater with a high efficiency condensing gas fired heaters, which can operate at efficiencies up to 96%.

Savings were calculated based on the DHW supply temperature, estimated DHW usage, and standby heat loss from the storage tank. Standby heat loss from the storage tank was evaluated based on the tank size and Department of Energy's averaged heat loss rate for hot water tanks. The efficiency of the gas-fired condensing heater is 96% per manufacturer's data. Implementation of this measure will require installation of the gas fired condensing water heaters, gas pipes, gas regulators, and PVC pipes for flue gas exhausting.

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

ECM-4 Replace the Gas Fired DHW Heater with a Gas Fired Condensing DHW Heater

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
10,166	0	0	79	97	(0.8)	300	105.3	102.2

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended due to the long payback period.

5.5 ECM-L1 Lighting Replacement / Upgrades

The school uses T8 lamps which until recently represented the most efficient lighting technology available throughout the building. Recent technological improvements in light emitting diode (LED) technologies have driven down the initial costs making LED lighting a viable option for installation.

Overall energy consumption can be reduced by replacing inefficient bulbs and linear fluorescent bulbs with more efficient LED lamps and removing ballasts. To compute the annual savings for this ECM, the energy consumption of the current lighting fixtures was established and compared to the proposed fixture power requirement with the same annual hours of operation. The difference between the existing and proposed annual energy consumption was the energy savings. These calculations are based on 1 to 1 replacements of the fixtures, and do not take into account lumen output requirements for a given space. A more comprehensive engineering study should be performed to determine correct lighting levels.

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

ECM-L1 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
36,875	8	23,343	0	3,767	0.2	0	9.8	9.8

* LED retrofits must go through the "custom" measures incentive option under New Jersey SmartStart Program. There are no "prescriptive" incentives for LED retrofits. Projects must achieve a minimum of 75,000 kWh annual savings to qualify for "custom" incentives. See section 6.0 for other incentive opportunities

This measure is not recommended in lieu of ECM L3.

5.6 ECM-L2 Install Lighting Controls (Occupancy Sensors)

Presently, all interior lighting fixtures are controlled by wall mounted switches. Review of the comprehensive lighting survey determined that lighting in some areas could benefit from installation of occupancy sensors to turn off lights when they are unoccupied.

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in the lighting replacement section, the energy

savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

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

ECM-L2 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
7,290	0	8,935	0	1,188	1.0	945	6.1	5.3

* Incentive shown is per the New Jersey SmartStart Program. See section 6.0 for other incentive opportunities.

This measure is not recommended in lieu of ECM L3.

5.7 ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

This measure is a combination of ECM-L1 and ECM-L2; recommending replace/upgrade the current lighting fixtures to more efficient ones and installing occupancy sensors on the new lights. Interactive effects of the higher efficiency lights and occupancy sensors lead the energy and cost savings for this measure to not be cumulative or equivalent to the sum of replacing the lighting fixtures alone and installing occupancy sensors without the lighting upgrade. The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
44,165	8	27,997	0	4,386	0.2	945	10.1	9.9

* LED retrofits must go through the "custom" measures incentive option under New Jersey SmartStart Program. There are no "prescriptive" incentives for LED retrofits. Projects must achieve a minimum of 75,000 kWh annual savings to qualify for "custom" incentives. See section 6.0 for other incentive opportunities

This measure is recommended.

5.8 Additional O&M Opportunities

This list of operations and maintenance (O&M) - type measures represent low-cost or no-cost opportunities, which if implemented will have a positive impact on the overall building operations, comfort and/or energy consumption. The recommended O&M measures for this building are as follows:

- Replace filters in the HVAC system quarterly.

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

The following sections give detailed information on available incentive programs including New Jersey Smart Start, Direct Install, New Jersey Pay for Performance (P4P) and Energy Savings Improvement Plan (ESIP). If the School District wishes to and is eligible to participate in the Energy Savings Improvement Plan (ESIP) program and/or the Pay for Performance Incentive Program (P4P), it cannot participate in either the Smart Start or Direct Install Programs. Refer to Appendix D for more information on the Smart Start program.

6.1.1 New Jersey Smart Start Program

For this energy audit, The New Jersey Smart Start Incentives are used in the energy savings calculations, where applicable. This program is intended for medium and large energy users and provides incentives for:

- Electric Chillers
- Gas Chillers
- Gas Heating
- Unitary HVAC
- Ground Source Heat Pumps
- Variable frequency Drives/ motors
- Refrigeration
- Prescriptive and performance lighting and lighting controls

The equipment is procured using a typical bid- build method, installed and paid for and then the incentives are reimbursed to the owner.

Refer to Appendix D for more information on the Smart Start program.

6.1.2 Direct Install Program

The Direct Install Program applies to smaller facilities that have a peak electrical demand of 200 kW or less 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 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, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can reduce the implementation cost of energy conservation projects.

The Direct Install program has specific HVAC equipment and lighting requirements and is generally applicable only to smaller package HVAC units, small boilers and lighting retrofits.

The program pays a maximum amount of \$75,000 per building, and up to \$250,000 per customer per year. Installations must be completed by an approved Direct Install participating contractor, a list of which can be found on the New Jersey Clean Energy Website. Contractors will coordinate with the applicant to arrange installation of recommended measures identified in a previous energy assessment, such as this energy audit. The incentive is reimbursed to the Owner upon successful replacement and payment of the equipment.

The building qualifies for this program because its electrical demand is less than the maximum peak electrical demand of 200 kW for the last 12 month period.

Refer to Appendix D for more information on this program.

6.1.3 New Jersey Pay For Performance Program (P4P)

This building may 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 to offset the cost of energy conservation projects for facilities that pay the Societal Benefits Charge (SBC) and whose demand (kW) in any of the preceding 12 months exceeds 100 kW. This demand minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations and *is not applicable to public schools*. 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). Additionally, the overall return on investment (ROI) must exceed 10%. 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). The ERP must include a detailed energy audit of the desired ECMs, energy savings calculations (using building modeling software) and inputting of all utility bills into the EPA Portfolio Manager website.

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

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

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.

Combining Incentives #2 and #3 will provide a total of \$0.18/ kWh and \$1.8/therm not to exceed 50% of total project cost. Additional Incentives for #2 and #3 are increased by \$0.005/kWh and \$0.05/therm for each percentage increase above the 15% minimum target to 20%, calculated with the EPA Portfolio Manager benchmarking tool, not to exceed 50% of total project cost.

For the purpose of demonstrating the eligibility of the ECM's to meet the minimum savings requirement of 15% annual savings and 10% ROI for the Pay for Performance Program, all ECM's identified in this report have been included in the incentive calculations. The results for the building are shown in Appendix C, with more detailed program information in Appendix D.

6.1.4 Energy Savings Improvement Plan

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” (ESO) to pay for the capital costs of energy improvements to their facilities. ESIP loans have a maximum loan term of 15 year. ESOs 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. 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. Refer to Appendix D for more information on this program.

6.1.5 Renewable Energy Incentive Program

The Renewable Energy Incentive Program (REIP) is part of New Jersey's efforts to reach its Energy Master Plan goals of striving to use 30 percent of electricity from renewable sources by 2020.

Incentives for sustainable bio-power projects and for energy storage projects are currently under development, with competitive solicitations for each of those technologies expected to begin in the first quarter of 2014. The wind program is currently on hold.

New solar projects are no longer eligible for REIP incentives, but can register for Solar Renewable Energy Certificates (SRECs) through the SREC Registration Program (SRP).

7.0 | ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

The building was evaluated for the potential to install ground mounted photovoltaic (PV) solar panels for power generation. As part of this evaluation, CHA reviewed a previous study conducted by Blue Sky Solar Power. According to the Blue Sky Solar Power PV study report, the Atlantic City Electric (ACE) circuit serving the school is limited to 250 kW AC of generating capacity. In discussing with the school staff, it was noted that the school has sufficient land/ground space for the solar PV panels, and that roof mounted systems were not desired. Therefore, the ground mounted PV is sized based on lower number of the building electricity usage and the 250 kW limit.

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 table below summarizes the approximate solar array size that can be installed to provide electricity for the building.

Potential PV Array Size (kW)
60

The PVWATTS solar power generation model was utilized to calculate PV power generation; this model is provided in Appendix E.

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. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. 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. Payments that will be received by the PV producer (school) will change from year to year dependent upon supply and demand. There is no definitive way to calculate an exact price that will be received by the PV producer for SREC credits over the next 15 years. Renewable Energy Consultants estimates an average of \$175/SREC for June 2014 and this number was utilized in the cash flow for this report.

The system costs for PV installations were derived from recent solar contractor budgetary pricing in the state of New Jersey and include the total cost of the system installation (PV panels, inverters, wiring, ballast, controls). The cost of installation is currently about \$4.00 per watt or \$4,000 per kW of installed system, for a typical system. There are other considerations that have not been included in this pricing, such as the condition of the roof and need for structural reinforcement. Photovoltaic systems can be ground mounted if the roof is not suitable, however, this installation requires a substantial amount of open property (not wooded) and underground wiring, which adds

more cost. 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 most likely need to be replaced during the useful life of the PV system.

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

Photovoltaic (PV) Rooftop Solar Power Generation – 60 kW System

Budgetary Cost	Annual Utility Savings			Total Savings	New Jersey Renewable SREC	Payback (without SREC)	Payback (with SREC)	Recommended
	Electricity		Natural Gas					
\$	kW	kWh	Therms	\$	\$	Years	Years	Y/N
\$240,000	60.0	97,427	0	\$15,783	\$17,050	15.2	7.3	FS

Note: Since the school has completed a detailed solar PV study, before implementation is pursued, CHA recommends the school district consult with certified solar PV contractor(s) and the electric company to refine pricing and savings estimate.

7.1.2 Solar Thermal Hot Water Generation

Active solar thermal systems use solar collectors to gather the sun's energy to heat a fluid. An absorber in the collector (usually black colored piping) converts the sun's energy into heat. The heat is transferred to circulating water, antifreeze, or air for immediate use or is storage for later utilization. Applications for active solar thermal energy include supplementing domestic hot water, heating swimming pools, space heating or preheating air in residential and commercial buildings.

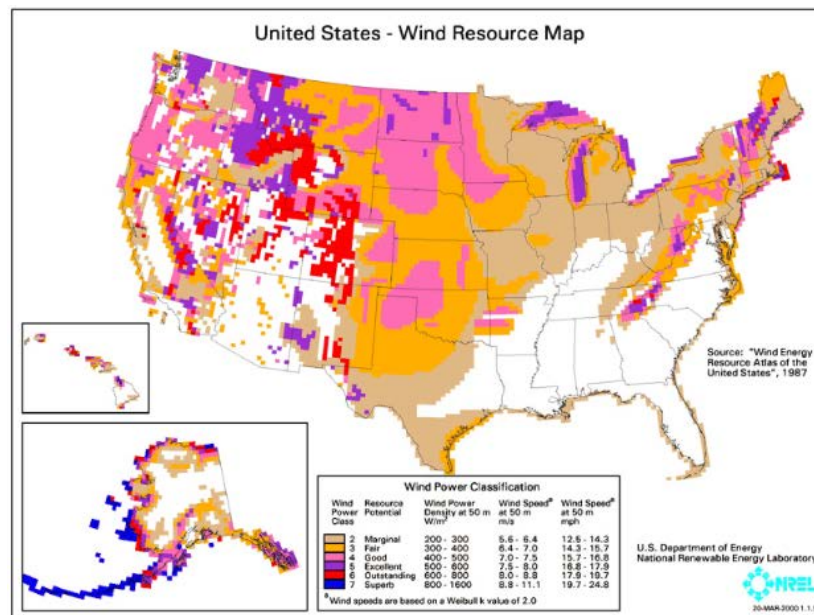
A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually placed on the roof of the building, oriented south, and tilted at the same angle as the site's latitude, to maximize the amount of solar radiation collected on a yearly basis.

Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping). The most practical system would transfer the heat from the panels to thermal storage tanks and then use the pre-heated water for domestic hot water production. DHW is presently produced by natural gas fired water heaters and, therefore, this measure would offer natural gas utility savings. Unfortunately, the amount of domestic hot water that is currently used by this school is very small. Installing a solar domestic hot water system is not recommended due to the limited amount of domestic hot water presently consumed by the school.

This measure is not recommended due to the relatively low domestic hot water usage.

7.2 Wind Powered Turbines

Wind power is the conversion of kinetic energy from wind into mechanical power that is used to drive a generator which creates electricity by means of a wind turbine. A wind turbine consists of rotor and blades connected to a gearbox and generator that are mounted onto a tower. Newer wind turbines also use advanced technology to generate electricity at a variety of frequencies depending on the wind speed, convert it to DC and then back to AC before sending it to the grid. Wind turbines range from 50 – 750 kW for utility scale turbines down to below 50 kW for residential use. On a scale of 1 (the lowest) to 7 (the highest), Class 3 and above (wind speeds of 13 mph or greater) are generally considered “good wind resource” according to the Wind Energy Development Programmatic EIS Information Center hosted by the Bureau of Land Management. According to the map below, published by NREL, Newark, NJ is classified as Class 1 at 50m, meaning the city would not be a good candidate for wind power.



This measure is not recommended due to the location of the school.

7.3 Combined Heat and Power Plant

Combined heat and power (CHP), cogeneration, is self-production of electricity on-site with beneficial recovery of the heat byproduct from the electrical generator. Common CHP equipment includes reciprocating engine-driven, micro turbines, steam turbines, and fuel cells. Typical CHP customers include industrial, commercial, institutional, educational institutions, and multifamily residential facilities. CHP systems that are commercially viable at the present time are sized approximately 50 kW and above, with numerous options in blocks grouped around 300 kW, 800 kW, 1,200 kW and larger. Typically, CHP systems are used to produce a portion of the electricity needed by a facility some or all of the time, with the balance of electric needs satisfied by purchase from the grid.

