

HOPEWELL VALLEY REGIONAL SCHOOL DISTRICT

HOPEWELL VALLEY CENTRAL HIGH SCHOOL

259 Pennington-Titusville Road, Pennington, NJ 08534

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

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CHA PROJECT NO. 28724

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

Building Name	Address	Square Feet	Construction Date
Hopewell Valley Central High School	259 Pennington-Titusville Road, Pennington, NJ 08534	220,000	1955, 1961,1974,1997 ,2004

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)
Hopewell Valley Central High School	292,799	2,936	43,752	16

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

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

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

Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs (\$)	Est. Savings (\$/year)	Payback w/o Incentive	Potential Incentive (\$)*	Payback w/ Incentive	Recommended
1	Roof Replacement	2,234,300	11,762	190.0	0	190.0	N
2	Replace Modular Boilers with Condensing Boilers	108,281	2,775	39.0	2,000	38.3	Y
3	Install VRV into Classrooms	3,192,000	33,346	95.7	13,000	95.3	N
4	Premium Efficiency Motors & VFDs	11,188	1,256	8.9	900	8.2	Y
5	DCV for RTU-16 and RTU-17	17,300	915	18.9	0	18.9	Y
6	Walk-In Freezer & Cooler Controls	20,625	1,198	17.2	100	17.1	Y
7	Vending Machine Controls	1,120	1,349	0.8	0	0.8	Y
8	Kitchen Hood Controls	30,787	947	32.5	0	32.5	Y
9	Convert Electric Dishwasher Booster Heater to Natural Gas	13,800	2,025	6.8	1,700	6.0	Y
10	Replace DHW-1 with High Efficiency Condensing Boiler	7,881	125	63.1	300	60.7	Y
L1**	Lighting Replacements	477,394	29,631	16.1	42,320	14.7	N
L2**	Lighting Controls	14,492	7,623	1.9	2,260	1.6	N
L3	Lighting Replacements with Controls	491,886	33,165	14.8	44,580	13.5	Y
Total**		6,129,169	88,860	69	62,580	69	
Total (Recommended)		702,869	43,752	16	49,580	15	

* Incentive shown is per the New Jersey SmartStart Program.

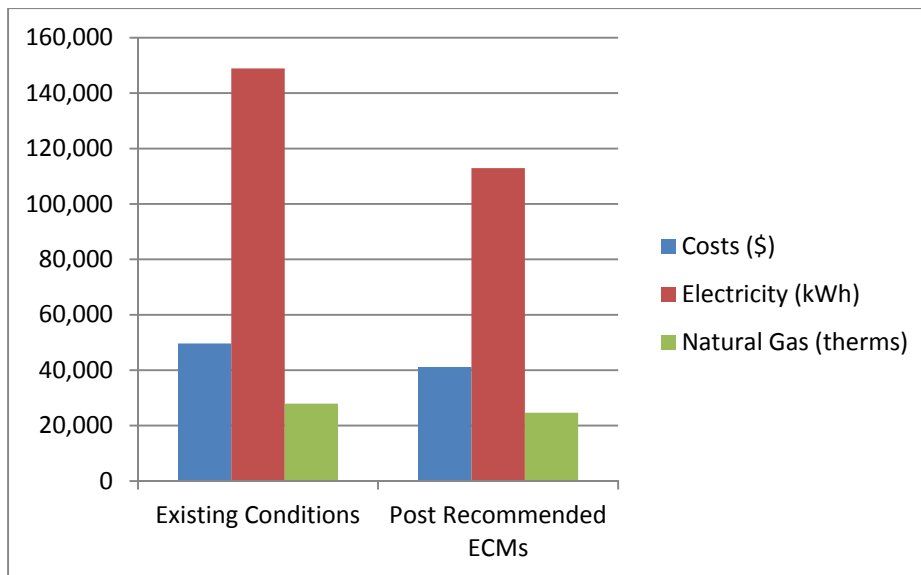
** These ECMs are not included in the Total, as they are alternate measures not recommended.

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

- Photovoltaic (PV) Rooftop Solar Power Generation – 820 kW System

If Hopewell Valley Regional School District implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	416,529	372,777	11%
Electricity (kWh)	2,192,806	1,900,007	13%
Natural Gas (therms)	123,706	120,770	2%
Site EUI (kbtu/SF/Yr)	90.2	84.4	



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: Hopewell Valley Central High School

Address: 259 Pennington-Titusville Road, Pennington, NJ 08534

Gross Floor Area: 220,000 Square Feet

Number of Floors: 1

Year Built: 1955

Additions: 1961, 1974, 1997, and 2004



Description of Spaces: Classrooms, offices, cafeteria, kitchen, media center, gymnasium, auto shop, wood shop, auditorium, computer lab, storage rooms, toilet rooms and a mechanical room.

Description of Occupancy: The school serves 1,200 students from 9th to 12th grade. There are 155 school faculty and staff members.

Number of Computers: The school has approximately 263 desktop and laptop computers.

Building Usage: Hours of operation are 7:45 AM – 2:45 PM Monday through Friday, with various after-school activities until 6:00 PM. Custodians are in the building until 11:00 each night. In general the occupied hours are considered 75 hours per week, 10 months per year

Building Envelope

Construction Materials: The building is constructed of structural steel framing with masonry block and brick exterior and masonry block interior walls. Exterior walls are insulated per the code at the time of construction.

Roof: The roof is steel framing, steel deck, and rigid insulation under a black colored rubber membrane. The roof is in fair condition. An ECM was evaluated to replace roof and increase the insulation value.

Windows: The windows are double glazed with aluminum frames. The windows have been retrofitted with an architectural window film on the exterior surface to reject heat gain. The windows are in good condition and therefore no ECMs are evaluated

Exterior Doors: The main entrance doors are double glazed storefront glass with aluminum frames. All other exterior doors are fiberglass reinforced plastic metal with double pane safety glass. Seals and sweeps on exterior doors are in good condition and no ECMs were evaluated.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: The heating system is hot water and consists of twenty-three (23) Hydrotherm modular boilers, with two banks of eight and one bank of seven. The boilers operate on natural gas and the two banks have a capacity of 2,400,000 BTUH, while the 3rd has a capacity of 2,100,000 BTUH. Boiler combustion efficiency is estimated at 80% based on nameplate information. These boilers were installed in 2002. Based on the efficiency, an ECM was included to replace a bank of these boilers with a high efficiency gas fired condensing boiler. Heating hot water serves air handling units and unit ventilators. The school has (5) zones that receive hot water from base mounted pumps that are constant flow. These pumps are 5 HP and 1.5 HP respectfully. An ECM is included to replace the existing motors with NEMA premium efficiency motors.

Classrooms are heated by unit ventilators having hot water coils and the air is distributed by blower fans. An ECM is included to analyze replacing the unit ventilator with a VRV heat pump that uses variable refrigerant flow control to maintain temperature in each classroom.

Cooling: The building is 100% cooled using direct expansion cooling systems. The main air handling units are provided with remote condensing units on the roof. Several classrooms have retrofitted unit ventilators with DX coils to supply cold air to classrooms. The remainder of the school and several large spaces such as the gym, cafeteria and auditorium are cooled using DX packaged rooftop units. These units install date ranges from 1996 – 2002. According to ASHRAE these units still have useful life. No ECM was included to assess the cooling systems of the high school.

A few IT rooms utilized window air conditioning units to help keep the servers and equipment cool.

Ventilation: The kitchen and old gym have makeup air units having electric re-heat coils and no cooling. Pre-heated outdoor air is distributed to each space via a ducted distribution system. The larger spaces that are served by the packaged heating and cooling rooftop units are ventilated by these same units. The new Gymnasium is served by RTU's #16 and #17, and an ECM is included which assesses the opportunity for demand controlled ventilation.

The classrooms are currently ventilated by the fresh air intake connected to each unit ventilator. An ECM is included to utilize a unique design strategy that incorporates both air-to-air heat exchange in combination with demand controlled ventilation.

Exhaust: The facility utilizes exhaust fans of various sizes located on the roof to exhaust air from restrooms and storage areas. The kitchen has dedicated exhaust fans for the hood and the dishwasher.

Controls Systems

The High School has a full CM3 DDC building management system. A review of the system indicates that it allows for space temperature set points and scheduling of each air handling unit within the building. Economizer operation is incorporated. The heating system is capable of night-time setback, allowing for higher or lower unoccupied space temperatures to consume less energy, depending upon the season. The system ties together all the data at one front end and provides trending, alarms, graphic display, control logic and reports. As is appears the controls are well managed, no ECM is evaluated.

Domestic Hot Water Systems

Domestic hot water (DHW) is generated by (8) water heaters. Three (3) Lochinvar gas-fired high efficiency heaters with an input of 300,000 btu/h and a thermal efficiency of 85% serve the kitchen. Hot water is stored in a 100 gallon storage tank. One (1) A.O. Smith gas fired water heater with an input of 179,000 BTU/H, a capacity of 86 gallons and a thermal efficiency of 80% serves M400 & W400 restrooms. One (1) Lochinvar gas-fired high efficiency heaters with an input of 1.5 MBH and a thermal efficiency of 87% serve an area of the school. One (1) A.O. Smith gas fired water heater with an input of 660,000 BTU/H and a thermal efficiency of 82% serves the main portion of the school. This unit was installed in 2006. The performing arts center restrooms are served by an electric Lochinvar heater that has a capacity of 250 gallons and input of 18 kW. A few restrooms are served by an electric Rheem heater that has a capacity of 6 gallons and input of 2 kW. This unit was installed in 2005.

An ECM was included to replace the heater serving the main portion of the school with a condensing gas fired high efficiency heater.

Kitchen Equipment

Hopewell Valley Central High School has a full cooking kitchen. Meals are prepared daily using gas double ovens, fryers and several microwave ovens. The kitchen has a 12 foot by 6 foot and 10 foot by 6 foot hood which is connected to a roof mounted up-blast fan. The kitchen is equipped with a commercial dishwasher utilizing a 54 kW booster heater for drying dishes. Food is stored in both walk-in type cooler/ freezers and side-by-side cooler/ freezers.

An ECM was evaluated to add controls to the walk-in cooler and freezer to better control the cycle time of the compressor. Another ECM was evaluated to install kitchen hood controls to better control the exhaust fan speed during times when cooking isn't occurring.

Plug Load

This school has computers, LCD monitors copiers, smart boards, residential appliances (microwave, refrigerator), printers, portable electric heaters (personal) and vending machines which contribute to the plug load in the building. The installation of vending machine occupancy sensors has been evaluated in an effort to reduce the plug load in the building.

Plumbing Systems

Plumbing systems include multiple staff and student toilet rooms and the kitchen. Toilet rooms are all equipped with low water consumption fixtures, 1.0 GPF or waterless urinals and 1.6 GPF water closets. Lavatory sinks have 2.2 GPM metering type faucets.

No ECMs were evaluated for the plumbing system due to the fact they currently have low flow fixtures.

Lighting Systems

The classroom lighting consists of 2 X 4 recessed troffers having 32W T8 fluorescent lamps with prismatic lenses. Restrooms are illuminated by recessed can fixtures having 1 lamp 23 watt CFL lamps. High-bay area such as the gym and auto shop is provided with 54W T5 fluorescent lamps. All interior lighting is manually controlled by wall switches with the exception of a few spaces in the performing art center addition.

Exterior lighting includes 400 watt metal halide spot lamps Exterior lighting is controlled by photocells mounted on the light fixtures.

Three lighting ECMs have been included which include 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

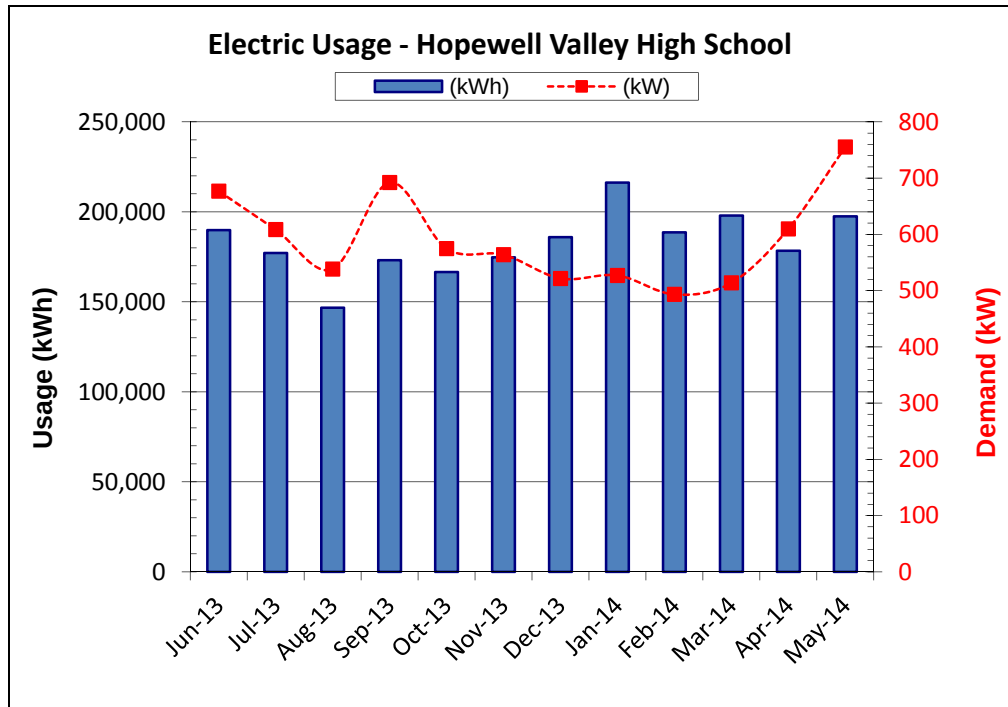
For the 12-month period ending in May 2014, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	2,192,806	kWh
Annual Cost	287,060	\$
Blended Unit Rate	0.131	\$/kWh
Supply Rate	0.110	\$/kWh
Demand Rate	6.51	\$/kW
Peak Demand	755.3	kW
Natural Gas Acct. #851144371		
Annual Consumption	117,708	Therms
Annual Cost	122,281	\$
Unit Rate	1.039	\$/therm
Natural Gas Acct. #3977835601		
Annual Consumption	5,998	Therms
Annual Cost	7,188	\$
Unit Rate	1.198	\$/therm

