

CARTERET BOARD OF EDUCATION

NATHAN HALE SCHOOL

678 Roosevelt Avenue, Carteret, NJ 07008

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

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CHA PROJECT NO. 30201

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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 the Nathan Hale School 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
Nathan Hale School	678 Roosevelt Avenue, Carteret, NJ 07008	51,539	1948

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

Building Name	Electric Savings (kWh)	NG Savings (therms)	Total Savings (\$)	Payback (years)
Nathan Hale School	191,419	5,227	42,285	12.3

The annual savings for each individual measure 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
1	Install Attic Insulation to R-38	38,595	1,166	33.1	0	33.1	Y
2	Condensing Boiler	170,676	1,938	88.0	0	88.0	Y
3	Replace RTUs with Higher EER Units	55,200	9,282	5.9	4,000	5.5	Y
4	Retro-commission DDC Controls	19,293	4,218	4.6	0	4.6	Y
5	Walk-In Cooler Controllers	22,275	1,124	19.8	200	19.6	Y
6	Replace Gas DHW Heater with Condensing DHW Heater	8,848	1,321	6.7	300	6.5	Y
7	Low Flow Plumbing Fixtures	61,473	4,184	14.7	0	14.7	Y
L1**	Lighting Replacements	131,097	17,041	7.7	13,665	6.9	N
L2**	Lighting Controls	11,543	3,862	3.0	900	2.8	N
L3	Lighting Replacements with Controls	142,640	19,051	7.5	14,565	6.7	Y
Total**		519,000	42,285	12.3	19,065	11.8	
Total (Recommended)		519,000	42,285	12.3	19,065	11.8	

* Incentive shown is per the New Jersey SmartStart Program.

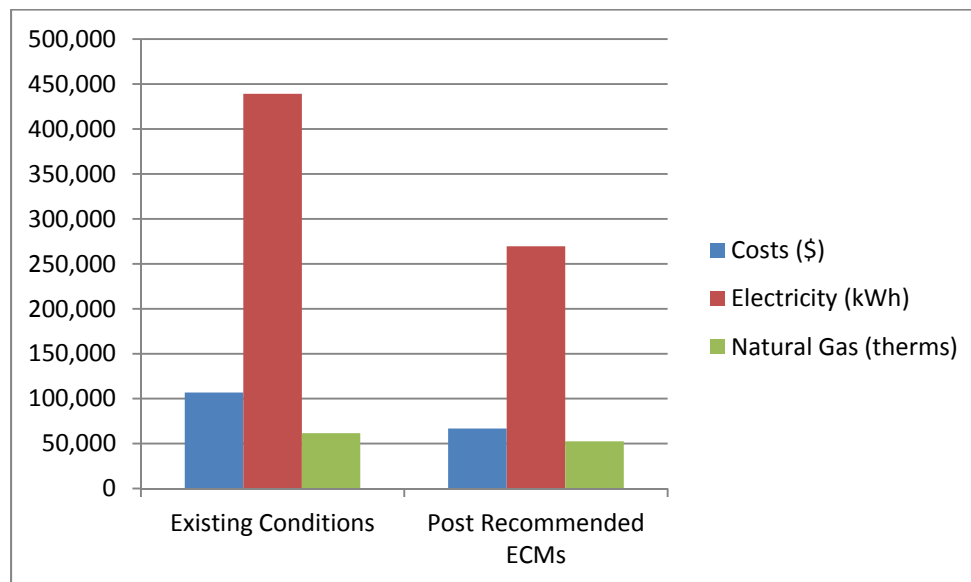
** These ECMs are not included in the Total, as they are alternate measures not recommended.

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

- Photovoltaic (PV) Rooftop Solar Power Generation – 30 kW System

If the Carteret Board of Education implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	80,902	38,617	52%
Electricity (kWh)	447,873	256,454	43%
Natural Gas (therms)	20,511	15,284	25%
Site EUI (kbtu/SF/Yr)	69.4	46.6	



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: Nathan Hale School

Address: 678 Roosevelt Avenue, Carteret, NJ 07008

Gross Floor Area: 51,539 Square Feet

Number of Floors: 3 including the ground floor

Year Built: 1948, addition in 1996



Description of Spaces: Classrooms, offices, cafeteria, multi-purpose room, gymnasium, media center, computer lab, storage rooms, toilet rooms and mechanical rooms.

Description of Occupancy: The school serves 332 students from Pre-K to 5th grade. There are 50 school faculty and staff members.

Number of Computers: The school has approximately 60 desktop and laptop computers.

Building Usage: Hours of operation are 8:00 AM to 3:30 PM Monday through Friday, with various after-school activities. Custodial staff are on site in three shifts, from 6:00 AM to 3:00 PM, 10:00 AM to 7:00 PM, and 2:00 PM to 10:00 PM 10 months per year.

Building Envelope

Construction Materials: Structural steel framing with concrete masonry unit and brick exterior walls, insulation unknown but assumed minimal. Interior walls a mix of sheetrock and plaster & lathe. Interior and exterior walls are in fair to good condition.

Façade: Concrete masonry units and brick

Roof: The roof is flat and surfaced with a black EPDM sheeting over rigid insulation and wooden decking, and appears to be in good condition. The roof structure is framed by wooden joists with a substantial attic space, and no visible insulation. An ECM adding attic insulation is considered.

Windows: Double hung double pane windows with aluminum frames. Windows are in good condition and no ECMs associated with window replacement were evaluated.

Exterior Doors: Most exterior doors are steel jacketed without windows. Main entrance doors are steel framed storefront style. In general the sweeps and seals around the doors appeared to be in poor condition and should be replaced. An ECM has been included to address this issue.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: Two H.B. Smith cast iron sectional gas fired boilers, each with a heating capacity of 3,297 MBH, provide hot water for the school. One was installed in 2000, the other in 1994. Only one boiler at a time is required to keep the building heated and for this reason they are operated on an alternating basis. The hot water is pumped around the building via two (2) 3.0 HP Taco vertical inline pumps that are controlled by VFDs. Terminal heating units include hot water unit ventilators, cabinet heaters, unit heaters, and radiators. Additionally two large gas-fired Mammoth rooftop units, approaching twenty years in age, provide heating and cooling to the Multi-Purpose Room.

Each classroom is heated and ventilated by a floor mounted unit ventilator, equipped with a hot water heating coil only. Vestibules and entranceways are heated by ceiling mounted cabinet heaters. Hydronic radiators and unit heaters provide heat to offices and storage areas respectively; an electric unit heater provides supplemental heat to the Boiler Room.

Cooling: Air conditioning is provided to approximately 50% of the building, which includes the multi-purpose room, the library, offices, and the computer lab. The multi-purpose room is cooled by the two Mammoth RTUs. The library is cooled by two (2) unit ventilators outfitted with DX coils—the condensing units are located on the roof. Remaining areas are cooled by Sanyo and I.C.P. split systems which utilize wall mounted fan coils and rooftop mounted condensing units. At the time of the site visit, no window A/C units were installed. Altogether the building utilizes approximately 60-70 tons of cooling.

Ventilation: Ventilation air is provided to the interior of the building by the two (2) Mammoth rooftop units and classroom unit ventilators described above. In general, building ventilation is adequate and no associated ECMs are included.

Exhaust: The facility utilizes exhaust fans of various sizes located on the roof to exhaust air from restrooms and storage areas, and provide general pressure relief.

Controls Systems

The building has a Siemens DDC digital control system that controls the boilers, pumps, Mammoth rooftop units, and unit ventilators. A computer gateway workstation located in the maintenance office allows limited access and control of mechanical equipment. Essentially operators are allowed to see unit motor operation and temperatures, but are not provided the capability to change operation, alter temperature set-points, or even perform unit scheduling. Adjustments to the system is not granted to school maintenance staff. At the time of the site visit

(5:00 PM on a school-day) with the building almost entirely unoccupied, all of the classroom unit ventilator fans were running and many windows were open. It was explained that the units run 24/7. Temperatures in the building are maintained between 70-72°F in the heating season and 73-75°F in the cooling season during both occupied and unoccupied times. An ECM is included to retro-commission the controls and provided better unoccupied operation of the unit ventilators.

Domestic Hot Water Systems

Domestic hot water is provided to lavatory sinks by a 2001 A.O. Smith tank type gas fired water heater with 365,000 BTUH capacity. Domestic hot water is only used for handwashing. An ECM is included which considers replacing this with a more efficient condensing DHW heater.

Kitchen Equipment

The building has a full kitchen, cooking facilities, and a full cafeteria. The kitchen contains primarily natural gas and some electric cooking appliances. Cooking equipment consists of Blodgett & Garland bread ovens; and a gas fired range. The surface of the range is exhausted by (approximate size) a 6' x 6' hood connected to one (1) rooftop exhaust fan. The Blodgett and Garland bread ovens are exhausted by one 8' x 6' hood connected to one (1) rooftop exhaust fan. Dishes are washed by hand in a conventional stainless steel triple sink. One (1) large walk-in refrigerator keeps food at 32°F; a walk-in freezer to the back provides frozen food storage at 3°F. Several reach-in coolers are also utilized. An ECM for a walk-in cooler controller are included in this report.

Plug Load

The Nathan Hale School has computers, copiers, residential appliances (microwave, refrigerator), printers, and portable heaters which contribute to the plug load in the building. By implementing other ECMs, plug load from the portable heaters may be reduced.

Plumbing Systems

Plumbing fixtures are mix of 1960's vintage high flow urinals and 3.5 GPF water closets; as well as newer low-flow fixtures. Some of the lavatory sinks have been upgraded to the metering type spring-loaded lavatory faucets. ECMs evaluating the high flow fixtures are included.

Lighting Systems

Lighting is primarily T-8 32watt four foot fluorescent lamps mounted in a variety of different fixtures. Recessed CFL lamps are used in vestibules and entranceways. All light fixtures are switched. Exterior lighting consists of 150 watt metal halide wall-packs and 400 watt metal halide decorative sconces.

Three lighting ECMs have been included which consist of adding occupancy sensors to the existing lighting, replacement of the T-8 lighting with LED lighting and a third ECM that evaluates the effect of occupancy sensors used with the LED lighting upgrades.

3.0 UTILITIES

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

	Electric	Natural Gas
Deliverer	PSE&G	Elizabethtown Gas
Supplier	Direct Energy	Woodruff Energy

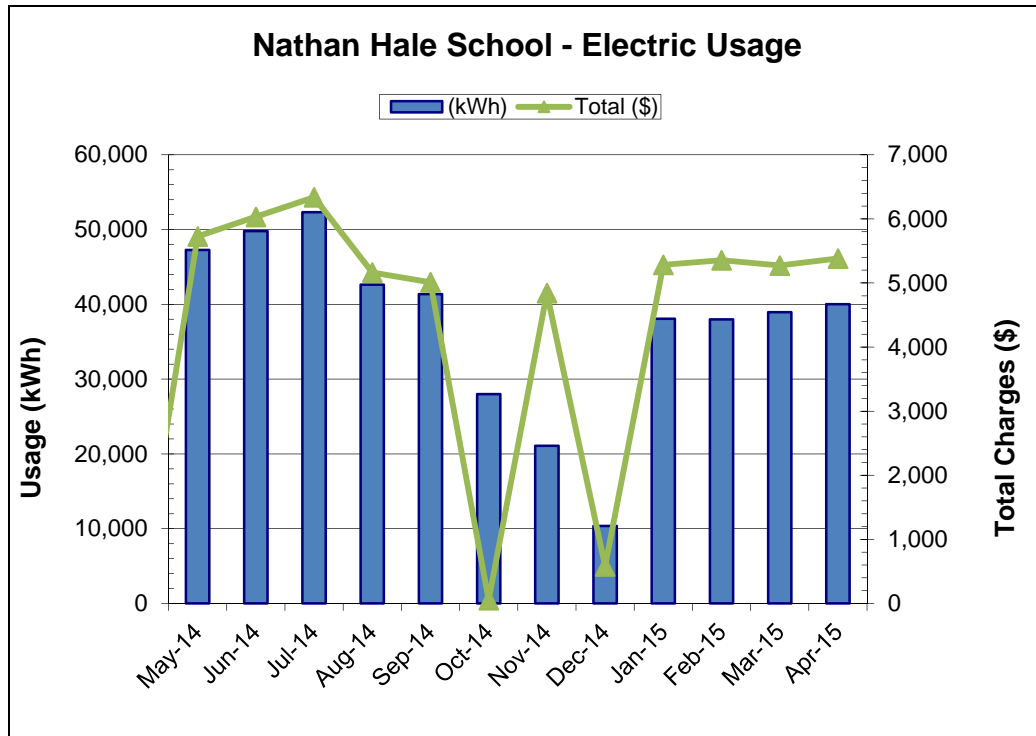
For the 12-month period ending in May 2015, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	447,873	kWh/yr.
Annual Cost	55,038	\$
Blended Unit Rate	0.123	\$/kWh
Supply Rate	0.113	\$/kWh
Demand Rate	2.65	\$/kW
Peak Demand	232.2	kW
Natural Gas		
Annual Usage	20,511	Therms/yr.
Annual Cost	25,864	\$
Rate	1.261	\$/therm
Water		
Annual Consumption	430,848	gallons/yr.
Annual Cost	7,380	\$
Rate	0.017	\$/gallon

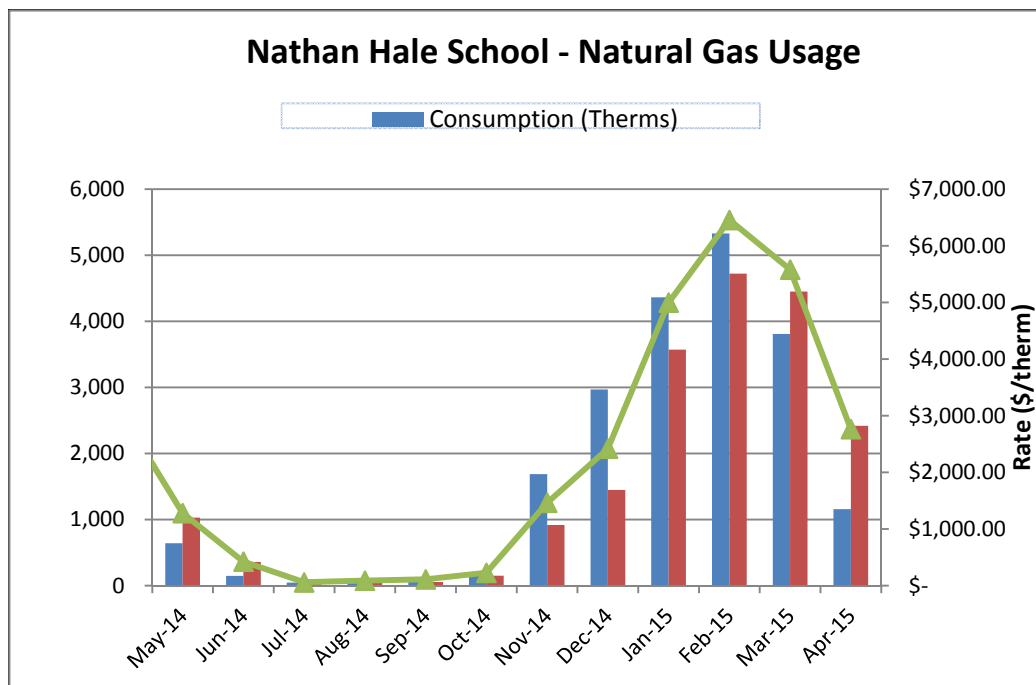
Blended Rate: Average rate charged determined by the annual cost / annual usage

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 electrical usage for this building is consistent with increased usage in the summer months for air conditioning and reduced usage during the winter months. Summer peaks occur during the maximum cooling season.



The natural gas usage is mostly driven by space heating in the winter months with a tail-off of usage during the summer months. The building does have kitchen use but some of the domestic hot water is generated by an electric water heater.

See Appendix A for 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	Building Average Rate	NJ Average Rate	
Electricity	\$/kWh	\$0.123	\$0.13	N
Natural Gas	\$/Therm	\$1.261	\$0.96	Y

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

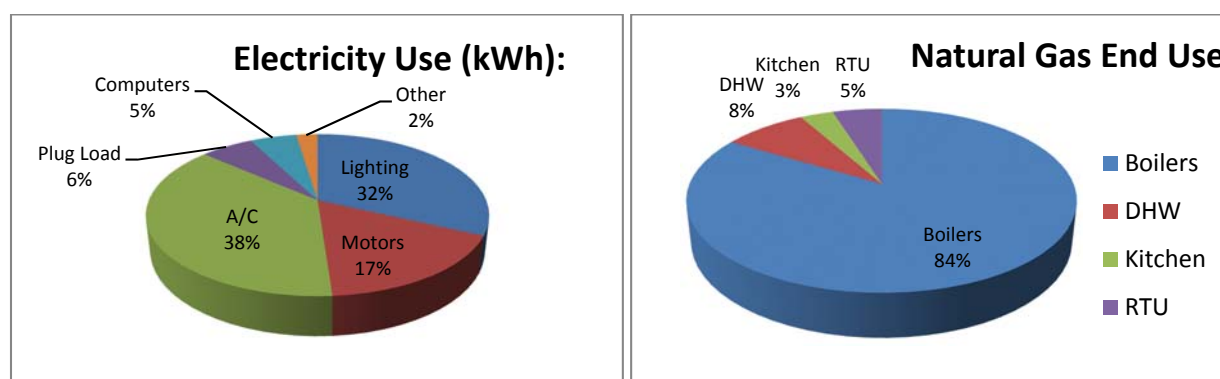
Additional information on selecting a third party energy supplier is available here:

<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.

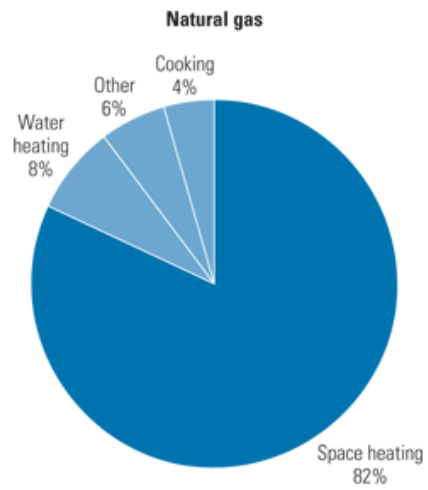
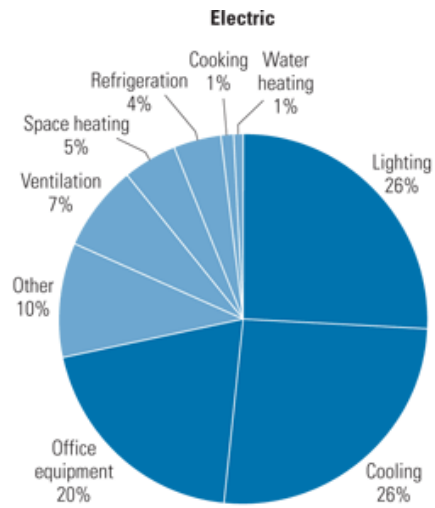
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.

Site End-Use Utility Profile



Most of the electricity consumed by municipal buildings 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 building's energy profile is different, and the following charts represent typical utility profiles for commercial buildings per U.S. Department of Energy.

Typical End-Use Utility Profile for Commercial Buildings



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.

Building	Site EUI kBtu/ft ² /yr	Source EUI Btu/ft ² /yr	Energy Star Rating (1-100)
Nathan Hale School	48.3	68.5	98

The building has an above average Energy Star Rating Score (50 being the median score). By implementing the measures discussed in this report, it is expected that the EUI can be reduced and the Energy Star Rating increased.

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 Add Attic Insulation to R-38

Portions of the attic were investigated during the site visit, and no insulation was observed installed either above the original ceiling or into the rafter spaces underneath the roof deck. It is estimated that the insulating value of the existing roof assembly has a thermal resistance value of R-9. Providing insulation into the attic will further reduce heat loss from the building.

To calculate the savings, the heat losses through the roof assembly of the facility were found using the existing roof's R-value of 9 and bin weather data. The values were totaled to determine the existing annual energy losses. Heating and cooling energy loss values were then determined with a thermal resistance which included the additional R-29 fiberglass batting insulation. The total proposed roof R-value with insulation is approximately R-38.

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

ECM-1 Add Attic Insulation to R-38

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas				
\$	kW	kWh	Therms	\$	%	\$	Years
38,595	0	2,208	712	1,166	(0.2)	0	33.1

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

This measure is recommended despite the long payback.

5.2 ECM-2 Replace the 1994 Boiler with a Condensing Boiler

The Nathan Hale school has two Smith cast iron sectional boilers that are well maintained and in good operating condition. However their combustion efficiency is approximately 82%, and one of the boilers was installed in 1994. New modulating condensing gas boilers are available that minimally operate at 88%, and can operate as high as 96%. This ECM reviews the replacement of the 1994 boiler with a new high efficiency condensing boiler, and piping it into the primary piping system.

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

ECM-2 Replace the 1994 Boiler with a Condensing Boiler

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas				
\$	kW	kWh	Therms	\$		Years	Years
170,676	0	0	1,545	1,938	(0.8)	0	88.0

This measure is recommended despite the long payback.

5.3 ECM-3 Replace RTUs with High EER Units

The Nathan Hale school has two Mammoth rooftop units that at approximately twenty (20) years old, are approaching the end of their useful lives. These units have standard 80% combustion efficiency and 9.0 EER cooling system efficiency. While gas furnace efficiencies (AFUE) have not increased significantly for packaged roof mounted HVAC equipment, there are new models available that have cooling EERs in the 14-15 range that use digital scroll compressors and variable speed evaporator fans. It is recommended that the existing units be replaced with new high EER packaged RTUs.

In order to implement this ECM, the existing RTUs will need to be dismantled and removed and new units installed in their place. The new units may require the installation of new roof curbs and may also require ductwork and piping modifications.

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

ECM-3 Replace RTUs with Higher EER RTUs

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive	Payback (without incentive)	Payback (with incentive)	
	Electricity		Natural Gas					Total
\$	kW	kWh	Therms	\$	\$	Years	Years	
55,200	12.8	55,067	0	9,282	2.6	4,000	5.9	5.5

This measure is recommended.