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The building has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter; however thermal usage during the summer months does not exist. Thermal energy produced by the CHP plant in the warmer months will be wasted. An absorption chiller could be installed to utilize the heat to produce chilled water; however, there is no chilled water distribution system in the building. CHP is not recommended due to the building's limited summer thermal demand.

This measure is not recommended due to the absence of year-round thermal loads which are needed for efficiency CHP operation.

7.4 Demand Response Curtailment

Presently, electricity is delivered by PSE&G, which receives the electricity from regional power grid RFC. PSE&G is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of 13 states and the District of Columbia including the State of New Jersey.

Utility Curtailment is an agreement with the utility provider's regional transmission organization and an approved Curtailment Service Provider (CSP) to shed electrical load by either turning major equipment off or energizing all or part of a facility utilizing an emergency generator; therefore, reducing the electrical demand on the utility grid. This program is to benefit the utility company during high demand periods and utility provider offers incentives to the CSP to participate in this program. Enrolling in the program will require program participants to drop electrical load or turn on emergency generators during high electrical demand conditions or during emergencies. Part of the program also will require that program participants reduce their required load or run emergency generators with notice to test the system.

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From May 2013 through April 2014 the following table summarizes the electricity load profile for the building.

Building Electric Load Profile

Peak Demand kW	Min Demand kW	Avg Demand kW	Onsite Generation Y/N	Eligible? Y/N
51	37.6	43.5	N	N

This measure is not recommended because the building does not have adequate load to meet the required minimum load reduction.

8.0 CONCLUSIONS & RECOMMENDATIONS

The LGEA energy audit conducted by CHA for the building identified potential annual savings of \$4,676/yr with an overall payback of 9.9 years, if the recommended ECMs are implemented.

The potential annual energy and cost savings for the recommended ECMs are shown in the following table.

Electric Savings (kWh)	Natural Gas Savings (therms)	Total Savings (\$)	Payback (years)
28,117	221	4,676	9.9

The following projects should be considered for implementation:

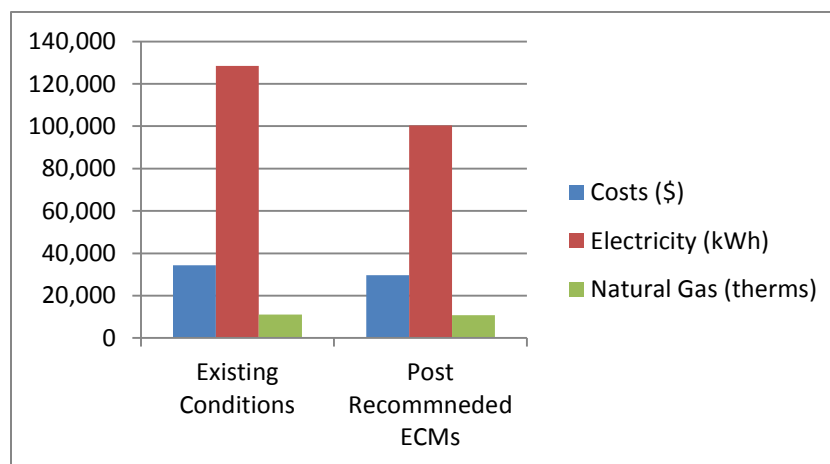
- Install Thermostatic Steam Radiator Valves
- Install Programmable Thermostats on PTHP
- Lighting Replacements with Controls (Occupancy Sensors)

The following alternative energy measures are recommended for further study:

- Photovoltaic (PV) Rooftop Solar Power Generation – 60 kW System

If NPS implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	34,410	29,734	14%
Electricity (kWh)	128,431	100,314	22%
Natural Gas (therms)	11,140	10,919	2%
Site EUI (kbtu/SF/Yr)	70.2	64.9	



APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Norma Elementary School
873 Gershal Ave Pittsgrove NJ 08318

Utility Bills: Account Numbers

<u>Account Number</u>	<u>School Building</u>	<u>Location</u>	<u>Type</u>	<u>Notes</u>
0441 6649 9994	Norma Elementary School	873 Gershal Ave Pittsgrove NJ 08318	Electricity	
3 07 20 0015 0 9	Norma Elementary School	873 Gershal Ave Pittsgrove NJ 08318	Natural Gas	

Norma Elementary School
873 Gershal Ave Pittsgrove NJ 08318

For Service at:
Account No.:
Meter No.:
Electric Service

Norma Elementary School
0441 6649 9994
94911305

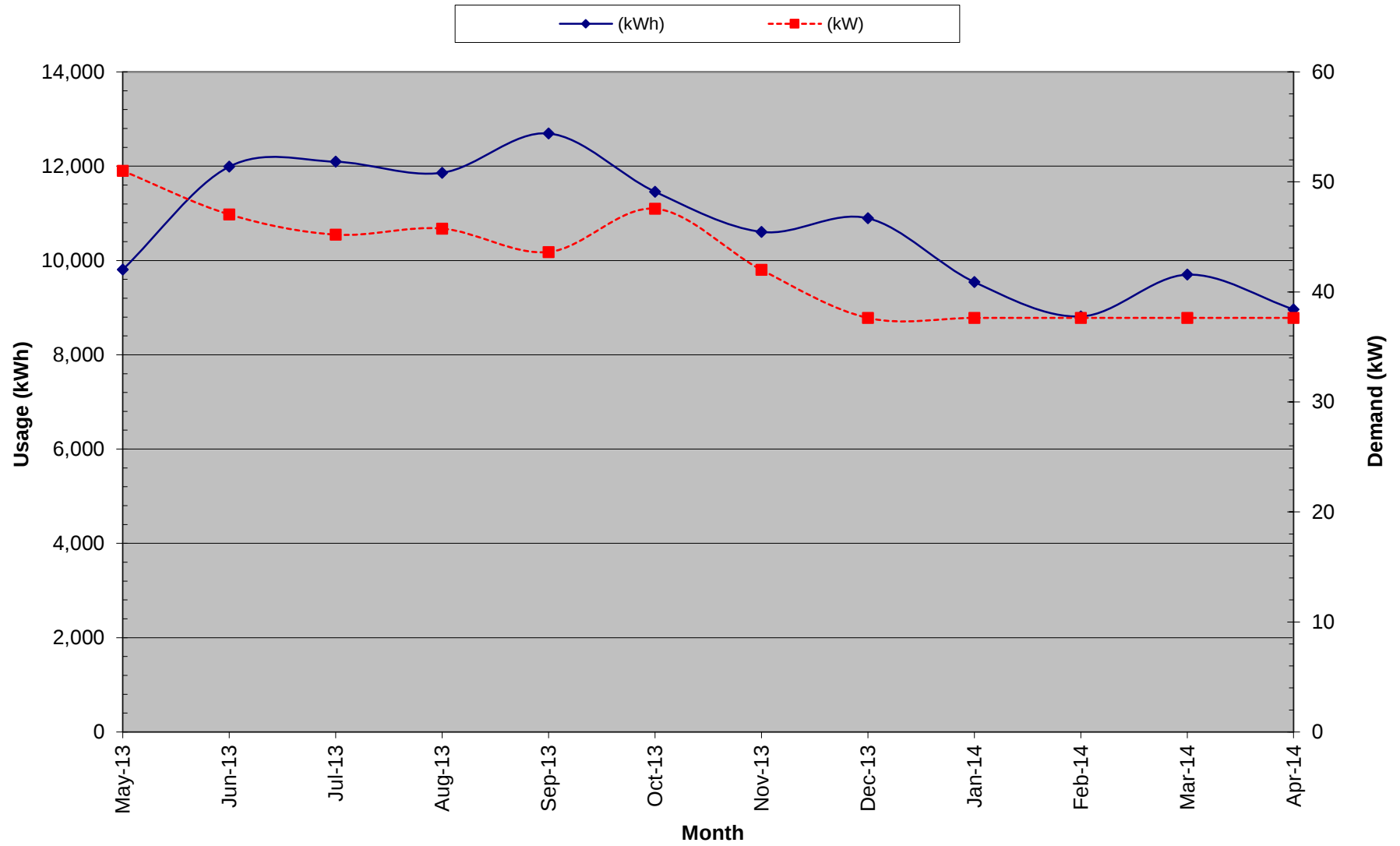
Delivery -
Supplier -

Atlantic City Electric
Constellation

Month	Consumption (kWh)	Demand (kW)	Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
			Delivery (\$)	Supplier (\$)	Total (\$)	Consumption (\$)	Demand (\$)	Blended Rate (\$/kWh)	Consumption Rate (\$/kWh)	Demand (\$/kW)
May-13	9,806	51.0	\$ 796.06	\$ 835.50	\$1,631.56	\$ 1,276.29	\$ 355.27	\$ 0.17	\$ 0.13	\$ 6.96
June-13	11,990	47.1	\$ 846.11	\$ 1,021.58	\$1,867.69	\$ 1,550.57	\$ 317.12	\$ 0.16	\$ 0.13	\$ 6.74
July-13	12,095	45.2	\$ 876.70	\$ 1,030.53	\$1,907.23	\$ 1,594.74	\$ 312.49	\$ 0.16	\$ 0.13	\$ 6.91
August-13	11,861	45.8	\$ 907.83	\$ 1,010.59	\$1,918.42	\$ 1,568.45	\$ 349.97	\$ 0.16	\$ 0.13	\$ 7.65
September-13	12,695	43.6	\$ 892.75	\$ 1,081.65	\$1,974.40	\$ 1,661.57	\$ 312.83	\$ 0.16	\$ 0.13	\$ 7.17
October-13	11,460	47.6	\$ 867.27	\$ 976.42	\$1,843.69	\$ 1,513.98	\$ 329.71	\$ 0.16	\$ 0.13	\$ 6.93
November-13	10,607	42.0	\$ 840.17	\$ 903.75	\$1,743.92	\$ 1,432.66	\$ 311.26	\$ 0.16	\$ 0.14	\$ 7.41
December-13	10,896	37.6	\$ 804.23	\$ 928.37	\$1,732.60	\$ 1,462.72	\$ 269.88	\$ 0.16	\$ 0.13	\$ 7.17
January-14	9,544	37.6	\$ 797.27	\$ 813.17	\$1,610.44	\$ 1,313.57	\$ 296.87	\$ 0.17	\$ 0.14	\$ 7.89
February-14	8,813	37.6	\$ 701.64	\$ 750.89	\$1,452.53	\$ 1,200.64	\$ 251.89	\$ 0.16	\$ 0.14	\$ 6.69
March-14	9,700	37.6	\$ 760.93	\$ 826.47	\$1,587.40	\$ 1,317.52	\$ 269.88	\$ 0.16	\$ 0.14	\$ 7.17
April-14	8,964	37.6	\$ 720.86	\$ 763.76	\$1,484.62	\$ 1,223.73	\$ 260.89	\$ 0.17	\$ 0.14	\$ 6.93
Total (last 12-months)	128,431	51.01	\$9,811.82	\$10,942.67	\$20,754.49	\$17,116.43	\$3,638.06	\$ 0.162	\$ 0.133	\$ 7.127
Notes	1	2	3	4	5	6	7	8	9	10

- 1.) Number of kWh of electric energy used per month
- 2.) Number of kW of power measured
- 3.) Electric charges from Delivery provider
- 4.) Electric charges from Supply provider
- 5.) Total charges (Delivery + Supplier)
- 6.) Charges based on the number of kWh of electric energy used
- 7.) Charges based on the number of kW of power measured
- 8.) Total Charges (\$) / Consumption (kWh)
- 9.) Consumption Charges (\$) / Consumption (kWh)
- 10.) Demand Charges (\$) / Demand (kW)
- Supply Rate Fixed/Averaged:
\$0.0852