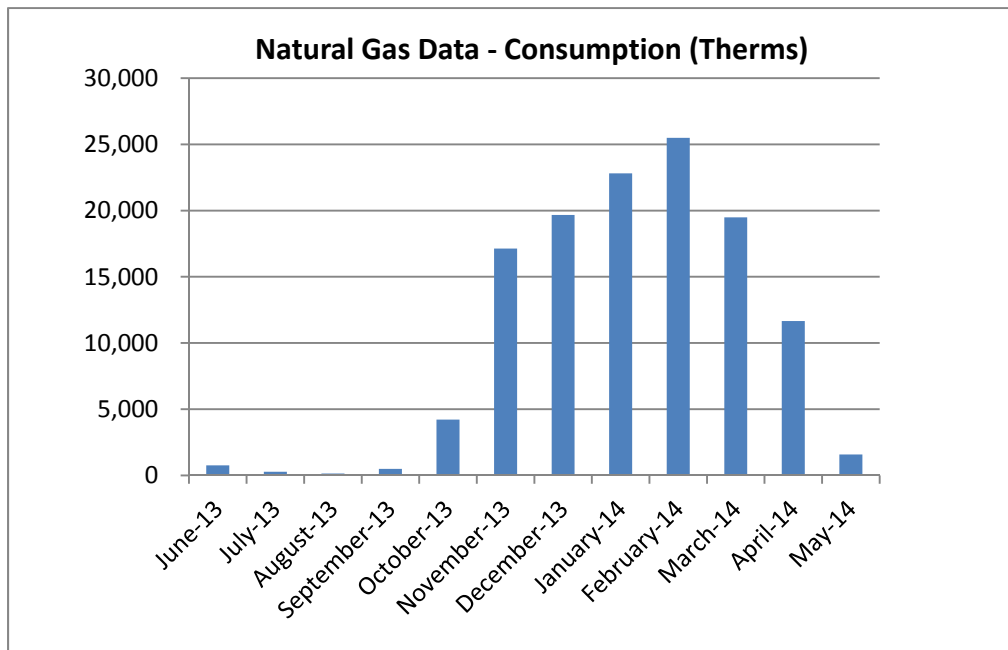
Blended Rate: Average rate charged determined by the annual cost / annual usage

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

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



The electrical usage for this building remains fairly constant month to month. Demand spikes can be seen in May, June, and September, which correspond with high cooling load during a period of high occupancy (summer building usage is low to moderate). There are also some small peaks during winter months which could be caused by portable electric heaters or added electrical motor usage.



The natural gas usage is mostly driven by space heating in the winter months with a small amount of baseline usage during the summer months. The baseline is split between the domestic hot water generation and kitchen equipment. It is difficult to separate the DHW and kitchen usage using the utility bills alone.

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	School Average Rate	NJ Average Rate	
Electricity	\$/kWh	\$0.13	\$0.13	N
Natural Gas	\$/Therm	\$1.05	\$0.96	Y

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

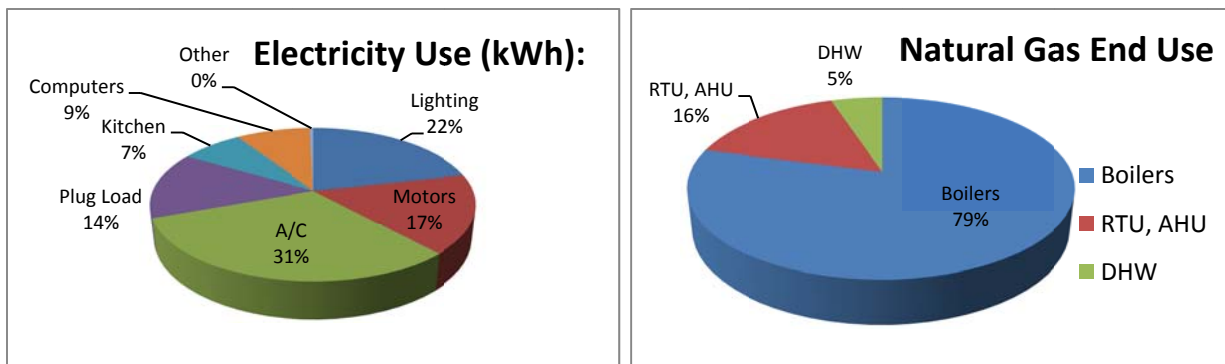
Additional information on selecting a third party energy supplier is available here:

<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.

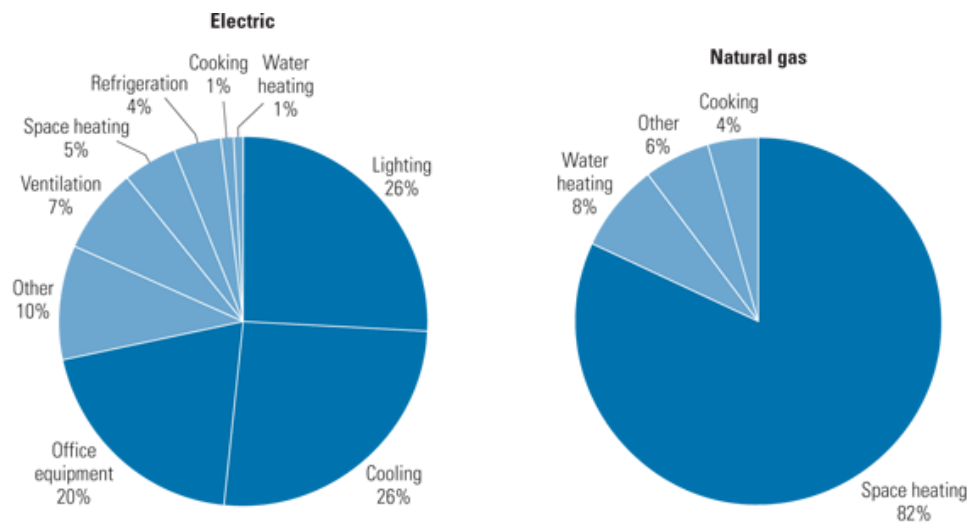
Site End-Use Utility Profile



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

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

Typical End-Use Utility Profile for Educational Facilities



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

4.0 BENCHMARKING

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

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

Building	Site EUI kBtu/ft ² /yr	Source EUI Btu/ft ² /yr	Energy Star Rating (1-100)
Hopewell Valley Central High School	36.7	109.6	77

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

5.0 ENERGY CONSERVATION MEASURES

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

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

Energy savings were quantified in the form of:

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

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

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

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

5.1 ECM-1 Replace Roof and Add Insulation

Approximately 90,000 sq.ft. of the building roof is constructed of metal roof decking, insulation, and rolled asphalt membrane system. This roof has reached the end of its useful life and should be replaced. This ECM addresses replacing this roof and increasing the insulation thickness to minimize heating and cooling energy losses.

To calculate the savings, the heat losses through the roof assembly of the school was found using the existing roof's R-value of 13.0 and bin weather data for nearby Newark, NJ. The values were totaled to determine the existing annual energy losses. Heating and cooling energy loss values were then determined with a thermal resistance which included the replacement roof R-value of 30.0. The annual energy savings of replacing the roof is detailed in the summary table below.

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

ECM-1 Replace Roof and Add Insulation

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
2,234,300	0	10,589	9,909	11,762	(0.9)	0	190.0	190.0

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

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

5.2 ECM-2 Replace Modular Boilers with High Efficiency Condensing Boiler

The heating system consists of twenty-three (23) Hydrotherm modular hot water boilers, with two banks of eight and one bank of seven. It is recommended that the bank of seven (7) modular boilers be replaced by one condensing high efficiency boiler of equivalent capacity. New modulating condensing gas boilers are available that operate at a minimal efficiency of 88%, and can operate as high as 96%, depending upon the outdoor air temperature.

To implement this ECM, one row of existing boilers and venting would be removed and the new hot water boiler installed in their place. Some localized piping and wiring would be required. New dedicated boiler venting would also need to be installed either through the roof or sidewall. It is possible that asbestos abatement may need to be performed prior to any work and the cost for this is not included in the payback analysis.

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

ECM-2 Replace Modular Boilers with High Efficiency Condensing Boiler

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
108,281	0	0	2,650	2,775	(0.4)	2,000	39.0	38.3

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

This measure is not recommended due to the high cost and long payback. As long as the boilers are maintained properly they should continue to operate beyond their service life. This ECM should only be pursued if a major portion of the heating system, such as the distribution piping, fails in the future.

5.3 ECM-3 Install VRV, DCV, and Air-to-Air Heat Exchangers in Classrooms

The majority of classrooms in the high school are heated, cooled, and ventilated by floor mounted unit ventilators. These units provide hydronic heating and DX cooling, and draw in outside air through a louver in the exterior wall. Most of these units have reached the end of their useful lives (according to ASHRAE), and are notorious for being noisy, inefficient, and drafty.

It is recommended that classrooms be upgraded with new equipment to provide heating, cooling, and ventilation in an energy efficient manner. This ECM examines three (3) technologies that when combined together into one classroom can provide significant energy savings. 1) It is recommended that a Variable Refrigerant Volume (VRV) system be installed into the existing classrooms. VRV is an applied cooling/heating system that distributes refrigerant to fan coil units in conditioned spaces. VRV condensing units have high efficiency variable speed “inverter” compressors coupled with inverter fan motors for superior system part load performance. The system is designed to transfer heat from spaces that reject it to spaces that need it. In this manner, over-all VRV system size is smaller than conventional systems serving equivalent footprints, and energy is saved. 2) It is recommended that a Demand Controlled Ventilation system (DCV) be installed into each classroom. DCV ensures adequate outdoor air by monitoring the CO₂ levels in the space and controlling either damper openings or fan speeds to provide sufficient ventilation without wasting energy. 3) Finally, it is recommended that a highly efficient air-to-air heat exchanger, as manufactured by Building Performance Equipment Inc., be installed into each classroom. These direct counter flow heat exchangers temper incoming outside air with exiting exhaust air at a rated efficiency of 85%. The speed of the inline fans is controlled in response to classroom CO₂ levels by vari-speed controllers. Thus, some of the thermal energy that is currently exhausted directly out of the building will be conserved.

Implementation of this ECM will entail insulating and blanking off of the existing outdoor air louver, and removing the UV fans and condensing units. Penetrations will need to be made in walls for new louvers and to run refrigerant piping. VRV fan coils and ancillary equipment, piping, ductwork and wiring will need to be installed in ceiling spaces; and condensing units will need to be installed on concrete housekeeping pads outside. Asbestos abatement may need to be performed prior to any work and the cost for this is not included in the payback analysis.

The order of magnitude implementation costs and savings related to these ECMs are detailed in Appendix H and summarized below:

ECM-3 Install VRV, DCV, and Air-to-Air Heat Exchangers in Classrooms

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
3,192,000	21	122,898	17,381	33,346	(0.8)	13,000	95.7	95.3

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

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

5.4 ECM-4 Install Premium Efficiency Motors & VFDs on Hot Water Pumps

The existing 5.0 HP base mounted U.S. Motors hot water pumps serving the school are not controlled by variable frequency drives (VFDs). Ideally pumps are perfectly selected to match the needs of a system operating a maximum capacity. Most times 1) pumps are over-sized somewhat for safety, and 2) the system is operating at less than full heating capacity. VFDs allow pumps to run at slower RPMs to better meet the needs of the system and in the process, energy is saved.

To implement this ECM, the existing pumps would be removed and new pumps and VFDs installed in their place. Piping and wiring modifications would be needed.

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

ECM-4 Install Premium Efficiency Motors & VFDs on Hot Water Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
11,188	5.3	7,659	0	1,256	(0.5)	900	8.9	8.2

* 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 Demand Controlled Ventilation for RTU-16 and RTU-17

RTU's #16 and #17, which serve new Gymnasium, could provide an energy savings with the implementation of demand controlled ventilation. HVAC systems serving larger spaces such as lecture halls, libraries, auditoriums and music halls have the capacity to provide ventilation (outdoor) air to the space based on occupancy levels. By implementing a Demand Controlled Ventilation strategy, carbon monoxide sensors are used to monitor carbon dioxide (CO2) levels which then control the outdoor air damper

position to maintain an acceptable level of CO₂ (typically 700 parts per million [ppm]), which is an indicator of good indoor air quality. As the occupancy levels increase, the outdoor air dampers will open and introduce more fresh air. When the space is not occupied, the dampers will close. Energy savings will result from the reduction in heating and cooling of the outdoor air.

The energy savings calculated below are based on estimated outdoor air flow rates (taken from design documents, when available) and the average reduction in outdoor air flow that would occur when implementing DCV if the space was currently being properly ventilated. A further detailed study is required to determine actual ventilation flow rates, space ventilation requirements, and room usage scheduling to determine more accurate energy savings potential.