5.4 ECM-4 Retro-Commission DDC Temperature Controls

The building is equipped with a Siemens DDC controls system. As observed during the site visit, however, the full capabilities of the system are not being realized: unoccupied setback is not implemented, optimum start / stop is not being utilized, and schedules are not in effect. This ECM reviews the re-programming and retro-commissioning of the existing system in order to better benefit from its energy-saving capabilities.

Commissioning is the process of verifying that systems are designed, installed, functionally tested, and capable of being operated and maintained according to the owner's operational needs. Retro-commissioning is the same systematic process applied to existing buildings.

Both controls and components of the heating and cooling systems present saving opportunities during the retro-commissioning process. The DDC system and controls within a building play a crucial role in providing a comfortable building environment. Over time, temperature sensors or thermostats may drift out of synch. Poorly calibrated sensors can increase heating and cooling loads and lead to occupant discomfort. The following procedure is recommended:

- Calibrate the indoor and outdoor building sensors. Calibration of room thermostats, duct thermostats, humidistats, and pressure and temperature sensors should be in accordance with the original design specifications.

Calibrating these controls may require specialized skills or equipment and may require outside expertise.

- Inspect damper and valve controls to verify proper functioning. Dampers should also be examined for proper opening and closing. Stiff dampers can cause improper modulation of the amount of outside air being used in the supply airstream. In some cases, dampers may be wired in a single position or disconnected, violating minimum outside air requirements.
- Review building operating schedules. HVAC controls must be adjusted to heat and cool the building properly during occupied hours. Occupancy schedules can change frequently over the life of a building, and control schedules should be adjusted accordingly. When the building is unoccupied, the temperature should be set back to save heating or cooling energy; however, minimal heating and cooling may be required when the building is unoccupied. In cold climates, for example, heating may be needed to keep water pipes from freezing.

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

ECM-4 Retro-Commission DDC Temperature Controls

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas				
\$	kW	kWh	Therms	\$	\$	Years	Years
19,293	0	15,016	1,889	4,218	12.0	0	4.6

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

This measure is recommended.

5.5 ECM-5 Install Walk-in Cooler / Freezer Controls

One (1) large walk-in refrigerator keeps food at 32°F; a walk-in freezer to the back provides frozen food storage at 3°F. Installing a walk-in cooler/ freezer control system was assessed. The system will monitor both dry and wet bulb temperature within the walk-in unit and allow evaporators and compressors to modulate up and down based on enthalpy set points rather than by dry bulb temperature alone. Savings is a result of reduced run time of evaporator fans, compressors and door heaters.

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

ECM-5 Install Walk-in Cooler / Freezer Controls

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas				
\$	kW	kWh	Therms	\$	%	Years	Years
22,275	0	9,142	0	1,124	(0.2)	200	19.6

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

This measure is recommended.

5.6 ECM-6 Replace Gas DHW Heater w/ Condensing DHW Heater

Domestic hot water is provided to the kitchen and lavatory sinks by a 2001 A.O. Smith tank type gas fired water heater with 365,000 BTUH capacity and a rated thermal efficiency of 81%. The domestic hot water heater serves the toilet rooms and sinks located throughout the office building. Energy savings could be realized by replacing the existing unit with a high efficiency condensing gas fired heater, which can operate at efficiencies up to 94%.

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

ECM-6 Replace Gas DHW Heater w/ 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
8,848	0	0	1,053	1,321	0.5	300	6.7	6.5

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

This measure is recommended.

5.7 ECM-7 Install Low-Flow Plumbing Fixtures

The plumbing fixtures in this building are older high flow fixtures. The water savings associated from replacing existing high flow fixtures with low-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the estimate usage of each fixture, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 Gals/flush toilets, 1.0 gal/flush urinals, and 0.5 gpm faucets will conserve water which will result in lower annual water and sewer charges. Faucets with low-flow push valves were not considered for replacement.

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

ECM-7 Low Flow Plumbing Fixtures

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
61,473	0	0	27	4,184	(0.9)	0	14.7	14.7

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

This measure is recommended.

5.8.1 ECM-L1 Lighting Replacement / Upgrades

The lighting within the Nathan Hale School consists of 2x4 and 2x2 recessed and ceiling mounted troffers having 32W T8 fluorescent lamps with prismatic lenses. Several areas also contain recessed cans outfitted with compact fluorescent lamps. The Council Chambers also contains CFLs inside decorative wall mounted sconces, as well as PAR track lighting. A few compact fluorescent lamps are found in storage areas. A combination of occupancy sensors and wall switches control the interior lighting.

Overall energy consumption can be reduced by replacing inefficient bulbs and linear fluorescent bulbs with more efficient LED technology. 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				
\$	kW	kWh	Therms	\$	\$	Years	Years
131,097	27.6	92,192	0	17,041	0.4	13,665	7.7

* 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.

5.8.2 ECM-L2 Install Lighting Controls (Occupancy Sensors)

Presently, interior lighting fixtures are controlled by a combination of wall mounted switches and occupancy sensors. 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 Section 5.7.1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

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

ECM-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
11,543	0	34,178	0	3,862	2.6	900	3.0	2.8

* 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.

5.8.3 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
142,640	27.6	109,986	0	19,051	0.4	14,565	7.5	6.7

* 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.

5.9 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:

- Purchase ENERGY STAR® label Appliances
- Disconnect unnecessary or unused small appliances and electronics when not in use to reduce phantom loads
- Train staff to turn off mechanical equipment when rooms are unoccupied
- Train staff to turn off lights when rooms are unoccupied
- Develop an Energy Master Plan to measure and track energy performance

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 Carteret Board of Education 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 does not qualify for this program because its electrical demand is greater 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 rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The amount of available roof area determines how large of a solar array can be installed on any given roof. The table below summarizes the approximate roof area available on the building and the associated solar array size that can be installed.

Available Roof Area (Ft ²)	Potential PV Array Size (kW)
4,784	30

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 \$155/SREC for 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 – 30 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
120,000	30.0	38,247	0	4,704	6,502	25.5	10.7	FS

Note: CHA typically recommends a more detailed evaluation be conducted for the installation of PV Solar arrays when the screening evaluation shows a payback of less than 20 years. Therefore, this ECM is recommended for further study. Before implementation is pursued, the school district should consult with a certified solar PV contractor.

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.

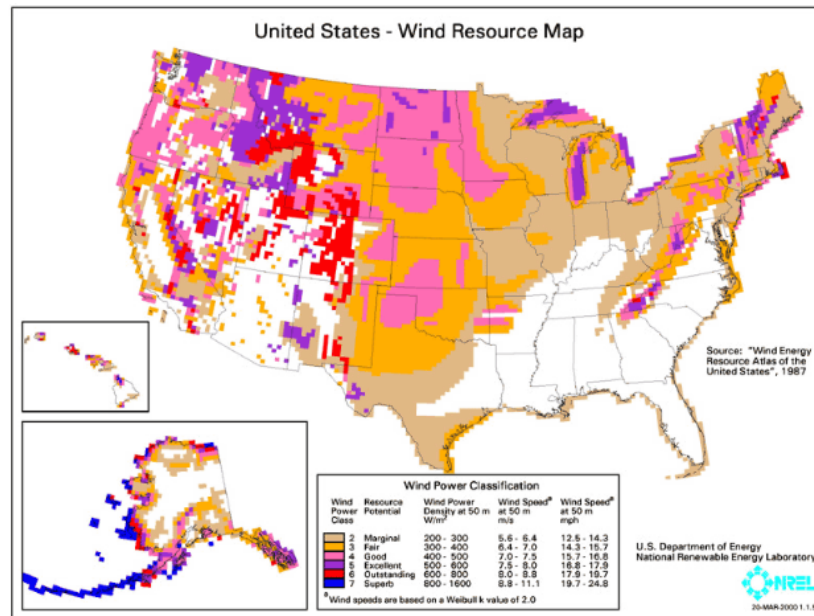
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping). 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 building 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 building.

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, Carteret, 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 building.

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 January 2013 through December 2013 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
232.2	101.9	143.4	N	Y

This measure is not recommended for further review because the building usage does not lend itself to load sharing.

8.0 CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for Building Name.

The following projects should be considered for implementation:

- Install Attic Insulation to R-38
- Add Condensing Boiler
- Replace RTUs with Higher EER Units
- Retro-Commission DDC Controls
- Walk-In Cooler Controllers
- Replace Gas DHW Heater with Condensing DHW Heater
- Install Low Flow Plumbing Fixtures
- Lighting Replacements with Controls (Occupancy Sensors)

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)
169,601	5,227	35,510	14.9

If the recommended ECMs are implemented, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	80,902	38,617	52%
Electricity (kWh)	447,873	256,454	43%
Natural Gas (therms)	20,511	15,284	25%
Site EUI (kbtu/SF/Yr)	69.4	46.6	

Next Steps: This energy audit has identified several areas of potential energy savings. The Carteret Board of Education can use this information to pursue incentives offered by the NJBPU's NJ Clean Energy Program.

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

**Carteret School District
Nathan Hale School
678 Roosevelt Ave. Carteret, NJ**

Utility Bills: Account Numbers

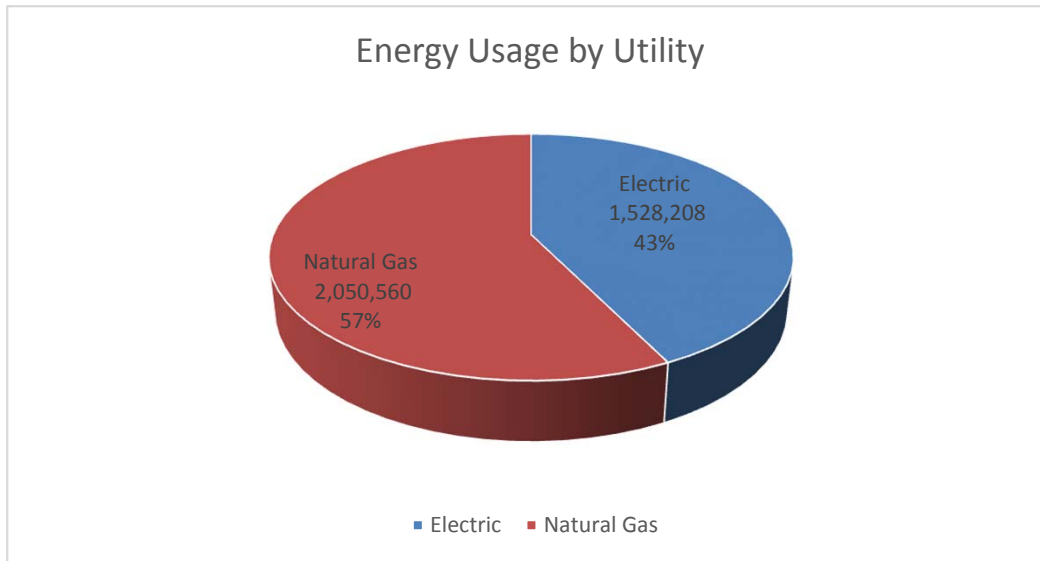
<u>Account Number</u>	<u>Building</u>	<u>Meter Location</u>	<u>Type</u>	<u>Notes</u>
42 009 165 09	Nathan Hale School	678 Roosevelt Ave.	Car Electric	
1262886190	Nathan Hale School	678 Roosevelt Ave.	Car Gas	
7467500000	Nathan Hale School	678 Roosevelt Ave.	Car Water	

Carteret School District
Nathan Hale School
678 Roosevelt Ave. Carteret, NJ

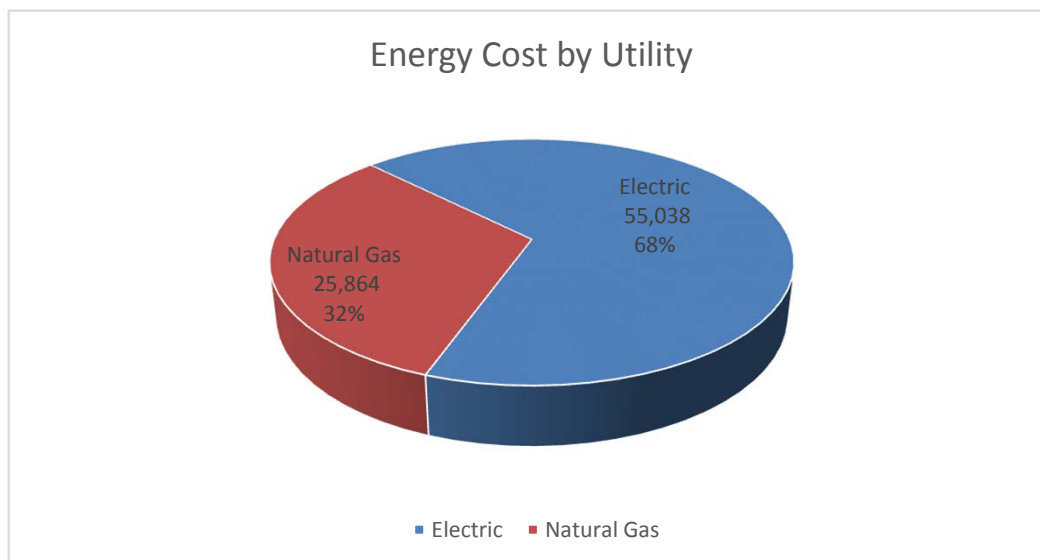
Annual Utilities
12-month Summary

Electric		
Annual Usage	447,873	kWh/yr
Annual Cost	55,038	\$
Blended Rate	0.123	\$/kWh
Consumption Rate	0.113	\$/kWh
Demand Rate	2.65	\$/kW
Peak Demand	232.2	kW
Min. Demand	101.9	kW
Avg. Demand	143.4	kW
Natural Gas		
Annual Usage	20,511	Therms/yr
Annual Cost	25,864	\$
Rate	1.261	\$/therm
Water		
Annual Usage	430,848	Gallons
Annual Cost	7,380	\$
Rate	0.017	\$/Gallon
Energy Summary		
Building Area	51,539	SF
Energy Usage Intensity (EUI)	69	KBtu/SF/yr
Energy Cost Index (ECI)	1.71	\$/SF/yr
Total Annual Utility Costs	88,282	\$

Utility	KBtu	%
Electric	1,528,208	43%
Natural Gas	2,050,560	57%
	3,578,768	100%



Utility	\$	%
Electric	55,038	68%
Natural Gas	25,864	32%
	80,902	100%



Carteret School District
Nathan Hale School
678 Roosevelt Ave. Carteret, NJ

Electric Service

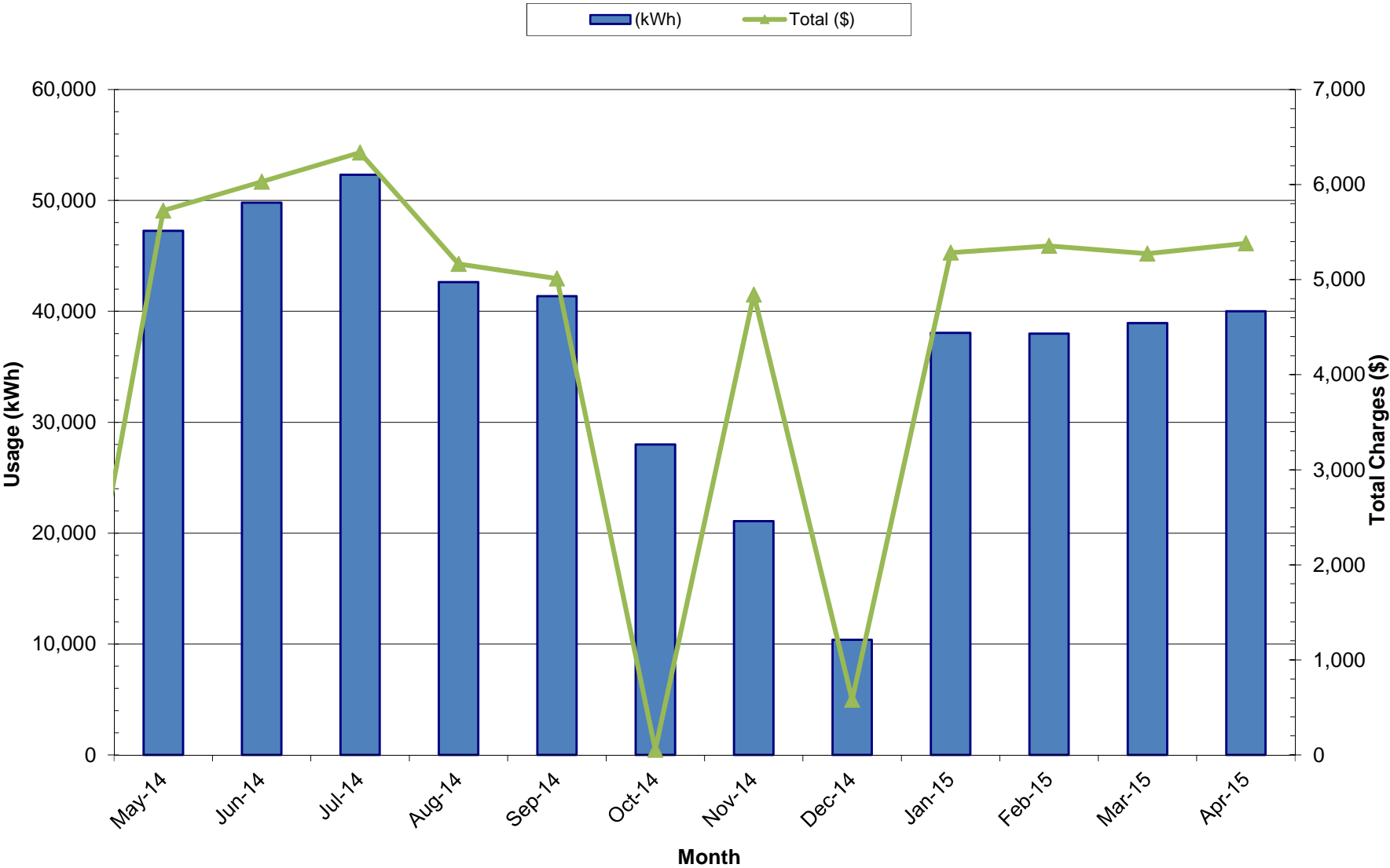
For Service at: 678 Roosevelt Ave. Carteret, NJ
Account No.: 42 009 165 09
Meter No.: 9208539

Delivery: PSE&G
Supply: Direct Energy

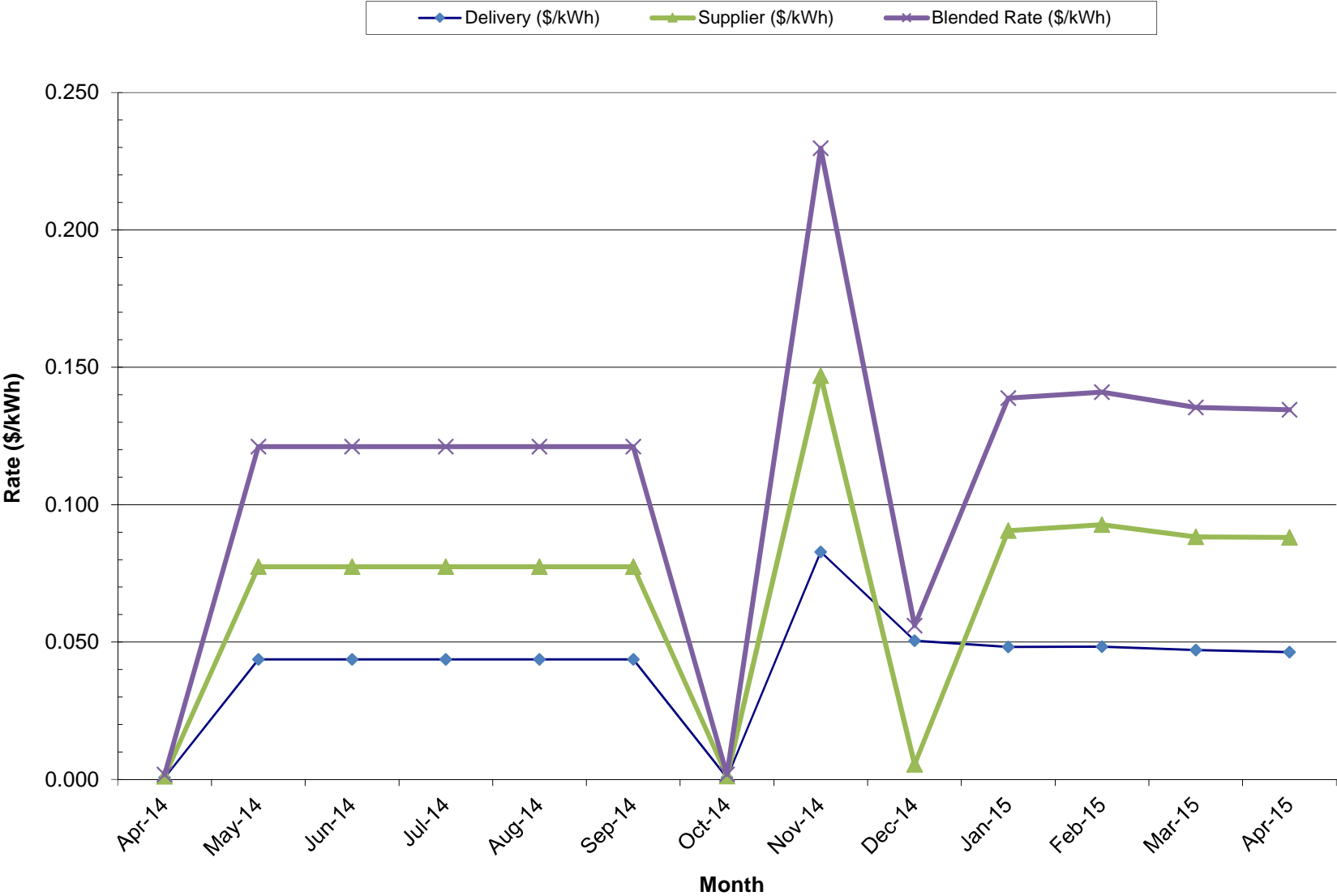
Month	Consump. (kWh)	Demand (kW)	Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs				
			Delivery (\$)	Supplier (\$)	Total (\$)	Consumption (\$)	Demand (\$)	Delivery (\$/kWh)	Supplier (\$/kWh)	Consumption Rate (\$/kWh)	Demand (\$/kW)	Blended Rate (\$/kWh)
April-14	39,018	113.8	24.73	43.86	68.59	62.81	5.78	0.001	0.001	0.002	0.002	0.002
May-14	47,270	135.7	2,064.07	3,661.03	5,725.10	5242.63	482.48	0.044	0.077	0.111	0.137	0.121
June-14	49,795	132.6	2,174.32	3,856.58	6,030.90	5522.65	508.25	0.044	0.077	0.111	0.144	0.121
July-14	52,319	124.9	2,284.57	4,052.12	6,336.69	5802.67	534.02	0.044	0.077	0.111	0.151	0.121
August-14	42,641	125.2	1,861.95	3,302.53	5,164.48	4729.25	435.23	0.044	0.077	0.111	0.123	0.121
September-14	41,379	200.3	1,806.83	3,204.76	5,011.59	4589.24	422.35	0.044	0.077	0.111	0.120	0.121
October-14	28,001	179.2	19.22	34.09	53.31	48.82	4.49	0.001	0.001	0.002	0.001	0.002
November-14	21,075	156.4	1,745.59	3,096.13	4,841.72	4433.68	408.03	0.083	0.147	0.210	0.115	0.230
December-14	10,372	101.9	523.65	56.53	580.18	457.92	122.26	0.050	0.005	0.044	0.014	0.056
January-15	38,068	124.1	1,837.18	3,446.32	5,283.50	4836.81	446.69	0.048	0.091	0.127	0.126	0.139
February-15	37,986	123.6	1,835.10	3,519.81	5,354.91	4910.02	444.89	0.048	0.093	0.129	0.127	0.141
March-15	38,951	232.2	1,834.08	3,438.87	5,272.95	4854.96	417.99	0.047	0.088	0.125	0.13	0.135
April-15	40,017	114.2	1,856.23	3,526.23	5,382.46	4970.88	411.58	0.046	0.088	0.124	0.128	0.135
Total (All)	486,891	232.20	\$19,867.52	\$35,238.86	\$55,106.37	\$50,462.34	\$4,644.04	\$0.04	\$0.07	\$0.10	\$2.49	\$0.11
Total (last 12-months)	447,873	232.20	\$19,842.79	\$35,195.00	\$55,037.78	\$50,399.53	\$4,638.26	\$0.04	\$0.08	\$0.11	\$2.65	\$0.12
Notes	1	2	3	4	5			6	7			8