Electric Usage - Norma Elementary School



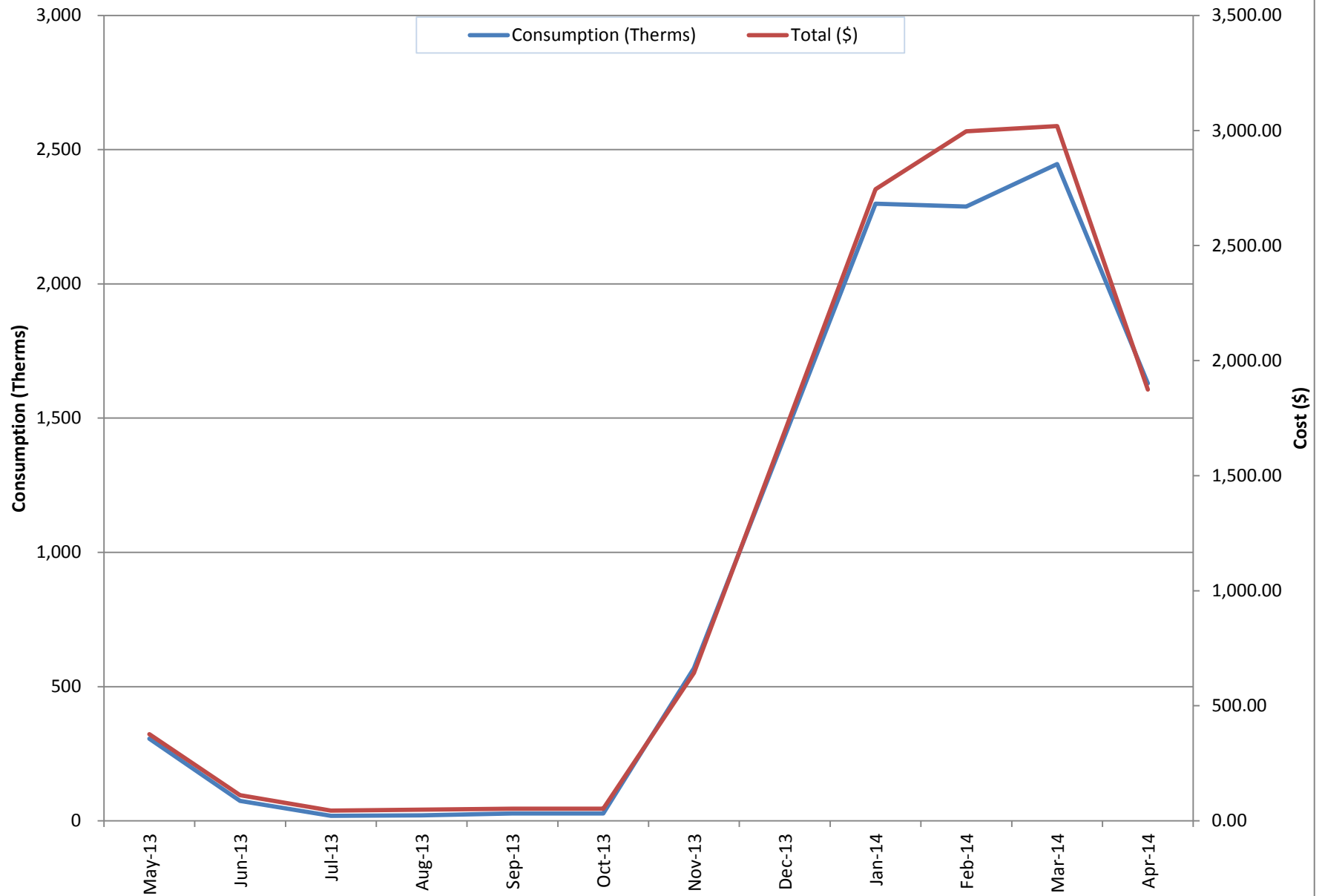
Norma Elementary School
873 Gershal Ave Pittsgrove NJ 08318

For Service at: Norma Elementary School
Account No.: 3 07 20 0015 0 9
Meter No.: 517210
Natural Gas Service
Delivery - South Jersey Gas
Supplier - Woodruff Energy

Month	Consumption (Therms)	Charges			Unit Costs		
		Delivery (\$)	Supply (\$)	Total (\$)	Delivery (\$/Therm)	Supply (\$/Therm)	Total (\$/Therm)
May-13	306	\$ 197	\$ 180	\$ 376	\$ 0.64	\$ 0.59	\$ 1.23
June-13	74	\$ 68	\$ 44	\$ 111	\$ 0.91	\$ 0.59	\$ 1.50
July-13	19	\$ 34	\$ 10	\$ 44	\$ 1.79	\$ 0.54	\$ 2.33
August-13	20	\$ 38	\$ 11	\$ 48	\$ 1.88	\$ 0.52	\$ 2.40
September-13	28	\$ 38	\$ 14	\$ 52	\$ 1.38	\$ 0.52	\$ 1.90
October-13	28	\$ 38	\$ 14	\$ 52	\$ 1.38	\$ 0.52	\$ 1.90
November-13	568	\$ 349	\$ 294	\$ 643	\$ 0.61	\$ 0.52	\$ 1.13
December-13	1,434	\$ 840	\$ 853	\$ 1,694	\$ 0.59	\$ 0.60	\$ 1.18
January-14	2,299	\$ 1,332	\$ 1,413	\$ 2,745	\$ 0.58	\$ 0.61	\$ 1.19
February-14	2,288	\$ 1,305	\$ 1,691	\$ 2,997	\$ 0.57	\$ 0.74	\$ 1.31
March-14	2,447	\$ 1,397	\$ 1,622	\$ 3,019	\$ 0.57	\$ 0.66	\$ 1.23
April-14	1,630	\$ 949	\$ 925	\$ 1,874	\$ 0.58	\$ 0.57	\$ 1.15
Total (12 - Month)	11,140			\$ 13,655.39			\$ 1.226

Missing Bills

Natural Gas Usage - Norma Elementary School



ATLANTIC CITY ELECTRIC SERVICE TERRITORY

Last Updated: 10/24/12

***CUSTOMER CLASS - R – RESIDENTIAL C – COMMERCIAL I – INDUSTRIAL**

Supplier	Telephone & Web Site	*Customer Class
Alpha Gas and Electric, LLC 641 5 th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	R/C ACTIVE
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877) 30-AMBIT (877) 302-6248 www.ambitenergy.com	R/C ACTIVE
American Powernet Management, LP 437 North Grove Street Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	C ACTIVE
AP Gas & Electric, LLC 10 North Park Place Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apge.com	R/C/I ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(201) 384-5552	R/C/I ACTIVE
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	C/I ACTIVE
Champion Energy Services, LLC 72 Avenue L Newark, NJ 07105	(877) 653-5090 www.championenergyservices.com	R/C/I ACTIVE
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	888-565-4490 www.4choiceenergy.com	R/C ACTIVE
Clearview Electric, Inc. 505 Park Drive Woodbury, NJ 08096	(888) CLR-VIEW (800) 746- 4702 www.clearviewenergy.com	R/C/I ACTIVE
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180	(888) 665-0955	C/I

Cherry Hill, NJ 08002	www.conedsolutions.com	ACTIVE
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(866) 237-7693 www.constellation.com	R/C/I ACTIVE
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	R ACTIVE

Direct Energy Business, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergybusiness.com	C/I ACTIVE
Direct Energy Services, LLC 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866) 547-2722 www.directenergy.com	C/I ACTIVE
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, NJ 08002	(800) 282-3331 www.discountenergygroup.com	R/C ACTIVE
DTE Energy Supply, Inc. One Gateway Center, Suite 2600 Newark, NJ 07102	(877) 332-2450 www.dtesupply.com	C/I ACTIVE
Energy Plus Holdings LLC 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	R/C ACTIVE
Energy.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855)243-7270 www.energy.me	R/C/I ACTIVE
Ethical Electric Benefit Co. d/b/a Ethical Electric 100 Overlook Center, 2 nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	R/C ACTIVE
FirstEnergy Solutions Corp. 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	C/I ACTIVE
Gateway Energy Services Corporation 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	R/C/I ACTIVE

GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, New Jersey 08819	(866) 999-8374 www.gdfsuezenergyresources.com	C/I ACTIVE
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	C/I ACTIVE
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	C/I ACTIVE
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	C/I ACTIVE
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	R/C ACTIVE
IDT Energy, Inc. 550 Broad Street Newark, New Jersey 07102	(973) 438-4380 www.idtenergy.com	R/C ACTIVE
Independence Energy Group, LLC 211 Carnegie Center Princeton, NJ 08540	(877) 235-6708 www.chooseindependence.com	R/C ACTIVE
Integritys Energy Services, Inc. 99 Wood Avenue, South Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integritysenergy.com	C/I ACTIVE
Liberty Power Delaware, LLC 3000 Atrium Way, Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	R/C/I ACTIVE
Liberty Power Holdings, LLC 3000 Atrium Way, Suite 273 Mt. Laurel, NJ 08054	(866) 769-3799 www.libertypowercorp.com	R/C/I ACTIVE
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	C/I ACTIVE
NATGASCO, Inc. 532 Freeman St. Orange, NJ 07050	(973) 678-1800 x. 251 www.supremeenergyinc.com	R/C ACTIVE

NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, New Jersey 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	R/C/I ACTIVE
NJ Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, New Jersey 07024	(866) 568-0290 www.NJGandE.com	R/C/I ACTIVE
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th fl. Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	C/I ACTIVE
North American Power and Gas, LLC 222 Ridgedale Ave. Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	R/C/I ACTIVE
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	R/C/I ACTIVE
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	C/I ACTIVE
PPL EnergyPlus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	C/I ACTIVE
Public Power & Utility of New Jersey, LLC 157 Broad St., Suite 304 Red Bank, NJ 07701	(888) 354-4415 www.ppandu.com	R/C/I ACTIVE
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com/pjm	R C/I ACTIVE
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	R/C/I ACTIVE
Respond Power LLC 10 Regency CT Lakewood, NJ 08701	(877) 973-7763 www.respondpower.com	R/C/I ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54	(800) 266-6020	C/I ACTIVE

Folsom, NJ 08037	www.southjerseyenergy.com	
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082	R/C/I ACTIVE
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	R/C/I ACTIVE
Stream Energy 309 Fellowship Road, Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	R ACTIVE
UGI Energy Services, Inc. d/b/a GASMAR 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	C/I ACTIVE
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	R/C/I ACTIVE
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	R/C/I ACTIVE
Xoom Energy New Jersey, LLC 744 Broad Street Newark, New Jersey 07102	(888) 997-8979 www.xoomenergy.com	R/C/I ACTIVE
YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	R/C/I ACTIVE
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	R/C/I ACTIVE

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SOUTH JERSEY GAS SERVICE TERRITORY
Last Updated: 10/24/12

***CUSTOMER CLASS - R – RESIDENTIAL C – COMMERCIAL I - INDUSTRIAL**

Supplier	Telephone & Web Site	Customer Class
Alpha Gas and Electric, LLC 641 5 th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	R/C ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	201- 384-5552 www.astralenergyllc.com	R/C/I ACTIVE
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	C/I ACTIVE
Clearview Electric Inc. d/b/a Clearview Gas 1744 Lexington Ave. Pennsauken, NJ 08110	800-746-4720 www.clearviewenergy.com	R/C ACTIVE
Colonial Energy, Inc. 83 Harding Road Wyckoff, NJ 07481	845-429-3229 www.colonialgroupinc.com	C/I ACTIVE
Compass Energy Services, Inc. 1085 Morris Avenue, Suite 150 Union, NJ 07083	866-867-8328 908-638-6605 www.compassenergy.net	C/I ACTIVE
ConocoPhillips Company 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-646-4427 www.conocophillips.com	C/I ACTIVE
Consolidated Edison Solutions, Inc. Cherry Tree Corporate Center 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-665-0955 www.conedsolutions.com	C/I ACTIVE
Constellation NewEnergy-Gas Division, LLC 900A Lake Street, Suite 2 Ramsey, NJ 07466	(800) 900-1982 www.constellation.com	C/I ACTIVE

Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	888-925-9115 www.directenergy.com	C/I ACTIVE
Direct Energy Services, LLP 120 Wood Avenue, Suite 611 Iselin, NJ 08830	866-547-2722 www.directenergy.com	R/C/I INACTIVE
Energy Plus Natural Gas LP 309 Fellowship Road, East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	R/C ACTIVE
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	800-805-8586 www.gesc.com	R/C/I ACTIVE
UGI Energy Services, Inc. d/b/a GASMART 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergyservices.com	C/I ACTIVE
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	888-452-2425 www.glacialenergy.com	C/I ACTIVE
Global Energy Marketing, LLC 129 Wentz Avenue Springfield, NJ 07081	800-542-0778 www.globalp.com	C/I ACTIVE
Great Eastern Energy 116 Village Blvd., Suite 200 Princeton, NJ 08540	888-651-4121 www.greateastern.com	C/I ACTIVE
Greenlight Energy 330 Hudson Street, Suite 4 Hoboken, NJ 07030	718-204-7467 www.greenlightenergy.us	C ACTIVE
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	C/I ACTIVE
Hess Small Business Services, LLC One Hess Plaza Woodbridge, NJ 07095	888-494-4377 www.hessenergy.com	C/I ACTIVE
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	R/C ACTIVE

IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	973-438-4380 www.idtenergy.com	R/C ACTIVE
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Integrus Energy Services – Natural Gas, LLC 99 Wood Avenue South Suite #802 Iselin, NJ 08830	(800) 536-0151 www.integrusenergy.com	C/I ACTIVE
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	800-927-9794 www.intelligentenergy.org	R/C/I ACTIVE
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	800-828-9427 www.metromediaenergy.com	C ACTIVE
MxEnergy, Inc. 900 Lake Street Ramsey, NJ 07446	800-758-4374 www.mxenergy.com	R/C/I ACTIVE
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	800-840-4GAS www.natgasco.com	C ACTIVE
New Jersey Gas & Electric 1 Bridge Plaza, Fl. 2 Fort Lee, NJ 07024	866-568-0290 www.NJGandE.com	R/C ACTIVE
North American Power & Gas, LLC d/b/a North American Power 197 Route 18 South Ste. 3000 East Brunswick, NJ 08816	(888) 313-9086 www.napower.com	R/C/I ACTIVE
Palmco Energy NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	R/C/I ACTIVE
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	800-363-7499 www.pepco-services.com	C/I ACTIVE
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	R/C/I ACTIVE

PPL EnergyPlus, LLC 811 Church Road - Office 105 Cherry Hill, NJ 08002	800-281-2000 www.pplenergyplus.com	C/I ACTIVE
Shell Energy North America (US) L.P. 17 Denison Street, Room 101B Highland Park, NJ 08904	800-281-2824 www.shell.com/us/energy	C/I ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	C/I ACTIVE
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	C/I ACTIVE
Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(973) 494-8097 www.streamenergy.net	R/C ACTIVE
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	800- 557-1121 www.woodruffenergy.com	R/C/I ACTIVE
Woodruff Energy US LLC 73 Water Street, P.O. Box 777 Bridgeton, NJ 08302	856-455-1111 800-557-1121 www.woodruffenergy.com	C/I ACTIVE
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	888-997-8979 www.xoomenergy.com	R/C/I ACTIVE
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	R/C/I ACTIVE

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APPENDIX B

Equipment Inventory

CHA Project # 28484
Norma Elementary School
THE PITTSBGROVE TOWNSHIP SCHOOL DISTRICT