The order of magnitude implementation costs and savings related to these ECMs are detailed in Appendix H and summarized below:

ECM-5 Demand Controlled Ventilation for RTU-16 and RTU-17

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
17,300	0	3,501	436	915	(0.2)	0	18.9	18.9

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

This measure is recommended.

5.6 ECM-6 Install Walk-in Cooler / Freezer Controls

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-6 Install Walk-in Cooler / Freezer Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
20,625	0	9,142	0	1,198	(0.7)	100	17.2	17.1

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

This measure is recommended.

5.7 ECM-7 Install Vending Misers

The building presently has three (3) cold beverage and one (1) snack type vending machines.

These vending machines operate continuously 24 hours per day, seven (7) days a week. Installing controls such as timers or occupancy sensors allow the machines to turn on only when a customer is present or when the compressor must run to maintain the product at the desired temperature. By implementing this measure electrical energy savings could be realized.

The calculation uses electrical consumption and annual electrical cost as the baseline, vs. the reduced electrical consumption and cost for the proposed case. The difference between the two values is the energy savings.

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

ECM-7 Install Vending Machine Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
1,120	0	10,295	0	1,349	11.0	0	0.8	0.8

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

This measure is recommended.

5.8 ECM-8 Install Kitchen Hood Controller

The kitchen contains one 12'x6' (approximate size) and one 10'x6' range exhaust hood that is ducted and exhausted via an exhaust fan located on the roof.

Installing a variable speed hood control system was evaluated. Upon activation of the system, the hood lights will turn on and the fans reach a preset minimum speed of 10 and 50 percent. When cooking appliances are turned on, the fan speed will increase based on temperature sensed in the exhaust duct. During cooking, an optical sensor will sense particulates entering the hood and the speed will increase to 100 percent until smoke and heat are removed.

Energy saving is calculated from reduction of exhaust fan speed and the amount of heated air diffused from other heated rooms.

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

ECM-8 Install Kitchen Hood Controller

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
30,787	0	1,387	730	947	(0.7)	0	32.5	32.5

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

This measure is recommended.

5.9 ECM-9 Convert Electric Dishwasher Booster Heater to Natural Gas

The High School uses a 54 kW electric dishwasher booster heater to increase the temperature of the incoming hot water from 140 degrees to 180 degrees. The school typically uses this heater for four (4) hours per day for 180 days per year, over a ten (10) month period. Natural gas is available for this conversion. Energy cost savings would be achieved through the lower cost of natural gas versus the higher cost of electricity.

The calculation uses electrical consumption and annual electrical cost as the baseline, which was converted to natural gas for the proposed case. The difference between the two values is the energy savings.

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

ECM-9 Convert Electric Dishwasher Booster Heater to Natural Gas

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
\$	kW	kWh	Therms	\$	%	\$	Years	Years
13,800	0	23,447	-1,000	2,025	0.5	1700	6.8	6.0

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

This measure is recommended.

5.10 ECM-10 Replace DHW-1 with Gas Fired Condensing Water Heater

One (1) A.O. Smith gas fired water heater with an input of 660,000 BTU/H and a thermal efficiency of 82% serves the main portion of the school. It is recommended that this water heater be replaced by a more efficient domestic hot water heater. New water heaters are currently available that can operate with thermal efficiencies as high as 96%.

Implementation of this ECM will entail replacing the existing DHW heater with a high efficiency condensing instantaneous water heater in its place. The tank size of the existing system will be reduced which will result in a combined savings from reducing the storage losses as well as reducing the overall fuel consumption.

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

ECM-10 Replace DHW-1 with Gas Fired Condensing Water Heater

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
\$	kW	kWh	Therms	kGal	\$		\$	Years	Years
7,881	0	0	119	0	125	(0.8)	300	63.1	60.7

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

This measure is not recommended due to the long payback and due to the fact that the metered type faucets are fairly new.

5.11.1 ECM-L1 Lighting Replacement / Upgrades

The classroom lighting consists of 2 X 4 recessed troffers having 32W T8 fluorescent lamps with prismatic lenses. Restrooms are illuminated by recessed can fixtures having 1 lamp 23 watt CFL lamps. High-bay area such as the gym and auto shop is provided with 54W T5 fluorescent lamps. Recent technological improvements in light emitting diode (LED) technologies have driven down the initial costs making it a viable option for installation.

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	Total				
\$	kW	kWh	Therms	\$		\$	Years	Years
477,394	90	205,236	0	29,631	(0.3)	42,320	16.1	14.7

* 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.

5.11.2 ECM-L2 Install Lighting Controls (Occupancy Sensors)

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

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in 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
14,492	0	69,298	0	7,623	5.3	2,260	1.9	1.6

* 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.

5.11.3 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
491,886	90	237,368	0	33,165	(0.2)	44,580	14.8	13.5

* 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.

5.12 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:

- Install Covers on Window Air Conditioners
- Clean Window AC filters before each season
- Perform a steam trap assessment yearly to ensure steam traps are functioning properly.
- Replace Unit Ventilator filters at least twice a year
- Clear surface above unit ventilators of materials, plants, or books
- Set computers monitors to turn off and computers to sleep mode when not in use
- Look for the ENERGY STAR® label when purchasing Window AC units or Kitchen Appliances
- Disconnect unnecessary or unused small appliances and electronics when not in use to reduce phantom loads
- Train custodians to turn off lights and set HVAC temperatures to minimum levels when rooms are unoccupied
- Develop an Energy Master Plan to measure and track energy performance
- Educate students and staff about how their behavior affects energy use. Create student energy patrols to monitor and inform administration when energy is being wasted.
- During the winter, Custodians should ensure all windows are closed as part of cleaning routine

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

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

6.1.1 New Jersey Smart Start Program

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

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

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

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

6.1.2 Direct Install Program

The Direct Install Program applies to smaller facilities that have a peak electrical demand of 200 kW or less in any of the previous 12 months. Buildings must be located in New Jersey and served by one of the state's public, regulated electric utility companies.

Direct Install is funded through New Jersey's Clean Energy Program and is designed to provide capital for building energy upgrade projects to fast track implementation. The program will pay up to 70% of the costs for lighting, HVAC, motors, refrigeration, and other equipment upgrades with higher efficiency alternatives. If a building is eligible for this funding, the Direct Install Program can reduce the implementation cost of energy conservation projects.

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

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

The building does not qualify for this program because its electrical demand is more 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)
103,615	820

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 – 10 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	
3,280,000	820	1,028,784	0	134,678	168,721	24.4	10.8	Y

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.

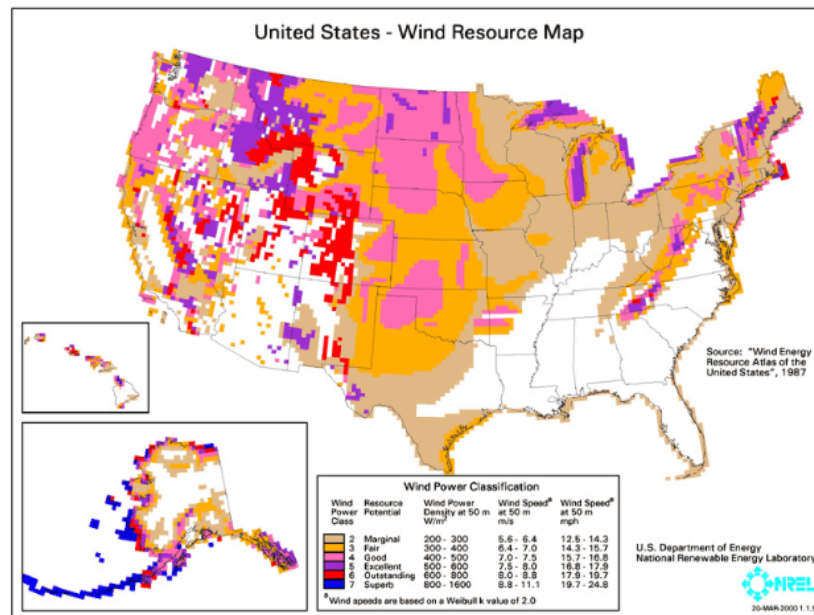
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping). 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 school is very small. Installing a solar domestic hot water system is not recommended due to the limited amount of domestic hot water presently consumed by the school.

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

7.2 Wind Powered Turbines

Wind power is the conversion of kinetic energy from wind into mechanical power that is used to drive a generator which creates electricity by means of a wind turbine. A wind

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



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

7.3 Combined Heat and Power Plant

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

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The building has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter; however thermal

usage during the summer months does not exist. Thermal energy produced by the CHP plant in the warmer months will be wasted. An absorption chiller could be installed to utilize the heat to produce chilled water; however, there is no chilled water distribution system in the building. CHP is not recommended due to the building's limited summer thermal demand.

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

7.4 Demand Response Curtailment

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

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

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From 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
755.3	498.2	589.6	N	Y

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

8.0 CONCLUSIONS & RECOMMENDATIONS

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

The following projects should be considered for implementation:

- Install Basic DDC Controls
- Install Window A/C Controller
- Install Door Sweeps and Seals
- Lighting Replacements with Controls (Occupancy Sensors)

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

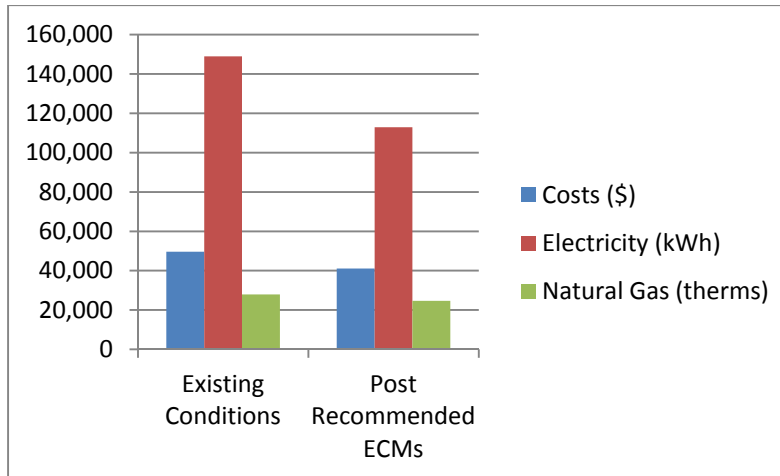
Electric Savings (kWh)	Natural Gas Savings (therms)	Total Savings (\$)	Payback (years)
292,799	2,936	43,752	16

The following alternative energy measures are recommended for further study:

- Photovoltaic (PV) Rooftop Solar Power Generation – 820 kW System

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs (\$)	416,529	372,777	11%
Electricity (kWh)	2,192,806	1,900,007	13%
Natural Gas (therms)	123,706	120,770	2%
Site EUI (kbtu/SF/Yr)	90.2	84.4	



Next Steps: This energy audit has identified several areas of potential energy savings. Hopewell Valley Regional School District can use this information to pursue incentives offered by the NJBPU's NJ Clean Energy Program. Additional meetings will be scheduled with Hopewell Valley Regional School District staff members to review possible options.

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Hopewell Valley Central High School
259 Pennington-Titusville Road, Pennington, NJ 08534

Annual Utilities
12-month Summary

Electric		
Annual Usage	2,192,806	kWh/yr
Annual Cost	287,060	\$
Blended Rate	0.131	\$/kWh
Consumption Rate	0.110	\$/kWh
Demand Rate	6.51	\$/kW
Peak Demand	755.3	kW
Min. Demand	493.2	kW
Avg. Demand	589.6	kW
Natural Gas		
Annual Usage	123,706	Therms/yr
Annual Cost	129,469	\$
Rate	1.047	\$/Therm

Hopewell Valley Central High School
259 Pennington-Titusville Road, Pennington, NJ 08534

Utility Bills: Account Numbers

<u>Account Number</u>	<u>School Building</u>	<u>Location</u>	<u>Type</u>	<u>Notes</u>
42-176-010-18	Hopewell Valley Central High School	259 Pennington-Titusville Road, Penningto	Electricity	
3977835601	Hopewell Valley Central High School	259 Pennington-Titusville Road, Penningto	Natural Gas	
851144371	Hopewell Valley Central High School	259 Pennington-Titusville Road, Penningto	Natural Gas	

Hopewell Valley Central High School
259 Pennington-Titusville Road, Pennington, NJ 08534

For Service at:

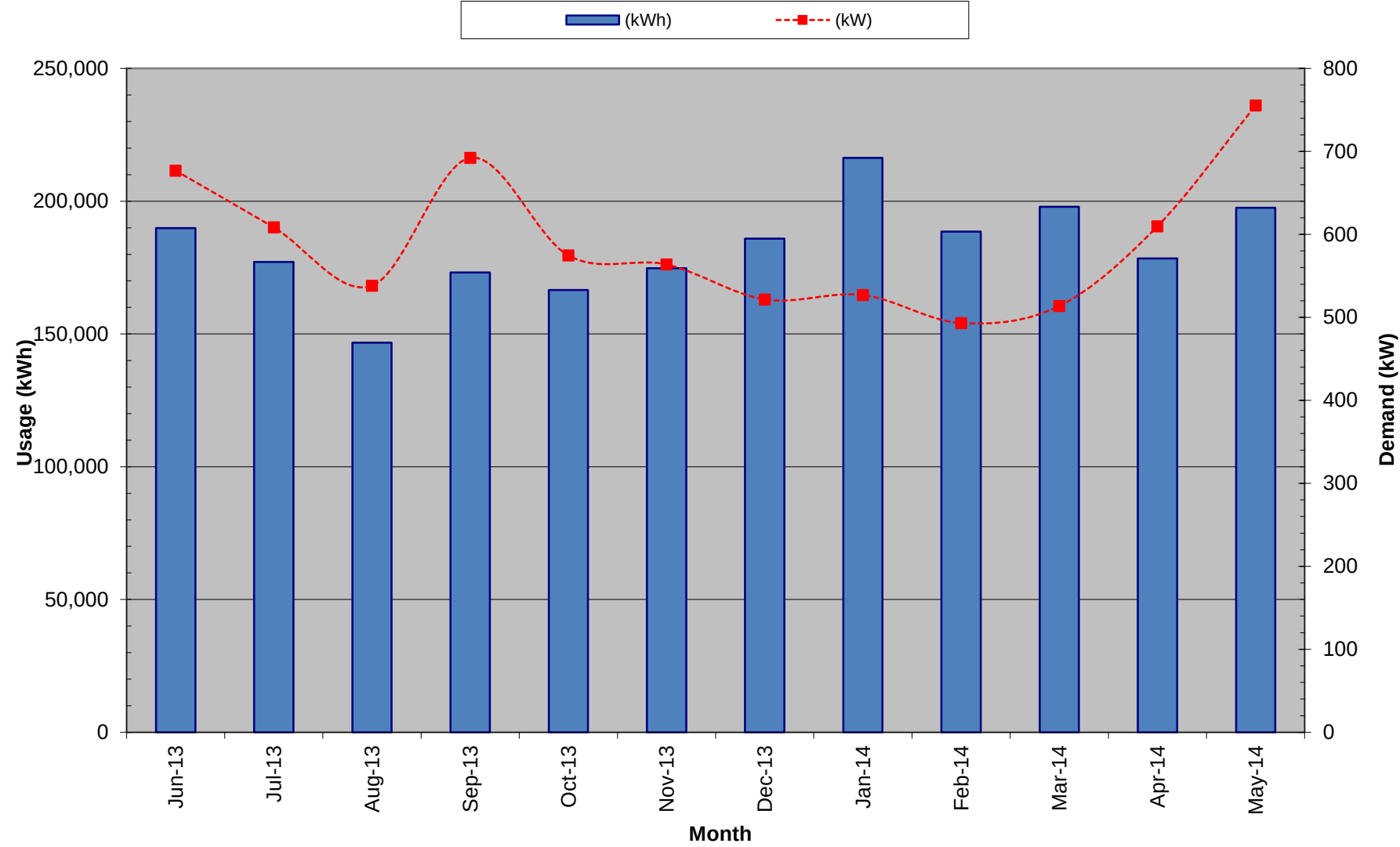
Account No.: 42-176-010-18
Meter No.: 778011091
Electric Service PE000009360102904583

Delivery - PSE&G
Supplier - Direct Energy

Month	Consumption (kWh)	Demand (kW)	Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
			Delivery (\$)	Supplier (\$)	Total (\$)	Consumption (\$)	Demand (\$)	Blended Rate (\$/kWh)	Consumption (\$/kWh)	Demand (\$/kW)
June-13	189,831	676.8	14,207.95	14,733.35	28,941.30	20,835.60	8,105.70	0.15	0.11	11.98
July-13	177,106	608.4	13,004.81	13,834.92	26,839.73	19,553.23	7,286.50	0.15	0.11	11.98
August-13	146,755	538.2	11,248.29	11,553.75	22,802.04	16,356.28	6,445.76	0.16	0.11	11.98
September-13	173,149	692.3	13,679.25	13,851.92	27,531.17	19,374.91	8,156.26	0.16	0.11	11.78
October-13	166,570	574.6	7,296.54	13,325.60	20,622.14	18,618.74	2,003.40	0.12	0.11	3.49
November-13	174,782	563.8	7,468.86	13,141.88	20,610.74	18,644.99	1,965.75	0.04	0.11	3.49
December-13	185,922	521.6	7,647.96	14,873.76	22,521.72	20,703.11	1,818.61	0.12	0.11	3.49
January-14	216,277	527.0	8,759.47	17,302.16	26,061.63	24,193.73	1,867.90	0.12	0.11	3.54
February-14	188,586	493.2	7,433.36	14,518.01	21,951.37	20,203.27	1,748.10	0.12	0.11	3.54
March-14	197,929	513.7	7,769.13	15,395.91	23,165.04	21,344.28	1,820.76	0.12	0.11	3.54
April-14	178,402	609.8	7,759.84	14,272.16	22,032.00	19,870.62	2,161.38	0.12	0.11	3.54
May-14	197,497	755.3	8,613.29	15,368.13	23,981.42	21,304.33	2,677.09	0.12	0.11	3.54
Total (All)	2,192,806	755.30	\$114,888.75	\$172,171.55	\$287,060.30	\$241,003.09	\$46,057.21	\$0.13	\$0.11	\$6.51
Total (last 12-months)	2,192,806	755.30	\$114,888.75	\$172,171.55	\$287,060.30	\$241,003.09	\$46,057.21	\$0.13	\$0.11	\$6.51
Notes	1	2	3	4	5	6	7	8	9	10

- 1.) Number of kWh of electric energy used per month
- 2.) Number of kW of power measured
- 3.) Electric charges from Delivery provider
- 4.) Electric charges from Supply provider
- 5.) Total charges (Delivery + Supplier)
- 6.) Charges based on the number of kWh of electric energy used
- 7.) Charges based on the number of kW of power measured
- 8.) Total Charges (\$) / Consumption (kWh)
- 9.) Consumption Charges (\$) / Consumption (kWh)
- 10.) Demand Charges (\$) / Demand (kW)
- Bill Missing. Interpolated data used. \$0.08/kwh supplied
- \$589.56

Electric Usage - Hopewell Valley High School



Hopewell Valley Central High School
259 Pennington-Titusville Road, Pennington, NJ 08534

For Service at:
Account No.: 3977835601
Meter No: 9439610 Delivery - Elizabethtown Gas 8551144371
Natural Gas Service Supplier - Woodruff Energy 511679

Month	Consumption (Therms)	Charges			Unit Costs		
		Delivery (\$)	Supply (\$)	Total (\$)	Delivery (\$/Therm)	Supply (\$/Therm)	Total (\$/Therm)
June-13	39	\$ 83.14	\$ 21.23	\$ 104.37	\$ 2.110	\$ 0.539	\$ 2.649
July-13	17	\$ 77.03	\$ 30.23	\$ 107.26	\$ 4.613	\$ 1.810	\$ 6.423
August-13	25	\$ 78.52	\$ 13.47	\$ 91.99	\$ 3.141	\$ 0.539	\$ 3.680
September-13	42	\$ 83.94	\$ 14.82	\$ 98.76	\$ 2.018	\$ 0.356	\$ 2.374
October-13	125	\$ 110.83	\$ 67.55	\$ 178.38	\$ 0.884	\$ 0.539	\$ 1.422
November-13	569	\$ 262.75	\$ 306.67	\$ 569.42	\$ 0.462	\$ 0.539	\$ 1.000
December-13	760	\$ 403.14	\$ 529.04	\$ 932.18	\$ 0.530	\$ 0.696	\$ 1.226
January-14	1,395	\$ 543.53	\$ 751.41	\$ 1,294.94	\$ 0.390	\$ 0.539	\$ 0.928
February-14	1,700	\$ 643.77	\$ 915.60	\$ 1,559.37	\$ 0.379	\$ 0.539	\$ 0.917
March-14	879	\$ 376.68	\$ 473.72	\$ 850.40	\$ 0.428	\$ 0.539	\$ 0.967
April-14	364	\$ 1,063.58	\$ 196.24	\$ 1,259.82	\$ 2.920	\$ 0.539	\$ 3.458
May-14	82	\$ 96.91	\$ 44.22	\$ 141.13	\$ 1.180	\$ 0.539	\$ 1.719
Total	5,998			\$ 7,188.02			\$ 1.198

Bill missing, estimate used

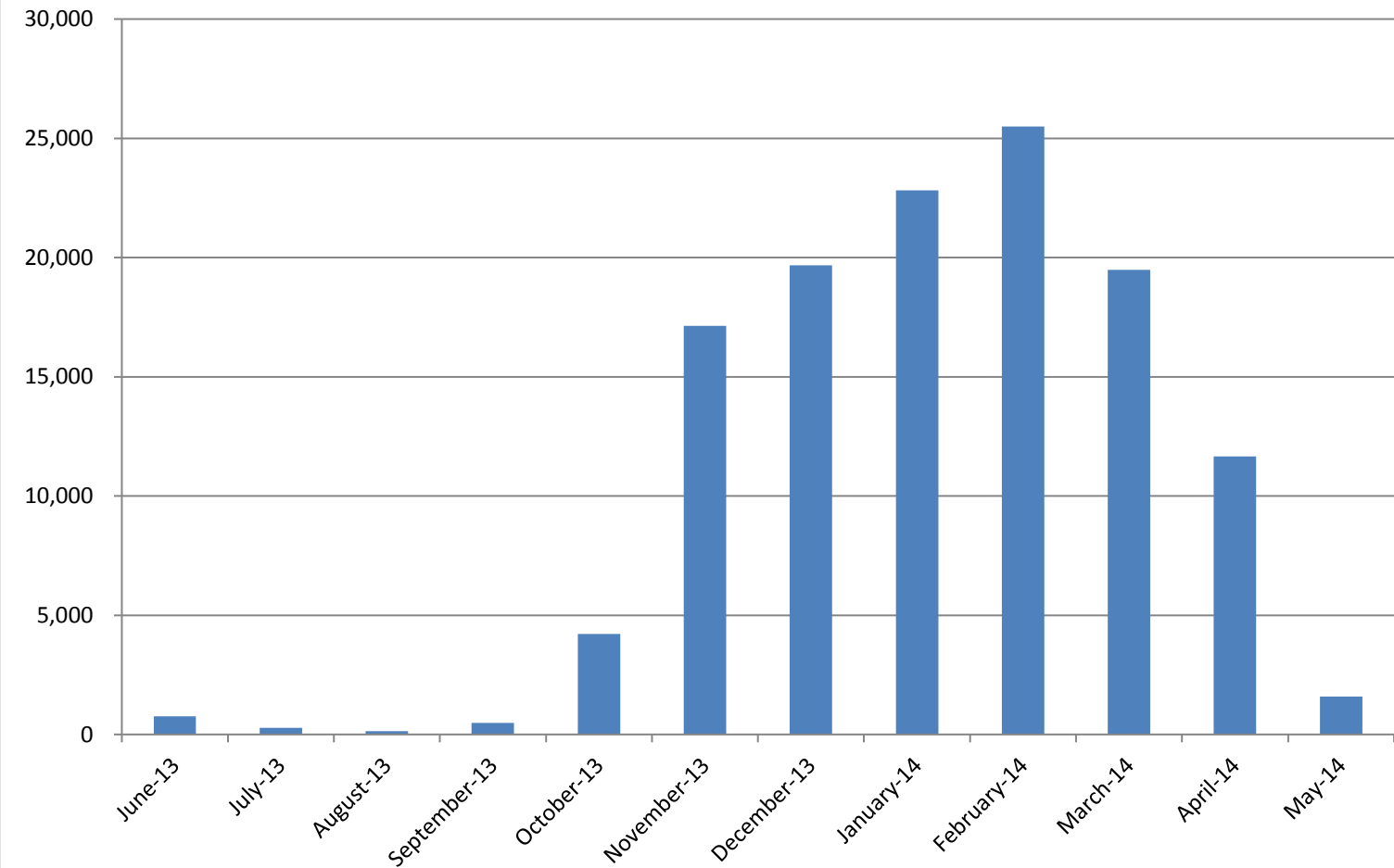
For Service at:
Account No.: 851144371
Meter No: --

Month	Consumption (Therms)	Charges			Unit Costs		
		Delivery (\$)	Supply (\$)	Total (\$)	Delivery (\$/Therm)	Supply (\$/Therm)	Total (\$/Therm)
June-13	717	\$ 365.23	\$ 573.78	\$ 939.01	\$ 0.510	\$ 0.800	\$ 1.310
July-13	257	\$ 165.49	\$ 386.63	\$ 552.12	\$ 0.644	\$ 1.506	\$ 2.150
August-13	117	\$ 79.03	\$ 307.34	\$ 386.37	\$ 0.677	\$ 2.631	\$ 3.308
September-13	444	\$ 228.79	\$ 790.43	\$ 1,019.22	\$ 0.515	\$ 1.779	\$ 2.294
October-13	4,092	\$ 982.75	\$ 4,070.87	\$ 5,053.62	\$ 0.240	\$ 0.995	\$ 1.235
November-13	16,565	\$ 2,109.21	\$ 14,787.50	\$ 16,896.71	\$ 0.127	\$ 0.893	\$ 1.020
December-13	18,909	\$ 2,478.29	\$ 15,012.07	\$ 17,490.36	\$ 0.131	\$ 0.794	\$ 0.925
January-14	21,419	\$ 2,700.63	\$ 15,612.19	\$ 18,312.82	\$ 0.126	\$ 0.729	\$ 0.855
February-14	23,797	\$ 2,797.22	\$ 15,454.77	\$ 18,251.99	\$ 0.118	\$ 0.649	\$ 0.767
March-14	18,606	\$ 2,474.62	\$ 21,415.87	\$ 23,890.49	\$ 0.133	\$ 1.151	\$ 1.284
April-14	11,286	\$ 1,466.14	\$ 15,937.18	\$ 17,403.32	\$ 0.130	\$ 1.412	\$ 1.542
May-14	1,500	\$ 1,000.00	\$ 1,085.00	\$ 2,085.00	\$ 0.667	\$ 0.723	\$ 1.390
Total	117,708			\$ 122,281.04			\$ 1.039