- 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 - note, includes 8.875% tax
- 5.) Total charges (Delivery + Supplier)
- 6.) Delivery Charges (\$) / Consumption (kWh)
- 7.) Supplier Charges (\$) / Consumption (kWh)
- 8.) Total Charges (\$) / Consumption (kWh)
- 9.) Highlighted values are estimates based on rates for complete months

Nathan Hale School - Electric Usage



Nathan Hale School - Electric Rates



**Carteret School District
Nathan Hale School
678 Roosevelt Ave. Carteret, NJ**

Natural Gas Service

For Service at: 678 Roosevelt Ave. Carteret, NJ

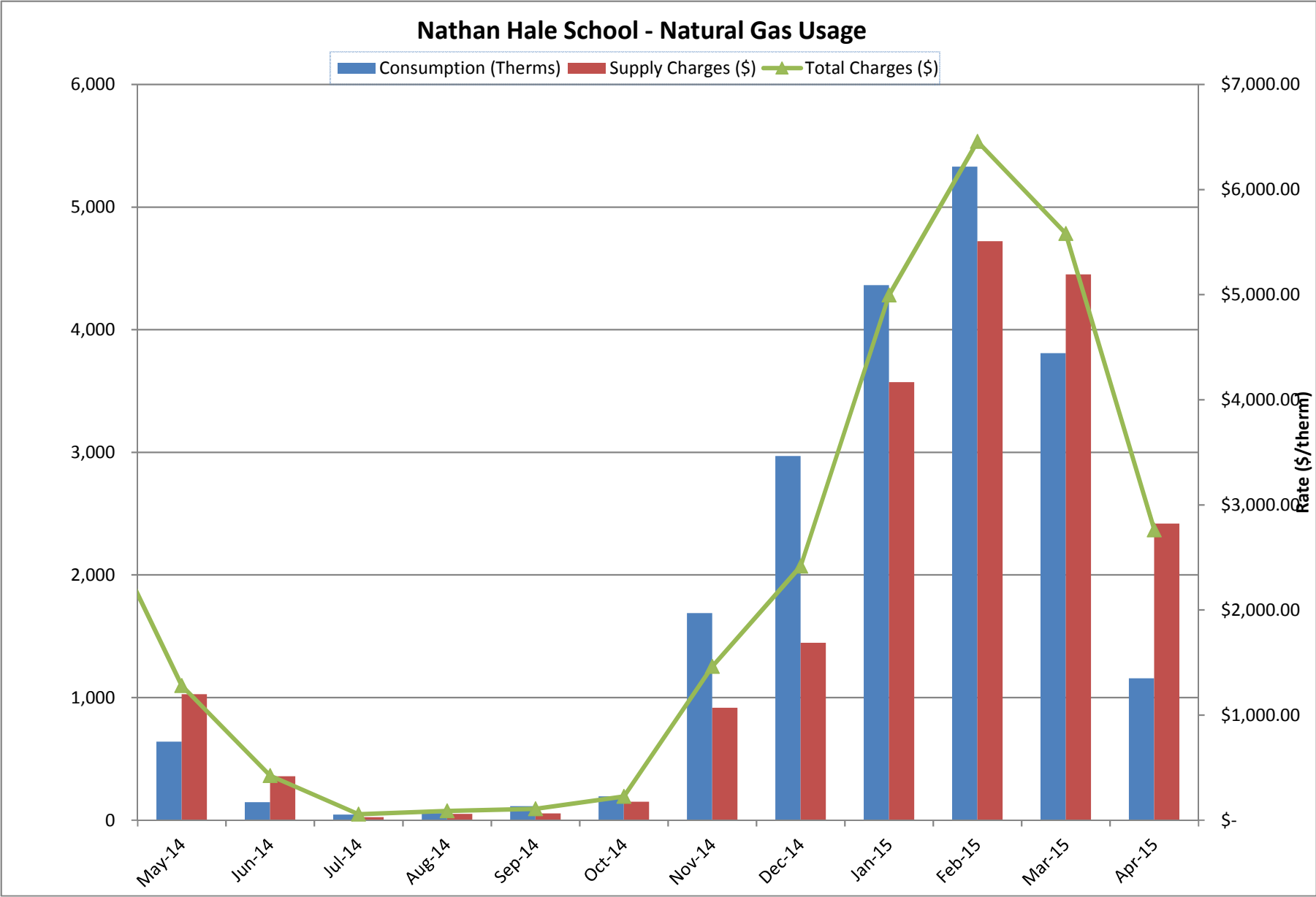
Account No.: 1262886190

Meter No: 9854381

Delivery: Elizabethtown Gas

Supply: Woodruff Energy

Month	Consumption (Therms)	Delivery Charges (\$)	Supply Charges (\$)	Total Charges (\$)	Rate (\$/Therm)
April-14	1,698.10	647.22	2,379.59	3,026.81	1.78
May-14	639.70	253.36	1,027.00	1,280.36	2.00
June-14	147.10	66.64	357.13	423.77	2.88
July-14	45.20	33.39	24.02	57.41	1.27
August-14	56.20	36.65	50.94	87.59	1.56
September-14	114.70	53.98	55.02	109.00	0.95
October-14	193.40	77.91	149.22	227.13	1.17
November-14	1,687.90	546.12	916.37	1,462.49	0.87
December-14	2,969.10	971.46	1,446.23	2,417.69	0.81
January-15	4,362.90	1,425.72	3,571.37	4,997.09	1.15
February-15	5,328.90	1,736.96	4,720.81	6,457.77	1.21
March-15	3,808.00	1,131.12	4,450.53	5,581.65	1.47
April-15	1,157.40	343.53	2,418.62	2,762.15	2.39
Total (12 Months)	20,511	6,677	\$ 19,187.26	\$ 25,864.10	\$ 1.26



**Carteret School District
Nathan Hale School
678 Roosevelt Ave. Carteret, NJ**

For Service at: 678 Roosevelt Ave. Carteret, NJ

Account No.: 7467500000

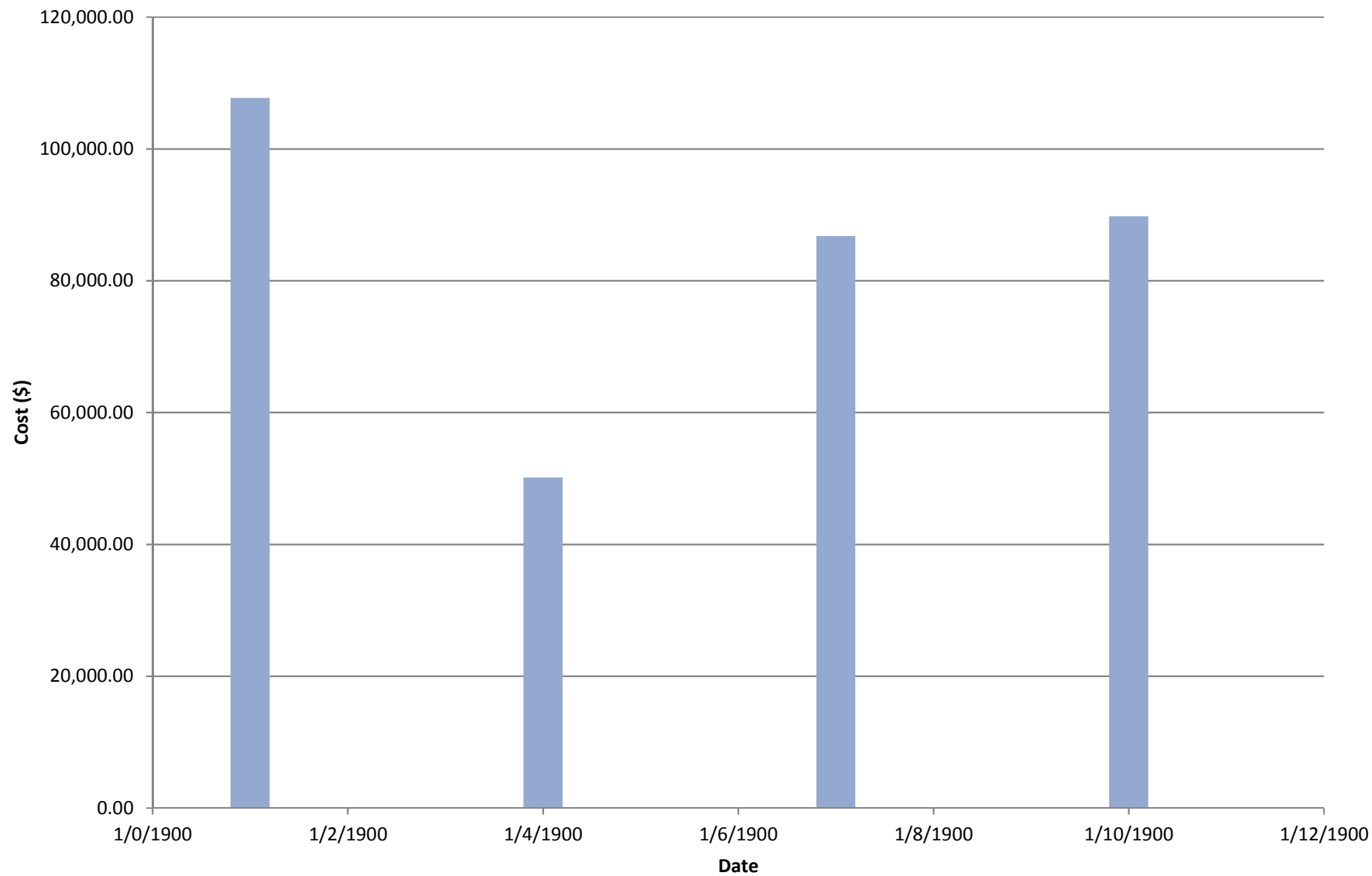
Meter No.: 9902140

Water & Sewer Service Delivery - Middlesex Water Company

Month	Total (\$)	Gallons	\$/Gallon
April-14	\$ 1,446.87	96,492.00	\$ 0.01
July-14	\$ 1,508.42	107,712.00	\$ 0.01
October-14	\$ 1,293.63	50,116.00	\$ 0.03
January-15	\$ 1,620.99	86,768.00	\$ 0.02
April-15	\$ 1,510.13	89,760.00	\$ 0.02
Total	\$ 7,380.04	430,848.00	\$ 0.02

Nathan Hale School - Water Usage

■ Gallons



PSE&G ELECTRIC SERVICE TERRITORY

Last Updated: 12/11/14

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

Supplier	Telephone & Web Site	*Customer Class
Abest Power & Gas of NJ, LLC 202 Smith Street Perth Amboy, NJ 08861	(888)987-6937 www.AbestPower.com	R/C/I ACTIVE
AEP Energy, Inc. f/k/a BlueStar Energy Services 309 Fellowship Road, Fl. 2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	R/C/I ACTIVE
Alpha Gas and Electric, LLC 641 5 th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	R/C ACTIVE
Ambit Northeast, LLC d/b/a Ambit Energy 103 Carnegie Center Suite 300 Princeton, NJ 08540	877-282-6284 www.ambitenergy.com	R/C ACTIVE
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	C/I ACTIVE
Amerigreen Energy, Inc. 333Sylvan Avenue Englewood Cliffs, NJ 07632	888-559-4567 www.amerigreen.com	R/C ACTIVE
AP Gas & Electric, (NJ) LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apgellc.com	R/C/I ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(888)850-1872 www.AstralEnergyLLC.com	R/C/I ACTIVE
Barclays Capital Services, Inc. 70 Hudson Street Jersey City, NJ 07302-4585	(800) 526-7000 www.barclays.com	C ACTIVE
BBPC, LLC d/b/a Great Eastern Energy	(888) 651-4121	C

116 Village Blvd. Suite 200 Princeton, NJ 08540	www.greateasternenergy.com	ACTIVE
Berkshire Energy Partners, LLC 9 Berkshire Road Landenberg, PA 19350 Attn: Dana A. LeSage, P.E.	(610) 255-5070 www.berkshireenergypartners.com	C/I ACTIVE
Blue Pilot Energy, LLC 197 State Rte. 18 South Ste. 3000 East Brunswick, NJ 08816	(800) 451-6356 www.bluepilotenergy.com	R/C ACTIVE
Brick Standard, LLC 235 Hudson Street Suite 1 Hoboken, NJ 07030	(201)706-8101 www.standardalternative.com	C/I ACTIVE
CCES LLC dba Clean Currents Energy Services 566 Terhune Street Teaneck, NJ 07666	(877) 933-2453 www.cleancurrents.com	R/C ACTIVE
Champion Energy Services, LLC 1200 Route 22 Bridgewater, NJ 08807	(888) 653-0093 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. 1744 Lexington Avenue Pennsauken, NJ 08110	(888) CLR-VIEW (800) 746- 4702 www.clearviewenergy.com	R/C/I ACTIVE
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	R/C ACTIVE
Community Energy Inc. 51 Sandbrook Headquarters Road Stockton, NJ 08559	(866)946-3123 www.communityenergyinc.com	R/C/I ACTIVE
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	C/I ACTIVE

ConocoPhillips Company 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 646-4427 www.conocophillips.com	C/I ACTIVE
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 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
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com	C ACTIVE
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 http://www.business.directenergy.com/	R ACTIVE
Direct Energy Business Marketing, LLC (fka Hess Energy Marketing) 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	C/I ACTIVE
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergy.com	R ACTIVE
Direct Energy Small Business, LLC (fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 464-4377 http://www.business.directenergy.com/	C/I ACTIVE
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, New Jersey 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.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855) 243-7270 www.energy.me	R/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
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
Energy Service Providers, Inc., d/b/a New Jersey Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.njgande.com	R/C ACTIVE
FirstEnergy Solutions 150 West State Street Trenton, NJ 08608	(866) 625-7318 www.fes.com	C/I ACTIVE
Gateway Energy Services Corp. 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866)348-4193 www.directenergybusiness.com	R/C ACTIVE
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	C/I ACTIVE
GDF Suez Retail Energy Solutions LLC d/b/a THINK ENERGY 333 Thornall St. Sixth Floor Edison, NJ 08819	1-866-252-0078 www.mythinkenergy.com	R/C/I ACTIVE
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	(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	R/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
Harborside Energy LLC 101 Hudson Street Suite 2100 Jersey City, NJ 07302	(877) 940-3835 www.harborsideenergynj.com	R/C 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/I ACTIVE
Hudson Energy Services, LLC 7 Cedar Street Ramsey, New Jersey 07446	(877) Hudson 9 www.hudsonenergyservices.com	C ACTIVE
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(877) 887-6866 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
Inspire Energy Holdings LLC 923 Haddonfield Road 3rd Fl. Building B2 Cherry Hill, NJ 08002	(866) 403-2620 www.inspireenergy.com	R/C/I
Integrus Energy Services, Inc. 33 Wood Ave, South, Suite 610 Iselin, NJ 08830	(800) 536-0151 www.integrusenergy.com	C/I ACTIVE
Jsynergy, LLC 445 Central Ave. Suite 204 Cedarhurst, NY 11516	(516) 331-2020 Jsynergylc.com	R/C/I ACTIVE
Kuehne Chemical Company, Inc. 86 North Hackensack Avenue South Kearney, NJ 07032	(973) 589-0700 kuehnechemical@comcast.net	I

Liberty Power Delaware, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	C/I ACTIVE
Liberty Power Holdings, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(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
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	R/C/I ACTIVE
MP2 Energy NJ, LLC 111 River Street, Suite 1204 Hoboken, NJ 07030	(877) 238-5343 www.mp2energy.com	R/C/I ACTIVE
Natures Current, LLC 95 Fairmount Avenue Philadelphia, Pennsylvania 19123	(215) 464-6000 www.naturescurrent.com	R/C/I ACTIVE
MPower Energy NJ LLC One University Plaza, Suite 507 Hackensack, NJ 07601	(877) 286-7693 www.mpowerenergy.com	R/C/I ACTIVE
NATGASCO, Inc. (Supreme Energy, Inc.) 532 Freeman St. Orange, NJ 07050	(800) 840-4427 www.supremeenergyinc.com	R/C/I ACTIVE
New Jersey Gas & Electric 10 North Park Place Suite 420 Morristown, NJ 07960	(866) 568-0290 www.njgande.com	R/C/ ACTIVE
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	R/C/I ACTIVE
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	C/I ACTIVE

Nordic Energy Services, LLC 50 Tice Boulevard, Suite 340 Woodcliff Lake, NJ 07677	(877) 808-1027 www.nordiceenergy.us.com	R/C/I ACTIVE
North American Power and Gas, LLC 222 Ridgedale Avenue Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	R/C/I ACTIVE
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 535-6340 www.entrustenergy.com	R/C/I ACTIVE
Oasis Power, LLC d/b/a Oasis Energy 11152 Westheimer, Suite 901 Houston, TX 77042	(800)324-3046 www.oasisenergy.com	R/C 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
Park Power, LLC 1200 South Church St. Suite 23 Mount Laurel, NJ 08054	(856) 778-0079 www.parkpower.com	R/C/I ACTIVE
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	R/C/I ACTIVE
Power Management Co., LLC b/b/a PMC Lightsavers Limited Liability Company 1600 Moseley Road Victor, NY 14564	(585) 249-1360 www.powermanagementco.com	C/I ACTIVE
PPL Energy Plus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	C/I ACTIVE
PPL EnergyPlus Retail, LLC 788 Shrewsbury Avenue, Suite 220 Tinton Falls, NJ 07724	(732) 741-0505 – 2000 www.pplenergyplus.com	C/I ACTIVE
Progressive Energy Consulting, LLC	(917) 837-7400	R/C/I

PO Box 4582 Wayne, New Jersey 07474	Progressivenrg@optionline.net	ACTIVE
Prospect Resources, Inc. 208 W. State Street Trenton, NJ 08608-1002	(847) 673-1959 www.prospectresources.com	C ACTIVE
Public Power & Utility of New Jersey, LLC One International Blvd, Suite 400 Mahwah, NJ 07495	(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	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
Residents Energy, LLC 550 Broad Street Newark, NJ 07102	(888) 828-7374 www.residentsenergy.com	R/C
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	(877) 973-7763 www.majorenergy.com	R/C/I ACTIVE
Save on Energy, LLC 1101 Red Ventures Drive Fort Mill, SC 29707	1 (877)-658-3183 www.saveonenergy.com	R/C
SFE Energy One Gateway Center Suite 2600 Newark, NJ 07012	1 (877) 316-6344 www.sfeenergy.com	R/C/I ACTIVE
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	(800) 695-0666 www.sjnaturalgas.com	C ACTIVE
SmartEnergy Holdings, LLC 100 Overlook Center 2nd Floor Princeton, NJ NJ 08540 United States of America	(800) 443-4440 www.smartenergy.com	R/C/I ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 266-6020 www.southjerseyenergy.com	R/C/I ACTIVE