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.	Current year	Years Old	ASHRAE life expectancy
Boiler	1	H.B. Smith with New Power Flame Burner	JR50A-15	70873011	Steam Boiler	1854 MBH input	Mechanical Room	Steam Radiators and Steam to Heating Hot Water Heat Exchanger	2012	23		2014	2	25
HHW Pump Motor	1	Weg Motor	00218EP3ERS145T	10844247	HHW Pump/Motor	2HP	Mechanical Room	HHW Loop	1994	0		2014	20	20
Chiller	1	Trane	CGAE040GAAAG01	Unknown	Chiller	~20 ton Cooling	On the Outside Ground next to the Mechanical Room	High School Heat Pump Loop	2000	6		2014	14	20
CHW Pump Motor	1	BAC	Unknown	Unknown	Cooling Tower	Blow-through Type Cooling Tower with Fan Motor Enclosed	On the Outside Ground next to the Mechanical Room	High School Heat Pump Loop	1976	-18		2014	38	20
DHW	1	Bradford White	MI504S6FBN	JH16952675	Natural Gas DHW Heater	50,000 BTH and 50 Gallon Storage	Mechanical Room	School	2000	6		2014	14	20
PTHP	1	Islandaire	EZ09	Unknown	PTHP Unit	12.15MBH Gas Heating Capacity 81% Eff. 0.8 ton Cooling Capacity and EER of 11.2	Nurse Office	Nurse Office	2009	15		2014	5	20
Ceiling Fan Coil	2	American Air Filter	ABAHAMGAAH30011010	VGB0220	Ceiling Mounted Fan Coil Unit with Outdoor Air Intake		Café	Café	1994	0		2014	20	20
Floor Mounted Fan Coil	15	Unknown	Unknown	Unknown	Floor Mounted Fan Coil		Classrooms	Classrooms	1994	0		2014	20	20

Cost of Electricity:

\$0.133	\$/kWh
\$7.13	\$/kW

EXISTING CONDITIONS												Retrofit Control	Notes
Field Code	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		Retrofit control device	
	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)			
218	Basement Room 16 Cafeteria	Cafeteria	20	W 32 C F 4 (ELE)	F44ILL/2	118	2.36	SW	2080	4,909	C-OCC		
46LED	Cafeteria Storage Room	Cafeteria	2	W 32 C F 2 (ELE)	F42LL	60	0.12	SW	2080	250	C-OCC		
50LED	Boiler Room	Mechanical Room	4	W 32 W P 2 (ELE)	F42LL	60	0.24	SW	6240	1,498	NONE		
40LED	Corridor	Hallway	16	T 32 R F 2 (ELE)	F42LL	60	0.96	SW	6240	5,990	NONE		
18LED	Faculty Dining Room	Cafeteria	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	2080	932	C-OCC		
18LED	Work Room 11	Classroom	6	T 32 R F 4 (ELE)	F44ILL	112	0.67	SW	2600	1,747	C-OCC		
18LED	Speech Room 10	Classroom	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	2600	1,165	C-OCC		
40LED	Corridor	Hallway	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	6240	749	NONE		
18LED	Stairwell	Hallway	1	T 32 R F 4 (ELE)	F44ILL	112	0.11	SW	6240	699	NONE		
35LED	Room 8	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2600	2,106	C-OCC		
7LED	Room 8	Classroom	2	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.12	SW	2600	312	C-OCC		
35LED	Room 9	Classroom	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	2600	2,340	C-OCC		
35LED	Ground Floor Room 1	Classroom	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2600	1,872	C-OCC		
35LED	Ground Floor Room 2	Classroom	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2600	1,872	C-OCC		
35LED	Ground Floor Room 3	Classroom	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2600	1,872	C-OCC		
35LED	Ground Floor Room 4	Classroom	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2600	1,872	C-OCC		
35LED	Ground Floor Room 5	Classroom	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2600	1,872	C-OCC		
18LED	Stairwell	Hallway	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	SW	6240	1,398	NONE		
24LED	Boys Room	Restroom	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	2600	312	C-OCC		
24LED	Girls Room	Restroom	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	2600	312	C-OCC		
35LED	Nurse Office	Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2600	702	NONE		
220	Nurse Office Toilet Room	Restroom	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	2600	52	C-OCC		
218	General Office	Office	4	W 32 C F 4 (ELE)	F44ILL/2	118	0.47	SW	2600	1,227	NONE		
218	Corridor	Hallway	6	W 32 C F 4 (ELE)	F44ILL/2	118	0.71	SW	6240	4,418	NONE		
24LED	Elevator Vest	Hallway	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	6240	749	NONE		
40LED	Corridor	Hallway	7	T 32 R F 2 (ELE)	F42LL	60	0.42	SW	6240	2,621	NONE		
18LED	Room NC 1	Classroom	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2600	2,621	C-OCC		
18LED	Room NC 2	Classroom	10	T 32 R F 4 (ELE)	F44ILL	112	1.12	SW	2600	2,912	C-OCC		
18LED	Room NC 3	Classroom	11	T 32 R F 4 (ELE)	F44ILL	112	1.23	SW	2600	3,203	C-OCC		
18LED	Room NC 4	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2600	2,330	C-OCC		
36	Toilet Room in Room NC 1	Restroom	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.02	SW	2600	52	C-OCC		
36	Toilet Room in Room NC 2	Restroom	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.02	SW	2600	52	C-OCC		
36	Toilet Room in Room NC 3	Restroom	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.02	SW	2600	52	C-OCC		
36	Toilet Room in Room NC 4	Restroom	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.02	SW	2600	52	C-OCC		
40LED	Kitchen Sink NC 4	Classroom	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2600	156	C-OCC		
40LED	Janitor	Storage Area	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1560	94	C-OCC		
46LED	Storage Room	Storage Area	2	W 32 C F 2 (ELE)	F42LL	60	0.12	SW	1560	187	C-OCC		
24LED	Stairwell	Hallway	1	1B 32 P F 2 (ELE)	F42LL	60	0.06	SW	6240	374	NONE		
Total			196				18.02			55,931			

APPENDIX C

ECM Calculations

Pittsgrove Township School -Norma Elementary School
CHA Project Numer: 28484

Rate of Discount (used for NPV) 3.0%

Estimated	Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
	\$	0.162	\$/kWh blended	0.000420205	22,110	Electric	Natural Gas	Fuel Oil
	\$	0.133	\$/kWh supply	0.000420205		\$ 20,755	\$ 13,655	
	\$	7.13	\$/kW	51.0				
	\$	1.23	\$/Therm	11,140	0.00533471			
	\$	7.50	\$/kgals	0				
			\$/Gal					

Recommend? Y or N	Norma Elementary School																						
		Item	Savings						Cost	Simple Payback	Life Expectancy	Equivalent CO ₂ (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings					ROI	NPV	IRR
			kW	kWh	therms	No. 2 Oil gal	Water kgal	\$								kW	kWh	therms	kgal/yr	\$			
N	ECM-1	Convert the Steam System to HHW System	0.0	0	2,422	0	0	2,969	\$ 283,478	95.5	30	12.9	\$ 3,500	N	94.3	0.0	0	72,651	0	\$ 89,070	(0.7)	(\$221,785)	-6.2%
Y	ECM-2	Install Thermostatic Steam Radiator Valves	0.0	0	193	0	0	236	\$ 1,855	7.9	25	1.0	\$ -	N	7.9	0.0	0	4,819	0	\$ 5,908	2.2	\$2,259	12.0%
Y	ECM-3	Install Programmable Thermostats on PTHP	0.0	120	28	0	0	54	\$ 413	7.7	15	0.2	\$ -	N	7.7	0.0	1,803	421	0	\$ 808	1.0	\$231	9.9%
N	ECM-4	Replace the Gas Fired DHW Heater with a Gas Fired Condensing DHW	0.0	0	79	0	0	97	\$ 10,166	105.3	15	0.4	\$ 300	N	102.2	0.0	0	1,181	0	\$ 1,448	(0.9)	(\$8,714)	-17.9%
N	ECM-L1	Lighting Replacements / Upgrades	7.7	23,343	0	0	0	3,767	\$ 36,875	9.8	15	9.8	\$ -	N	9.8	116.2	350,145	0	0	\$ 66,663	0.8	\$8,098	5.9%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	8,935	0	0	0	1,188	\$ 7,290	6.1	15	3.8	\$ 945	N	5.3	0.0	134,025	0	0	\$ 21,712	2.0	\$7,842	16.9%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	7.7	27,997	0	0	0	4,386	\$ 44,165	10.1	15	11.8	\$ 945	N	9.9	116.2	419,955	0	0	\$ 77,972	0.8	\$9,143	5.8%
Total (Does Not Include ECM-L1 & ECM-L2)			7.7	28,117	2,721	0	0	\$ 7,742	\$ 340,077	43.9	20.0	26	\$ 4,745		43.3	116	421,758	79,072	-	\$ 175,206	(0.5)	(\$218,865)	-6.4%
Recommended Measures (highlighted green above)			7.7	28,117	221	0	0	\$ 4,676	\$ 46,433	9.9	18.3	13	\$ 945	0	9.7	116	421,758	5,240	-	\$ 84,688	0.8	\$11,633	7.5%
% of Existing			15%	22%	2%	0	0																

City:			Atlantic City, NJ				
Occupied Hours/Week			48				
			Building	Auditorium	Gymnasium	Library	Classrooms
	Enthalpy		Operating	Occupied	Occupied	Occupied	Occupied
Temp	h (Btu/lb)	Bin Hours	Hours	Hours	Hours	Hours	Hours
102.5							
97.5	38.6	17	5	0	0	0	0
92.5	38.5	61	17	0	0	0	0
87.5	37.5	132	38	0	0	0	0
82.5	34.8	344	98	0	0	0	0
77.5	32.4	566	162	0	0	0	0
72.5	31.3	755	216	0	0	0	0
67.5	27.8	780	223	0	0	0	0
62.5	24.7	889	254	0	0	0	0
57.5	21.8	742	212	0	0	0	0
52.5	19.0	710	203	0	0	0	0
47.5	17.0	642	183	0	0	0	0
42.5	15.0	795	227	0	0	0	0
37.5	12.8	784	224	0	0	0	0
32.5	10.7	682	195	0	0	0	0
27.5	8.7	345	99	0	0	0	0
22.5	7.1	229	65	0	0	0	0
17.5	5.4	189	54	0	0	0	0
12.5	4.1	70	20	0	0	0	0
7.5	2.5	22	6	0	0	0	0
2.5	1.3	6	2	0	0	0	0
-2.5							
-7.5							

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

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

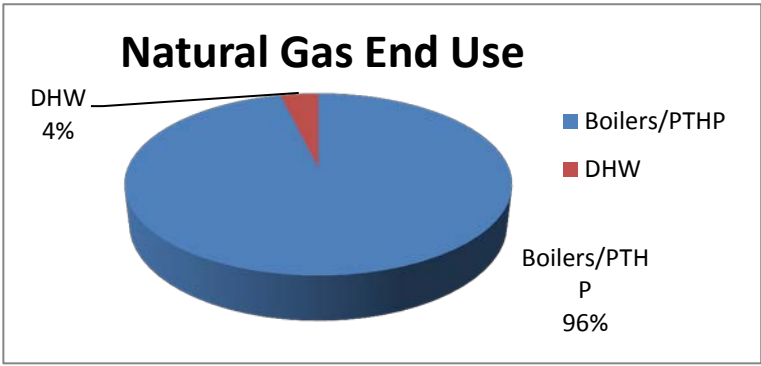
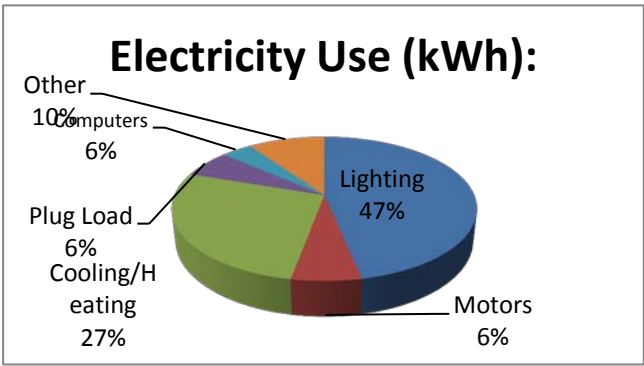
Heating	
Hours	4,474 Hrs
Weighted Avg	41 F
Avg	28 F

Cooling	
Hours	4,286 Hrs
Weighted Avg	67 F
Avg	78 F

Utility End Use Analysis		
Electricity Use (kWh):		Notes/Comments:
128,431	Total	Based on utility analysis
60,000	Lighting	From Lighting Calculations
8,000	Motors	Estimated
35,000	Cooling/Heating	Estimated
8,000	Plug Load	Estimated
5,000	Computers	Estimated
12,431	Other	Remaining
Natural Gas Use (Therms):		Notes/Comments:
11,140	Total	Based on utility analysis
10,718	Boilers/PTHP	Therms/SF x Square Feet Served
422	DHW	Based on utility analysis

47%
6%
27%
6%
4%
10%

96%
4%



Pittsgrove Township School -Norma Elementary School
CHA Project Numer: 28484
Norma Elementary School

ECM-1 Convert the Steam System to HHW System

Description: This ECM evaluates the savings associated with replacement of an existing steam system with high efficiency hot water system. The existing boiler efficiency is 80% (per NJBPU protocols) and the proposed boiler efficiency is 90% (average seasonal efficiency). Electrical power consumption due to pumps is considered to be the same for both the proposed system and the baseline system.