Combined Accounts:

Month	Consumption (Therms)	Charges			Unit Costs		
		Delivery (\$)	Supply (\$)	Total (\$)	Delivery (\$/Therm)	Supply (\$/Therm)	Total (\$/Therm)
June-13	756			\$ 1,043.38			\$ 1.380
July-13	274			\$ 659.38			\$ 2.411
August-13	142			\$ 478.36			\$ 3.374
September-13	486			\$ 1,117.98			\$ 2.301
October-13	4,217			\$ 5,232.00			\$ 1.241
November-13	17,135			\$ 17,466.13			\$ 1.019
December-13	19,669			\$ 18,422.54			\$ 0.937
January-14	22,813			\$ 19,607.76			\$ 0.859
February-14	25,496			\$ 19,811.36			\$ 0.777
March-14	19,486			\$ 24,740.89			\$ 1.270
April-14	11,651			\$ 18,663.14			\$ 1.602
May-14	1,582			\$ 2,226.13			\$ 1.407
Total	123,706			\$ 129,469.06			\$ 1.047

Consumption (Therms)



PSE&G ELECTRIC SERVICE TERRITORY

Last Updated: 10/24/12

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

Supplier	Telephone & Web Site	*Customer Class
AEP Energy, Inc. 309 Fellowship Road, Fl. 2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	C/I ACTIVE
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	R/C ACTIVE
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877)-30-AMBIT (877) 302-6248 www.ambitenergy.com	R/C ACTIVE
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	C ACTIVE
Amerigreen Energy, Inc. 1463 Lambertson Road Trenton, NJ 08611	888-423-8357 www.amerigreen.com	R/C ACTIVE
AP Gas & Electric, LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apge.com	R/C/I ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(201) 384-5552 www.astralenergylc.com	R/C/I ACTIVE
Barclays Capital Services, Inc. 70 Hudson Street Jersey City, NJ 07302-4585	(888) 978-9974 www.group.barclays.com	C ACTIVE
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateasternenergy.com	C/I ACTIVE
Champion Energy Services, LLC 72 Avenue L Newark, NJ 07105	(877) 653-5090 www.championenergyservices.com	R/C/I ACTIVE
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	888-565-4490 www.4choiceenergy.com	R/C ACTIVE
Clearview Electric, Inc. 505 Park Drive Woodbury, NJ 08096	(888) CLR-VIEW (800) 746-4702 www.clearviewenergy.com	R/C/I ACTIVE
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	R 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
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(866) 237-7693 www.constellation.com	R/C/I ACTIVE

Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	R ACTIVE
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 www.directenergybusiness.com	C/I ACTIVE
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 348-4193 www.directenergy.com	R ACTIVE
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, New Jersey 08002	(800) 282-3331 www.discountenergygroup.com	R/C ACTIVE
Dominion Retail, Inc. d/b/a Dominion Energy Solutions 395 Route #70 West Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.dom.com/products	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, 2nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	R/C ACTIVE
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	C/I ACTIVE
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	R/C/I ACTIVE
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	C/I ACTIVE
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	C/I ACTIVE
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	(800) 542-0778 www.globalp.com	C/I ACTIVE

Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	C/I ACTIVE
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	C/I ACTIVE
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	R/C ACTIVE
HOP Energy, LLC d/b/a Metro Energy, HOP Fleet Fueling, HOP Energy Fleet Fueling 1011 Hudson Avenue Ridgefield, NJ 07657	(877) 390-7155 www.hopenenergy.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 3711 Market Street, 10th Fl. Philadelphia, PA 19104	(877) 235-6708 www.chooseindependence.com	R/C ACTIVE
Integrus Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrusenergy.com	C/I ACTIVE
Keil & Sons, Inc. d/b/a Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	(877) 797-8786 www.systrumenergy.com	R/C/I ACTIVE
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	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
MXenergy Electric Inc. 900 Lake Street Ramsey, NJ 07446	(800) 785-4374 www.mxenergy.com	R/C/I ACTIVE
NATGASCO, Inc. 532 Freeman St. Orange, NJ 07050	(973) 678-1800 x. 251 www.supremeenergyinc.com	R/C ACTIVE
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	R/C/I ACTIVE
New Jersey Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.NJGandE.com	R/C 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
North American Power and Gas, LLC 222 Ridgedale Avenue Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	R/C/I ACTIVE
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	R/C/I ACTIVE
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	C/I ACTIVE
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	R/C/I ACTIVE
PPL Energy Plus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	C/I ACTIVE
Public Power & Utility of New Jersey, LLC 39 Old Ridgebury Rd. Suite 14 Danbury, CT 06810	(888) 354-4415 www.ppandu.com	R/C/I ACTIVE
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com/pjm	R/C/I ACTIVE
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	R/C/I ACTIVE
Respond Power LLC 10 Regency CT Lakewood, NJ 08701	(877) 973-7763 www.respondpower.com	R/C/I ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 266-6020 www.southjerseyenergy.com	C/I ACTIVE
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082	R/C/I ACTIVE
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, N.J. 08007	(800) 695-0666 www.sjnaturalgas.com	R/C ACTIVE
Spark Energy, L.P. 2105 CityWest Blvd., Ste 100 Houston, Texas 77042	(800) 441-7514 www.sparkenergy.com	R/C/I ACTIVE
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com	C/I ACTIVE
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	R/C/I ACTIVE
Stream Energy 309 Fellowship Rd., Suite 200 Mt. Laurel, NJ 08054	(877) 39-8150 www.streamenergy.net	R ACTIVE

UGI Energy Services, Inc. d/b/a GASMARK 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	C/I ACTIVE
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	R/C/I ACTIVE
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	R/C/I ACTIVE
Xoom Energy New Jersey, LLC 744 Broad Street Newark, 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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ELIZABETHTOWN GAS CO. SERVICE TERRITORY

Last Updated: 10/24/12

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

Supplier	Telephone & Web Site	*Customer Class
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	855-553-6374 www.alphagasandelectric.com	R/C ACTIVE
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	201-384-5552 www.astralenergyllc.com	R/C/I ACTIVE
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	C/I ACTIVE
Clearview Electric Inc. d/b/a Clearview Gas 1744 Lexington Ave. Pennsauken, NJ 08110	800-746-4720 www.clearviewenergy.com	R/C ACTIVE
Colonial Energy, Inc. 83 Harding Road Wyckoff, NJ 07481	845-429-3229 www.colonialgroupinc.com	C/I ACTIVE
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07746	888-817-8572 www.commerceenergy.com	R ACTIVE
Compass Energy Services, Inc. 1085 Morris Avenue, Suite 150 Union, NJ 07083	866-867-8328 908-638-6605 www.compassenergy.net	C/I ACTIVE
ConocoPhillips Company 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-646-4427 www.conocophillips.com	C/I ACTIVE
Consolidated Edison Solutions, Inc. Cherry Tree Corporate Center 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-665-0955 www.conedsolutions.com	C/I ACTIVE
Constellation NewEnergy-Gas Division, LLC 900A Lake Street, Suite 2 Ramsey, NJ 07466	800-900-1982 www.constellations.com	C/I ACTIVE
Direct Energy Services, LLP 120 Wood Avenue, Suite 611 Iselin, NJ 08830	866-547-2722 www.directenergy.com	R/C/I INACTIVE
Energy Plus Natural Gas LP 309 Fellowship Road, East Gate Center Suite 200 Mt. Laurel, NJ 08054	877-866-9193 www.energypluscompany.com	R/C ACTIVE
UGI Energy Services, Inc. d/b/a GASMARK 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergyservices.com	C/I ACTIVE
Gateway Energy Services Corporation 44 Whispering Pines Lane Lakewood, NJ 08701	800-805-8586 www.gesc.com	R/C/I ACTIVE
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	1-888-452-2425 www.glacialenergy.com	C/I ACTIVE
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	800-542-0778 www.globalp.com	C/I ACTIVE

Great Eastern Energy 116 Village Blvd., Suite 200 Princeton, NJ 08540	888-651-4121 www.greateastern.com	C/I ACTIVE
Greenlight Energy 330 Hudson Street, Suite 4 Hoboken, NJ 07030	718-204-7467 www.greenlightenergy.us	C ACTIVE
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	C/I ACTIVE
Hess Small Business Services, LLC One Hess Plaza Woodbridge, NJ 07095	888-494-4377 www.hessenergy.com	C/I ACTIVE
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	888-264-4908 www.hikoenergy.com	R/C ACTIVE
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	973-438-4380 www.idtenergy.com	R/C ACTIVE
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	800-927-9794 www.intelligentenergy.org	R/C/I ACTIVE
Keil & Sons, Inc. d/b/a Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	877-797-8786 www.systrumenergy.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	800-828-9427 www.metromediaenergy.com	C ACTIVE
MxEnergy, Inc. 900 Lake Street Ramsey, NJ 07446	800-758-4374 www.mxenergy.com	R/C/I ACTIVE
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	800-840-4GAS www.natgasco.com	C ACTIVE
Naughton Energy Corporation 1898 Route 940, Box 709 Pocono Pines, PA 18350	800-372-6942 www.naughtonenergy.com	C/I ACTIVE
New Energy Services LLC 101 Neptune Ave. Deal, NJ 07723`	800-660-3643 www.newenergyservicesllc.com	R/C/I ACTIVE
North American Power & Gas, LLC d/b/a North American Power 197 Route 18 South Ste. 3000 East Brunswick, NJ 08816	(888) 313-9086 www.napower.com	R/C/I ACTIVE
Palmco Energy NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	R/C/I ACTIVE
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	800-363-7499 www.pepco-services.com	C/I ACTIVE
PPL EnergyPlus, LLC 811 Church Road - Office 105 Cherry Hill, NJ 08002	800-281-2000 www.pplenergyplus.com	C/I ACTIVE

Respond Power LLC 10 Regency CT Lakewood, NJ 08701	877-973-7763 www.respondpower.com	R/C/I ACTIVE
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	C/I ACTIVE
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	C/I ACTIVE
Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	973-494-8097 www.streamenergy.net	R/C ACTIVE
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	800-557-1121 www.woodruffenergy.com	R/C/I ACTIVE
Woodruff Energy US LLC 73 Water St., P.O. Box 777 Bridgeton, NJ 08302	856-455-1111 800-557-1121 www.woodruffenergy.com	C/I ACTIVE
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	888-997-8979 www.xoomenergy.com	R/C/I ACTIVE
Your Energy Holdings, LLC One International Boulevard, Suite 400 Mahwah, NJ 07495-0400	855-732-2493 www.thisisyourenergy.com	R/C/I ACTIVE