Spark Energy Gas, LP/ Spark Energy 2105 City West Blvd. Suite 100 Houston, TX 77042	(713)600-2600 www.sparkenergy.com	R/C/I ACTIVE
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082 www.sperianenergy.com	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 New Jersey, LLC 309 Fellowship Rd., Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	R/C ACTIVE
Summit Energy Services, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	C/I ACTIVE
Texas Retail Energy LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663 Attn: Chris Hendrix	(866) 532-0761 Texasretailenergy.com	C/I ACTIVE
TransCanada Power Marketing Ltd. 190 Middlesex Essex Turnpike, Suite 200 Iselin, NJ 08830	(877) MEGAWAT www.transcanada.com/powermarketing	C/I ACTIVE
TriEagle Energy, LP 90 Washington Valley Rd Bedminster, NJ 07921	(877) 933-2453 www.trieagleenergy.com	R/C/I ACTIVE
UGI Energy Services, Inc. dba UGI Energy Link 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 427-8545 www.ugienergylink.com	C/I ACTIVE
Verde Energy USA, Inc. 2001 Route 46 Waterview Plaza Suite 301 Parsippany, NJ 07054	(800) 388-3862 www.lowcostpower.com	R/C 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. 16 th Floor Newark, NJ 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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PSE&G GAS SERVICE TERRITORY
Last Updated: 12/11/14

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

Supplier	Telephone & Web Site	*Customer Class
Ambit Northeast, LLC d/b/a Ambit Energy 103 Carnegie Center Suite 300 Princeton, NJ 08540	877-282-6284 www.ambitenergy.com	R/C ACTIVE
Amerigreen Energy, Inc. 333 Sylvan Avenue Suite 206 Englewood Cliffs, NJ 07632	(888)559-4567 www.amerigreen.com	R/C/I ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	888-850-1872 www.AstralEnergyLLC.com	R/C/I ACTIVE
BBPC, LLC Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	C ACTIVE
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	(888) 565-4490 www.4choiceenergy.com	R/C/I
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
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07746	888 817-8572 www.commerceenergy.com	R ACTIVE
Compass Energy Services, Inc. 33 Wood Avenue South, 610 Iselin, NJ 08830	866-867-8328 www.compassenergy.net	C/I ACTIVE

Compass Energy Gas Services, LLC 33 Wood Avenue South Suite 610 Iselin, NJ 08830	866-867-8328 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 Energy, Inc. d/b/a Con Edison Solutions 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-686-1383 x2130 www.conedenergy.com	
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 116 Village Boulevard, Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	C/I ACTIVE
Constellation Energy Gas Choice, Inc. 116 Village Blvd., Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	R/C/I ACTIVE
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	888-925-9115 http://www.business.directenergy.com/	R ACTIVE
Direct Energy Business Marketing, LLC (fka Hess Energy Marketing) One Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	C/I ACTIVE
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergy.com	R ACTIVE

Direct Energy Small Business, LLC (fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 464-4377 http://www.business.directenergy.com/	C/I ACTIVE
Gateway Energy Services Corp. 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866) 348-4193 www.gesc.com	R/C ACTIVE
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	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
Harborside Energy LLC 101 Hudson Street, Suite 2100 Jersey City, NJ 07302	877-940-3835 www.harborsideenergynj.com	R/C ACTIVE
Hess Energy, Inc. One 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/I ACTIVE
Hudson Energy Services, LLC 7 Cedar Street Ramsey, NJ 07446	877- Hudson 9 www.hudsonenergyservices.com	C ACTIVE
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	877-887-6866 www.idtenergy.com	R/C ACTIVE

Infinite Energy dba Intelligent Energy 1200 Route 22 East Suite 2000 Bridgewater, NJ 08807-2943	(800) 927-9794 www.InfiniteEnergy.com	R/C/I ACTIVE
Integrays Energy Services-Natural Gas, LLC 101 Eisenhower Parkway Suite 300 Roseland, NJ 07068	(800) 536-0151 www.integraysenergy.com	C/I ACTIVE
Jsynergy LLC 445 Cental Ave. Suite 204 Cedarhurst, NY 11516	(516) 331-2020 www.Jsnergylc.com	R/C/I ACTIVE
Major Energy Services, LLC 1001 East Lawn Drive Teaneck NJ 07666	888-625-6760 www.majorenergy.com	R/C/I ACTIVE
Marathon Power LLC 302 Main Street Paterson, NJ 07505	888-779-7255 www.mecny.com	R/C/I ACTIVE
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	1-877-750-7046 www.metromediaenergy.com	C/I ACTIVE
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	888-53-Metro www.metroenergy.com	R/C ACTIVE
MPower Energy NJ LLC One University Plaza, Suite 507 Hackensack, NJ 07601	877-286-7693 www.mpowerenergy.com	R/C/I ACTIVE
NATGASCO (Supreme Energy, Inc.) 532 Freeman Street Orange, NJ 07050	800-840-4427 www.supremeenergyinc.com	R/C/I ACTIVE
New Energy Services LLC 101 Neptune Avenue Deal, New Jersey 07723	800-660-3643 www.newenergyservicesllc.com	R/C/I ACTIVE
New Jersey Gas & Electric 10 North Park Place Suite 420 Morristown, NJ 07960	866-568-0290 www.njgande.com	R/C 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 & Gas, LLC d/b/a North American Power 197 Route 18 South Ste. 300 New Brunswick, NJ 08816	888- 313-8086 www.napower.com	R/C/I ACTIVE
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 535-6340 www.entrustenergy.com	R/C/I ACTIVE
Oasis Power, LLC d/b/a Oasis Energy 11152 Westheimer, Suite 901 Houston, TX 77042	(800)324-3046 www.oasisenergy.com	R/C 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
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	855-32-POWER (76937) www.plymouthenergy.com	R/C/I ACTIVE
PPL EnergyPlus, LLC Shrewsbury Executive Offices 788 Shrewsbury Avenue Suite 2200 Tinton Falls, NJ 07724	(732) 741-0505 www.pplenergyplus.com	C/I ACTIVE
PPL EnergyPlus Retail, LLC Shrewsbury Executive Offices 788 Shrewsbury Avenue, Suite 220 Tinton Falls, NJ 07724	(732) 741-0505 – 2000 www.pplenergyplus.com	C/I ACTIVE
Public Power & Utility of New Jersey, LLC One International Blvd, Suite 400 Mahwah, NJ 07495	(888) 354-4415 www.ppandu.com	R/C/I ACTIVE

Residents Energy, LLC 550 Broad Street Newark, NJ 07102	(888) 828-7374 www.residentsenergy.com	R/C
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	(877) 973-7763 www.respondpower.com	R/C/I ACTIVE
Save on Energy, LLC 1101 Red Ventures Drive Fort Mill, SC 29707	1 (877) 658-3183 www.saveonenergy.com	R/C ACTIVE
SFE Energy One Gateway Center Suite 2600 Newark, NJ 07012	1 (877) 316-6344 www.sfeenergy.com	R/C/I ACTIVE
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	(800) 695-0666 www.sjnaturalgas.com	C ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	R/C/I ACTIVE
SouthStar Energy d/b/a New Jersey Energy 1085 Morris Avenue, Suite 155 Union, NJ 07083	(866) 477-8823 www.newjerseyenergy.com	R/C ACTIVE
Spark Energy Gas, LP/ Spark Energy 2105 City West Blvd. Suite 100 Houston, TX 77042	(713)600-2600 www.sparkenergy.com	R/C/I ACTIVE
Sperian Energy Corp. Bridgewater Center 1200 Route 22 East Bridgewater, NJ 08807	888-682-8082 www.sperianenergy.com	R/C/I ACTIVE
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	C/I ACTIVE
Stuyvesant Energy LLC 10 West Ivy Lane, Suite 4 Englewood, NJ 07631	800-640-6457 www.stuyfuel.com	C ACTIVE

Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	R/C ACTIVE
Summit Energy Services, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	C/I ACTIVE
Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	877-797-8786 www.systrumenergy.com	R/C/I ACTIVE
Tiger Natural Gas, Inc. dba Tiger, Inc. 234 20th Avenue Brick, NJ 008724	888-875-6122 www.tignaturalgas.com	R/C/I ACTIVE
UGI Energy Services, Inc. dba UGI Energy Link 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-427-8545 www.ugienergylink.com	C/I ACTIVE
UGI Energy Services, Inc. d/b/a GASMARK 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergylink.com	C/I ACTIVE
Verde Energy USA, Inc. 2001 Route 46 Waterview Plaza, Suite 301 Parsippany, NJ 07054	800-388-3862 www.lowcostpower.com	R/C ACTIVE
Viridian Energy PA LLC 2001 Route 46, Waterview Plaza Suite 230 Parsippany, NJ 07054	866-663-2508 www.viridian.com	R/C ACTIVE
Vista Energy Marketing, L.P. 197 State Route 18 South, Suite 3000 South Wing East Brunswick, NJ 08816	888-508-4782 www.vistaenergymarketing.com	R/C/I 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. 16th Floor 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

[Back to main supplier information page](#)

APPENDIX B

Equipment Inventory

Carteret School District
CHA Project# 30201
Nathan Hale School

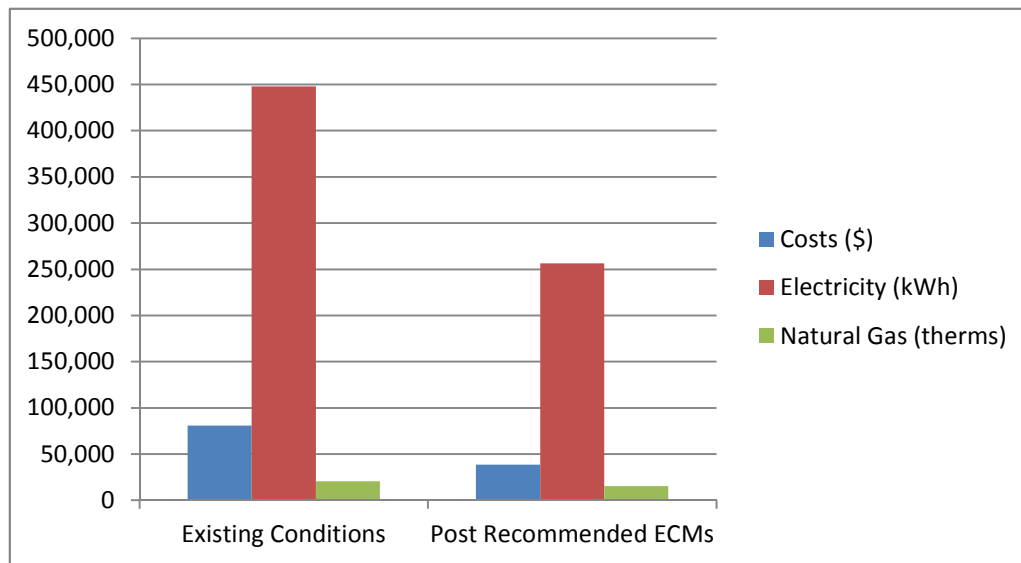
Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size	Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
EF-1	1	Lauren Cook	150C38	N/A	Roof mounted exhaust fan	1/4 hp	N/A	Roof	Building	N/A	N/A	
EF-2	1	Lauren Cook	150V4B	N/A	Roof mounted exhaust fan	1/3 hp	N/A	Roof	Building	N/A	N/A	
RTU-1, 2	2	Mammoth	9820-C0352	498209691	Rooftop unit	N/A	N/A	Roof	Building	1996	6	
CU-1	1	Fujitsu	AOU30CLX	DEN 004059	Split condensing unit	30,700 BTUH	N/A	Roof	Building	N/A	~10	
CU-2	1	Sanyo	CL1852	6711	Split condensing unit	17,000 BTUH	N/A	Roof	Building	N/A	~10	
CU-3	1	Thermal Zone	TZAA-348-CA757	8376W261317965	Split condensing unit	N/A	N/A	Roof	Building	N/A	N/A	
CU-4	1	ICP	CAC030AKA1	L002722029	Split condensing unit	N/A	N/A	Roof	Building	N/A	N/A	
CU-5	1	Sanyo	C0951	N/A	Split condensing unit	9,000 BTUH	N/A	Roof	Building	N/A	N/A	
CU-6	1	ICP	CAC030AKAA	L0037 58766	Split condensing unit	48,000 BTUH	N/A	Roof	Building	N/A	N/A	
CU-7	1	Sanyo	C0951	8911	Split condensing unit	9,000 BTUH	N/A	Roof	Building	2001	4	
CUH-1	1	Nesbitt	N/A	N/A	Cabinet Heater	N/A	N/A	Corridor ceiling	Entrance-way	1948	exceeded	
Gen-1	1	Generac	0043892	3888146	gas generator	7,000 watts	N/A	Outside	Building	N/A	N/A	
CU-7,8	2	Russell	MLH100H22-E	B0198812-014	Split condensing unit	N/A	N/A	Outside	Building	N/A	N/A	
DHW-1	1	A.O. Smith	BTR 365A	N/A	Domestic hot water heater	365,000 BTUH	N/A	Boiler Room	Building	2001	1	
UH-1	2	Modine	N/A	N/A	Hydronic unit heater	N/A	N/A	Boiler Room	Building	N/A	N/A	
B-1	1	Smith	28A-13 series	N2000-984	Hot water Boiler	2867 MBH	82%	Boiler Room	Building	2000	10	
B-2	1	Smith	28A-13 series	N2000-985	Hot water Boiler	2867 MBH	82%	Boiler Room	Building	1994	6	
P-1	1	Taco	N/A	N/A	inline hot water pump	3.0 HP	N/A	Boiler Room	Building	N/A	~15	
P-2	1	Taco	N/A	N/A	inline hot water pump	3.0 HP	N/A	Boiler Room	Building	N/A	~15	
UH-2	1	Modine	N/A	N/A	Electric unit heater	N/A	N/A	Boiler Room	Building	N/A	N/A	
VFD-1,2	2	Siemens	N/A	N/A	VFD	N/A	N/A	Boiler Room	Building	N/A	~10	
VFD-3	1	Siemens	N/A	N/A	VFD	N/A	N/A	Boiler Room	Building	N/A	~10	

APPENDIX C

ECM Calculations

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	80,902	38,617	52%
Electricity (kWh)	447,873	256,454	43%
Natural Gas (therms)	20,511	15,284	25%
Site EUI (kbtu/SF/Yr)	69.4	46.6	



Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

Summary of Energy Conservation Measures							
Energy Conservation Measure		Approx. Costs (\$)	Approx. Savings (\$/year)	Payback (Years) w/o Incentive	Potential Incentive (\$)*	Payback (Years) w/ Incentive	Recommended For Implementation
1	Install Attic Insulation to R-38	38,595	1,166	33.1	0	33.1	Y
2	Replace the 1994 Boiler with a Condensing Boiler	170,676	1,938	88.0	0	88.0	Y
3	Replace RTUs with Higher EER Units	55,200	9,282	5.9	4,000	5.5	Y
4	Retro-Commission DDC Controls	19,293	4,218	4.6	0	4.6	Y
5	Walk-In Cooler Controllers	22,275	1,124	19.8	200	19.6	Y
6	Replace Gas DHW Heater with Condensing DHW Heater	8,848	1,321	6.7	300	6.5	Y
7	Low Flow Plumbing Fixtures	61,473	4,184	14.7	0	14.7	Y
L1	Lighting Replacements / Upgrades	131,097	17,041	7.7	13,665	6.9	N
L2	Install Lighting Controls (Add Occupancy Sensors)	11,543	3,862	3.0	900	2.8	N
L3	Lighting Replacements with Controls (Occupancy Sensors)	142,640	19,051	7.5	14,565	6.7	Y

Total	519,000	42,285	12.3	19,065	11.8
Total (Recommended)	519,000	42,285	12.3	19,065	11.8

* Incentive shown is per the New Jersey SmartStart Program

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM Summary Sheet

* Incentive shown is per the New Jersey SmartStart Program

ECM-1 Install Attic Insulation to R-38

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$	Years	Years
38,595	0.0	2,208	712	1,166	(0.2)	0	33.1	33.1

ECM-2 Replace the 1994 Boiler with a Condensing Boiler

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$	Years	Years
170,676	0.0	0	1,545	1,938	(0.8)	0	88.0	88.0

ECM-3 Replace RTUs with Higher EER Units

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$	Years	Years
55,200	12.8	55,067	0	9,282	2.6	4,000	5.9	5.5

ECM-4 Retro-Commission DDC Controls

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$	Years	Years
19,293	0.0	15,016	1,889	4,218	1.2	0	4.6	4.6

ECM-5 Walk-In Cooler Controllers

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$	Years	Years
22,275	0.0	9,142	0	1,124	(0.2)	200	19.8	19.6

ECM-6 Replace Gas DHW Heater with Condensing DHW Heater

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive)	Payback (with incentive)
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$	Years	Years
8,848	0.0	0	1,053	1,321	0.5	300	6.7	6.5

ECM-7 Low Flow Plumbing Fixtures

Budgetary Cost	Annual Utility Savings					ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kW	Electric kWh	Nat Gas Therms	Water kGal	Total \$				
\$							\$		
61,473	0.0	0	27	746	4,184	0.4	0	14.7	14.7

ECM-L1 Lighting Replacements / Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$		
131,097	27.6	92,192	0	17,041	0.4	13,665	7.7	6.9

ECM-L2 Install Lighting Controls (Add Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$		
11,543	0.0	34,178	0	3,862	2.6	900	3.0	2.8

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Incentive *	Payback (without incentive) Years	Payback (with incentive) Years
	Electric kW	Electric kWh	Nat Gas Therms	Total \$				
\$						\$		
142,640	27.6	109,986	0	19,051	0.4	14,565	7.5	6.7

Carteret Board of Education
CHA Project Number: 30201

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
\$	0.123	\$/kWh blended		0.000420205	51,539	Electric	Natural Gas
\$	0.113	\$/kWh supply	447,873	0.000420205		\$ 55,038	\$ 25,864
\$	19.98	\$/kW	232.2	0			
\$	1.26	\$/Therm	20,511	0.00533471			
\$	5.56	\$/kgals	431	0			
		\$/Gal					

Nathan Hale School																							
Recommend? Y or N		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				\$
Y	ECM-1	Install Attic Insulation to R-38	0.0	2,208	712	0	0	1,166	\$ 38,595	33.1	25.0	4.7		N	33.1	0.0	55,207	17,812	0	\$ 29,145	(0.2)	(\$18,295)	-2.1%
Y	ECM-2	Replace the 1994 Boiler with a Condensing Boiler	0.0	0	1,545	0	0	1,938	\$ 170,676	88.0	15.0	8.2	\$ -	N	88.0	0.0	0	23,169	0	\$ 29,077	(0.8)	(\$147,534)	-16.8%
Y	ECM-3	Replace RTUs with Higher EER Units	12.8	55,067	0	0	0	9,282	\$ 55,200	5.9	20.0	23.1	\$ 4,000	N	5.5	255.2	1,101,333	0	0	\$ 196,660	2.6	\$86,898	17.4%
Y	ECM-4	Retro-Commission DDC Controls	0.0	15,016	1,889	0	0	4,218	\$ 19,293	4.6	10.0	16.4	\$ -	N	4.6	0.0	150,158	18,894	0	\$ 42,181	1.2	\$16,688	17.5%
Y	ECM-5	Walk-In Cooler Controllers	0.0	9,142	0	0	0	1,124	\$ 22,275	19.8	15.0	3.8	\$ 200	N	19.6	0.0	137,129	0	0	\$ 16,867	(0.2)	(\$8,651)	-3.2%
Y	ECM-6	Replace Gas DHW Heater with Condensing DHW Heater	0.0	0	1,053	0	0	1,321	\$ 8,848	6.7	10.0	5.6	\$ 300	N	6.5	0.0	0	10,529	0	\$ 13,214	0.493489	\$2,724	8.8%
Y	ECM-7	Low Flow Plumbing Fixtures	0.0	0	27	0	746	4,184	\$ 61,473	14.7	20.0	0.1		N	14.7	0.0	0	547	14,925	\$ 83,672	0.4	\$769	3.1%
N	ECM-L1	Lighting Replacements / Upgrades	27.6	92,192	0	0	0	17,041	\$ 131,097	7.7	10.0	38.7	\$ 13,665	N	6.9	276.0	921,920	0	0	\$ 179,570	0.4	\$27,931	7.4%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	34,178	0	0	0	3,862	\$ 11,543	3.0	10.0	14.4	\$ 900	N	2.8	0.0	341,780	0	0	\$ 42,039	2.6	\$22,301	N/A
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	27.6	109,986	0	0	0	19,051	\$ 142,640	7.5	10.0	46.2	\$ 14,565	N	6.7	276.0	1,099,860	0	0	\$ 201,457	0.4	\$34,434	8.0%
Total (Not Including ECMs L1, L2)			40.4	191,419	5,227	0	746	\$ 42,285	\$ 519,000	12.3	13.9	136	\$ 19,065		11.8	531	2,543,688	70,952	14,925	\$ 612,273	0.2	(\$50,234)	1.4%
Recommended Measures (highlighted green above)			40.4	191,419	5,227	0	746	\$ 42,285	\$ 519,000	12.3	13.9	108	\$ 19,065	0	11.8	531	2,543,688	70,952	14,925	\$ 612,273	0.2	(\$50,234)	1.4%
% of Existing			17%	42.74%	25.48%	0	0																

City:		Newark, NJ					
Occupied Hours/Week		70	70	70	70	50	
		Building	Auditorium	Gymnasium	Library	Classrooms	
Temp	Enthalpy h (Btu/lb)	Bin Hours	Operating Hours	Occupied Hours	Occupied Hours	Occupied Hours	
102.5							
97.5	35.4	6	3	3	3	3	2
92.5	37.4	31	13	13	13	13	9
87.5	35.0	131	55	55	55	55	39
82.5	33.0	500	208	208	208	208	149
77.5	31.5	620	258	258	258	258	185
72.5	29.9	664	277	277	277	277	198
67.5	27.2	854	356	356	356	356	254
62.5	24.0	927	386	386	386	386	276
57.5	20.3	600	250	250	250	250	179
52.5	18.2	730	304	304	304	304	217
47.5	16.0	491	205	205	205	205	146
42.5	14.5	656	273	273	273	273	195
37.5	12.5	1,023	426	426	426	426	304
32.5	10.5	734	306	306	306	306	218
27.5	8.7	334	139	139	139	139	99
22.5	7.0	252	105	105	105	105	75
17.5	5.4	125	52	52	52	52	37
12.5	3.7	47	20	20	20	20	14
7.5	2.1	34	14	14	14	14	10
2.5	1.3	1	0	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

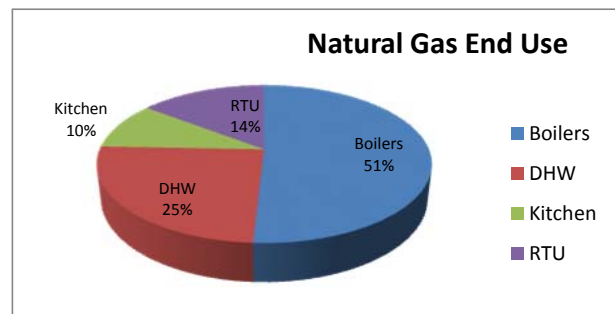
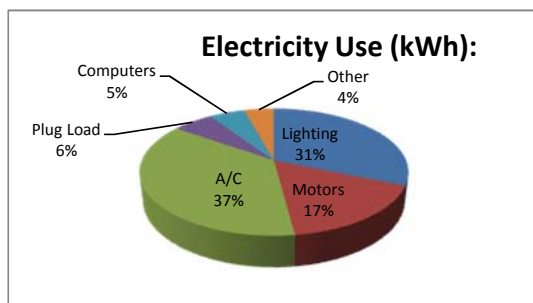
Heating	
Hours	4,427 Hrs
Weighted Avg	40 F
Avg	28 F

Cooling	
Hours	4,333 Hrs
Weighted Avg	68 F
Avg	78 F

Utility End Use Analysis		
Electricity Use (kWh):		Notes/Comments:
447,873	Total	Based on utility analysis
140,000	Lighting	From Lighting Calculations
74,590	Motors	Calculated
165,000	A/C	Estimated
26,000	Plug Load	Estimated
23,000	Computers	Estimated
19,283	Other	Remaining
Natural Gas Use (Therms):		Notes/Comments:
20,511	Total	Based on utility analysis
10,436	Boilers	Therms/SF x Square Feet Served
5,075	DHW	Based on utility analysis
2,000	Kitchen	Based on utility analysis
3,000	RTU	Based on utility analysis

31.26%
16.65%
36.84%
5.81%
5.14%
4.31%
100.00%

0.508800156
0.247428209
0.097508654



Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-1 Add Attic Insulation to R-38

Existing: roof insulation assumed to be approximately R-9.