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	\$ 1.23	/ Therm	Natural Gas
Baseline Fuel Cost		/ Gal	No. 2 Oil
FORMULA CONSTANTS			
Oversize Factor	0.8		
Hours per Day	24		
Infrared Conversion Factor	1.0		1.0 if Boiler, 0.8 if Infrared Heater
EXISTING			
Capacity	1,854,000	btu/hr	Estimated Boiler Load % and Capacity
Heating Combustion Efficiency	80%		Estimated averaged Efficiency
Heating Degree-Day	2,792	Degree-day	
Design Temperature Difference	57	F	
Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	1,854,000	btu/hr	
Efficiency	90%		
SAVINGS			
Fuel Savings	2,422	therms	NJ Protocols Calculation
Fuel Cost Savings	\$ 2,969		

Savings calculation formulas are taken from NJ Protocols document for Occupancy Controlled Thermostats

Algorithms

Gas Savings (Therms)

$$= \frac{OF \times ((CAPY_{Bi} \times EFF_Q) - (CAPY_{Qi} \times EFF_B \times ICF)) \times HDD_{mod} \times 24}{\Delta T \times HC_{fuel} \times EFF_B \times ICF \times EFF_Q}$$

Definition of Variables

OF = Oversize factor of standard boiler or furnace (OF=0.8)

CAPY_{Bi} = Total input capacity of the baseline furnace, boiler or heater in Btu/hour

CAPY_{Qi} = Total input capacity of the qualifying furnace, boiler or heater in Btu/hour

HDD_{mod} = HDD by zone and building type

24 = Hours/Day

ΔT = design temperature difference

HC_{fuel} = Conversion from Btu to therms of gas or gallons of oil or propane (100,000 btu/therm; 138,700 btu/gal of #2 oil; 92,000 btu/gal of propane)

EFF_Q = Efficiency of qualifying heater(s) (AFUE %)

EFF_B = Efficiency of baseline heaters (AFUE %)

ICF = Infrared Compensation Factor (ICF = 0.8 for IR Heaters, 1.0 for furnaces/boilers)²

Furnaces and Boilers

Component	Type	Value	Source
AFUE _q	Variable		Application
AFUE _b	Fixed	Furnaces: 78% Boilers: 80% Infrared: 78%	EPACT Standard for furnaces and boilers
CAPY _{in}	Variable		Application
ΔT	Variable	See Table Below	1
HDD _{mod}	Fixed	See Table Below	1

Sources:

1. KEMA, *Smartstart Program Protocol Review*. 2009.
2. http://www.spaceray.com/1_space-ray_faqs.php

Adjusted Heating Degree Days by Building Type

Building Type	Heating Energy Density (kBtu/sf)	Degree Day Adjustment Factor	Atlantic City (HDD)	Newark (HDD)	Philadelphia (HDD)	Monticello (HDD)
Education	29.5	0.55	2792	2783	2655	3886
Food Sales	35.6	0.66	3369	3359	3204	4689
Food Service	39.0	0.73	3691	3680	3510	5137
Health Care	53.6	1.00	5073	5057	4824	7060
Lodging	15.0	0.28	1420	1415	1350	1976
Retail	29.3	0.55	2773	2764	2637	3859
Office	28.1	0.52	2660	2651	2529	3701
Public Assembly	33.8	0.63	3199	3189	3042	4452
Public Order/Safety	24.1	0.45	2281	2274	2169	3174
Religious Worship	29.1	0.54	2754	2745	2619	3833
Service	47.8	0.89	4524	4510	4302	6296
Warehouse/Storage	20.2	0.38	1912	1906	1818	2661

Heating Degree Days and Outdoor Design Temperature by Zone

Weather Station	HDD	Outdoor Design Temperature (F)
Atlantic City	5073	13
Newark	5057	14
Philadelphia, PA	4824	15
Monticello, NY	7060	8

Pittsgrove Township School -Norma Elementary School

CHA Project Numer: 28484

Norma Elementary School

ECM-1 Convert the Steam System to HHW System - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
1,000 MBH NG Condensing Boiler	2	EA	\$ 20,000	\$ 10,000		\$ 41,080	\$ 24,920	\$ -	\$ 66,000	Vendor Estimate
Flue Installation	1	LS	\$2,500.0	\$ 2,500.00		\$ 2,568	\$ 3,115	\$ -	\$ 5,683	Vendor Estimate
Primary pumps	2	EA	\$1,500.0	\$ 750.00		\$ 3,081	\$ 1,869	\$ -	\$ 4,950	Estimated
Secondary pumps	2	EA	\$ 3,500	\$ 1,500		\$ 7,189	\$ 3,738	\$ -	\$ 10,927	Estimated
Piping (Insulation, valves)	1	LS	\$ 30,000	\$ 10,000		\$ 30,810	\$ 12,460	\$ -	\$ 43,270	Estimated
Terminal Units	15	EA	\$ 3,500	\$ 1,500		\$ 53,918	\$ 28,035	\$ -	\$ 81,953	Estimated
Electrical wiring	1	EA	\$ 1,000	\$ 5,000		\$ 1,027	\$ 6,230	\$ -	\$ 7,257	Estimated
Controls	1	EA	\$ 500	\$ 5,000		\$ 514	\$ 6,230	\$ -	\$ 6,744	Estimated
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

\$ 226,783	Subtotal
\$ 56,696	25% Contingency
\$ 283,478	Total

Pittsgrove Township School -Norma Elementary School
CHA Project Numer: 28484
Norma Elementary School

ECM-2 Install Thermostatic Steam Radiator Valves

Description: This ECM evaluates adding automatic temperature controls that will control the steam radiators based on outdoor air and indoor air temperatures.

Temperature Control			
EXISTING CONDITIONS			
Heating			
Heating Season Facility Temp	76	F	Th
Weekly Occupied Hours	48	hrs	H
Heating Season Setback Temp	73	F	Sh
Heating Season % Savings per	3%		Ph
Annual Boiler Capacity	1,854	Mbtu/yr	
Connected Heating Load	278,100	Btu/hr	Caph
Equivalent Full Load Heating	900	hrs	EFLHh
Heating Equipment Efficiency	80%		AFUEh
Cooling			
Cooling Season Facility Temp	72	F	Tc
Weekly Occupied Hours	-	hrs	H
Cooling Season Setback Temp	80	F	Sc
Cooling Season % Savings per	6%		Pc
Connected Cooling Load	-	Tons	Capc
Equivalent Full Load Cooling	381	hrs	EFLHc
Cooling Equipment EER	10.0		AFUEc
SAVINGS			
Natural Gas Savings	193	Therms ³	
Cooling Electricity Savings	0	kWh	

\$0.16 \$/kWh Blended
\$1.23 \$/Therm

COMBINED SAVINGS		
Natural Gas Savings	193	Therms
Cooling Electricity Savings	0	kWh
Total Cost Savings	\$ 236	
Estimated Total Project Cost	\$ 1,855	
Simple Payback	7.9	Yrs

Savings calculation formulas are taken from NJ Protocols document for Occupancy Controlled Thermostats

Algorithms

Cooling Energy Savings (kWh) = (((T_c*(H+5)+S_c*(168-(H+5)))/168)-
T_c)*(P_c*Cap_{hp}*12*EFLH_c/EER_{hp})

Heating Energy Savings (kWh) = (((T_h*(H+5)+S_h*(168-(H+5)))/168)-
T_h)*(P_h*Cap_{hp}*12*EFLH_h/EER_{hp})

Heating Energy Savings (Therms) = (T_h-(T_h*(H+5)+S_h*(168-(H+5)))/168)*
(P_h*Cap_h*EFLH_h/AFUE_h/100,000)

Definition of Variables

T_h = Heating Season Facility Temp. (°F)
T_c = Cooling Season Facility Temp. (°F)
S_h = Heating Season Setback Temp. (°F)
S_c = Cooling Season Setup Temp. (°F)
H = Weekly Occupied Hours
Cap_{hp} = Connected load capacity of heat pump/AC (Tons) – Provided on Application.
Cap_h = Connected heating load capacity (Btu/hr) – Provided on Application.
EFLH_c = Equivalent full load cooling hours
EFLH_h = Equivalent full load heating hours
P_h = Heating season percent savings per degree setback
P_c = Cooling season percent savings per degree setup
AFUE_h = Heating equipment efficiency – Provided on Application.
EER_{hp} = Heat pump/AC equipment efficiency – Provided on Application

Occupancy Controlled Thermostats

Component	Type	Value	Source
T _h	Variable		Application
T _c	Variable		Application
S _h	Fixed	T _h -5°	
S _c	Fixed	T _c +5°	
H	Variable		Application; Default of 56 hrs/week
Cap _{hp}	Variable		Application
Cap _h	Variable		Application
EFLH _c	Fixed	381	1
EFLH _h	Fixed	900	PSE&G
P _h	Fixed	3%	2
P _c	Fixed	6%	2
AFUE _h	Variable		Application
EER _{hp}	Variable		Application

- Sources:
1. JCP&L metered data from 1995-1999
 2. ENERGY STAR Products website

Pittsgrove Township School -Norma Elementary School
CHA Project Numer: 28484
Norma Elementary School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-2 Install Thermostatic Steam Radiator Valves - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						\$ -	\$ -	\$ -	\$ -	
Control Valves.	8	ea	\$ 120	\$ 50		\$ 986	\$ 498	\$ -	\$ 1,484	Estimated
						\$ -	\$ -	\$ -	\$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

\$ 1,484	Subtotal
\$ 371	25% Contingency
\$ 1,855	Total

Pittsgrove Township School -Norma Elementary School
CHA Project Numer: 28484
Norma Elementary School

ECM-3 Install Programmable Thermostats on PTHP

Description: This ECM evaluates adding automatic temperature controls that will control the PTHP based on outdoor air and indoor air temperatures.

Temp Setback			
EXISTING CONDITIONS			
Heating			
Heating Season Facility Temp	75	F	Th
Weekly Occupied Hours	48	hrs	H
Heating Season Setback Temp	65	F	Sh
Heating Season % Savings per	3%		Ph
Annual Boiler Capacity	12.15	Mbtu/yr	
Connected Heating Load	12,150	Btu/hr	Caph
Equivalent Full Load Heating	900	hrs	EFLHh
Heating Equipment Efficiency	80%		AFUEh
Cooling			
Cooling Season Facility Temp	72	F	Tc
Weekly Occupied Hours	48	hrs	H
Cooling Season Setback Temp	80	F	Sc
Cooling Season % Savings per	6%		Pc
Connected Cooling Load	0.8	Tons	Capc
Equivalent Full Load Cooling	381	hrs	EFLHc
Cooling Equipment EER	10.0		AFUEc
SAVINGS			
Natural Gas Savings	28	Therms ³	
Cooling Electricity Savings	120	kWh	

\$0.16 \$/kWh Blended
\$1.23 \$/Therm

COMBINED SAVINGS		
Natural Gas Savings	28	Therms
Cooling Electricity Savings	120	kWh
Total Cost Savings	\$ 54	
Estimated Total Project Cost	\$ 413	
Simple Payback	7.7	Yrs

Savings calculation formulas are taken from NJ Protocols document for Occupancy Controlled Thermostats

Algorithms

Cooling Energy Savings (kWh) = (((T_c*(H+5)+S_c*(168-(H+5)))/168)-
T_c)*(P_c*Cap_{hp}*12*EFLH_c/EER_{hp})

Heating Energy Savings (kWh) = (((T_h*(H+5)+S_h*(168-(H+5)))/168)-
T_h)*(P_h*Cap_{hp}*12*EFLH_h/EER_{hp})

Heating Energy Savings (Therms) = (T_h-(T_h*(H+5)+S_h*(168-(H+5)))/168)-
(H+5)))/168)*(P_h*Cap_h*EFLH_h/AFUE_h/100,000)

Definition of Variables

T_h = Heating Season Facility Temp. (°F)
T_c = Cooling Season Facility Temp. (°F)
S_h = Heating Season Setback Temp. (°F)
S_c = Cooling Season Setup Temp. (°F)
H = Weekly Occupied Hours
Cap_{hp} = Connected load capacity of heat pump/AC (Tons) – Provided on Application.
Cap_h = Connected heating load capacity (Btu/hr) – Provided on Application.
EFLH_c = Equivalent full load cooling hours
EFLH_h = Equivalent full load heating hours
P_h = Heating season percent savings per degree setback
P_c = Cooling season percent savings per degree setup
AFUE_h = Heating equipment efficiency – Provided on Application.
EER_{hp} = Heat pump/AC equipment efficiency – Provided on Application

Occupancy Controlled Thermostats

Component	Type	Value	Source
T _h	Variable		Application
T _c	Variable		Application
S _h	Fixed	T _h -5°	
S _c	Fixed	T _c +5°	
H	Variable		Application; Default of 56 hrs/week
Cap _{hp}	Variable		Application
Cap _h	Variable		Application
EFLH _c	Fixed	381	1
EFLH _h	Fixed	900	PSE&G
P _h	Fixed	3%	2
P _c	Fixed	6%	2
AFUE _h	Variable		Application
EER _{hp}	Variable		Application

- Sources:
1. JCP&L metered data from 1995-1999
 2. ENERGY STAR Products website

Pittsgrove Township School -Norma Elementary School
CHA Project Numer: 28484
Norma Elementary School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-3 Install Programmable Thermostats on PTHP-Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						\$ -	\$ -	\$ -	\$ -	
Programmable Thermostats	1	ea	\$ 200	\$ 100		\$ 205	\$ 125	\$ -	\$ 330	RS Means 2012
						\$ -	\$ -	\$ -	\$ -	

**Cost Estimates are for Energy Savings calculations only, do not use for procurement

\$ 330	Subtotal
\$ 83	25% Contingency
\$ 413	Total

Pittsgrove Township School -Norma Elementary School

CHA Project Numer: 28484

Norma Elementary School

ECM-4 Replace the Gas Fired DHW Heater with a Gas Fired Condensing DHW Heater

Summary:

Replace the gas fired DHW heater with high efficiency condensing DHW heater

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	35	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	42,000	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	78%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	32,760	MBTU/yr	
Existing Tank Size	50	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	°F	Per building personnel
Room Temperature	72	°F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.6	MBH	
Annual Standby Hot Water Load	4,818	MBTU/yr	
New Tank Size	50	Gallons	Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	°F	
Room Temperature	72	°F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.6	MBH	
Annual Standby Hot Water Load	4,818	MBTU/yr	
Total Annual Hot Water Demand	32,760	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	341	therms	Standby Losses and inefficient DHW heater eliminated
Utility Cost	\$1.23	\$/Therm	
Existing Operating Cost of DHW	\$515	\$/yr	
Proposed Operating Cost of DHW	\$418	\$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	79	\$97

Pittsgrove Township School -Norma Elementary School
CHA Project Numer: 28484
Norma Elementary School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-4 Replace the Gas Fired DHW Heater with a Gas Fired Condensing DHW Heater - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
DHW Heater Removal	1	LS		\$ 50		\$ -	\$ 62	\$ -	\$ 62	RS Means 2012
50 gallon High Efficiency Gas-Fired DHW Heater	1	EA	\$ 3,500	\$ 1,000		\$ 3,595	\$ 1,246	\$ -	\$ 4,841	From Internet Price/ Estimated Labor Cost*
Miscellaneous Electrical	1	LS	\$ 300			\$ 308	\$ -	\$ -	\$ 308	RS Means 2012
Venting Kit	1	EA	\$ 450	\$ 650		\$ 462	\$ 810	\$ -	\$ 1,272	RS Means 2012
Miscellaneous Piping and Valves	1	LS	\$ 1,000	\$ 500		\$ 1,027	\$ 623	\$ -	\$ 1,650	Estimated

* Rheem SPIDefire
**Cost Estimates are for Energy Savings calculations only, do not use for procurement

\$ 8,133	Subtotal
\$ 2,033	25% Contingency
\$ 10,166	Total

Pittsgrove Township School -Norma Elementary School
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Norma Elementary School

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. At a minimum, all recommended measures were used for this calculation. To qualify for P4P incentives, the following P4P requirements must be met:

- At least 15% source energy savings
- No more than 50% savings from lighting measures
- Scope includes more than one measure
- Project has at least a 10% internal rate of return
- At least 50% of the source energy savings must come from investor-owned electricity and/or natural gas (note: exemption for fuel conversions)

Total Building Area (Square Feet)		22,110	
Is this audit funded by NJ BPU (Y/N)		Yes	
Board of Public Utilites (BPU)			
	Annual Utilities		
	kWh	Therms	
Existing Cost (from utility)	\$20,755	\$13,655	
Existing Usage (from utility)	128,431	11,140	
Proposed Savings	28,117	221	
Existing Total MMBtus	1,552		
Proposed Savings MMBtus	118		
% Energy Reduction	7.6%		
Proposed Annual Savings	\$4,676		

		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	\$0
Incentive #2	\$0	\$0	\$0
Incentive #3	\$0	\$0	\$0
Total All Incentives	\$0	\$0	\$0

Total Project Cost	\$46,433
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	Allowable Incentive	
% Incentives #1 of Utility Cost*	0.0%	\$0
% Incentives #2 of Project Cost**	0.0%	\$0
% Incentives #3 of Project Cost**	0.0%	\$0
Total Eligible Incentives***	\$0	
Project Cost w/ Incentives	\$46,433	

Project Payback (years)	
w/o Incentives	w/ Incentives
9.9	9.9

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

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

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

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

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

		EXISTING CONDITIONS										RETROFIT CONDITIONS										COST & SAVINGS ANALYSIS									
Area Description		No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Incentive	Simple Payback								
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Simple Payback							
218	Basement Room 16 Cafeteria	20	W 32 C F 4 (ELE)	F44ILL/2	118	2.4	SW	2080	4,909	20	W 32 C F 4 (ELE)	F44ILL/2	118	2.4	C-OCC	1,560	3,682	1,227	0.0	\$ 163.22	\$ 270.00	\$ 35	1.7	1.4							
46LED	Cafeteria Storage Room	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	2080	250	2	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,560	94	156	0.1	\$ 25.88	\$ 596.70	\$ 35	23.1	21.7							
50LED	Boiler Room	4	W 32 W P 2 (ELE)	F42LL	60	0.2	SW	6240	1,498	4	4 ft LED Tube	200732x2	30	0.1	NONE	6,240	749	749	0.1	\$ 109.85	\$ 653.40	\$ -	5.9	5.9							
40LED	Corridor	16	T 32 R F 2 (ELE)	F42LL	60	1.0	SW	6240	5,990	16	T 38 R LED	RTLLED38	38	0.6	NONE	6,240	3,794	2,196	0.4	\$ 322.24	\$ 3,780.00	\$ -	11.7	11.7							
18LED	Faculty Dining Room	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2080	932	4	T 50 R LED	RTLLED50	50	0.2	C-OCC	1,560	312	620	0.2	\$ 103.65	\$ 1,215.00	\$ 35	11.7	11.4							
18LED	Vern Room 11	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	SW	2600	1,747	6	T 50 R LED	RTLLED50	50	0.3	C-OCC	1,950	585	1,162	0.4	\$ 186.39	\$ 1,687.50	\$ 35	9.1	8.9							
18LED	Speech Room 10	4	T 32 R F 4 (ELE)	F44ILL	112	0.4	SW	2600	1,165	4	T 50 R LED	RTLLED50	50	0.2	C-OCC	1,950	390	775	0.2	\$ 124.26	\$ 1,215.00	\$ 35	9.8	9.5							
40LED	Corridor	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6240	749	2	T 38 R LED	RTLLED38	38	0.1	NONE	6,240	474	40.28	0.0	\$ 40.28	\$ 472.50	\$ -	11.7	11.7							
18LED	Stairwell	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	6240	699	1	T 50 R LED	RTLLED50	50	0.1	NONE	6,240	312	387	0.1	\$ 56.76	\$ 236.25	\$ -	4.2	4.2							
35LED	Room 8	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2600	2,106	9	T 38 R LED	RTLLED38	38	0.3	C-OCC	1,950	667	1,439	0.5	\$ 231.43	\$ 2,396.25	\$ 35	10.4	10.2							
7LED	Room 8	2	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2600	312	2	2T 25 R LED	2RTLLED	25	0.1	C-OCC	1,950	98	34.52	0.1	\$ 34.52	\$ 675.00	\$ 35	19.6	18.5							
35LED	Room 9	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	2600	2,340	10	T 38 R LED	RTLLED38	38	0.4	C-OCC	1,950	741	1,599	0.5	\$ 257.14	\$ 2,632.50	\$ 35	10.2	10.1							
35LED	Ground Floor Room 1	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2600	1,872	8	T 38 R LED	RTLLED38	38	0.3	C-OCC	1,950	593	205.71	0.4	\$ 205.71	\$ 2,160.00	\$ 35	10.5	10.3							
35LED	Ground Floor Room 2	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2600	1,872	8	T 38 R LED	RTLLED38	38	0.3	C-OCC	1,950	593	1,279	0.4	\$ 205.71	\$ 2,160.00	\$ 35	10.5	10.3							
35LED	Ground Floor Room 3	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2600	1,872	8	T 38 R LED	RTLLED38	38	0.3	C-OCC	1,950	593	1,279	0.4	\$ 205.71	\$ 2,160.00	\$ 35	10.5	10.3							
35LED	Ground Floor Room 4	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2600	1,872	8	T 38 R LED	RTLLED38	38	0.3	C-OCC	1,950	593	1,279	0.4	\$ 205.71	\$ 2,160.00	\$ 35	10.5	10.3							
35LED	Ground Floor Room 5	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2600	1,872	8	T 38 R LED	RTLLED38	38	0.3	C-OCC	1,950	593	1,279	0.4	\$ 205.71	\$ 2,160.00	\$ 35	10.5	10.3							
18LED	Stairwell	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	6240	1,398	2	T 50 R LED	RTLLED50	50	0.1	NONE	6,240	624	113.52	0.0	\$ 472.50	\$ 472.50	\$ -	4.2	4.2							
24LED	Boys Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	2600	312	2	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,820	109	203	0.1	\$ 32.10	\$ 596.70	\$ 35	18.6	17.5							
24LED	Girls Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	2600	312	2	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,820	109	203	0.1	\$ 32.10	\$ 596.70	\$ 35	18.6	17.5							
35LED	Nurse Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2600	702	3	T 38 R LED	RTLLED38	38	0.1	NONE	2,600	296	406	0.2	\$ 67.29	\$ 708.75	\$ -	10.5	10.5							
220	Nurse Office Toilet Room	1	S 17 C F 1 (ELE)	F21ILL	20	0.0	SW	2600	52	1	S 17 C F 1 (ELE)	F21ILL	20	0.0	C-OCC	1,820	36	16	0.0	\$ 2.07	\$ 270.00	\$ 35	130.1	113.3							
218	General Office	4	W 32 C F 4 (ELE)	F44ILL/2	118	0.5	SW	2600	1,227	4	W 32 C F 4 (ELE)	F44ILL/2	118	0.5	NONE	2,600	1,227	-	0.0	\$ -	\$ -	\$ -	-	-							
218	Corridor	6	W 32 C F 4 (ELE)	F44ILL/2	118	0.7	SW	6240	4,418	6	W 32 C F 4 (ELE)	F44ILL/2	118	0.7	NONE	6,240	4,418	-	0.0	\$ -	\$ -	\$ -	-	-							
24LED	Elevator Vest	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	6240	749	2	4 ft LED Tube	200732x2	30	0.1	NONE	6,240	374	374	0.1	\$ 54.93	\$ 326.70	\$ -	5.9	5.9							
40LED	Corridor	7	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	6240	2,621	7	T 38 R LED	RTLLED38	38	0.3	NONE	6,240	1,660	961	0.2	\$ 140.98	\$ 1,653.75	\$ -	11.7	11.7							
18LED	Room NC 1	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	2600	2,621	9	T 50 R LED	RTLLED50	50	0.5	C-OCC	1,950	878	279.58	0.6	\$ 279.58	\$ 2,396.25	\$ 35	8.6	8.4							
18LED	Room NC 2	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	SW	2600	2,912	10	T 50 R LED	RTLLED50	50	0.5	C-OCC	1,950	975	310.65	0.6	\$ 310.65	\$ 2,632.50	\$ 35	8.5	8.4							
18LED	Room NC 3	11	T 32 R F 4 (ELE)	F44ILL	112	1.2	SW	2600	3,203	11	T 50 R LED	RTLLED50	50	0.6	C-OCC	1,950	1,073	2,131	0.7	\$ 341.71	\$ 2,868.75	\$ 35	8.4	8.3							
18LED	Room NC 4	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2600	2,330	8	T 50 R LED	RTLLED50	50	0.4	C-OCC	1,950	780	1,550	0.5	\$ 248.52	\$ 2,160.00	\$ 35	8.7	8.6							
36	Toilet Room in Room NC 1	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2600	52	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	C-OCC	1,820	36	16	0.0	\$ 2.07	\$ 270.00	\$ 35	130.1	113.3							
36	Toilet Room in Room NC 2	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2600	52	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	C-OCC	1,820	36	16	0.0	\$ 2.07	\$ 270.00	\$ 35	130.1	113.3							
36	Toilet Room in Room NC 3	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2600	52	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	C-OCC	1,820	36	16	0.0	\$ 2.07	\$ 270.00	\$ 35	130.1	113.3							
36	Toilet Room in Room NC 4	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	SW	2600	52	1	2T 3' 17 R F 1 (ELE)	F21ILL	20	0.0	C-OCC	1,820	36	16	0.0	\$ 2.07	\$ 270.00	\$ 35	130.1	113.3							
40LED	Kitchen Sink NC 4	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2600	156	1	T 38 R LED	RTLLED38	38	0.0	C-OCC	1,950	74	82	0.0	\$ 12.77	\$ 506.25	\$ 35	39.6	36.9							
40LED	Janitor	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1560	94	1	T 38 R LED	RTLLED38	38	0.0	C-OCC	1,092	41	52	0.0	\$ 8.81	\$ 506.25	\$ 35	57.5	53.5							
46LED	Storage Room	2	W 32 C F 2 (ELE)	F42LL	60	0.1	SW	1560	187	2	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,092	66	122	0.1	\$ 21.32	\$ 596.70	\$ 35	28.0	26.4							
24LED	Stairwell	1	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	6240	374	1	4 ft LED Tube	200732x2	30	0.0	NONE	6,240	187	27.46	0.0	\$ 27.46	\$ 163.35	\$ -	5.9	5.9							
Total		196				18.0			55,931	196				10.3			27,934	7.7	4,388	44,165	\$945										
S																		Demand Savings	7.7	\$663											
S																		kWh Savings	27,997	\$3,724											
S																		Total Savings		\$4,386		10.1	9.9								

APPENDIX D

New Jersey Board of Public Utilities Incentives

- i. Smart Start**
 - ii. Direct Install**
 - iii. Pay for Performance (P4P)**
 - iv. Energy Savings Improvement Plan (ESIP)**
-

I. SMART START



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With New Jersey SmartStart Buildings ...

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

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings impacted by Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have been added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

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

[Project Categories](#)

[Custom Measures](#)

[Incentives for Qualifying Equipment and Projects](#)

[Program Terms and Conditions](#)

[Find a Trade Ally](#)

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

Getting Started

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

PAST PROGRAMS**TOOLS AND RESOURCES****PROGRAM UPDATES****CONTACT US**

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

Support for Custom Energy-Efficiency Measures

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

Incentives for Qualifying Equipment and Projects

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

Find out more about equipment incentives

For specific details on equipment requirements and financial incentives, including incentives for equipment not listed here, contact a program representative. Fiscal year financial incentives will be limited to a maximum of \$500,000 per customer utility account and are available as long as permits are obtained.