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APPENDIX B

Equipment Inventory

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.
B-1	1	Hydrotherm	MR-2400B-PV	MSN1339	Heating / Natural Gas	2,400,000 BTU in (8 modules @ 300 MBH each), 1,920,000 BTU output	80%	MER	School	2002	18	
B-2	1	Hydrotherm	MR-2400B-PV	MSN1340	Heating / Natural Gas	2,400,000 BTU in (8 modules @ 300 MBH each), 1,920,000 BTU output	80%	MER	School	2002	18	
B-3	1	Hydrotherm	MR-2100B-PV	MSM1066	Heating / Natural Gas	2,100,000 BTU in (7 modules @ 300 MBH each), 1,680,000 BTU output	80%	MER	School	2002	18	
HWP-1	1	B&G	-	-	Heating / Hot Water	5 HP		MER	School	2002	8	
HWP-2	1	B&G	U4A-5518186		Heating / Hot Water	5 HP		MER	School	2002	8	
HWP-3	1	B&G	U4A-5518186		Heating / Hot Water	5 HP		MER	School	2002	8	
HWP-4	1	B&G			Heating / Hot Water	1.5 HP, 65 GPM, 35 FT HD		MER	School	2002	8	
HWP-5	1	B&G			Heating / Hot Water	1.5 HP, 65 GPM, 35 FT HD		MER	School	2002	8	
DHW-1	1	A.O. Smith	HW-670-100	H0613683	Hot Water / Natural Gas	660,000 BTU in, 543,900 BTU out	82.4%	MER	Main Building	2006	8	(1) 500 Gallon remote storage tank
DHW-2	1	Lochinvar	PFN1500PM	G02H00143374	Heating / Natural Gas	1.5 MBH	87.0%	Closet			-	
DHW-3	1	Lochinvar	HST18-052	YF1551420	Heating / Natural Gas	18 kW, 250 Gallons	98.0%	Closet	Restrooms in Pac Center		-	
DHW-4	1	Rheem	IP281	VG 0105600577	Cooling / DX Cooling	6 Gallons, 2 kW	98.0%	Closet		2005	8	
DHW-5	1	Lochinvar	EWN300PM	G02H00143715	Cooling / DX Cooling	300,000 BTUH	85.0%	Closet	Kitchen		-	(1) 100 Gallon Storage Tank
DHW-6		Lochinvar	EWN300PM	G02H00143716	Cooling / DX Cooling	300,000 BTUH	85.0%	Closet	Kitchen		-	
DHW-7	1	Lochinvar	EWN300PM	G02H00143723	Cooling / DX Cooling	300,000 BTUH	85.0%	Closet	Kitchen		-	
DHW-8	1	A.O. Smith	BTC 179 964	MA97-0612079-964	Heating / Natural Gas	179,000 BTU, 86 gallons	80.0%	Closet	M400 & W400		-	
RTU-1	1	Trane	YCD120C3MCAB	L24104851D	Heating / Hot Water / Cooling / Cold Water			Roof	Upper 400	1996	18	
RTU-2	1	Trane	YCD151B3HCDD	L24104870D	Heating / Hot Water / Cooling / Cold Water			Roof	Upper 400	1996	18	
RTU-3	1	Trane	YCC018F1LOBC	L441NH62H	Heating / Hot Water / Cooling / Cold Water			Roof	Science Office	1996	18	
RTU-4	1	Trane	YCD151B3HCDD	L24104872D	Heating / Hot Water / Cooling / Cold Water			Roof	Lower 400	1996	18	
RTU-5	1	Trane	YCD120C3MCAB	L26101985D	Heating / Hot Water / Cooling / Cold Water			Roof	Lower 400	1996	18	
RTU-6	1	Trane	VSC092A3RHA0LF	229100524L	Heating / Hot Water / Cooling / Cold Water			Roof	Kitchen	1996	18	
RTU-7	1	Trane	YCD240B3LCHA	228100225D	Heating / Hot Water / Cooling / Cold Water			Roof	Cafeteria	2002	18	
RTU-8	1	Trane	YSC060A3RMAONF2	228100973L	Heating / Hot Water / Cooling / Cold Water			Roof	Faculty Lounge	1996	18	
RTU-9	1	Mammoth	DEHBFRC-351-G320-N100-M27	23333-02-01	Heating / Hot Water / Cooling / Cold Water			Roof	Upper 300 Hall	1996	18	
RTU-10	1	Mammoth	DEHBFRC-351-G51-G320-N100-M212	23333-01-01	Heating / Hot Water / Cooling / Cold Water			Roof	Media Center	1996	18	
RTU-11	1	Trane	YSC060A3RMAONF2	228101035L	Heating / Hot Water / Cooling / Cold Water			Roof	Guidance Center	1996	18	
RTU-12	1	Trane	YSC120F3RH	1330102871	Heating / Hot Water / Cooling / Cold Water			Roof	Main Office	2013	18	
RTU-13	1	Trane	TCH121B300DB	L29104753D	Heating / Hot Water / Cooling / Cold Water			Roof	Music Room	1996	18	
RTU-14	1	Trane	YSC060A3RMAONF2	228101012L	Heating / Hot Water / Cooling / Cold Water			Roof	Ceramics Room	2002	18	
RTU-15	1	Trane	YSC060A3RMAONF2	228100894L	Heating / Hot Water / Cooling / Cold Water			Roof	Art Room	2002	18	
RTU-16	1	Trane	TCD180B300HB	823101128D	Heating / Hot Water / Cooling / Cold Water			Roof	New Gym Girls Side	2008	18	
RTU-17	1	Trane	TCD301C30ABA	228100834D	Heating / Hot Water / Cooling / Cold Water			Roof	New Gym Boys Side	2002	18	
RTU-18	1	Trane	SFHFC60EJ346A57D1B110020000	C02F05719	Heating / Hot Water / Cooling / Cold Water			Roof	Auditorium	1996	18	
RTU-19	1	Trane	YCD150D3HAAA	227100855D	Heating / Hot Water / Cooling / Cold Water			Roof	Stage	1996	18	
MUA-1	1	Greenheck	TXG-118-H32-DB	02G21391	Heating / Electric			Roof	Kitchen	1996	18	
MUA-2	1	McQuay	RDS708BY	3YK0130503	Heating / Electric			Roof	Old Gym	1996	18	
MUA-3	1	McQuay	RDS708BY	3YK01306	Heating / Electric			Roof		1996	18	
CU-1	1	Sanyo	CL2472	81693	Cooling / DX Cooling	2-ton		Roof	Classroom 118	2002	13	
CU-2	1	Sanyo	CL2472	69893	Cooling / DX Cooling	2-ton		Roof	Classroom 116	2002	13	
CU-3	1	Fujitsu	AOU24CL	DDN014238	Cooling / DX Cooling	2-Ton		Roof	IT Room	2002	13	
CU-4	1	Trane	2TTR2048A1000AA	2291YWF2F	Cooling / DX Cooling	4-ton		Roof	Classroom 107	2002	13	
CU-5	1	Trane	2TTA0060A3000AA	2293TE63F	Cooling / DX Cooling	5-ton		Roof	Woodshop	2002	13	
CU-6	1	Trane	2TTR2024A1000AA	23135613F	Cooling / DX Cooling	2-ton		Roof	Finishing Room	2002	13	
CU-7	1	Trane	2TTR2042A1000AA	22613L22F	Cooling / DX Cooling	3.5-ton		Roof	Boys Locker Room	2002	13	
CU-8	1	Trane	2TTR2042A1000AA	226120N2F	Cooling / DX Cooling	3.5-ton		Roof	Boys Locker Room	2002	13	
CU-9	1	Trane	2TTR2042A1000AA	2305SM85F	Cooling / DX Cooling	3.5-ton		Roof	Trainers Room	2002	13	
CU-10	1	Trane	2TTR2042A1000AA	340420P3F	Cooling / DX Cooling	3.5-ton		Roof	Athletic Director Office	2003	13	
CU-11	1	Trane	-	-	Cooling / DX Cooling	-		Roof	Band Offices	1996	13	
CU-12	1	Trane	2TTA240B300DB	L3011CCKAH	Cooling / DX Cooling	-		Roof	Band Room	1996	13	
CU-13	1	Trane	TTB018C100A0	L291Y1CAF	Cooling / DX Cooling	-		Roof	Chorus Room Office	1996	13	
CU-14	1	Trane	2TTR2024A1000AA	231356F3F	Cooling / DX Cooling	-		Roof	TV Studio	1996	13	
CU-15	1	Trane	2TT0036A1000AA	231SME95F	Cooling / DX Cooling	-		Roof	TV Control Room	1996	13	
CU-16	1	Trane	2TT0036A1000AA	2315NKM5F	Cooling / DX Cooling	-		Roof	TV Office	1996	13	
CU-17	1	Carrier	38CK060540	1993E15243	Cooling / DX Cooling	-		Roof	Copy Room	1996	13	
CU-18	1	Quietside	QSCC091	QSCC0910115070778	Cooling / DX Cooling	-		Roof	IT Room	1996	13	
CU-19	1	Sanyo	C4272R	09882	Cooling / DX Cooling	-		Roof	MDF Room	1996	13	
CU-20	1	Sanyo	C3672R	0130964	Cooling / DX Cooling	-		Roof	MDF Room	1996	13	
CU-21	1	CAC	PA13NR036	1311X60030	Cooling / DX Cooling	-		Roof	Computer Room	1996	13	
CU-22	1	EMI	-	-	Cooling / DX Cooling	-		Roof	Science Supervisor Room	1996	13	
CU-23	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	302	2001	13	
CU-24	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	302	2001	13	
CU-25	1	Sanyo	C4272R	0001981	Cooling / DX Cooling	-		Ground	MDF Room	1996	13	
CU-26	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	306	2001	13	
CU-27	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	306	2001	13	
CU-28	1	Rheem	RAKA-036CAS	4959M210106228	Cooling / DX Cooling	3-ton		Ground	216	2001	13	
CU-29	1	Rheem	RAKA-036CAS	4959M240109895	Cooling / DX Cooling	3-ton		Ground	214	2001	13	
CU-30	1	Rheem	RAKA-036CAS	4959M230108090	Cooling / DX Cooling	3-ton		Ground	212	2001	13	
CU-31	1	Rheem	RAKA-024CAS	5882-M2501-02431	Cooling / DX Cooling	2-ton		Ground	210	1996	13	
CU-32	1	Rheem	RAKA-036CAS	4959M210106227	Cooling / DX Cooling	3-ton		Ground	208	1996	13	
CU-33	1	Rheem	RAKA-036CAS	4959-M2101-06231	Cooling / DX Cooling	3-ton		Ground	206	1996	13	
CU-34	1	Rheem	RAKA-036CAS	-	Cooling / DX Cooling	3-ton		Ground	204	1996	13	
CU-35	1	Rheem	RAKA-036CAS	4959-M2401-09894	Cooling / DX Cooling	3-ton		Ground	202	1996	13	
CU-36	1	Rheem	RAKA-036CAS	4959-M2401-09899	Cooling / DX Cooling	3-ton		Ground	200	1996	13	
CU-37	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	301	1996	13	
CU-38	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	301	1996	13	
CU-39	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	303	1996	13	
CU-40	1	RUUD	-	-	Cooling / DX Cooling	-		Ground	303	1996	13	
CU-41	1	Trane	2TTR2024A1000AA	231355M3F	Cooling / DX Cooling	2-ton		Ground	305	2002	13	
CU-42	1	Trane	2TTB0036A100AA	2321KPY5F	Cooling / DX Cooling	3-ton		Ground	114	1996	13	
CU-43	1	Rheem			Cooling / DX Cooling			Ground	213	1996	13	
CU-44	1	Rheem			Cooling / DX Cooling			Ground	215	1996	13	
CU-45	1	Trane	2TTR2024A1000AA	231357J3F	Cooling / DX Cooling			Ground	223	1996	13	
CU-46	1	Trane	2TTB0036A100AA	2321KG75F	Cooling / DX Cooling			Ground	108	1996	13	
CU-47	1	Trane	2TTB0036A100AA	2315M205F	Cooling / DX Cooling			Ground	106	1996	13	
CU-48	1	Trane	2TTB0036A100AA	2321KTF5F	Cooling / DX Cooling			Ground	104	1996	13	
CU-49	1	Trane	2TTB0036A100AA	2315M545F	Cooling / DX Cooling			Ground	102	1996	13	
CU-50	1	Trane	2TTR2024A1000AA	231356S3F	Cooling / DX Cooling			Ground	205	1996	13	
CU-51	1	Trane	2TTA0060A30000AA	2293TFJ3F	Cooling / DX Cooling			Ground	Weight Room	1996	13	
HP-1	1	Mitsubishi	MX2-8B48NA	11U02193B	Heating / Electric / Cooling / Electric			Roof	Home EC & Special Needs (112 & 112B)	1996	13	
AHU-1	1	Marathon	EVH-145TTDR66	31VD	Cooling / DX Cooling			Ceiling	Room 100C	1996	13	
AHU-2	1	-	-	-	Cooling / DX Cooling			Ceiling	Room 100D	1996	13	
AHU-3	1	-	-	-	Cooling / DX Cooling			Ceiling	Band Storage	1996	13	
AHU-4	1	Baldor	X70410556010	-	Cooling / DX Cooling			Ceiling	TV Studio	1996	13	
AHU-5	1	Baldor	X70410556010	-	Cooling / DX Cooling			Ceiling	TV Studio	1996	13	
AHU-6	1	Baldor	X70410556010	-	Cooling / DX Cooling			Ceiling	TV Studio	1996	13	
AHU-7	1	Baldor	X70421283010	-	Cooling / DX Cooling			Ceiling	Auditorium Foyer	1996	13	
AHU-8	1	Baldor	SK182ALZ449B	-	Cooling / DX Cooling			Ceiling	Room 111	1996	13	
AHU-9	1	Baldor	X70421283010	-	Cooling / DX Cooling			Ceiling	Trainers Room	1996	13	
AHU-10	1	Baldor	X70421283010	-	Cooling / DX Cooling			Ceiling	AD Office	1996	13	
AHU-11	1	-	-	-	Cooling / DX Cooling			Ceiling	Boys Locker Room	1996	13	
AHU-12	1	-	-	-	Cooling / DX Cooling			Ceiling	Girls Locker Room	1996	13	
AHU-13	1	-	-	-	Cooling / DX Cooling			Ceiling	Auto Shop	1996	13	
AHU-14	1	CAT	H852 8158997-01	BU03-28	Cooling / DX Cooling			Ceiling	Main Office	1996	13	
AHU-15	1	-	-	-				Ceiling	Auxillary Gym		-	

Cost of Electricity:

\$0.110	\$/kWh
\$6.51	\$/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	Classroom 102	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
220	Classroom 102-Storage	Storage Areas	1	S 17 C F 1(ELE)	F21ILL	20	0.02	SW	1000	20	None	
35LED	Classroom 104	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 104-Storage	Storage Areas	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	180	None	
35LED	Classroom 106	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 106-Storage	Storage Areas	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	180	None	
40LED	Wood Shop	Classroom	41	T 32 R F 2 (ELE)	F42LL	60	2.46	SW	2400	5,904	None	
40LED	109 Storage	Storage Areas	10	T 32 R F 2 (ELE)	F42LL	60	0.60	SW	1000	600	None	
274LED	Storage	Storage Areas	2	T 34 R F 2 (MAG)	F42EE	72	0.14	SW	1000	144	None	
40LED	Downstairs Wood Shop Storage	Storage Areas	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	1000	180	None	
40LED	Upstairs Wood Shop Storage	Storage Areas	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	None	
40LED	Classroom 107	Classroom	15	T 32 R F 2 (ELE)	F42LL	60	0.90	SW	2400	2,160	OCC	
35LED	Classroom 108	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 109	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
40LED	Nurse	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	None	
40LED	Exam Room 1	Offices	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2400	144	None	
40LED	Exam Room 2	Offices	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2400	144	None	
126	Toilet Room	Restroom w/ OCC	1	DC 23 C CF 2	CFQ22/2	48	0.05	SW	1000	48	OCC	
40LED	Office	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	OCC	
126	Toilet Room	Restroom w/ OCC	1	DC 23 C CF 2	CFQ22/2	48	0.05	SW	1000	48	OCC	
254LED	Storage	Storage Areas	1	CFQ26/2	CFQ26/2	66	0.07	SW	1000	66	None	
254LED	Storage	Storage Areas	1	CFQ26/2	CFQ26/2	66	0.07	SW	1000	66	None	
274LED	Electrical Room (Locked)	Mechanical Room	2	T 34 R F 2 (MAG)	F42EE	72	0.14	SW	1000	144	None	
40LED	Corridor	Hallways	30	T 32 R F 2 (ELE)	F42LL	60	1.80	SW	2280	4,104	None	
65	Custodian's Office	Offices	1	I 100	I100/1	100	0.10	SW	2400	240	None	
35LED	Supply Room	Storage Areas	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
40LED	Supply Room	Storage Areas	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	1000	240	None	
35LED	Classroom 200	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
35LED	Classroom 201	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 202	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 203	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 204	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
40LED	Conference Room 205	Conference	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	1200	432	None	
35LED	Classroom 206	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
35LED	Classroom 207	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 211	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 209	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
40LED	Corridor	Hallways	30	T 32 R F 2 (ELE)	F42LL	60	1.80	SW	2280	4,104	None	
40LED	Girls' Bathroom	Restroom w/ OCC	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	None	
40LED	Boys' Bathroom	Restroom w/ OCC	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	None	
40LED	Custodial Closet	Storage Areas	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	None	
35LED	Special Education Office	Offices	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	1,296	None	
35LED	Classroom 213	Classroom	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	1,728	OCC	
35LED	Classroom 210	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 215	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
18LED	Classroom 212	Classroom	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2400	2,419	OCC	
35LED	Classroom 214	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 219	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 221	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 216	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Office 223	Offices	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	2400	864	OCC	
35LED	Classroom 225	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 227	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 218	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	Classroom 220	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
40LED	Storage 213	Storage Areas	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	None	
35LED	Safety Officer	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	None	
35LED	Classroom 112	Classroom	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	SW	2400	3,240	OCC	
35LED	Room 112B	Classroom	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2400	1,728	None	
126	Toilet Room	Restroom w/ OCC	1	DC 23 C CF 2	CFQ22/2	48	0.05	SW	1000	48	None	
35LED	Classroom 114	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
252	Old Gym	Gymnasium	36	T 54 W F 6 (ELE) (T-5)	F46GHL	351	12.64	SW	2000	25,272	None	
40LED	Girls' Locker Room	Locker Room	20	T 32 R F 2 (ELE)	F42LL	60	1.20	SW	2800	3,360	None	
65	Girls' Locker Room	Locker Room	4	I 100	I100/1	100	0.40	SW	2800	1,120	None	
40LED	Girls' Locker Room	Locker Room	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	2800	1,008	None	
35LED	Classroom 116	Classroom	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	SW	2400	3,240	OCC	
35LED	Classroom 118	Classroom	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	SW	2400	3,240	OCC	
40LED	Maintenance Office	Offices	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	2400	864	None	
40LED	Mechanical Equipment Room	Mechanical Room	10	T 32 R F 2 (ELE)	F42LL	60	0.60	SW	1000	600	None	
40LED	Staff Locker Room	Locker Room	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2800	168	None	
35LED	Exercise Room	Gymnasium	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2000	1,080	None	

Cost of Electricity:

\$0.110	\$/kWh
\$6.51	\$/kWh

			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	Weight Room	Gymnasium	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2000	2,160	None	
40LED	Vestibule Exit	Hallways	1	T 32 R F 2 (ELE)	F42LL	60	0.06	Breaker	2280	137	None	
18LED	Gym Storage	Storage Areas	1	T 32 R F 4 (ELE)	F44ILL	112	0.11	SW	1000	112	None	
35LED	Coach Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Coach Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
235	Toilet Room	Restroom w/ OCC	1	SP 100 W I 2	i100/2	200	0.20	SW	1000	200	OCC	
235	Toilet Room	Restroom w/ OCC	1	SP 100 W I 2	i100/2	200	0.20	SW	1000	200	OCC	
65	Men's Locker Room	Locker Room	4	I 100	i100/1	100	0.40	SW	2800	1,120	None	
40LED	Men's Locker Room	Locker Room	25	T 32 R F 2 (ELE)	F42LL	60	1.50	SW	2800	4,200	None	
40LED	Toilet Room	Restroom w/ OCC	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	None	
40LED	Corridor	Hallways	5	T 32 R F 2 (ELE)	F42LL	60	0.30	Breaker	2280	684	None	
40LED	Corridor	Hallways	4	T 32 R F 2 (ELE)	F42LL	60	0.24	Breaker	2280	547	None	
35LED	Corridor	Hallways	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.26	Breaker	2280	2,873	None	
35LED	Athletic Training	Offices	11	T 32 R F 3 (ELE)	F43ILL/2	90	0.99	SW	2400	2,376	None	
35LED	Trainer's Room	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	None	
35LED	Trainer's Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	None	
198LED	Women's Team Locker Room	Locker Room	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2800	174	None	
35LED	Women's Team Locker Room	Locker Room	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.26	SW	2800	3,528	None	
35LED	Office	Offices	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.45	SW	2400	1,080	None	
35LED	Toilet Room	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
40LED	Shower	Locker Room	8	T 32 R F 2 (ELE)	F42LL	60	0.48	SW	2800	1,344	None	
252	New Gym	Gymnasium	35	T 54 W F 6 (ELE) (T-5)	F46GHL	351	12.29	SW	2000	24,570	None	
40LED	Gym Storage	Storage Areas	5	T 32 R F 2 (ELE)	F42LL	60	0.30	SW	1000	300	None	
198LED	Men's Team Locker Room	Locker Room	2	2T 17 R F 2 (ELE)	F22LL	31	0.06	SW	2800	174	None	
35LED	Men's Team Locker Room	Locker Room	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.26	SW	2800	3,528	None	
35LED	Office	Offices	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.45	SW	2400	1,080	OCC	
35LED	Toilet Room	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
40LED	Shower	Locker Room	8	T 32 R F 2 (ELE)	F42LL	60	0.48	SW	2800	1,344	None	
35LED	Athletic Department Office 1	Offices	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	2400	864	OCC	
35LED	Athletic Department Office 2	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Ticket Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	None	
35LED	Corridor	Hallways	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	Breaker	2280	2,668	None	
65	Corridor	Hallways	3	I 100	I100/1	100	0.30	Breaker	2280	684	None	
40LED	Storage	Storage Areas	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	1000	180	None	
40LED	Men's Bathroom	Restroom w/ OCC	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	1000	240	None	
40LED	Women's Bathroom	Restroom w/ OCC	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	1000	240	None	
40LED	Corridor	Hallways	22	T 32 R F 2 (ELE)	F42LL	60	1.32	Breaker	2280	3,010	None	
40LED	Robotics	Classroom	40	T 32 R F 2 (ELE)	F42LL	60	2.40	SW	2400	5,760	None	
252	Auto Shop	Classroom	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.21	SW	2400	10,109	None	
275	Boys' Bathroom	Restroom w/ OCC	2	F42GHL	F42GHL	117	0.23	SW	1000	234	None	
275	Girls' Bathroom	Restroom w/ OCC	2	F42GHL	F42GHL	117	0.23	SW	1000	234	None	
55LED	Auditorium Lobby	Hallways	22	2T 17 R F 3 (ELE)	F23ILL	47	1.03	Breaker	2280	2,358	None	
55LED	Auditorium Lobby	Hallways	38	2T 17 R F 3 (ELE)	F23ILL	47	1.79	Breaker	2280	4,072	None	
35LED	Men's Bathroom - PAC	Restroom w/ OCC	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	1000	360	None	
35LED	Women's Bathroom - PAC	Restroom w/ OCC	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	1000	360	None	
55LED	Auditorium	Auditorium	8	2T 17 R F 3 (ELE)	F23ILL	47	0.38	SW	1820	684	None	
65	Auditorium	Auditorium	52	I 100	I100/1	100	5.20	SW	1820	9,464	None	
40LED	Storage	Storage Areas	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	None	
40LED	Stage	Auditorium	12	T 32 R F 2 (ELE)	F42LL	60	0.72	SW	1820	1,310	None	
40LED	Ticket Office	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	None	
35LED	Corridor	Hallways	13	T 32 R F 3 (ELE)	F43ILL/2	90	1.17	Breaker	2280	2,668	None	
35LED	Band Room 100 (Locked)	Classroom	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	SW	2400	3,240	OCC	
35LED	Instrument Storage (Locked)	Storage Areas	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	1000	540	None	
35LED	Choral Music 101 (Locked)	Classroom	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	SW	2400	3,240	OCC	
35LED	TV Studio (Locked)	Classroom	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	SW	2400	3,240	None	
35LED	Corridor	Hallways	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.63	Breaker	2280	1,436	None	
7LED	Main Lobby	Hallways	21	2T 32 R F 2 (u)	FU2LL	60	1.26	Breaker	2280	2,873	None	
35LED	Ceramics 302	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	None	
35LED	Storage	Storage Areas	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	180	None	
35LED	Art Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Kiln	Classroom	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	None	
35LED	Art Room 301	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	None	
35LED	Art Room Storage	Storage Areas	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	180	None	
7LED	Main Vestibule	Hallways	5	2T 32 R F 2 (u)	FU2LL	60	0.30	Breaker	2280	684	None	
40LED	Men's Bathroom	Restroom w/ OCC	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	1000	180	None	
40LED	Women's Bathroom	Restroom w/ OCC	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	1000	180	None	
40LED	Corridor	Hallways	12	T 32 R F 2 (ELE)	F42LL	60	0.72	Breaker	2280	1,642	None	
7LED	Main Office	Offices	30	2T 32 R F 2 (u)	FU2LL	60	1.80	SW	2400	4,320	None	
40LED	IT Room	Storage Areas	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	None	
40LED	Principal's Office	Offices	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	2400	864	OCC	
40LED	Break Room	Staff Lounge	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	3000	180	None	

Cost of Electricity:

\$0.110	\$/kWh
\$6.51	\$/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
7LED	Office	Offices	6	2T 32 R F 2 (u)	FU2LL	60	0.36	SW	2400	864	OCC	
7LED	Vice Principal's Office	Offices	6	2T 32 R F 2 (u)	FU2LL	60	0.36	SW	2400	864	OCC	
35LED	Testing Office	Offices	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.45	SW	2400	1,080	OCC	
40LED	Men's Bathroom	Restroom w/ OCC	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	None	
40LED	Women's Bathroom	Restroom w/ OCC	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	None	
40LED	Child Study Team	Offices	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	2400	864	None	
126	Break Room	Staff Lounge	2	DC 23 C CF 2	CFQ22/2	48	0.10	SW	3000	288	None	
40LED	Copy Room	Copy Room	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2125	128	OCC	
40LED	Child Study Team Office 1	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	OCC	
40LED	Child Study Team Office 2	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	OCC	
40LED	Child Study Team Office 3	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	OCC	
40LED	Child Study Team Office 4	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	OCC	
40LED	Child Study Team Office 5	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	OCC	
40LED	Child Study Team Office 6	Offices	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	OCC	
40LED	Break Room	Break Room	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	1820	437	OCC	
35LED	Supply Room	Storage Areas	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	180	None	
40LED	Counseling Office	Offices	8	T 32 R F 2 (ELE)	F42LL	60	0.48	SW	2400	1,152	OCC	
35LED	Conference Room	Conference	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	1200	324	OCC	
35LED	Counseling Office 1	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Counseling Office 2	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Counseling Office 3	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Counseling Office 4	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Counseling Office 5	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Counseling Office 6	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
35LED	Counseling Office 7	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2400	432	OCC	
40LED	Principal's Conference Room	Conference	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	1200	288	OCC	
40LED	Corridor	Hallways	4	T 32 R F 2 (ELE)	F42LL	60	0.24	Breaker	2280	547	None	
40LED	Girls' Bathroom	Restroom w/ OCC	2	T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	1000	120	None	
276	Cafeteria	Cafeteria	28	F44GHL	F44GHL	234	6.55	SW	1600	10,483	None	
35LED	Kitchen	Cafeteria	16	T 32 R F 3 (ELE)	F43ILL/2	90	1.44	SW	1600	2,304	None	
35LED	Cooking Area	Kitchen	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.63	SW	3000	1,890	None	
35LED	Office	Offices	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	2400	216	OCC	
35LED	Locker Room	Locker Room	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	2800	252	None	
35LED	Bathroom	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
35LED	Office	Offices	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	2400	216	OCC	
35LED	Dishwasher Area	Kitchen	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	3000	540	None	
35LED	F-1 Toilet Room	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
35LED	F-2Toilet Room	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
40LED	Boys' Bathroom	Restroom w/ OCC	2	T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	1000	120	None	
40LED	School Store	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	None	
40LED	100 Corridor	Hallways	8	T 32 R F 2 (ELE)	F42LL	60	0.48	Breaker	2280	1,094	None	
276	100 Corridor	Hallways	15	F44GHL	F44GHL	234	3.51	Breaker	2280	8,003	None	
40LED	Corridor	Hallways	9	T 32 R F 2 (ELE)	F42LL	60	0.54	Breaker	2280	1,231	None	
18LED	Classroom 401	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
18LED	Classroom 401 Prep	Storage Areas	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	1000	448	OCC	
18LED	Classroom 401 Storage	Storage Areas	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	SW	1000	224	None	
18LED	Classroom 403	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
18LED	Classroom 402	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
18LED	Classroom 402 Prep	Storage Areas	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	1000	448	OCC	
18LED	Classroom 402 Storage	Storage Areas	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	SW	1000	224	None	
18LED	Classroom 404	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
35LED	M400 Mens Rm	Restroom w/ OCC	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	1000	270	OCC	
40LED	M400 Mens Rm	Restroom w/ OCC	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	OCC	
35LED	Janitor	Storage/Janitor	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	500	45	None	
35LED	Women's Bathroom	Restroom w/ OCC	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	1000	270	OCC	
40LED	Women's Bathroom	Restroom w/ OCC	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	1000	60	OCC	
35LED	Roof access	Hallways	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	Breaker	2280	205	None	
40LED	Supervisor's Office	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	None	
35LED	Electrical closet	Storage Areas	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
18LED	409 Office	Offices	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	2400	1,075	None	
40LED	Corridor	Hallways	7	T 32 R F 2 (ELE)	F42LL	60	0.42	Breaker	2280	958	None	
18LED	406 Classroom	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
18LED	Prep Rm	Classroom	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	2400	1,075	OCC	
18LED	Storage	Storage Areas	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	SW	1000	224	None	
18LED	408 Classroom	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
18LED	407 Classroom	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
18LED	Prep Rm	Storage Areas	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	1000	448	None	
18LED	Storage	Storage Areas	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	1000	448	None	
18LED	405 Classroom	Classroom	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	SW	2400	4,301	OCC	
35LED	Faculty Lounge	Break/Lunch Rooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	3102.5	2,513	None	
35LED	Copy Room	Copy Room	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2125	1,148	None	