Proposed: Install R-30 or 9" fiberglass insulation between joists of the old ceiling to bring total R-value up to R-38

Note: approximately 30% of the building is air conditioned.

Roof area to be insulated	11,500 SF	Cooling System Efficiency	1.2 kW/ton	Heating System Efficiency	80%
Existing Infiltration Factor	0.06 cfm/SF	Ex Occupied Cing Temp.	74 °F	Heating On Point	55 °F
Proposed Infiltration Factor	0.02 cfm/SF	Ex Unoccupied Cing Temp.	74 °F	Ex Occupied Htg Temp.	70 °F
Existing U Value	0.111 Btu/h/SF°F	Cooling Occ Enthalpy Setpoint	27.5 Btu/lb	Ex Unoccupied Htg Temp.	70 °F
Proposed U Value	0.026 Btu/h/SF°F	Cooling Unocc Enthalpy Setpoint	27.5 Btu/lb	Cooling Electricity	\$ 0.685 \$/kWh
				Heating NG Cost	\$ 1.25 \$/Therm

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Ext Wall Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Infiltration & Heat Load BTUH	Infiltration & Heat Load BTUH	Infiltration & Heat Load BTUH	Infiltration & Heat Load BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy Therms	Proposed Heating Energy Therms
A		B	C	D	E	F	G	H	I	J	K	L
117.5	35.4	6	3	4	-80,080	-80,080	-21,190	-21,190	48	13	0	0
112.5	37.4	31	13	18	-79,891	-79,891	-21,760	-21,760	248	67	0	0
107.5	35.0	131	55	76	-66,003	-66,003	-17,763	-17,763	865	233	0	0
102.5	33.0	500	208	292	-53,604	-53,604	-14,263	-14,263	2680	713	0	0
97.5	31.5	620	258	362	-42,566	-42,566	-11,216	-11,216	2639	695	0	0
92.5	29.9	664	277	387	-31,086	-31,086	-8,022	-8,022	2064	533	0	0
87.5	27.2	854	356	498	-16,255	-16,255	-3,711	-3,711	1388	317	0	0
82.5	24.0	927	386	541	37	37	1,088	1,088	0	0	0	13
77.5	20.3	600	250	350	18,043	18,043	6,457	6,457	0	0	135	48
72.5	18.2	730	304	426	0	0	0	0	0	0	0	0
67.5	16.0	491	205	286	0	0	0	0	0	0	0	0
62.5	14.5	656	273	383	0	0	0	0	0	0	0	0
57.5	12.5	1,023	426	597	0	0	0	0	0	0	0	0
52.5	10.5	734	306	428	35,380	35,380	9,580	9,580	0	0	325	88
47.5	8.7	334	139	195	45,488	45,488	12,317	12,317	0	0	190	51
42.5	7.0	252	105	147	55,597	55,597	15,054	15,054	0	0	175	47
37.5	5.4	125	52	73	65,705	65,705	17,791	17,791	0	0	103	28
32.5	3.7	47	20	27	75,814	75,814	20,528	20,528	0	0	45	12
27.5	2.1	34	14	20	85,922	85,922	23,265	23,265	0	0	37	10
22.5	1.3	1	0	1	96,031	96,031	26,002	26,002	0	0	1	0
TOTALS		8,760	3,650	5,110					9932	2571	1,010	298

Existing Roof Infiltration	690 cfm
Existing Roof Heat Transfer	1,277 Btu/h°F
Proposed Roof Infiltration	230 cfm
Proposed Roof Heat Transfer	299 Btu/h°F

Savings	712 Therms	\$ 888
	2,208 kWh	\$ 1,513
		\$ 2,400

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-1 Add Attic Insulation - 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.		
						\$ -	\$ -		\$ -	
R-30 9" fiberglass insulation	11,500	SF	\$ 1.200	\$ 1.000	\$ -	\$ 14,214	\$ 14,375	\$ -	\$ 28,589	Vendor quote
						\$ -	\$ -	\$ -	\$ -	

Note: Cost estimates are for energy savings calculations only, do not use for procurement

\$ 28,589	Subtotal
\$ 10,006	35% Contingency
\$ 38,595	Total

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-2: Replace the 1994 Boiler with a Condensing Boiler

Description: This ECM evaluates the addition of one high efficiency condensing gas boiler. The existing boiler efficiency is 82% 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. The new boiler would be the primary heat source and operate during shoulder months, while the newer existing boiler would be retained as back-up.

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	\$ 1.26	/ Therm	Natural Gas
Baseline Fuel Cost		/ Gal	No. 2 Oil
FORMULA CONSTANTS			
Oversize Factor	0.8		
Hours per Day	24		
Design Outdoor Temp	14	F	
Infrared Conversion Factor	1.0		1.0 if Boiler, 0.8 if Infrared Heater
EXISTING			
Capacity	2,000,000	btu/hr	
Heating Combustion Efficiency	82%		
Heating Degree-Day	2,783	Degree-day	
Design Temperature Difference	75	F	
Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	2,000,000	btu/hr	
Efficiency	90%		Average seasonal efficiency
SAVINGS			
Fuel Savings	1,545	Therms	NJ Protocols Calculation
Fuel Cost Savings	\$ 1,938		

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

Carteret Board of Education

CHA Project Number: 30201

Nathan Hale School

ECM-2: Replace the 1994 Boiler with a Condensing Boiler - 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.		
Aerco BMK2000 w/ condensate	1	EA	\$ 32,000	\$ 12,000		\$ 32,864	\$ 14,952	\$ 1,000	\$ 48,816	Vendor Estimate
Flue Installation	1	LS	\$ 25,000.0	\$ 25,000.00		\$ 25,675	\$ 31,150	\$ -	\$ 56,825	Vendor Estimate
controls	1	EA	\$ 1,000.0	\$ 1,500.00		\$ 1,027	\$ 1,869	\$ -	\$ 2,896	RS Means 2012
Miscellaneous Electrical	1	LS	\$ 1,500	\$ 1,500		\$ 1,541	\$ 1,869	\$ -	\$ 3,410	RS Means 2012
Miscellaneous HW Piping	1	LS	\$ 5,000	\$ 2,500		\$ 5,135	\$ 3,115	\$ -	\$ 8,250	RS Means 2012
Removal of existing boiler	1	EA		\$ 5,000		\$ -	\$ 6,230	\$ -	\$ 6,230	Engineering Estimate
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

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

\$ 126,427	Subtotal
\$ 44,249	35% Contingency
\$ 170,676	Total

ECM-3: Replace Packaged RTU with High EER RTU

Description: This ECM evaluates the energy savings associated with replacing older less efficient heating and cooling equipment with modern high efficiency unitary equipment having the same capacity. On the roof of the Municipal Bldg. the Carrier unit furthest to the west is the unit recommended replacing.

Equipment Tag	Equipment Description	General Type	Cooling Capacity (Btu/h)	Heating Capacity (Btu/h)
RTU-1	RTU	HVAC	240,000	
RTU-2	RTU	HVAC	240,000	-

Item	Value	Units	Formula/Comments	
Demand Rate	\$ 19.98	/ kW		
Electricity Rate	\$ 0.11	/kWh		
FORMULA CONSTANTS				
Coincidence Factor	0.67		NJ Protocols	
Conversion	3.412	btu/kW		
COOLING - HVAC				
Cooling Capacity	480,000	btu/hr		btuh
Baseline EER	9.0		Assumed EER based on unit age	EERb
Proposed EER	14.0		Proposed EER of new equipment	EERq
Equivalent Full Load Hours	2,891	hrs	NJ Protocols	
Demand Savings	12.76	kW		
Energy Savings	55,067	kWh		
SAVINGS				
Demand Savings	12.76	kW		
Energy Savings	55,067	kWh		
Cost Savings	\$ 9,282			

Savings calculation formulas are taken from NJ Protocols document for Electric HVAC Equipment

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-3: Replace Packaged RTU with High EER RTU - 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.		
						\$ -	\$ -	\$ -	\$ -	
Existing 20.0 ton RTU demolition & removal	1	EA	\$ 100	\$ 2,000		\$ 103	\$ 2,492	\$ -	\$ 2,595	RS Means 2015
New 20.0 ton RTU	1	EA	\$ 23,000	\$ 2,950		\$ 23,621	\$ 3,676	\$ 2,000	\$ 29,297	RS Means 2015
- Reprogram Controls for new RTU	1	EA	\$ 100	\$ 400		\$ 103	\$ 498	\$ -	\$ 601	RS Means 2015
Electrical - misc.	1	LS	\$ 1,500	\$ 5,500		\$ 1,541	\$ 6,853	\$ -	\$ 8,394	RS Means 2015

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

\$ 40,886	Subtotal
\$ 14,310	35% Contingency
\$ 55,200	Total

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-4: Retro-Commission DDC Controls

Description: The school has a fully functioning Siemens DDC system. It however has not been set up to optimize energy savings sequences, such as optimum Start/ Stop, night setback, temporary occupied set back, economizer control of UVs and AHU's. This energy savings percentage is based on past performance of similar buildings which have a fully functioning DDC control systems.

Building Information:

51,539	Sq Footage	\$0.12	\$/kWh Blended
50%	Cooling	\$1.26	\$/Therm
Y	Heating		

FULL DDC - TEMPERATURE SETBACK SAVINGS CALCULATION				FULL DDC - ADDITIONAL CONTROLS SAVINGS CALCULATION			
EXISTING CONDITIONS				EXISTING CONDITIONS			
Heating							
Heating Season Facility Temp	72	F		Existing Facility Total Electric usage	447,873	kWh	
Weekly Occupied Hours	50	hrs		Existing Facility Total Gas usage	20,511	Therms	
Heating Season Setback Temp	67	F		Existing Facility Cooling Electric usage	-	kWh ¹	
Heating Season % Savings per Degree Setback	2%			Existing Facility Heating Natural Gas usage	18,870	Therms	
Annual Boiler Capacity	2,051	Mbtu/yr		PROPOSED CONDITIONS			
Connected Heating Load Capacity	3,297	Btu/hr		Proposed Facility Cooling Electric Savings	0	kWh	
Equivalent Full Load Heating Hours	900	hrs		Proposed Facility Natural Gas Savings	1,887	Therms	
Heating System Efficiency	84%			SAVINGS			
Cooling				Electric Savings	0	kWh	
Cooling Season Facility Temp	74	F		Natural Gas Savings	1,887	Therms	
Weekly Occupied Hours	50	hrs					
Cooling Season Setback Temp	85	F					
Cooling Season % Savings per Degree Setback	2%						
Connected Cooling Load Capacity	40	Tons					
Equivalent Full Load Cooling Hours	381	hrs					
Cooling Equipment EER	10.0						
SAVINGS							
Natural Gas Savings	2	Therms					
Cooling Electricity Savings	15,016	kWh					

Assumptions			
1	0% of facility total electricity dedicated to Cooling; based on utility information		
2	92% of facility total natural gas dedicated to Heating; based on utility information		
3	10% Typical Savings associated with installation of DDC controls		

Savings calculation formulas for setback are taken from NJ Protocols document for Occupancy Controlled Thermostats
Savings calculations for additional controls are estimated based on the level of control to be added and prior experience

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-4: Retro-Commission DDC Controls Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									\$ -	
Re-program DDC Controls	51539	SF	\$ 0.27	INC	INC	\$ 14,291	INC	INC	\$ 14,291	EPA Estimate
						\$ -	\$ -	\$ -	\$ -	

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

\$ 14,291	Subtotal
\$ 5,002	35% Contingency
\$ 19,293	Total

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-5: Walk-in Cooler & Freezer EC Motor Retrofits

ECM Description :

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

Utility Cost

\$0.12 \$/kWh Blended

EXISTING CONDITIONS		
Walk-In Freezer(s)		
Existing Freezer Controls?	N	
Quantity of Walk-In Freezers	1	
Nameplate Amps of Freezer Evaporator Fan	4	AmpsEF
Nameplate Volts of Freezer Evaporator Fan	280	VoltsEF
Phase of Evaporator Fan	1	PhaseEF
Power Factor of Evaporator Fan	0.55	PFEF
Operating Hours	8,760	hrs
Load Reduction	65%	LR
Electricity Savings (Evaporator Fan)	3,157	kWhEF
Electricity Savings (Evaporator Fan Reduced Heat)	1,414	kWhRH
Total Walk-In Freezer(s) Electricity Savings	4,571	kWh
Walk-In Cooler(s)		
Existing Cooler Controls?	N	
Quantity of Walk-In Coolers	1	
Nameplate Amps of Cooler Evaporator Fan	4	
Nameplate Volts of Cooler Evaporator Fan	280	
Phase of Evaporator Fan	1	
Power Factor of Evaporator Fan	0.55	
Operating Hours	8,760	hrs
Load Reduction	65%	
Electricity Savings (Evaporator Fan)	3,157	kWh
Electricity Savings (Evaporator Fan Reduced Heat)	1,414	kWh
Total Walk-In Cooler(s) Electricity Savings	4,571	kWh
SAVINGS		
Total Electricity Savings	9,142	kWh
Total Cost Savings	\$ 1,124	
Estimated Cost	\$ 22,275	
Simple Payback	19.8	years

Savings calculation formulas are taken from NJ Protocols document for Walk-in Controller

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

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-5: Walk-in Cooler & Freezer EC Motor Retrofits - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									\$ -	
Turnkey Walk-In Controller & Equipment	1	EA	\$ 10,000	\$ 5,000	\$ -	\$ 10,270	\$ 6,230	\$ -	\$ 16,500	Vendor Estimate
						\$ -	\$ -	\$ -	\$ -	

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

\$ 16,500	Subtotal
\$ 5,775	35% Contingency
\$ 22,275	Total

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

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

Description: This ECM evaluates the energy savings associated with replacing a gas fired tank type water heater with an equivalent capacity instantaneous water heater.

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	422	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	506,400	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	78%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	394,992	MBTU/yr	
Existing Tank Size	80	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	°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)	1.2	MBH	
Annual Standby Hot Water Load	10,549	MBTU/yr	
New Tank Size	0	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	140	°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)	0.1	MBH	
Annual Standby Hot Water Load	621	MBTU/yr	
Total Annual Hot Water Demand	385,064	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	4,011	Therms	Standby Losses and inefficient DHW heater eliminated
Utility Cost	\$1.26	\$/Therm	
Existing Operating Cost of DHW	\$6,355	\$/yr	
Proposed Operating Cost of DHW	\$5,034	\$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	1,053	\$1,321

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-6: Replace N.G. Water Heater with 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		\$ 250		\$ -	\$ 312	\$ -	\$ 312	RS Means 2012
High Efficiency Gas-Fired DHW Heater	1	EA	\$ 4,000	\$ 280		\$ 4,108	\$ 349	\$ -	\$ 4,457	RS Means 2012
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	\$ 200			\$ 205	\$ -	\$ -	\$ 205	RS Means 2012

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

\$ 6,554	Subtotal
\$ 2,294	35% Contingency
\$ 8,848	Total

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-7: Replace faucets with low flow

Description; This ECM evaluates the water savings resulting from replacing/ upgrading faucets to 0.5 gallon per minute flow

E X I S T I N G C O N D I T I O N S		
Cost of Water / 1000 Gallons	\$5.56	\$ / kGal
Faucets in Building	10	
Average Uses / Faucet (per day)	3	Based on # of occupants
Average Time of Use	10.0	seconds
Average Flowrate	2.5	gpm

P R O P O S E D C O N D I T I O N S		
Proposed Faucets to be Replaced	10	
Proposed Flowrate	0.5	gpm

H E A T I N G S A V I N G S		
Fuel Cost	\$ 1.00	/Therm
Number of Faucets	10	
Hours per Day of Usage	0.5	hrs
Days per Year of Facility Usage	365	days
Average Flowrate	2.5	gpm
Proposed Flowrate	0.5	gpm
Heat Content of Water	8.33	Btu/gal/F
Temperature Difference (Intake and Output)	50	F
Water Heating Equipment Efficiency	80%	
Conversion Factor	100,000	Btu/Therm
S A V I N G S		
Current Faucet Water Use	4.56	kGal / year
Proposed Faucet Water Use	0.91	kGal / year
Water Savings	3.65	kGal / year
Heating Savings	27	Therms
Cost Savings	\$48	/ year

Savings calculation formulas are taken from NJ Protocols document for Faucet

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

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-7: Replace urinals and flush valves with low flow

Description: This ECM evaluates the water savings associated with replacing/ upgrading urinals with waterless urinals.

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	\$5.56	\$ / kGal
Urinals in Building to be replaced	6	
Average Flushes / Urinal (per Day)	56	Based on # of occupants
Average Gallons / Flush	1.0	Gal

PROPOSED CONDITIONS		
Proposed Urinals to be Replaced	6	
Proposed Gallons / Flush	0.000	Gal
Proposed Material Cost of new urinal & valve	\$1,200	RS Means 2012
Proposed Installation Cost of new urinal & valve	\$1,000	RS Means 2012
Total cost of new urinals & valves		

SAVINGS		
Current Urinal Water Use	122.64	kGal / year
Proposed Urinal Water Use	0.00	kGal / year
Water Savings	122.64	kGal / year
Cost Savings	\$682	/ year

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

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

ECM-7: Replace toilets and flush valves with low flow

Description: This ECM evaluates the water savings associated with replacing/upgrading toilets to 1.28 GPF fixtures and/or flush valves.