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Equipment Incentives

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings impacted by Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have been added for high efficiency food service equipment.

Visit the Sandy web page for details and important links.

More reasons for a smart start on your next project!

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

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

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

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



Electric Chillers

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

Gas Cooling

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

PAST PROGRAMS**TOOLS AND RESOURCES****PROGRAM UPDATES****CONTACT US****Desiccant Systems** (\$1.00 per cfm - gas or electric)**Electric Unitary HVAC**

Unitary AC and split systems (\$73 - \$92 per ton)
 Air-to-air heat pumps (\$73 - \$92 per ton)
 Water-source heat pumps (\$81 per ton)
 Packaged terminal AC & HP (\$65 per ton)
 Central DX AC Systems (\$40 - \$72 per ton)
 Dual Enthalpy Economizer Controls (\$250)
 Occupancy Controlled Thermostats (\$75 each)
 A/C Economizing Controls (\$85 - \$170 each)

Ground Source Heat Pumps

Closed Loop (\$450-750 per ton)

Gas Heating

Gas-fired boilers < 300 MBH (\$300 per unit)
 Gas-fired boilers ≥ 300 MBH - 1500 MBH (\$1.75 per MBH)
 Gas-fired boilers ≥ 1500 MBH - ≤ 4000 MBH (\$1.00 per MBH)
 Gas-fired boilers > 4000 MBH (Calculated through Custom Measure)
 Gas furnaces (\$300-\$400 per unit)
 Gas infrared heaters - indoor only (\$300 - \$500 per unit)
 Boiler economizing controls (\$1,200 - \$2,700 per unit)

Variable Frequency Drives

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

Natural Gas Water Heating

Gas water heaters ≤ 50 gallons (\$50 per unit)
 Gas-fired water heaters > 50 gallons (\$1.00 - \$2.00 per MBH)
 Tankless water heaters replacing a free standing water heater > 82 energy factor (\$300 per heater)
 Gas-fired booster water heaters (\$17 - \$35 per MBH)

Premium Motors

Three-phase motors (\$45 - \$700 per motor) (**Incentive was discontinued effective March 1, 2013 except for buildings impacted by Hurricane Sandy. Approved applications will have the standard timeframe from the program commitment date to complete the installation.**)

Refrigerator/Freezer Case Premium Efficiency Motors (ECM)

Fractional (< 1 HP) Electronic Commutated Motors (ECM) (\$40 per for replacement of existing shaded-pole motor in refrigerated/freezer case)

Prescriptive Lighting

New Linear Fluorescent

T-12, HID and Incandescent to T-5 and T-8 (\$25 - \$200 per fixture) (**Note: T12 replacements are only available for buildings impacted by Hurricane Sandy**)

New Induction (\$70 per replaced HID fixture)

New LED

Screw-in/Plug-in (\$10 - \$20 per lamp)

Refrigerator/Freezer Case (\$30 - \$65 per fixture)

Outdoor pole/arm/wall-mounted luminaires (\$100 - \$175 per fixture)

Display case (\$30 per case)

Shelf-mounted display and task (\$15 per linear foot)

Wall-wash, desk, recessed (\$20 - \$35 per fixture)

Parking garage luminaires (\$100 per fixture)

Track or Mono-Point directional (\$50 per fixture)

Stairwell and Passageway luminaires (\$40 per fixture)

High-Bay, Low-Bay (\$150 per fixture)

Bollard (\$50 per fixture)

luminaires for Ambient Lighting of Interior Commercial Space
Linear panels (\$50 per fixture)

Fuel pump canopy (\$100 per fixture)

LED retrofit kits (custom measures)

New Pulse-Start Metal Halide (\$25 per fixture)

Linear Fluorescent Retrofit (\$10 - \$20 per fixture)

Induction Retrofit (\$50 per retrofitted HID fixture)

New Construction/Complete Renovation (performance-based)

Note: Incentives for T-12 to T-5 and T-8 lamps with electronic ballast in facilities (\$10 per fixture, 1-4 lamps) and T-5/T-8 high bay fixtures (\$16 - per fixture) were discontinued effective March 1, 2013 for T-12 retrofits replacements except for buildings impacted by Hurricane Sandy. Approved applications will have the standard timeframe of one year from the project commitment date to complete the installation

Lighting Controls

Occupancy Sensors

Wall mounted (\$20 per control)

Remote mounted (\$35 per control)

Daylight dimmers (\$25 per fixture controlled, \$50 per fixture for office applications only)

Occupancy controlled hi-low fluorescent controls (\$25 per fixture controlled)

HID or Fluorescent Hi-Bay Controls

Occupancy hi-low (\$35 per fixture controlled)

Daylight dimming (\$45 per fixture controlled)

Refrigeration

Covers and Doors

Energy-Efficient doors for open refrigerated doors/covers (\$100 per door)

Aluminum Night Curtains for open refrigerated cases (\$3.50 per linear foot)

Controls

Door Heater Control (\$50 per control)

Electric Defrost Control (\$50 per control)

Evaporator Fan Control (\$75 per control)

Novelty Cooler Shutoff (\$50 per control)

Food Service Equipment

Cooking

Combination Electric Oven/Steamer (\$1,000 per oven)
 Combination Gas Oven/Steamer (\$750 per oven)
 Electric Convection Oven (\$350 per oven)
 Gas Convection Oven (\$500 per oven)
 Gas Rack Oven (\$1,000 single, \$2,000 double)
 Gas Conveyor Oven (\$500 small deck, \$750 large deck)
 Electric Fryer (\$200 per vat)
 Gas Fryer (\$749 per vat)
 Electric Large Vat Fryer (\$200 per vat)
 Gas Large Vat Fryer (\$500 per vat)
 Electric Griddle (\$300 per griddle)
 Gas Griddle (\$125 per griddle)
 Electric Steam Cooker (\$1,250 per steamer)
 Gas Steam Cooker (\$2,000 per steamer)

Holding

Full Size Insulated Cabinets (\$300 per cabinet)
 Three Quarter Size Insulated Cabinets (\$250 per cabinet)
 Half Size Insulated Cabinets (\$200 per cabinet)

Cooling

Glass Door Refrigerators (\$75 - \$150 per unit)
 Solid Door Refrigerators (\$50 - \$200 per unit)
 Glass Door Freezers (\$200 - \$1,000 per unit)
 Solid Door Freezers (\$100 - \$600 per unit)
 Ice Machines (\$50 - \$500 per unit)

Cleaning

Dishwashers (\$400 - \$1,500 per unit)

Other Equipment Incentives*

Performance Lighting (\$1.00 per watt per square foot below program incentive threshold, currently 5% more energy efficient than ASHRAE 2007 for New Construction only.)

Custom electric and gas equipment incentives (not prescriptive)

*Equipment incentives are calculated based on type, efficiency, size, and application and are evaluated on a case-by-case basis. Contact us for details.

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II. DIRECT INSTALL



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NEW JERSEY'S CLEAN ENERGY PROGRAM

DIRECT Install

Let us pay up to 70% of your energy efficiency upgrade.

Sometimes, the biggest challenge to improving energy efficiency is knowing where to and how to get through the process. Created specifically for existing small to medium facilities, Direct Install is a turnkey solution that makes it easy and affordable to upgrade high efficiency equipment. Direct Install is designed to cut your facility's energy costs replacing lighting, HVAC and other outdated operational equipment with energy efficient alternatives. The program pays up to 70% of retrofit costs, dramatically improving your payback on the project. There is a \$125,000 incentive cap on each project.

ELIGIBILITY



Existing small to mid-sized commercial and industrial facilities with a peak electric demand that did not exceed 200 kW in any of the preceding 12 months are eligible to participate in Direct Install. Applicants will submit the last 12 months of electric utility bills indicating that they are below the demand threshold and have occupied the building during that time. Buildings must be located in New Jersey and served by the state's public, regulated electric or natural gas utility companies.

SYSTEMS & EQUIPMENT ADDRESSED BY THE PROGRAM

Lighting
Heating, Cooling & Ventilation (HVAC)
Refrigeration
Motors
Natural Gas
Variable Frequency Drives



Measures eligible for Direct Install are limited to specific equipment categories, types and capacities. Boilers may not exceed 500,000 Btuh and furnaces may not exceed 140,

III. PAY FOR PERFORMANCE (P4P)



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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 facility. Earn incentives that are directly linked to your savings. Pay for Performance relies on a



program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop a whole-building energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for full implementation of 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, family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following customer classes are not required to meet the 100 kW demand threshold to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profit organizations, affordable multifamily housing, and local governmental entities. Your energy reduction plan defines 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 this 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

**OIL, PROPANE & MUNICIPAL
ELECTRIC CUSTOMERS**

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

EDA PROGRAMS

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

SBC CREDIT PROGRAM

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.

PAST PROGRAMS

TOOLS AND RESOURCES

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-

PROGRAM UPDATES

implementation results. Incentives for electricity and natural gas savings will be based on actual savings, provided that the minimum performance threshold of savings has been achieved.

CONTACT US



A detailed Incentive Structure document is available on the applications and form

Steps to Participation

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

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PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2013 - June 30, 2014

Utility Serving Applicant: ☐ Atlantic City Electric ☐ Jersey Central Power & Light ☐ PSE&G
☐ New Jersey Natural Gas ☐ Elizabethtown Gas ☐ Rockland Electric Co. ☐ South Jersey Gas
☐ Other Electric Service Provider (please specify): _____
☐ Other Fuel Provider: _____ ☐ Oil: _____ ☐ Other (Please specify): _____

Instructions

1. Read the program material to determine project qualification.
2. Read the Participation Agreement and sign where indicated.
3. Fill out all applicable spaces on this form.
4. Provide a copy of the customer's company W-9 form.
5. Provide the most recent consecutive 12 month period of utility bills for the project.

6. Provide brief description of facility.
7. Partner must submit the application package via e-mail, mail or fax **DIRECTLY** to the Market Manager – see back of this form.

Approval of this Application is not an approval of the project's scope of work. Scope of work is only approved upon approval of the Energy Reduction Plan. See application and program guidelines for more information.

Customer/Owner Information (payment will be made to entity entered here)

Company Name		Project Contact/Title	
Company Address		City	State Zip
Phone/Fax	E-mail	Federal ID/SSN	

Partner Information

Company Name		Project Contact/Title	
Company Address		City	State Zip
Phone	Fax	E-mail	

Project Information

Project Name			
Building Address		City	State Zip
Utility Account Number(s): Electric		Gas	
* Note: Please use the back of this page for additional utility accounts if quantity exceeds space allotment.			
Annual Peak kW Demand	Building Type		Number of Buildings
Size of Building(s) (gross sq/ft)		Direct, Master or Sub Metered	

Funding

☐ Check the box if an Energy Savings Improvement Program (ESIP) will be a source of funding. ESIP allows government agencies to pay for energy related improvements using the value of the resulting energy savings.

Do you expect to receive funding under any other efficiency programs? ☐ No ☐ Yes If Yes, please specify below:

Utility Program #1 – Utility: _____	Program Name: _____
Utility Program #2 – Utility: _____	Program Name: _____
Federal Program #1 – Organization: _____	Program Name: _____
Federal Program #2 – Organization: _____	Program Name: _____
Other Program – Organization: _____	Program Name: _____

Additional Project information

Additional Utility Account(s)

Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number
Account type	Account number

Additional Comments:

Complete this application form and send it directly to the Commercial/Industrial Market Manager by e-mail, mail or fax.

New Jersey's Clean Energy Program
c/o TRC Energy Services-P4P
900 Route 9 North, Suite 404 • Woodbridge, NJ 07095

Phone: 866-657-6278 • Fax: 732-855-0422
E-mail: P4P@NJCleanEnergy.com

Visit our website: NJCleanEnergy.com/P4P

New Jersey SmartStart Buildings[®] is a registered trademark. Use of the mark without the permission of the New Jersey Board of Public Utilities, Office of Clean Energy is prohibited.

*Incentives/Requirements subject to change.



002-FY14-04/14

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

Design Incentives – Incentives that may be offered to design professionals by the Program.

Design Services – Services that may be offered to design professionals under the Program.

Energy-Efficient Measures – Any device eligible to receive a Program Incentive payment through the NJ Clean Energy Commercial and Industrial Program (New Jersey SmartStart Buildings).

New Jersey Utilities – The regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.

Administrator – New Jersey Board of Public Utilities, Office of Clean Energy

Participating Customers – Those non-residential electric and/or gas service customers of the New Jersey Utilities who participate in this Program.

Product Installation or Equipment Installation – Installation of the Energy-Efficient Measures.

Projects with a contract threshold of \$14,187 (increasing to \$15,444 effective July 1, 2014) are required to pay no less than prevailing wage rate to workers employed in the performance of any construction undertaken in connection with Board of Public Utilities financial assistance, or undertaken to fulfill any condition of receiving Board of Public Utilities financial assistance, including the performance of any contract to construct, renovate or otherwise prepare a facility, the operations of which are necessary for the receipt of Board of Public Utilities financial assistance. By submitting an application, or accepting program incentives, applicant agrees to adhere to New Jersey Prevailing Wage requirements, as applicable.

Program – The Commercial and Industrial Energy-Efficient Construction Program (New Jersey SmartStart Buildings) offered herein by the New Jersey Board of Public Utilities, Office of Clean Energy pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

Program Incentives – Refers to the amount or level of incentive that the Program provides to Participating Customers pursuant to the Program offered herein (see description under "Incentive Amount" heading).

Program Offer – Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities identified above.

Program Manager – TRC Energy Services.

Application and Eligibility Process – The Program pays incentives after the installation of qualified energy-efficient

measures that were pre-approved (for exceptions to this condition, please refer to "Exceptions for Approval".) In order to be eligible for Program Incentives, a Customer, or an agent (contractor/vendor) authorized by a Customer, must submit a properly completed application package. The package must include an application signed by the customer; a complete (current) utility bill; and technology worksheet and manufacturer's cut sheets (where appropriate). This information must be submitted to the Program Manager before equipment is installed. Applications for measures that are self installed by customers must be submitted by the customer and not the sales vendor of the measure, however, the customer may elect to assign payment of the incentive to the sales vendor. This application package must be received by the Program Manager on or before June 30, 2014 in order to be eligible for the fiscal year July 1, 2013-June 30, 2014 incentives. The Program Manager will review the application package to determine if the project is eligible for a Program Incentive. If eligible, the Customer will receive an approval letter with the estimated authorized incentive amount and the date by which the equipment must be installed in order for the approval to remain in effect. Upon receipt of an approval letter, the Customer may then proceed to install the equipment listed on the approved application. Equipment installed prior to the date of the Program Manager's approval letter is not eligible for an incentive. The Program Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the approval letter. All equipment must be purchased within 12 months of date of application. **Any Customer and/or agent who purchases equipment prior to the receipt of an incentive approval letter does so at his/her own risk.**

Exceptions for Approval – The Application and Eligibility Process pertains to all projects except for those involving either Gas Heating, Unitary HVAC or Motors having an incentive amount less than \$5,000 that were installed within 12 months of receipt of the application. These measures, at this incentive level, may be installed without prior approval. In addition, but at the sole discretion of the Program Manager, emergency replacement of equipment may not require a prior approval determination and letter. **In such cases, please notify the Program Manager of such emergencies as early as possible, that an application will soon be sent in that was not pre-approved.**

Post-Installation Approval – After installation is completed, the Customer, or an agent authorized by the Customer, must finalize and submit an invoice for the purchase of the equipment (material cost must be broken out from labor costs), and any other required documentation as specified on the equipment application or in the Program Manager's initial approval letter.

Please refer to the program guide on the NJCleanEnergy.com/ssb website for the complete Application and Eligibility Process.

The Program Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing product or equipment (if applicable) and the Energy-Efficient Measures

installed under this Program, either prior to issuing incentives or at a later time.

Energy-Efficient Measures must be installed in buildings located within a New Jersey Utilities' service territory and designated on the Participating Customer's incentive application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program materials and incentive applications. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease. Design Incentives are available to design professionals as described in the Program materials and applications. A different and separate agreement must be executed by participating design professionals to be eligible for this type of incentive. The design professional does not need to be based in New Jersey.

Equipment procured by Participating Customers through another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, is not eligible for incentives through this program. Customers who have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility are not eligible for incentives offered through this program.

Incentive Amount – Program Incentives will equal either: a) the approved Program Incentive amount, or b) the actual equipment cost of the Energy-Efficient Measure, whichever is less, as determined by the Program Manager. Products offered at no direct cost to the customer are ineligible. Incomplete application submissions, applications requiring inspections and unanticipated high volume of activities may cause processing delays. Program Incentives are limited to \$500,000 per utility account in a calendar year. Contact the Program Manager regarding any questions.

Tax Liability – The Program Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their federal tax identification number or social security number to the Program Manager on the application form in order to receive a Program Incentive. In addition, Participating Customers must also provide a Tax Clearance Form (entitled "Business Assistance or Incentive Clearance Certificate") that is dated within 90 days of equipment installation.

Endorsement – The Program Manager and Administrator do not endorse, support or recommend any particular manufacturer, product or system design in promoting this Program.

Warranties – THE PROGRAM MANAGER AND ADMINISTRATOR DO NOT WARRANT THE PERFORMANCE OF INSTALLED EQUIPMENT, AND/OR SERVICES RENDERED AS PART OF THIS PROGRAM, EITHER EXPRESSLY OR IMPLICITLY. NO WARRANTIES OR REPRESENTATIONS OF ANY KIND, WHETHER STATUTORY, EXPRESSED, OR IMPLIED, INCLUDING, WITHOUT LIMITATIONS, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE REGARDING EQUIPMENT OR SERVICES PROVIDED BY A MANUFACTURER OR VENDOR. CONTACT YOUR VENDOR/SERVICES PROVIDER FOR DETAILS REGARDING PERFORMANCE AND WARRANTIES.

Limitation of Liability – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against the Program Manager or the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Program Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Program Manager, its representatives, or subcontractors, or the Administrator, be liable for any lost profits, special, punitive, consequential or incidental damages or for any other damages or claims connected with or resulting from participation in this Program. Further, any liability attributed to the Program Manager under this Program shall be individual, and not joint and/or several.

Assignment – The Participating Customer may assign Program Incentive payments to a specified vendor.

Participating Customer's Certification – Participating Customer certifies that he/she purchased and installed the equipment listed in their application at their defined New Jersey location. Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements listed in the application.

Termination – The New Jersey Board of Public Utilities reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

Acknowledgement – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Program Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the NJ SmartStart Buildings Program. Additionally, I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program.

CUSTOMER'S SIGNATURE
PARTNER SIGNATURE
By signing, I certify that I have read, understand and agree to the Participation Agreement listed above.

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)



Your Power to Save

At Home, for Business, and for the Future

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HOME

RESIDENTIAL

COMMERCIAL, INDUSTRIAL
AND LOCAL GOVERNMENT

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND
FUEL CELLSLOCAL GOVERNMENT ENERGY
AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT
PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL
ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Program

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under 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 make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. The program also allows agencies to reduce energy usage with minimal expenditure of new financial resources.

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

Local Government
School Districts (K-12)

All RFPs must be submitted to the Board for approval at ESIP@bpu.state.nj.us.

The Board also adopted protocols to measure energy savings:

Measuring Energy Savings
Procedures for Implementation

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.

The NJ Board of Public Utilities sponsored Sustainable Jersey in the creation of an ESIP Guidebook that explains how to implement the program. The guidebook also includes a list of successful projects and a list of helpful resources.

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit as prescribed in P.L.2012 c.55.

ENERGY REDUCTION PLANS

If you have an ESIP plan that needs to be submitted to the Board of Public Utilities, please email it to ESIP@bpu.state.nj.us. Please limit the file size to 3MB (or break it into smaller files).

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

ESIP PROGRAM

Final version 42413

BPU RULES

1. Public Entity must decide if they will use an ESCO or DIY method or Hybrid thereof prior to issuing the RFP and the RFP must state the intended method. A change in the project procurement model after the RFP closing date will be cause for immediate rejection and disqualification of potential Clean Energy program incentives.
2. RFP procedures shall be adhered to as per the legislation, including the use of BPU approved forms. Any alteration of the forms, without prior approval from the BPU shall be grounds for rejection.
3. RFP must include copy of an audit (ASHRAE Level II w/Level III for lighting) and audit must be prepared by a firm classified by DPMC in the 036 discipline.
4. All firms, including professional services, whether using ESCO or DIY model, must be DPMC classified.
5. If an Architect is engaged by the public entity, the architectural fees are the responsibility of the public entity and must be paid directly to the firm. These fees may be included in the energy cost savings analysis and payback.

ESCO's may contract directly with an architectural firm, in which case the architectural firm serves as a subcontractor to the ESCO and the project related service costs may be included within the project's economic model.

6. Public entity shall conduct pre-bid meetings and site visits per existing statutes.

In the interest of open public bidding transparency, it is a requirement of the BPU that all proposers must attend the pre-proposal bid meeting.

7. There shall be no negative cash flow in any year of the program.
section 7 (1)(a)
"the energy savings resulting from the program will be sufficient to cover the cost of the program's energy conservation measures."
8. SREC values are not permitted to be used in the energy cost savings calculations.
9. Capital cost avoidance values are not to be used in the energy savings calculations.
10. Operational and Maintenance (O&M) cost savings may be permitted in the cost savings calculations, but only with supporting documentation.
11. Blended utility rates shall not be permitted. Use the actual utility tariff or local contracted rates if there is a third party supplier.

For the RFP proposals, the public entity shall define the utility rates in the RFP

12. Contracted third party utility rates may only be used for the term of the contract (5 yr. maximum)
Subsequent years are to be projected at the utility tariff rates plus the annual BPU escalation rates.
13. Public entity shall conduct M&V (measurement and verification) at the one (1) year operational date and shall provide a copy of the M&V report to the Board of Public Utilities.

For the RFP proposals, the ESCO shall provide the cost for the one (1) year M&V only. For comparative purposes, the one year M&V pricing shall be indicated on the proposal Form VI, under the “Annual Service Costs” column. Additional M&V costs are at the discretion of the local unit and are not to be included in the proposal.

14. The decisions made by BPU staff regarding compliance or other issues that arise in connection with the RFP procurement process shall be considered a final decision of the BPU. Any appeal will need to be through the New Jersey Superior Court, Appellate Division.
15. For the RFP proposals only, Demand Response (DR) revenues claimed by ESCO’s can only be projected for a maximum period of three (3) years. DR revenue projections beyond three years will not be permitted. DR revenues must be included and presented under the “Energy Rebates/Incentives” column of FORM VI.
16. ESCO “fees” proposed during the RFP phase of the project cannot increase post-award. ESCO’s are required to maintain the fee percentages through final contract negotiations and construction of the Board approved Energy Savings Plan
17. Public Bid openings shall be held on the due date of the proposal submissions. The public entity shall announce the name of the bidder and the total dollar amount. After award of a contract, all proposals received will be made available by the owner for public inspection
18. Rejection of bids by the public entity shall be conducted in accordance with the appropriate sections of the applicable legislation, as stated in Title 40A:11-13.2. Additionally all proposals must be returned to the respective ESCO’s upon rejection.
19. Field changes that exceed 5% of the project cost require BPU approval.
20. Energy Savings Plans (ESP) that is dependent upon incentives from the Clean Energy Program must review the current program requirements, at the time of application, for each incentive to insure eligibility. If any program incentive is denied, resubmission of all ESIP related forms will be necessary to remain ESIP qualified.

APPENDIX E

Photovoltaic Analysis

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Norma Elementary School
Preliminary Screening
Solar PV

Cost of Electricity	\$0.162	/kWh
Electricity Usage	128,431	kWh/yr
System Unit Cost	\$4,000.000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary	Annual Utility Savings				Estimated	Total		New Jersey Renewable	Payback	Payback
Cost					Maintenance	Savings	Federal Tax Credit	** SREC	(without incentive)	(with incentive)
					Savings					
\$	kW	kWh	therms	\$	\$	\$	\$	\$	Years	Years
\$240,000	60.0	97,427	0	\$15,783	0	\$15,783	\$0	\$17,050	15.2	7.3

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= \$175 /1000kwh

Area Output*

0 m2
0 ft2

Perimeter Output*

0 m
0 ft

Available Roof Space for PV:

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

Approximate System Size:

11 watt/ft2
0 DC watts
60 kW Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle 40
Array Azimuth 170 Enter into PV Watts (default)
Zip Code 8318 Enter into PV Watts
DC/AC Derate Factor 0.77 Enter info PV Watts

PV Watts Output

97,427 annual kWh calculated in PV Watts program

% Offset Calc

Usage 128,431 (from utilities)
PV Generation 97,427 (generated using PV Watts)
% offset 76%



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



AC Energy & Cost Savings



Station Identification	
City:	Atlantic_City
State:	New_Jersey
Latitude:	39.45° N
Longitude:	74.57° W
Elevation:	20 m
PV System Specifications	
DC Rating:	78.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	60.1 kW
Array Type:	Fixed Tilt
Array Tilt:	40.0°
Array Azimuth:	170.0°
Energy Specifications	
Cost of Electricity:	11.2 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
1	3.61	6954	778.85
2	4.19	7250	812.00
3	4.76	8749	979.89
4	5.20	9008	1008.90
5	5.39	9425	1055.60
6	5.45	8833	989.30
7	5.52	9118	1021.22
8	5.39	9010	1009.12
9	5.21	8636	967.23
10	4.60	8039	900.37
11	3.59	6427	719.82
12	3.17	5978	669.54
Year	4.68	97427	10911.82

[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](#)

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



APPENDIX F

Photos

ECM-1 Convert the Steam System to HHW System



Existing Boiler

ECM-2 Install Thermostatic Steam Radiator Valves



Existing Steam Radiator

ECM-3 Install Programmable Thermostats on PTHP



Existing PTHP Unit

ECM-4 Replace the Gas Fired DHW Heater with a Gas Fired Condensing DHW Heater

No Pictures Available

ECM-L1 Lighting Replacement / Upgrades



Existing T8 Lamps

ECM-L2 Install Lighting Controls (Occupancy Sensors)

No Pictures Available

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

See ECM L-1 and L-2

APPENDIX G

EPA Benchmarking Report



ENERGY STAR[®] Statement of Energy Performance

66

ENERGY STAR[®]
Score¹

Norma Elementary School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 22,110
Built: 1953

For Year Ending: April 30, 2014
Date Generated: May 29, 2014

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address

Norma Elementary School
873 Gershal Ave
Pittsgrove, New Jersey 08318

Property Owner

Pittsgrove Township Schools
1083 Almond Road
Pittsgrove, NJ 08318
() -

Primary Contact

,
() -

Property ID: 4058441

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

70.2 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	438,207 (28%)
Natural Gas (kBtu)	1,113,994 (72%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	82.1
National Median Source EUI (kBtu/ft ²)	134.6
% Diff from National Median Source EUI	-14%

Source EUI

115.1 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	115
---	-----

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____ Date: _____

Licensed Professional

,
() -



**Professional Engineer Stamp
(if applicable)**