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	\$5.56	\$ / kGal
Toilets in Building	18	
Average Flushes / Toilet (per Day)	42	Based on # of occupants
Average Gallons / Flush	3.5	Gal

PROPOSED CONDITIONS		
Proposed Toilets to be Replaced	18	
Proposed Gallons / Flush	1.28	Gal

SAVINGS		
Current Toilet Water Use	976.01	kGal / year
Proposed Toilet Water Use	356.94	kGal / year
Water Savings	619.07	kGal / year
Cost Savings	\$3,442	/ year

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-7: Replace Plumbing Fixtures - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									\$ -	
Waterless Urinal	30	EA	\$ 450	\$ 500	\$ -	\$ 13,865	\$ 18,690	\$ -	\$ 32,555	Vendor Estimate
Install Dual-Flush flushometers	30	EA	\$ 300	\$ 100	\$ -	\$ 9,243	\$ 3,738	\$ -	\$ 12,981	Vendor Estimate
						\$ -	\$ -	\$ -	\$ -	

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

\$ 45,536	Subtotal
\$ 15,937	35% Contingency
\$ 61,473	Total

Carteret Board of Education
CHA Project Number: 30201
Nathan Hale 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)	51,539
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilities (BPU)

Incentive #1		
Audit is funded by NJ BPU	\$0.05	\$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	\$55,038	\$25,864
Existing Usage (from utility)	447,873	20,511
Proposed Savings	191,419	5,227
Existing Total MMBtus	3,580	
Proposed Savings MMBtus	1,176	
% Energy Reduction	32.9%	
Proposed Annual Savings	\$42,285	

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

	Incentives \$		
	Elec	Gas	Total
Incentive #1	\$0	\$0	\$5,000
Incentive #2	\$21,056	\$6,533	\$27,590
Incentive #3	\$21,056	\$6,533	\$27,590
Total All Incentives	\$42,112	\$13,067	\$60,179

Total Project Cost	\$519,000
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		Allowable Incentive
% Incentives #1 of Utility Cost*	6.2%	\$5,000
% Incentives #2 of Project Cost**	5.3%	\$27,590
% Incentives #3 of Project Cost**	5.3%	\$27,590
Total Eligible Incentives***	\$60,179	
Project Cost w/ Incentives	\$458,821	

Project Payback (years)	
w/o Incentives	w/ Incentives
12.3	10.9

* 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

Energy Audit of Carteret Nathan Hale School
CHA Project No. 30201

ECM-L1 Lighting Replacements

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
\$131,097	27.6	92,192	0	\$17,041	0	\$17,041	\$13,665	7.7	6.9

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-L2 Install Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
\$11,543	0.0	34,178	0	\$3,862	0	\$3,862	\$900	3.0	2.8

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

ECM-L3 Lighting Replacements with Occupancy Sensors

Budgetary	Annual Utility Savings				Estimated	Total	New Jersey	Payback	Payback
Cost					Maintenance	Savings	Incentive	(without incentive)	(with incentive)
\$	kW	kWh	therms	\$	\$	\$	\$	Years	Years
\$142,640	27.6	109,986	0	\$19,051	0	\$19,051	\$14,565	7.5	6.7

*Incentive based on New Jersey Smart Start Prescriptive Lighting Measures

Cost of Electricity:

\$0.113 \$/kWh

\$19.98 \$/kW

Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	Usage Describe Usage Type using Operating Hours	No. of Fixtures No. of fixtures before the retrofit	EXISTING CONDITIONS							Retrofit Control Retrofit control device	Notes
				Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/space) * (Annual Hours)		
40LED	Room 821 Basement (Old Room #s)	Classrooms	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	3360	202	OCC	
192	Restrooms	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.25	SW	2688	661	OCC	
40LED	Girls Locker Room	Hallways	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	3360	202	NONE	
46	Storage	Storage Areas	3	W 32 C F 2 (ELE)	F42LL	60	0.18	SW	2016	363	OCC	
46LED	Boiler Room (3 spaces)	Mechanical Room	16	W 32 P F 2 (ELE)	F42ILL	59	0.94	SW	8064	7,612	OCC	
35LED	Computer Education	Classrooms	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	3360	1,210	OCC	
46LED	Computer Education	Classrooms	3	W 32 P F 2 (ELE)	F42ILL	59	0.18	SW	3360	595	OCC	
192	Restrooms	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.25	SW	2688	661	OCC	
40LED	Hallway	Hallways	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	3360	202	NONE	
35LED	Room 821	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
218LED	Stairway	Hallways	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.54	SW	3360	1,814	NONE	
40LED	Hallway	Hallways	9	T 32 R F 2 (ELE)	F42LL	60	0.54	SW	3360	1,814	NONE	
218LED	Stairway	Hallways	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.54	SW	3360	1,814	NONE	
192	Restrooms	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.12	SW	2688	331	OCC	
40LED	Hallway	Hallways	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	3360	403	NONE	
40LED	Janitor's Closet	Storage Areas	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2016	121	OCC	
35LED	Old Boiler Room (Kitchen)	Kitchen	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.62	SW	2688	4,355	OCC	
40LED	Hallway	Hallways	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	3360	806	NONE	
141LED	Multipurpose Room	Gymnasium	16	HPS 200	HPS200/1	250	4.00	SW	2688	10,752	OCC	
196LED	Stage	Gymnasium	5	W 32 C F 4 (ELE)	F44ILL	112	0.56	SW	2688	1,505	OCC	
44	Stage	Gymnasium	6	DC 26 W CF 2	CFQ26/2-L	50	0.30	SW	2688	806	OCC	
40LED	Hallway	Hallways	7	T 32 R F 2 (ELE)	F42LL	60	0.42	SW	3360	1,411	NONE	
35LED	Classroom	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom	Classrooms	3	W 32 C F 1	F41LL	32	0.10	SW	3360	323	OCC	
192	Restrooms	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.12	SW	2688	331	OCC	
35LED	Classroom 663	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	3360	1,814	OCC	
35LED	Classroom 663	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	3360	1,814	OCC	
40LED	Hallway - New Addition	Hallways	7	T 32 R F 2 (ELE)	F42LL	60	0.42	SW	3360	1,411	NONE	
46	Stairway - New Addition	Hallways	12	W 32 C F 2 (ELE)	F42LL	60	0.72	SW	3360	2,419	NONE	
103	Restrooms - New Addition	Restrooms	8	1T 32 R F 1	F41LL	32	0.26	SW	2688	688	OCC	
103	Restrooms - New Addition	Restrooms	8	1T 32 R F 1	F41LL	32	0.26	SW	2688	688	OCC	
40LED	Janitor's Closet - New addition	Storage Areas	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2016	121	OCC	
40LED	Janitor's Closet - New addition	Storage Areas	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2016	121	OCC	
35LED	Classroom - New Addition	Classrooms	11	T 32 R F 3 (ELE)	F43ILL/2	90	0.99	SW	3360	3,326	OCC	
70	Classroom - New Addition	Classrooms	3	W 32 C F 1	F41LL	32	0.10	SW	3360	323	OCC	
208	Classroom - New Addition	Classrooms	4	SP 26 R CF 2	CFQ25/2	66	0.26	SW	3360	887	OCC	
192	Restroom	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.12	SW	2688	331	OCC	
35LED	Classroom - New Addition	Classrooms	11	T 32 R F 3 (ELE)	F43ILL/2	90	0.99	SW	3360	3,326	OCC	
70	Classroom - New Addition	Classrooms	3	W 32 C F 1	F41LL	32	0.10	SW	3360	323	OCC	
208	Classroom - New Addition	Classrooms	4	SP 26 R CF 2	CFQ25/2	66	0.26	SW	3360	887	OCC	
192	Restroom	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.12	SW	2688	331	OCC	
35LED	Classroom - New Addition	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
208	Classroom - New Addition	Classrooms	5	SP 26 R CF 2	CFQ25/2	66	0.33	SW	3360	1,109	OCC	
192	Restroom	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.12	SW	2688	331	OCC	
46LED	Electric Room	Storage Areas	1	W 32 P F 2 (ELE)	F42ILL	59	0.06	SW	2016	119	OCC	
35LED	Classroom 768 (First Floor)	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 768	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 754	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 754	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 754	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 754	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
40LED	Hallway	Hallways	16	T 32 R F 2 (ELE)	F42LL	60	0.96	SW	3360	3,226	NONE	
106	Hallway	Hallways	15	SP 65 I	I65/1	65	0.98	SW	3360	3,276	NONE	
35LED	Classroom 754	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 754	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 754	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 754	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
40LED	Classroom 768	Classrooms	12	T 32 R F 2 (ELE)	F42LL	60	0.72	SW	3360	2,419	OCC	
70	Classroom 768	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Office and Principal's Office	Offices	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.26	SW	3024	3,810	OCC	
35LED	Nurse's Offices	Offices	11	T 32 R F 3 (ELE)	F43ILL/2	90	0.99	SW	3024	2,994	OCC	
70	Nurse's Offices	Offices	4	W 32 C F 1	F41LL	32	0.13	OCC	3024	387	OCC	
192	Restroom	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.12	SW	2688	331	OCC	
46	Server Room	Storage Areas	2	W 32 C F 2 (ELE)	F42LL	60	0.12	SW	2016	242	OCC	
40LED	Storage	Storage Areas	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2016	242	OCC	
44	Entrance Lobby	Hallways	4	DC 26 W CF 2	CFQ26/2-L	50	0.20	SW	3360	672	NONE	
43	Entrance Lobby	Hallways	1	DC 26 P CF 2	CFQ26/2-L	50	0.05	SW	3360	168	OCC	
40LED	Hallway - New Addition	Hallways	7	T 32 R F 2 (ELE)	F42LL	60	0.42	SW	3360	1,411	NONE	
103	Restroom - New Addition	Restrooms	8	1T 32 R F 1	F41LL	32	0.26	SW	2688	688	OCC	
103	Restroom - New Addition	Restrooms	8	1T 32 R F 1	F41LL	32	0.26	SW	2688	688	OCC	
46	Janitor's Closet (2)	Storage Areas	2	W 32 C F 2 (ELE)	F42LL	60	0.12	SW	2016	242	OCC	
106	Hallway - New Addition Floodlights (3 floors)	Hallways	24	SP 65 I	I65/1	65	1.56	SW	3360	5,242	NONE	
35LED	Classroom - New Addition	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	3360	2,419	OCC	
208	Classroom - New Addition	Classrooms	4	SP 26 R CF 2	CFQ25/2	66	0.26	SW	3360	887	OCC	
192	Restroom	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.12	SW	2688	331	OCC	

Cost of Electricity:

\$0.113	\$/kWh
\$19.98	\$/kW

			EXISTING CONDITIONS								Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
Field Code	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)	Retrofit control device	Notes
35LED	Library	Library	22	T 32 R F 3 (ELE)	F43ILL/2	90	1.98	SW	2688	5,322	OCC	
46LED	Library	Library	14	W 32 P F 2 (ELE)	F42ILL	59	0.83	SW	2688	2,220	OCC	
106	Library	Library	9	SP 65 I	I65/1	65	0.59	SW	2688	1,572	OCC	
40LED	Hallway - Second Floor	Hallways	17	T 32 R F 2 (ELE)	F42LL	60	1.02	SW	3360	3,427	NONE	
106	Hallway	Hallways	12	SP 65 I	I65/1	65	0.78	SW	3360	2,621	NONE	
35LED	Classroom 1	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 1	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 2	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 2	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 3	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 3	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 4	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 4	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 5	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 5	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 6	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 6	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 7	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 7	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 8	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 8	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Offices	Offices	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.63	SW	3024	1,905	OCC	
44	Closet	Storage Areas	1	DC 26 W CF 2	CFQ26/2-L	50	0.05	SW	2016	101	OCC	
40LED	Hallway - New Addition	Hallways	7	T 32 R F 2 (ELE)	F42LL	60	0.42	SW	3360	1,411	NONE	
103	Restroom - New Addition	Restrooms	8	1T 32 R F 1	F41LL	32	0.26	SW	2688	688	OCC	
103	Restroom - New Addition	Restrooms	8	1T 32 R F 1	F41LL	32	0.26	SW	2688	688	OCC	
35LED	Classroom 1 - New Addition	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 1 - New Addition	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 2 - New addition	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	3360	3,629	OCC	
70	Classroom 2 - New addition	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
35LED	Classroom 3 - New Addition	Classrooms	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	SW	3360	3,931	OCC	
70	Classroom 3 - New Addition	Classrooms	2	W 32 C F 1	F41LL	32	0.06	SW	3360	215	OCC	
43	Classroom 3 - New Addition	Classrooms	3	DC 26 P CF 2	CFQ26/2-L	50	0.15	OCC	3360	504	OCC	
46	Janitor's Closet	Storage Areas	1	W 32 C F 2 (ELE)	F42LL	60	0.06	SW	2016	121	OCC	
142LED	Exterior Lights	Outdoor Lighting	12	MH 100	MH100/1	128	1.54	OCC	4032	6,193	PHC	
77	Exterior Lights	Outdoor Lighting	5	I 150	I150/1	150	0.75	OCC	4032	3,024	PHC	
	Total		745				58.29			191,041		

			EXISTING CONDITIONS										RETROFIT CONDITIONS										COST & SAVINGS ANALYSIS									
Field Code	Area Description	No. of Fixtures before the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Pre-Inst. control device	Annual Hours	Annual kWh	Number of Fixtures after the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit control device	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Incentive	Simple Payback	Simple Payback								
	Unique description of the location - Room number/Room name: Floor number (if applicable)		"Lighting Fixture Code" Example 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)		Estimated daily hours for the usage group	(kWh/space) * (Annual Hours)		"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)		Estimated annual hours for the usage group	(kWh/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered								
40LED	Room 821 Basement (Old Room #s	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	202	1	T 38 R LED	RTLED38	38	0.0	SW	3,360	128	74	0.0	\$	13.63	\$	236.25	17.3	15.5							
192	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2688	661	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2,688	661	-	0.0	\$	-	\$	-		#DIV/0!							
40LED	Girls Locker Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	202	1	T 38 R LED	RTLED38	38	0.0	SW	3,360	128	74	0.0	\$	13.63	\$	236.25	17.3	15.5							
46	Storage	3	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	2016	363	3	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	2,016	363	-	0.0	\$	-	\$	-		#DIV/0!							
46LED	Boiler Room (3 spaces)	16	W 32 P F 2 (ELE)	F42LL	59	0.9	SW	8064	7,612	16	4 ft LED Tube	200732x2	30	0.5	SW	8,064	3,871	3,742	0.5	\$	534.06	\$	2,613.80	\$240	4.9	4.4						
35LED	Computer Education	4	T 32 R F 3 (ELE)	F43LL/2	90	0.4	SW	3360	1,210	4	T 59 R LED	RTLED38	38	0.2	SW	3,360	511	699	0.2	\$	128.84	\$	945.00	\$100	7.3	6.6						
46LED	Computer Education	3	W 32 P F 2 (ELE)	F42LL	59	0.2	SW	3360	595	3	4 ft LED Tube	200732x2	30	0.1	SW	3,360	302	292	0.1	\$	53.89	\$	490.05	\$45	9.1	8.3						
192	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2688	661	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2,688	661	-	0.0	\$	-	\$	-		#DIV/0!							
40LED	Hallway	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	202	1	T 38 R LED	RTLED38	38	0.0	SW	3,360	128	74	0.0	\$	13.63	\$	236.25	\$25	17.3	15.5						
35LED	Room 821	12	T 32 R F 3 (ELE)	F43LL/2	90	1.1	SW	3360	3,629	12	T 59 R LED	RTLED38	38	0.5	SW	3,360	1,532	2,097	0.6	\$	386.53	\$	2,835.00	\$300	7.3	6.6						
218LED	Stairway	6	W 32 C F 3 (ELE)	F43LL/2	90	0.5	SW	3360	1,814	6	STLED4	STLED4	40	0.4	SW	3,360	806	1,008	0.3	\$	185.83	\$	2,140.20	\$90	11.5	11.0						
40LED	Hallway	9	T 32 R F 2 (ELE)	F42LL	60	0.5	SW	3360	1,814	9	T 38 R LED	RTLED38	38	0.3	SW	3,360	1,149	665	0.2	\$	122.65	\$	2,126.25	\$225	17.3	15.5						
218LED	Stairway	6	W 32 C F 3 (ELE)	F43LL/2	90	0.5	SW	3360	1,814	6	STLED4	STLED4	40	0.2	SW	3,360	806	1,008	0.3	\$	185.83	\$	2,140.20	\$90	11.5	11.0						
192	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2688	331	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2,688	331	-	0.0	\$	-	\$	-		#DIV/0!							
40LED	Hallway	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	403	2	T 38 R LED	RTLED38	38	0.1	SW	3,360	255	148	0.0	\$	27.26	\$	472.50	\$50	17.3	15.5						
40LED	Janitor's Closet	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121	1	T 38 R LED	RTLED38	38	0.0	SW	2,016	77	44	0.0	\$	10.29	\$	236.25	\$25	23.0	20.5						
35LED	Old Boiler Room (Kitchen	18	T 32 R F 3 (ELE)	F43LL/2	90	1.6	SW	2688	4,355	18	T 59 R LED	RTLED38	38	0.7	SW	2,688	1,839	2,516	0.9	\$	508.72	\$	4,252.50	\$450	8.4	7.5						
40LED	Hallway	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	3360	806	4	T 38 R LED	RTLED38	38	0.2	SW	3,360	511	296	0.1	\$	54.51	\$	945.00	\$100	17.3	15.5						
141LED	Multipurpose Room	16	HPS200/1	HPS200/1	250	4.0	SW	2688	10,752	16	FXLED78/1	FXLED78/1	78	1.2	SW	2,688	3,355	7,397	2.8	\$	1,495.72	\$	13,507.13	\$1,600	9.0	8.0						
196LED	Stage	5	W 32 C F 4 (ELE)	F44LL	112	0.6	SW	2688	1,505	5	T 50 R LED	RTLED50	50	0.5	SW	2,688	672	833	0.3	\$	168.49	\$	1,181.25	\$250	7.0	5.5						
44	Stage	6	DC 26 W CF 2	CFQ26/2-L	50	0.3	SW	2688	806	6	DC 26 W CF 2	CFQ26/2-L	50	0.3	SW	2,688	806	-	0.0	\$	-	\$	-		#DIV/0!							
40LED	Hallway	7	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	3360	1,411	7	T 38 R LED	RTLED38	38	0.3	SW	3,360	894	517	0.2	\$	95.39	\$	1,653.75	\$175	17.3	15.5						
35LED	Classroom	12	T 32 R F 3 (ELE)	F43LL/2	90	1.1	SW	3360	3,629	12	T 59 R LED	RTLED38	38	0.5	SW	3,360	1,532	2,097	0.6	\$	386.53	\$	2,835.00	\$300	7.3	6.6						
70	Classroom	3	W 32 C F 1	F41LL	32	0.1	SW	3360	323	3	W 32 C F 1	F41LL	32	0.1	SW	3,360	323	-	0.0	\$	-	\$	-		#DIV/0!							
192	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2688	331	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2,688	331	-	0.0	\$	-	\$	-		#DIV/0!							
35LED	Classroom 663	6	T 32 R F 3 (ELE)	F43LL/2	90	0.5	SW	3360	1,814	6	T 59 R LED	RTLED38	38	0.2	SW	3,360	766	1,048	0.3	\$	193.27	\$	1,417.50	\$150	7.3	6.6						
35LED	Classroom 663	6	T 32 R F 3 (ELE)	F43LL/2	90	0.5	SW	3360	1,814	6	T 59 R LED	RTLED38	38	0.2	SW	3,360	766	1,048	0.3	\$	193.27	\$	1,417.50	\$150	7.3	6.6						
40LED	Hallway - New Addition	7	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	3360	1,411	7	T 38 R LED	RTLED38	38	0.3	SW	3,360	894	517	0.2	\$	95.39	\$	1,653.75	\$175	17.3	15.5						
46	Stairway - New Addition	12	W 32 C F 2 (ELE)	F42LL	60	1.2	SW	3360	2,419	12	W 32 C F 2 (ELE)	F42LL	60	1.2	SW	3,360	2,419	-	0.0	\$	-	\$	-		#DIV/0!							
103	Restrooms - New Addition	8	1T 32 R F 1	F41LL	32	0.3	SW	2688	688	8	1T 32 R F 1	F41LL	32	0.3	SW	2,688	688	-	0.0	\$	-	\$	-		#DIV/0!							
103	Restrooms - New Addition	8	1T 32 R F 1	F41LL	32	0.3	SW	2688	688	8	1T 32 R F 1	F41LL	32	0.3	SW	2,688	688	-	0.0	\$	-	\$	-		#DIV/0!							
40LED	Janitor's Closet - New Addition	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121	1	T 38 R LED	RTLED38	38	0.0	SW	2,016	77	44	0.0	\$	10.29	\$	236.25	\$25	23.0	20.5						
40LED	Janitor's Closet - New Addition	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121	1	T 38 R LED	RTLED38	38	0.0	SW	2,016	77	44	0.0	\$	10.29	\$	236.25	\$25	23.0	20.5						
35LED	Classroom - New Addition	11	T 32 R F 3 (ELE)	F43LL/2	90	1.0	SW	3360	3,326	11	T 59 R LED	RTLED38	38	0.4	SW	3,360	1,404	1,922	0.6	\$	354.32	\$	2,598.75	\$275	7.3	6.6						
70	Classroom - New Addition	3	W 32 C F 1	F41LL	32	0.1	SW	3360	323																							

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		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	No. 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	Simple Payback	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 annual hours for the usage group	(kWh/Space) * (Annual Hours)	No. of fixtures after the retrofit	'Lighting Fixture Code' Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	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	(kWh/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) (\$/kWh)	Cost for renovations to lighting system	Lighting Incentive	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered							
40LED	Room 821 Basement (Old Room #s	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	201.6	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	2352	141.1	60.5	0.0	\$6.83	\$128.25	\$10.00	18.8	17.3							
192	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2688	661.2	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	OCC	1881.6	462.9	198.4	0.0	\$22.42	\$128.25	\$10.00	5.7	5.3							
40LED	Girls Locker Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	201.6	1	T 32 R F 2 (ELE)	F42LL	60	0.1	NONE	3360	201.6	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
46	Storage	3	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	2016	362.9	3	W 32 C F 2 (ELE)	F42LL	60	0.2	OCC	1411.2	254.0	108.9	0.0	\$12.30	\$128.25	\$10.00	10.4	9.6							
40LED	Boiler Room (3 spaces)	16	W 32 P F 2 (ELE)	F42LL	59	0.9	SW	8064	7,612.4	16	W 32 P F 2 (ELE)	F42LL	59	0.9	OCC	8064	7,612.4	0.0	0.0	\$0.00	\$128.25	\$10.00		#DIV/0!							
35LED	Computer Educator	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	3360	1,209.6	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	OCC	2352	946.7	362.9	0.0	\$41.01	\$128.25	\$10.00	3.1	2.9							
46LED	Computer Educator	3	W 32 P F 2 (ELE)	F42ILL	59	0.2	SW	3360	594.7	3	W 32 P F 2 (ELE)	F42ILL	59	0.2	OCC	2352	416.3	178.4	0.0	\$20.16	\$128.25	\$10.00	6.4	5.9							
192	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2688	661.2	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	OCC	1881.6	462.9	198.4	0.0	\$22.42	\$128.25	\$10.00	5.7	5.3							
40LED	Hallway	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	201.6	1	T 32 R F 2 (ELE)	F42LL	60	0.1	NONE	3360	201.6	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
35LED	Room 821	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	3360	3,628.8	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	2352	2,540.2	1,088.6	0.0	\$123.02	\$128.25	\$10.00	1.0	1.0							
218LED	Stairway	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814.4	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.5	NONE	3360	1,814.4	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
40LED	Hallway	9	T 32 R F 2 (ELE)	F42LL	60	0.5	SW	3360	1,814.4	9	T 32 R F 2 (ELE)	F42LL	60	0.5	NONE	3360	1,814.4	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
218LED	Stairway	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814.4	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.5	NONE	3360	1,814.4	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
192	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2688	330.6	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	OCC	1881.6	231.4	99.2	0.0	\$11.21	\$128.25	\$10.00	11.4	10.6							
40LED	Hallway	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	403.2	2	T 32 R F 2 (ELE)	F42LL	60	0.1	NONE	3360	403.2	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
40LED	Janitor's Closet	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1411.2	84.7	36.3	0.0	\$4.10	\$128.25	\$10.00	31.3	28.8							
35LED	Old Boiler Room (Kitchen	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	SW	2688	4,354.6	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	OCC	2688	4,354.6	0.0	0.0	\$0.00	\$128.25	\$10.00		#DIV/0!							
40LED	Hallway	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	3360	806.4	4	T 32 R F 2 (ELE)	F42LL	60	0.2	NONE	3360	806.4	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
141LED	Multipurpose Room	16	HPS 200/1	HPS200/1	250	4.0	SW	2688	10,752.0	16	HPS 200/1	HPS200/1	250	4.0	OCC	2688	10,752.0	0.0	0.0	\$0.00	\$128.25	\$10.00		#DIV/0!							
196LED	Stage	5	W 32 C F 4 (ELE)	F44LL	112	0.6	SW	2688	1,505.3	5	W 32 C F 4 (ELE)	F44LL	112	0.6	OCC	2688	1,505.3	0.0	0.0	\$0.00	\$128.25	\$10.00		#DIV/0!							
44	Stage	6	DC 26 W CF 2	CFQ26/2-L	50	0.3	SW	2688	806.4	6	DC 26 W CF 2	CFQ26/2-L	50	0.3	OCC	2688	806.4	0.0	0.0	\$0.00	\$128.25	\$10.00		#DIV/0!							
40LED	Hallway	7	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	3360	1,411.2	7	T 32 R F 2 (ELE)	F42LL	60	0.4	NONE	3360	1,411.2	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
35LED	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	3360	3,628.8	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	2352	2,540.2	1,088.6	0.0	\$123.02	\$128.25	\$10.00	1.0	1.0							
70	Classroom	3	W 32 C F 1	F41LL	32	0.1	SW	3360	322.6	3	W 32 C F 1	F41LL	32	0.1	OCC	2352	225.8	96.8	0.0	\$10.93	\$128.25	\$10.00	11.7	10.8							
192	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2688	330.6	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	OCC	1881.6	231.4	99.2	0.0	\$11.21	\$128.25	\$10.00	11.4	10.6							
35LED	Classroom 663	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814.4	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	2352	1,270.1	544.3	0.0	\$61.51	\$128.25	\$10.00	2.1	1.9							
35LED	Classroom 663	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814.4	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	2352	1,270.1	544.3	0.0	\$61.51	\$128.25	\$10.00	2.1	1.9							
40LED	Hallway - New Addition	7	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	3360	1,411.2	7	T 32 R F 2 (ELE)	F42LL	60	0.4	NONE	3360	1,411.2	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
46	Stairway - New Addition	12	W 32 C F 2 (ELE)	F42LL	60	1.2	SW	3360	2,419.2	12	W 32 C F 2 (ELE)	F42LL	60	1.2	OCC	3360	3,249.2	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!							
103	Restrooms - New Addition	8	1T 32 R F 1	F41LL	32	0.3	SW	2688	688.1	8	1T 32 R F 1	F41LL	32	0.3	OCC	1881.6	481.7	206.4	0.0	\$23.33	\$128.25	\$10.00	5.5	5.1							
103	Restrooms - New Addition	8	1T 32 R F 1	F41LL	32	0.3	SW	2688	688.1	8	1T 32 R F 1	F41LL	32	0.3	OCC	1881.6	481.7	206.4	0.0	\$23.33	\$128.25	\$10.00	5.5	5.1							
40LED	Janitor's Closet - New Addition	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1411.2	84.7	36.3	0.0	\$4.10	\$128.25	\$10.00	31.3	28.8							
40LED	Janitor's Closet - New Addition	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1411.2	84.7	36.3	0.0	\$4.10	\$128.25	\$10.00	31.3	28.8							

		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 device	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
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 annual hours for the usage group	(kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	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	Annual kWh (Annual Hours)	Annual kWh Saved (Original Annual kW) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * (\$/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
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															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
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															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
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EXISTING CONDITIONS										RETROFIT CONDITIONS										COST & SAVINGS ANALYSIS						
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of Fixtures before the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Pre-Inst. control device	Annual Hours	Annual kWh	No. of fixtures after the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control device	Annual Hours	Annual kWh	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Incentive	Simple Payback	Simple Payback		
																									Lighting Fixture Code	Code from Table of Standard Fixture Wattages
40LED	Room 821 Basement (Old Room #s	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	202	1	T 38 R LED	RTLED38	38	0.0	OCC	2,352	89	112.0.0	\$ 17.96	\$ 364.50	\$ 35	20.3	18.4			
192	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2688	661	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	OCC	1,882	463	198.0.0	\$ 22.42	\$ 128.25	\$ 10	5.7	5.3			
40LED	Girls Locker Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	202	1	T 38 R LED	RTLED38	38	0.0	NONE	3,360	128	74.0.0	\$ 13.63	\$ 236.25	\$ 25	17.3	15.5			
46	Storage	3	W 32 C F 2 (ELE)	F42LL	60	0.2	SW	2016	363	3	W 32 C F 2 (ELE)	F42LL	60	0.2	OCC	1,411	254	109.0.0	\$ 12.30	\$ 128.25	\$ 10	10.4	9.6			
46LED	Boiler Room (3 spaces)	16	W 32 P F 2 (ELE)	F42LL	59	0.9	SW	8064	7,612	16	4 ft LED Tube	200732x2	30	0.5	OCC	8,064	3,871	3,742.0.5	\$ 340.06	\$ 2,741.85	\$ 250	5.1	4.7			
35LED	Computer Educator	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	3360	1,210	4	T 59 R LED	RTLED38	38	0.2	OCC	2,352	358	852.0.2	\$ 146.16	\$ 1,073.25	\$ 110	7.3	6.6			
46LED	Computer Educator	3	W 32 P F 2 (ELE)	F42ILL	59	0.2	SW	3360	595	3	4 ft LED Tube	200732x2	30	0.1	OCC	2,352	212	383.0.1	\$ 64.14	\$ 618.30	\$ 55	9.8	8.8			
192	Restrooms	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	SW	2688	661	2	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.2	OCC	1,882	463	198.0.0	\$ 22.42	\$ 128.25	\$ 10	5.7	5.3			
40LED	Hallway	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	202	1	T 38 R LED	RTLED38	38	0.0	NONE	3,360	128	74.0.0	\$ 13.63	\$ 236.25	\$ 25	17.3	15.5			
35LED	Room 821	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	3360	3,629	12	T 59 R LED	RTLED38	38	0.5	OCC	2,352	1,073	2,556.0.6	\$ 438.47	\$ 2,963.25	\$ 310	6.8	6.1			
218LED	Stairway	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814	6	STLED4	STLED4	40	0.2	NONE	3,360	806	1,008.0.3	\$ 185.83	\$ 2,140.20	\$ 90	11.5	11.0			
40LED	Hallway	9	T 32 R F 2 (ELE)	F42LL	60	0.5	SW	3360	1,814	9	T 38 R LED	RTLED38	38	0.3	NONE	3,360	1,149	665.0.2	\$ 122.65	\$ 2,126.25	\$ 225	17.3	15.5			
218LED	Stairway	6	W 32 C F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814	6	STLED4	STLED4	40	0.2	NONE	3,360	806	1,008.0.3	\$ 185.83	\$ 2,140.20	\$ 90	11.5	11.0			
192	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2688	331	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	OCC	1,882	231	99.0.0	\$ 11.21	\$ 128.25	\$ 10	11.4	10.6			
40LED	Hallway	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	3360	403	2	T 38 R LED	RTLED38	38	0.1	NONE	3,360	255	149.0.0	\$ 27.26	\$ 472.50	\$ 50	17.3	15.5			
40LED	Janitor's Closet	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121	1	T 38 R LED	RTLED38	38	0.0	OCC	1,411	54	67.0.0	\$ 12.88	\$ 364.50	\$ 35	28.3	25.6			
35LED	Old Boiler Room (Kitchen	18	T 32 R F 3 (ELE)	F43ILL/2	90	1.6	SW	2688	4,355	18	T 59 R LED	RTLED38	38	0.7	OCC	2,688	1,839	2,516.0.9	\$ 508.72	\$ 4,380.75	\$ 460	8.6	7.7			
40LED	Hallway	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	3360	806	4	T 38 R LED	RTLED38	38	0.2	NONE	3,360	511	296.0.1	\$ 54.51	\$ 945.00	\$ 100	17.3	15.5			
141LED	Multipurpose Room	16	HP5 20' F 1 (ELE)	HP5200F1	250	4.0	SW	2688	10,752	16	FXLED39/1	FXLED39/1	76	1.2	OCC	2,688	3,355	7,387.2.8	\$ 1,495.72	\$ 13,836.38	\$ 1,610	9.1	8.0			
196LED	Stage	5	W 32 C F 4 (ELE)	F44ILL	112	0.6	SW	2688	1,505	5	T 50 R LED	RTLED50	50	0.3	OCC	2,688	672	833.0.3	\$ 168.49	\$ 1,309.50	\$ 260	7.8	6.2			
44	Stage	6	DC 26 W CF 2	CFQ26/2-L	50	0.3	SW	2688	806	6	DC 26 W CF 2	CFQ26/2-L	50	0.3	OCC	2,688	806	- .0.0	\$ -	\$ 128.25	\$ 10	17.6	16.2			
40LED	Hallway	7	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	3360	1,411	7	T 38 R LED	RTLED38	38	0.3	NONE	3,360	894	517.0.2	\$ 95.39	\$ 1,653.75	\$ 175	17.3	15.5			
35LED	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	3360	3,629	12	T 59 R LED	RTLED38	38	0.5	OCC	2,352	1,073	2,556.0.6	\$ 438.47	\$ 2,963.25	\$ 310	6.8	6.1			
70	Classroom	3	W 32 C F 1	F41LL	32	0.1	SW	3360	323	3	W 32 C F 1	F41LL	32	0.1	OCC	2,352	226	97.0.0	\$ 10.93	\$ 128.25	\$ 10	11.7	10.8			
192	Restrooms	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2688	331	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	OCC	1,882	231	99.0.0	\$ 11.21	\$ 128.25	\$ 10	11.4	10.6			
35LED	Classroom 663	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814	6	T 59 R LED	RTLED38	38	0.2	OCC	2,352	536	1,278.0.3	\$ 219.24	\$ 1,545.75	\$ 160	7.1	6.3			
35LED	Classroom 663	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	3360	1,814	6	T 59 R LED	RTLED38	38	0.2	OCC	2,352	536	1,278.0.3	\$ 219.24	\$ 1,545.75	\$ 160	7.1	6.3			
40LED	Hallway - New Addition	7	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	3360	1,411	7	T 38 R LED	RTLED38	38	0.3	NONE	3,360	894	517.0.2	\$ 95.39	\$ 1,653.75	\$ 175	17.3	15.5			
46	Stairway - New Addition	12	W 32 C F 3 (ELE)	F42LL	60	0.5	SW	3360	2,419	12	W 32 C F 3 (ELE)	F42LL	60	0.7	NONE	3,360	2,419	- .0.0	\$ -	\$ 128.25	\$ 10	11.7	10.8			
103	Restrooms - New Addition	8	1T 32 R F 1	F41LL	32	0.3	SW	2688	688	8	1T 32 R F 1	F41LL	32	0.3	OCC	1,882	482	206.0.0	\$ 23.33	\$ 128.25	\$ 10	5.5	5.1			
103	Restrooms - New Addition	8	1T 32 R F 1	F41LL	32	0.3	SW	2688	688	8	1T 32 R F 1	F41LL	32	0.3	OCC	1,882	482	206.0.0	\$ 23.33	\$ 128.25	\$ 10	5.5	5.1			
40LED	Janitor's Closet - New Addition	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2016	121	1	T 38 R LED	RTLED38	38	0.0	OCC	1,411	54	67.0.0	\$ 12.88	\$ 364.50	\$ 35	28.3	25.6			
40LED	Classroom - New Addition	1	T 32 R F 2 (ELE)	F43ILL/2	90	1.0	SW	3360	3,326	11	T 38 R LED	RTLED38	38	0.4	OCC	2,352	983	2,343.0.6	\$ 401.93	\$ 2,727.00	\$ 285	6.8	6.1			
35LED	Classroom - New Addition	11	W 32 C F 1	F41LL	32	0.1	SW	3360	323	3	W 32 C F 1	F41LL	32	0.1	OCC	2,352	226	97.0.0	\$ 10.93	\$ 128.25	\$ 10	11.7	10.8			
208	Classroom - New Addition	4	SP 26 R CF 2	CFQ25/2	66	0.3	SW	3360	887	4	SP 26 R CF 2	CFQ25/2	66	0.3	OCC	2,352	621	266.0.0	\$ 30.07	\$ 128.25	\$ 10	4.3	3.9			
192	Restroom	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	SW	2688	331	1	S 60 C F 2 (ELE) 8' Egg Crate	F82EE	123	0.1	OCC	1,882	231	99.0.0	\$ 11.21	\$ 128.						

[illegible]

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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NJ SmartStart Buildings

Program Overview



With New Jersey SmartStart Buildings ...

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

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

- [Project Categories](#)
- [SmartStart Applications](#)
- [Program Terms and Conditions](#)
- [Find a Trade Ally](#)

Incentives for Qualifying Equipment and Projects

Financial incentives are available for size projects which can offset some - or maybe even all - of the added cost to purchase qualifying energy-efficient equipment.

Support for Custom Energy-Efficiency Measures

Custom measures gives you the opportunity to receive an incentive for unique energy-efficiency measures that are not on the prescriptive equipment list, but are new/innovative or project/facility specific.

Application and Eligibility Process

We have made it even easier to participate! Pre-approval is no longer required for prescriptive measures, with the exception of prescriptive & performance lighting and lighting controls. Please note that anyone who purchases and installs equipment without Market Manager approval does so at his/her own risk.

Program Updates

- [Notice of Fiscal Year 2016 Program Changes](#)

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Equipment Incentives

More reasons for a smart start on your next project!

New Jersey SmartStart Buildings provides **financial incentives for qualifying equipment**. These incentives help 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)

Application and Eligibility Process

For all Prescriptive measures with the exception of Prescriptive & Performance Lighting and Lighting Controls, pre-approval is not required prior to installation, however any customer and/or agent who purchases and installs equipment without Market Manager approval does so at their own risk.

Eligibility: 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. A complete application package should include:

- Completed application forms signed by the customer
- Manufacturer specification sheets and supporting documentation of qualifications.
- Recent copy of a full utility bill from a participating utility (gas or electric depending on technology) showing societal benefits charge.
 - Name of the customer listed on the application must match the name of the customer listed on the utility bill.
 - For new construction projects where a utility account has not yet been established, the customer will be required to submit a utility bill prior to incentive payment however it does not need to be included with the initial application submission.
- W-9 form completed for incentive payee.


For completed projects that do not require program pre-approval (excluding Prescriptive Lighting, Prescriptive Lighting Controls, Performance Lighting and Custom Measures) the application must be submitted to the Market Manager within 12 months of equipment purchase. Sufficient documentation must be provided confirming the date of equipment purchase (material invoice, purchase order, etc.). Customers may choose to submit additional documentation to allow the program to process payment including a valid Tax Clearance Certificate for the customer (see tax clearance requirements) and final invoice documentation. All projects are subject to post-inspection to confirm equipment installation prior to payment.

Pre-Inspections: the Market Manager reserves the right to conduct a pre-inspection of the facility prior to the installation of lighting, lighting control equipment and custom measures. This will be done prior to the issuance of the approval letter. Work must not begin prior to formal program approval.

Tax Clearance Requirements: the name of the customer listed on the certificate must match the customer name listed on the utility bill and application. In addition, the customer tax ID listed on the application must agree with the tax ID on the Certificate. Certificates are valid for 180 days and must be valid on the date the Market Manager signs off on the incentive.

Utility account: Each utility account requires a complete, separate application. Projects for the same utility account that are being done at the same time must be submitted on one application. Applications for measures that are self-installed by customers must be signed 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 Market Manager on or before June 30, 2016 in order to be eligible for the fiscal year program (July 1, 2015 - June 30, 2016) incentives.

Expirations: Pre-approved projects are given a one year approval in which the proposed measure is to be installed and operational. When a project has expired the customer will have 30 days to either submit a request for an extension OR submit final project paperwork. Extension requests must be in writing from the customer and include the circumstances that led to the extension request, and the percentage of the project completed. Extension requests may be granted for a period no longer than six (6) months. The Market Manager may provide up to two, six month extensions from the original approval expiration date. If the project has not started and the applicant is still interested in installing the equipment, the existing application will be cancelled and a new application must be submitted and approved




Program Updates

- Notice of Fiscal Year 2016 Program Changes


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prior to installation. The incentive amount will be based upon the program guidelines in effect at the time of the new submission. If no response is received within 30 days of expiration the project will be cancelled.

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](#).

Electric Chillers

Gas Cooling

Electric Unitary HVAC

Ground Source Heat Pumps

Gas Heating

Variable Frequency Drives

Gas Water Heating

Prescriptive lighting Application

Lighting Controls

Performance Lighting

Refrigeration Doors

Refrigeration Controls

Food Service Equipment

Refrigerator/Freezer Motors

Custom Measures

*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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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 start and how to get through the process. Created specifically for existing small to medium-sized facilities, Direct Install is a turnkey solution that makes it easy and affordable to upgrade to high efficiency equipment. Direct Install is designed to cut your facility's energy costs by replacing lighting, HVAC and other outdated operational equipment with energy efficiency 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 one of 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 1,500,000 Btuh and furnaces may not exceed 140,000 Btuh. Limitations on packaged HVAC, motors and other equipment also apply. Larger capacity equipment may be eligible for financial incentives through [NJ SmartStart Buildings](#).

See how other [small businesses owners](#) have saved!

BENEFITS OF DIRECT INSTALL



Turnkey Process - A network of selected [participating contractors](#) address your project from start to finish, beginning with an assessment of your facility, and ending with the installation of eligible energy-efficient equipment.

Minimal Cost - Your share of the project's cost will be approximately 30%, the program pays the remaining 70%. With incentives so dramatic, your upgrade project can very quickly pay for itself.

Fast Turnaround Time - Project installations are typically completed within 90 days from the time of scheduling your energy assessment.

Ongoing Savings - Your new energy-efficient equipment will provide savings for years to come through dramatically reduced energy costs on your monthly utility bills.

Program Updates

- Notice of Fiscal Year 2016 Program Changes

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7/29/2015



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III. PAY FOR PERFORMANCE (P4P)

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Pay for Performance

Pay for Performance is a comprehensive energy efficiency program that provides incentives towards whole-building energy improvements. Choose the component that best describes your building.


Program Participants


EXISTING BUILDINGS

The [Existing Buildings](#) component is designed for commercial and industrial buildings with a peak demand in excess of 200 kW in any of the preceding twelve months, and 100kW for select multifamily buildings. Save 15% or more on the energy consumption in your buildings with the help of our approved partners and receive incentives along the way.


NEW CONSTRUCTION

The [New Construction](#) component is designed for new commercial, industrial, and multifamily buildings with 50,000 square feet or more of planned space, as well as buildings undergoing substantial renovation. Construct your building to achieve energy costs 15% below the current energy code with the help of our approved partners and receive incentives.


Program Updates


- [Notice of Fiscal Year 2016 Program Changes](#)
- [Other updates posted.](#)



Program Literature

Applications and Brochures
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Jersey Shore University Medical Center
Co-generation units at the center of major expansion

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Pay for Performance - Existing Buildings - Participation Steps

Participating in the Pay for Performance Program is easy. Just follow this step-by-step process...


- Select a program partner from this list of [approved partners](#). Be sure to [download this flyer](#) for tips on how to select a partner as well as ideas for what to expect from your working relationship.
- Submit [Application Package](#) - With your assistance, your partner will download and complete the Application and Participation Agreement and submit the forms and required documentation according to the Instructions section of the application.
- Receive Approval Notice - Program representatives will review your application package and if approved, will send a notice to proceed. A case manager will be assigned to your project.
- Develop Benchmarks and Goals. Your partner will benchmark your building, identify performance goals and create an energy reduction plan to achieve no less than 15% energy savings.
- Submit Your Plan - Your partner will submit your energy reduction plan, a complete benchmarking report and partner-participant contract with a request for [Incentive #1](#) as defined in the participation agreement. When the energy reduction plan is approved, you will receive Incentive #1.
- Implement Your Project - Your partner will help you with the bidding process and will monitor construction to ensure that the appropriate steps are being taken to achieve the expected performance goals.
- Submit Request for Second Incentive - Your partner will submit a request for [Incentive #2](#) along with the material and labor invoices when the project is complete. When approved, you will receive Incentive #2.
- Submit Request for Final Incentive - Within approximately 12 months after the project is completed, your partner will re-benchmark the building and submit a request for [Incentive #3](#) along with the post-construction benchmarking report. If the building performance goal is met, you will receive Incentive #3.

A detailed Incentive Structure document is available on the [applications and forms](#) page.



Program Updates

- Notice of Fiscal Year 2016 Program Changes
- Other updates posted.


Program Literature

Applications and Brochures
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Continued Commitment to Saving Energy


Local Govt and Schools

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Learn more about energy use & savings in your industry

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Pay for Performance - Existing Buildings - Applications and Forms

Forms should be completed with the assistance of your program partner. The forms are available in electronic (eForms) format, which allows you to complete the forms on your computer and save them at your convenience. Acrobat Reader 5.0 or greater is required to use eForms.

[Incentive Structure](#)

- [Program Application](#)
- [Incentive Request Form One](#)
- [Incentive Request Form Two](#)
- [Incentive Request Form Three](#)
- [Installation Agreement](#)
- [Building Performance with ENERGY STAR Participation Agreement](#)

Program Updates

- [Notice of Fiscal Year 2016 Program Changes](#)
- [Other updates posted.](#)

Program Literature



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Success Stories



Flying Fish Brewing Company
NJ's largest craft brewery supports local expansion with energy saving technologies

Local Govt and Schools



Find out what financial incentives are available today!

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Learn more about energy use & savings in your industry

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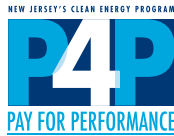


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How did you learn about this Energy Efficiency Program?

- ☐ Advertisement ☐ Internet Search ☐ Mailer ☐ Video
☐ Tradeshow/Event ☐ Word of Mouth ☐ Radio ☐ Contractor
☐ Other _____

PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2015 – June 30, 2016

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 Participation Agreement (pages 3,4) and sign where indicated.
 2. Fill out all applicable spaces on this form. Note Customer/Owner Information must be listed for the utility rate payer of the Project facility.
 3. Provide a copy of the customer's company W-9 form.
 4. Provide the most recent (within 2 years) consecutive 12 month period of utility bills for the project for all accounts, organized in chronological order and separated by account. Utilize Utility Tool for applications with multiple accounts to organize data.
 5. Provide brief description of facility, noting any special or unusual circumstances and/or site conditions.
 6. 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	NAICS Code

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 – Utility: _____ Program Name: _____
- Federal Program – 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

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*Incentives/Requirements subject to change.



001-FY16-07/15

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

ADMINISTRATOR – New Jersey Board of Public Utilities (NJBPUB)

APPLICATION PROCESS – The Program pays incentives in phases upon satisfactory completion of each of three Program milestones - approval of a complete Energy Reduction Plan, installation of all recommended measures per the Energy Reduction Plan, completion of Post-Construction Benchmarking Report (for incentive amounts, please refer to Incentive Amounts). In order to be eligible for Program Incentives, a Participating Customer or an agent authorized by a Customer, must submit to the Market Manager a properly completed application package – application form, Participating Customer's company W-9, twelve consecutive months of the project's utility bills and executed Participation Agreement. All components of the application package must be filled out completely, truthfully and accurately. This application package must be received on or before June 30, 2016 in order to be eligible for the Fiscal Year 2016 Incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. When approved, the Participating Customer will receive an approval letter from their Case Manager with the estimated authorized first incentive amount and the date by which the Energy Reduction Plan must be submitted. Upon receipt of the approval letter, the Participating Customer and Partner may proceed with work on the Energy Reduction Plan. The Market Manager or agent thereof 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 Energy Reduction Plan approval letter. 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.

CHANGES TO THE PROGRAM – The Program and Participation Agreements may be changed by the Market Manager at any time without notice. Approved applications, however, will be processed to completion under the agreements in effect at the time of the Market Manager's approval.

ELIGIBILITY - Program Incentives are available to existing commercial and industrial buildings with peak kilowatt demand usage of more than 200 kW in any of the most recent preceding twelve months of utility bills, 100 kW for multifamily buildings, and a customer of the New Jersey Utilities. Market Manager has the discretion to approve applications that fall below the 200 kW minimum, 100 kW for multifamily, by no more than 10%. If the Participant is a municipal electric company customer, and a customer of an investor-owned gas New Jersey Utility, only gas measures will be eligible for incentives under the Program. Similarly, if the Participant is an oil/propane customer and a customer of an investor-owned electric New Jersey Utility, only electricity measures will be eligible for incentives under the Program.

Projects may not participate or apply for incentives for energy efficient measures through other New Jersey's Clean Energy Programs while participating in this Program. Equipment procured by participating Customer through another program offered by New Jersey Utilities, as applicable, is not eligible for incentives through this Program. Customers who, from July 1, 2014 - June 30, 2015, have not contributed to the Societal Benefits Charge of the applicable New Jersey Utility, may not be eligible for incentives offered through this program.

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

ENERGY-EFFICIENT MEASURES – Any device eligible to receive a Program Incentive payment through the New Jersey's Clean Energy Commercial and Industrial Program

ENERGY REDUCTION PLAN – A document created by the Participating Customer's selected Partner that defines several key aspects of the project including (but not limited to) existing conditions as a result of a whole-building technical analysis, benchmarking summaries, recommended measures, financing plan and implementation schedule.

ENERGY REDUCTION PLAN APPROVAL – After application approval, the Participating Customer and Partner must work together to finalize and submit an Energy Reduction Plan which incorporates a work scope that will achieve the minimum 15% reduction in source energy performance target in accordance with the Program rules and policies along with the Benchmarking Tool, modeling software file, a copy of the executed Partner and Participating Customer contract, a copy of the executed Installation Agreement and a Request for Incentive #1 Payment form. All components of the submittal package must be filled out completely, truthfully and accurately. The Market Manager, agents thereof and/or the selected Partner must be provided reasonable access to the Participating Customer's facility, staff, tenants and/or others necessary to develop an Energy Reduction Plan that will achieve the minimum 15% performance target as well as the necessary utility billing data as dictated by the Program. The Energy Reduction Plan submittal package will be reviewed and must be approved by the Market Manager prior to payment of Incentive #1. Upon approval of the submittal package, the Customer will receive an Incentive #1 approval letter indicating the date by which all measures in the Energy Reduction Plan must be installed (no later than twelve months following the Energy Reduction Plan submittal approval date, up to twenty four months with extension approvals).

INCENTIVE AMOUNTS – Incentive #1 - \$0.10 per square foot of the project with a maximum amount of \$50,000 and minimum of \$5,000, not to exceed 50% of the project's annual energy cost and contingent on installation of measures in the Energy Reduction Plan and receipt of a signed Installation Agreement. If installation does not commence within the required timeframe, Incentive #1 may be required to be returned to the program. In the event the project is cancelled and Incentive #1 is not returned, the project may reapply to the program in the future but another Incentive #1 will not be paid. Incentive #2 – 50% of the total performance-based incentive (combination of Incentives #2 and #3) calculated per Program's incentive structure; Incentive #3 – remaining amount based on the realized energy savings of the project. For customers that have successfully participated in the Local Government Energy Audit Program, Incentive #1 will be reduced by 50% to \$0.05 per square foot up to \$25,000. Actual Incentive #1 paid shall not be higher than 5% over the committed amount. Actual Incentive #2 paid shall not be higher than the committed amount, unless the Energy Reduction Plan has been resubmitted due to changes in the work scope. Actual Incentive #3 paid shall be higher or lower than the committed amount based on actual energy savings but shall not be greater than program Incentive Caps.

The Market Manager will provide incentives according to those described in this section or as modified upon notice to Participating Customer. All incentive payments are paid directly to the Participating Customer as indicated on the application form. The Program is not bound to pay any incentive unless the submittal package associated with the incentive payment is approved by the Market Manager who reserves the sole discretion of approving or disapproving the submittal packages.

INCENTIVE CAP – Program Incentives #2 and #3 will be capped not to exceed 50% of the total project cost, lesser of estimated or actual. Incentive #1 will be capped not to exceed 50% of the project's annual energy cost. Program Incentives (Incentive #1, #2 and #3) are restricted to \$1M per gas and electric account (limited to \$2M per project) in a program year. Campus style facilities, which are master-metered, are subject to the annual incentive cap of \$1 million per gas and electric account. The Participating Customer will also be subject to an annual Entity Cap of \$4M or \$5M if a Combined Heat and Power/Fuel Cell Application is approved for the same facility (Definition of an Entity can be found in the Board Order Docket No. EO07030203).

INSTALLATION AGREEMENT – The Participating Customer must submit an executed Installation Agreement as part of the Request for Incentive #1 Form. By executing the Installation Agreement, the Customer agrees to install all of the measures in the Energy Reduction Plan, which are estimated to result in meeting or exceeding the minimum 15% performance target. The Customer agrees to the performance-based incentives (Incentives #2 & #3) as indicated in the document which are based on the results of the Energy Reduction Plan. Implementation of the measures must commence in the time period twelve months following the approval date of the Energy Reduction Plan, up to twenty four months with extension approvals. Failure to complete the installation of the measures in the Energy Reduction Plan may result in the repayment of Incentive #1, and the forfeiting of Incentives #2 and #3. In the event the project is cancelled and Incentive #1 is not returned, the project may reapply to the program in the future but another Incentive #1 will not be paid.

LIMITATION OF LIABILITY – By virtue of participating in this Program, Participating Customers agree to waive any and all claims or damages against TRC Energy Services, the Market Manager, and the Administrator, except the receipt of the Program Incentive. Participating Customers agree that the Market Manager's and Administrator's liability, in connection with this Program, is limited to paying the Program Incentive specified. Under no circumstances shall the Market 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 Market Manager under this Program shall be individual, and not joint and/or several.

The Market Manager's review and approval of the Energy Reduction Plan cannot be construed to be a determination as to performance, applicability, dollar savings, energy savings, or any other aspect of the proposed project. The Market Manager and Administrator offer no guarantee or warranty of performance of the project's equipment or system. The participant assumes full responsibility and liability for the installation of all equipment, including but not limited to design, specification, all permits, installation, maintenance, performance and financing. By participating in the program and accepting incentive dollars, you agree to hold harmless the Market Manager and Administrator and their respective staffs with respect to the Project

MARKET MANAGER – TRC Energy Services is responsible for managing the New Jersey Clean Energy Commercial & Industrial Programs.

MEASUREMENT & VERIFICATION APPROVAL – Twelve months subsequent to the Incentive #2 Payment Submittal package approval date, measurement and verification of the projected energy reduction will be conducted by the Participating Customer's Partner using the project's post-installation utility data (supplied by the Customer). The Participating Customer must work with their Partner to submit the Incentive #3 Payment Submittal, consisting of the Post-Construction Benchmarking Report, Benchmarking Tool, and Request for Incentive #3 form. All components of the submittal package must be filled out completely, truthfully and accurately.

Upon review of the submittal package (by the Market Manager or agent thereof), the remaining 50% of the total performance-based incentive (Incentives #2 & #3) will be released to the Participating Customer. If the Post-Construction Benchmarking Report indicates that the project did not meet the minimum performance target, the post-installation completion period may be extended to up to twenty-four months subsequent to the Incentive Payment #2 package approval date. If after this time the minimum performance target is still not met, the final Incentive #3 will not be paid.

NEW JERSEY UTILITIES – The investor-owned 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.

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

PARTICIPATING CUSTOMER'S CERTIFICATION – Participating Customer agrees that all information is true and that he/she has conformed to all of the Program and equipment requirements per the Program Guidelines. Participating Customer certifies that he/she purchased and installed the equipment listed in the Energy Reduction Plan at their defined New Jersey project location.

PARTNER – An approved professional who provides technical building performance services to Participating Customers, acting as their “energy efficiency expert”. Participating Customers are required to hire an approved Pay for Performance Partner to develop the Energy Reduction Plan and facilitate installation of the recommended package of Energy-Efficient Measures. Participants are required to enter into a contractual agreement with a selected Partner which outlines the set of minimum services the Partner will provide to the Participating Customer throughout the life of the project. It is strongly recommended that Participating Customers perform due diligence in selecting a Pay for Performance Partner. Fees charged by the Partner are not regulated by the Program and could vary between Partners. Incentives may cover some, or potentially all, of the Partner fees.

PERFORMANCE-BASED INCENTIVES – The combination of Incentives #2 and #3, which are based on the projected and actual energy reduction performance of the project.

PERFORMANCE TARGET – A minimum of a 15% annual source energy savings must be achieved in order to participate. The performance target is based on reducing the total energy consumption for the facility. No more than 50% of the total source energy savings may be derived from lighting measures; up to 70% lighting savings may be considered but performance target will increase by 1% for each percent over 50% (e.g. project with 60% savings from lighting will have a minimum performance target of 25%). A 4% performance target may be offered to customers whose annual energy consumption is heavily weighted to manufacturing and process loads, as well as hospitals. This approach will be reviewed on a case-by-case basis and must be pre-approved by the Market Manager. In order to be considered, the project must involve: A manufacturing facility, including such industries as plastics and packaging, chemicals, petrochemicals, metals, paper and pulp, transportation, biotechnology, pharmaceutical, food and beverage, mining and mineral processing, general manufacturing, equipment manufacturers and data centers; and manufacturing and/or process-related loads, including data center consumption, consume 50% or more of total facility energy consumption. For hospitals, 50% or more of the gross floor area must be used for general medical and surgical services and 50% or more of the licensed beds must provide acute care services. The total energy savings may not come from a single measure. No more than 50% of the total source energy savings may be derived from non-investor owned utilities or fuels.

POST-INSTALLATION APPROVAL – After the complete installation of all measures in the Energy Reduction Plan, the Customer and their Partner must finalize and submit the Incentive #2 Payment Submittal, consisting of the Installation Report, invoices, and Request for Incentive #2 Payment form. All components of the submittal package must be filled out completely, truthfully and accurately. Upon review of the submittal package and verification of the complete installation of all measures in the Energy Reduction Plan (via inspection by the Market Manager or agent thereof), 50% of the total performance based incentive (Incentives #2 & #3) will be released to the Participating Customer. Upon approval of the submittal package, the Customer will receive an Incentive #2 approval letter indicating the date by which the post-installation Measurement & Verification phase began and will end (twelve to twenty four months in length).

The Market Manager reserves the right to verify sales transactions and to have reasonable access to Participating Customer's facility to inspect both pre-existing products 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 the service territory of one of the New Jersey Utilities (as defined by the Program) as designated on the Participating Customer's Pay for Performance application. Program Incentives are available for qualified Energy-Efficient Measures as listed and described in the Program Guidelines. The Participating Customer must ultimately own the equipment, either through an up-front purchase or at the end of a short-term lease.

PRE-INSTALLED MEASURES - An Energy Reduction Plan must be approved by the program and an approval letter sent to the customer in order for incentives to be committed. Upon receipt of an Energy Reduction Plan, all project facilities must be pre-inspected. Measures installed prior to pre-inspection of the facility shall not be included as part of the ERP scope of work and will not be eligible for incentive

Measure installation undertaken prior to ERP approval, but after pre-inspection, is done at the customer's own risk. In the event that an Energy Reduction Plan is rejected by the program, the customer will not receive any incentives.

PRODUCT INSTALLATION OR EQUIPMENT INSTALLATION – Installation of the Energy-Efficient Measures. Projects with a contract threshold of \$15,444 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 – New Jersey's Clean Energy Pay for Performance Program offered herein by the New Jersey Board of Public Utilities pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

PROGRAM GUIDELINES – See Pay for Performance Program Guidelines available from your Partner.

PROGRAM INCENTIVES – Refers to the amount or level of incentive that the Program provides to participating customers pursuant to the Program offered herein (see the description under “Incentive Amount” heading).

PROGRAM OFFER – The Program covers products purchased and/or services rendered on or after July 1, 2015.

PROJECT – A commercial or industrial existing building with peak demand in excess of 200 kW in any of the most recent preceding twelve months of electric usage, 100 kW for multifamily buildings. Multifamily building(s) must be four (4) stories or greater or three (3) stories and under having central heating, cooling, or metering serving more than one building. Refer to Multifamily Decision Tree.

TAX CLEARANCE CERTIFICATION – Businesses must apply for and receive a Tax Clearance Certificate from the New Jersey Division of Taxation before they can receive any incentive, grant or other financial assistance from the Program.

TAX LIABILITY – The Market 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 on the application form in addition to providing a copy of their W-9 form as part of the application package in order to receive a Program Incentive.

TERMINATION – New Jersey's Clean Energy Program reserves the right to extend, modify (this includes modification of Program Incentive levels) or terminate this Program without prior or further notice.

WARRANTIES – THE MARKET 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.

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 Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the Pay For Performance Program, including the release of electric and natural gas utility billing information, as well as make available to the public non-sensitive information. 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. This arrangement supersedes all other communications and representations.

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)




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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 improve and reduce energy usage with minimal expenditure of new financial resources.

Please review the [New Jersey's Clean Energy Program \(NJCEP\) and ESIP Interaction memo](#) and flow chart for recommendations on when to submit incentive applications to various NJCEP programs relative to the ESIP timeframe.

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

- [Local Government](#)
- [School Districts \(K-12\)](#)

All RFPs and final Energy Savings Plan (ESP) 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 case studies 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 SAVINGS 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).

- [Ocean Township Board of Education:](#)
 - [Part 1](#)
 - [Part 2](#)
 - [Part 3](#)
 - [Part 4](#)
- [Tabernacle Board of Education](#)
- [Robbinsville Board of Education](#)
- [Frankford Township School District](#)
- [Northern Hunterdon-Voorhees Regional High School](#)
- [Manalapan Township \(180 MB - Right Click, Save As\)](#)


Program Updates

- [Notice of Fiscal Year 2016 Program Changes](#)

[Other updates posted.](#)


Program Literature
[Applications and Brochures](#)
[Download the Latest Program Materials](#)


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[Panasonic Corporation of North America](#)
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APPENDIX E

Photovoltaic Analysis

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Carteret Board of Education Nathan Hale School

Cost of Electricity	\$0.123	/kWh
Electricity Usage	447,873	kWh/yr
System Unit Cost	\$4,000	/kW

Note: this is equal to the annual kWh consumption for the bldg.

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary	Annual Utility Savings				Estimated	Total		New Jersey	Payback	Payback
Cost					Maintenance	Savings	Federal Tax	Renewable	(without	(with
					Savings		Credit	** SREC	incentive)	incentive)
\$	kW	kWh	therms	\$	\$	\$	\$	\$	Years	Years
\$120,000	30.0	38,247	0	\$4,704	0	\$4,704	\$0	\$6,502	25.5	10.7

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= \$170 /1000kwh

Area Output*

1,063 m2
11,442 ft2

Perimeter Output*

177 m
581 ft

Available Roof Space for PV:

(Area Output - 10 ft x Perimeter) x 85%
4,784 ft2

Approximate System Size:

Is the roof flat? (Yes/No) Yes

8 watt/ft2
38,271 DC watts
30 kW

Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle 20 pitched - enter estimated roof angle)
Array Azimuth 180 Enter into PV Watts (default)
Zip Code 07008 Enter into PV Watts
DC/AC Derate Factor 0.83 Enter info PV Watts



PV Watts Output

38,247 annual kWh calculated in PV Watts program

% Offset Calc

Usage 447,873 (from utilities)
PV Generation 38,247 (generated using PV Watts)
% offset 9%

* <http://www.freemaptools.com/area-calculator.htm>

** <http://www.flettexchange.com>

*** http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html



Cautions: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at <http://sam.nrel.gov>) that allow for more precise and complex modeling of PV systems.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

The names DOE/NREL/ALLIANCE shall not be used in any representation, advertising, publicity or other manner whatsoever to endorse or promote any entity that adopts or uses the Model. DOE/NREL/ALLIANCE shall not provide

any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

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RESULTS

38,247 kWh per Year *

Month	Solar Radiation (kWh / m ² / day)	AC Energy (kWh)	Energy Value (\$)
January	2.78	2,259	339
February	3.52	2,556	383
March	4.34	3,398	510
April	4.95	3,620	543
May	5.69	4,177	627
June	5.86	4,057	609
July	5.73	4,050	607
August	5.47	3,833	575
September	4.91	3,424	514
October	3.99	2,974	446
November	2.68	2,021	303
December	2.35	1,879	282
Annual	4.36	38,248	\$ 5,738

Location and Station Identification

Requested Location	678 Roosevelt Ave., Carteret, NJ 07008
Weather Data Source	(TMY2) NEWARK, NJ 9.4 mi
Latitude	40.7° N
Longitude	74.17° W

PV System Specifications (Commercial)

DC System Size	30 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	20°
Array Azimuth	180°
System Losses	14%
Inverter Efficiency	96%
DC to AC Size Ratio	1.1

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.15 \$/kWh
Initial Cost	4.00 \$/Wdc
Cost of Electricity Generated by System	0.19 \$/kWh

Selected Incentives

Capacity Based Incentives (CBI)	New Jersey Renewable Energy Incentive Program Rate: \$0.75 - Maximum Amount: \$5,625.00
---------------------------------	--------------------------------------------------------------------------------------------

These values can be compared to get an idea of the cost-effectiveness of this system. However, system costs, system financing options (including 3rd party ownership) and complex utility rates can significantly change the relative value of the PV system.

APPENDIX F

Photos



1: Nathan Hale School



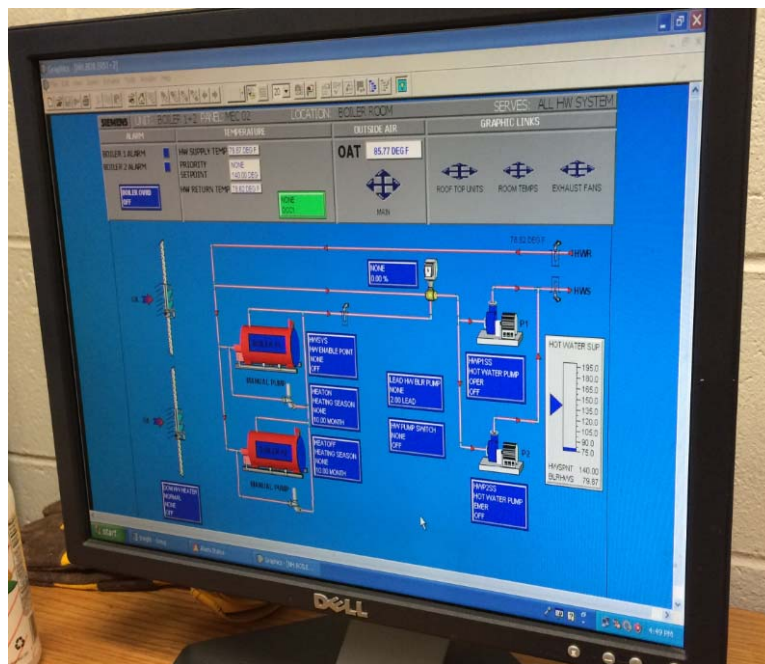
2: A pair of unit ventilators that serve the library



3: Attic space with opportunity for insulation



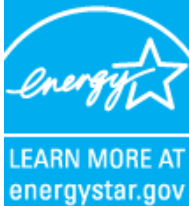
4: Mammoth rooftop unit



5: Siemens DDC temperature controls screen

APPENDIX G

EPA Benchmarking Report



ENERGY STAR[®] Statement of Energy Performance

98

ENERGY STAR[®]
Score¹

Nathan Hale School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 51,539
Built: 1922

For Year Ending: April 30, 2015
Date Generated: June 05, 2015

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

Nathan Hale School
678 Roosevelt Ave
Carteret, New Jersey 07008

Property Owner

,
(____)____-____

Primary Contact

,
(____)____-____

Property ID: 4439925

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

48.3 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	439,214 (18%)
Natural Gas (kBtu)	2,051,050 (82%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	103.6
National Median Source EUI (kBtu/ft ²)	147
% Diff from National Median Source EUI	-53%

Source EUI

68.5 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	168
---------------------------------------------------------------	-----

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)