	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	300 Corridor	Hallways	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.26	Breaker	2280	2,873	None	
40LED	Electrical closet	Storage Areas	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	None	
40LED	Custodial Closet	Storage/Janitor	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	500	30	None	
35LED	301 Classroom	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
35LED	302 Classroom	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
35LED	303 Classroom	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
35LED	Tech Support	Classroom	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	1,296	OCC	
35LED	305 Office	Offices	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2400	1,296	None	
35LED	306 Classroom	Classroom	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2400	2,592	OCC	
35LED	307 Classroom	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	308 Classroom	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
35LED	310 Classroom	Classroom	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2400	1,944	OCC	
18LED	311 Classroom	Classroom	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2400	2,419	OCC	
18LED	313 Classroom	Classroom	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2400	2,419	OCC	
40LED	Corridor	Hallways	16	T 32 R F 2 (ELE)	F42LL	60	0.96	Breaker	2280	2,189	None	
18LED	Corridor	Hallways	5	T 32 R F 4 (ELE)	F44ILL	112	0.56	Breaker	2280	1,277	None	
18LED	Corridor	Hallways	5	T 32 R F 4 (ELE)	F44ILL	112	0.56	Breaker	2280	1,277	None	
18LED	315 Classroom	Classroom	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2400	2,419	OCC	
18LED	317 Classroom	Classroom	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2400	2,419	OCC	
18LED	Media Center	Classroom	102	T 32 R F 4 (ELE)	F44ILL	112	11.42	SW	2400	27,418	OCC	
18LED	Media Center Office	Offices	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	None	
18LED	Small Computer Lab	Classroom	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	2400	2,419	OCC	
18LED	Conference Rm	Conference	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	1200	538	None	
18LED	Office	Offices	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	2400	1,075	None	
18LED	320 Classroom	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	OCC	
18LED	Conference Rm	Conference	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	1200	538	None	
18LED	Computer Rm	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	OCC	
18LED	Office	Offices	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	2400	1,075	None	
18LED	Office	Offices	4	T 32 R F 4 (ELE)	F44ILL	112	0.45	SW	2400	1,075	None	
18LED	327 Classroom	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	OCC	
18LED	325 Classroom	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	OCC	
18LED	323 Classroom	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	OCC	
18LED	321 Classroom	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	OCC	
18LED	319 Classroom	Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.90	SW	2400	2,150	OCC	
18LED	Corridor	Hallways	11	T 32 R F 4 (ELE)	F44ILL	112	1.23	Breaker	2280	2,809	None	
18LED	M-U300 Training	Classroom	10	T 32 R F 4 (ELE)	F44ILL	112	1.12	SW	2400	2,688	OCC	
18LED	MF-U300 Training	Classroom	10	T 32 R F 4 (ELE)	F44ILL	112	1.12	SW	2400	2,688	OCC	
18LED	WU-U300 Training	Classroom	10	T 32 R F 4 (ELE)	F44ILL	112	1.12	SW	2400	2,688	OCC	
18LED	Corridor	Hallways	6	T 32 R F 4 (ELE)	F44ILL	112	0.67	Breaker	2280	1,532	None	
40LED	Corridor	Hallways	8	T 32 R F 2 (ELE)	F42LL	60	0.48	Breaker	2280	1,094	None	
40LED	9V Studio Classroom	Classroom	10	T 32 R F 2 (ELE)	F42LL	60	0.60	SW	2400	1,440	OCC	
35LED	Control Rm	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2400	648	None	
35LED	TV Studio	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2400	648	None	
40LED	100 Sound rm	Classroom	148	T 32 R F 2 (ELE)	F42LL	60	8.88	SW	2400	21,312	OCC	
40LED	100 Sound rm	Classroom	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	OCC	
40LED	100A Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	None	
40LED	100B office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	None	
40LED	100C Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	None	
40LED	100D Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	None	
40LED	100E Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	None	
40LED	Choral Rm	Classroom	10	T 32 R F 2 (ELE)	F42LL	60	0.60	SW	2400	1,440	OCC	
40LED	Choral Rm	Classroom	10	T 32 R F 2 (ELE)	F42LL	60	0.60	SW	2400	1,440	OCC	
40LED	Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	None	
40LED	Corridor	Hallways	7	T 32 R F 2 (ELE)	F42LL	60	0.42	Breaker	2280	958	None	
40LED	Dressing Rm A	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	None	
40LED	Dressing Rm B	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	None	
40LED	Costume	Offices	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	2400	864	None	

APPENDIX C

ECM Calculations

Hopewell Valley Regional School District
CHA Project Number: 28724

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
\$	0.131	\$/kWh blended	0.000420205	220,000	Electric	Natural Gas	Fuel Oil
\$	0.110	\$/kWh supply	2,192,806		\$ 287,060	\$ 129,469	
\$	6.51	\$/kW	755.3				
\$	1.05	\$/Therm	123,706				
\$	8.04	\$/kgals	3,067				
		\$/Gal					

Recommend? Y or N	Central Valley High School																						
		Item	Savings					Cost	Simple Payback	Life Expectancy	Equivalent CO ₂ (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings					ROI	NPV	IRR	
			kW	kWh	therms	No. 2 Oil gal	Water kgal								\$	kW	kWh	therms	kgal/yr				\$
N	ECM-1	Roof Replacement and Insulate	0.0	10,589	9,909	0	0	11,762	\$ 2,234,300	190.0	25.0	57.3		N	190.0	0.0	264,717	247,733	0	\$ 294,055	(0.9)	(\$2,029,483)	-11.9%
Y	ECM-2	Replace Modular Boilers with a Condensing Boiler	0.0	0	2,650	0	0	2,775	\$ 108,281	39.0	25.0	14.1	\$ 2,000	N	38.3	0.0	0	66,262	0	\$ 69,376	(0.4)	(\$57,959)	-3.0%
N	ECM-3	Install Variable Refrigerant Volume Units in Classrooms	20.9	122,898	17,381	0	0	33,346	\$ 3,192,000	95.7	15.0	144.4	\$ 13,000	N	95.3	312.8	1,843,476	260,711	0	\$ 538,899	(0.8)	(\$2,780,921)	-17.4%
Y	ECM-4	Premium Efficiency Motors & VFDs onto Pumps	5.3	7,659	0	0	0	1,256	\$ 11,188	8.9	15.0	3.2	\$ 900	N	8.2	79.3	114,892	0	0	\$ 21,246	0.9	\$4,700	8.7%
Y	ECM-5	Demand Control Ventilation for RTU-16 and RTU-17	0.0	3,501	436	0	0	915	\$ 17,300	18.9	15.0	3.8		N	18.9	0.0	52,512	6,534	0	\$ 13,720	(0.2)	(\$6,381)	-2.8%
Y	ECM-6	Install Walk-In Cooler & Freezer Controls	0.0	9,142	0	0	0	1,198	\$ 20,625	17.2	5.0	3.8	\$ 100	N	17.1	0.0	45,710	0	0	\$ 5,988	(0.7)	(\$15,040)	-30.7%
Y	ECM-7	Install Vending Machine Controls	0.0	10,295	0	0	0	1,349	\$ 1,120	0.8	10.0	4.3		N	0.8	0.0	102,953	0	0	\$ 13,487	11.0	\$10,384	120.3%
Y	ECM-8	Install Kitchen Hood Controls	0.0	1,387	730	0	0	947	\$ 30,787	32.5	10.0	4.5		N	32.5	0.0	13,869	7,305	0	\$ 9,465	(0.7)	(\$22,713)	-17.2%
Y	ECM-9	Convert Electric Dishwasher Booster Heaters to NG	0.0	23,447	(1,000)	0	0	2,025	\$ 13,800	6.8	10.0	4.5	\$ 1,700	N	6.0	0.0	234,467	(10,000)	0	\$ 20,245	0.5	\$5,170	10.6%
Y	ECM-10	Replace DHW-1 with High Efficiency Condensing Boiler	0.0	0	119	0	0	125	\$ 7,881	63.1	15.0	0.6	\$ 300	N	60.7	0.0	0	1,788	0	\$ 1,872	(0.8)	(\$6,091)	-13.9%
N	ECM-L1	Lighting Replacements / Upgrades	90.3	205,236	0	0	0	29,631	\$ 477,394	16.1	10.0	86.2	\$ 42,320	N	14.7	903.0	2,052,360	0	0	\$ 339,402	(0.3)	(\$182,316)	-6.4%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	69,298	0	0	0	7,623	\$ 14,492	1.9	10.0	29.1	\$ 2,260	N	1.6	0.0	692,980	0	0	\$ 90,780	5.3	\$52,794	61.8%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	90.3	237,368	0	0	0	33,165	\$ 491,886	14.8	10.0	99.7	\$ 44,580	N	13.5	903.0	2,373,680	0	0	\$ 381,494	(0.2)	(\$164,404)	-5.1%
Total (Not Including ECMs L1, L2)			116.4	426,286	30,226	0	0	\$ 88,860	\$ 6,129,169	69.0	14.1	340	\$ 62,580		68.3	1,295	5,046,275	580,333	-	\$ 1,369,847	(0.8)	(\$5,062,820)	-16.3%
Recommended Measures (highlighted green above)			95.6	292,799	2,936	0	0	\$ 43,752	\$ 702,869	16.1	12.8	139	\$ 49,580	0	14.9	982	2,938,081	71,889	-	\$ 536,894	(0.2)	(\$217,780)	-3.2%
% of Existing			13%	13%	2%	0	0																

City:			Newark, NJ				
Occupied Hours/Week			70	70	70	70	50
			Building	Auditorium	Gymnasium	Library	Classrooms
			Operating	Occupied	Occupied	Occupied	Occupied
Temp	Enthalpy h (Btu/lb)	Bin Hours	Hours	Hours	Hours	Hours	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

\$ 6,621,055
\$ (2,234,300)
\$ (3,192,000)
\$ (477,394)
\$ (14,492)
\$ 702,869

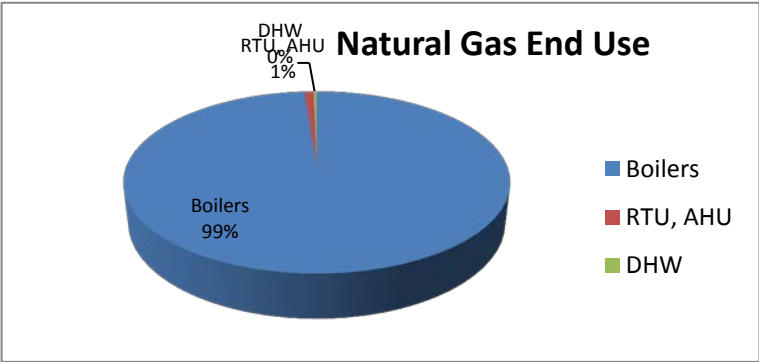
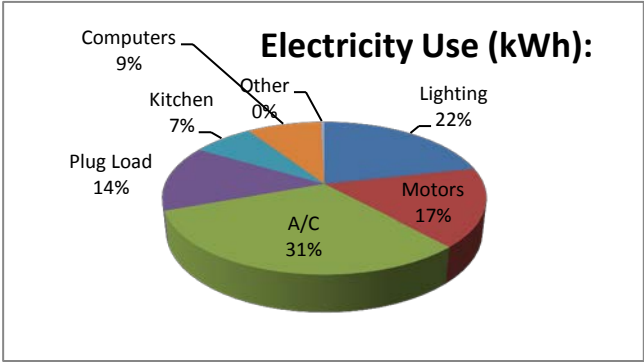
Heating	
Hours	4,427 Hrs
Weighted Avg	40 F
Avg	28 F

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

Utility End Use Analysis		
Electricity Use (kWh):		Notes/Comments:
2,192,806	Total	Based on utility analysis
472,174	Lighting	From Lighting Calculations
364,995	Motors	Estimated
685,000	A/C	See Window AC Calculation
308,000	Plug Load	Estimated
159,333	Kitchen	Estimated
195,000	Computers	Estimated
8,304	Other	Remaining
Natural Gas Use (Therms):		Notes/Comments:
123,706	Total	Based on utility analysis
123,346	Boilers	Therms/SF x Square Feet Served
1,129	RTU, AHU	Based on utility analysis
360	DHW	Based on utility analysis

0.21532867
0.166451113
0.312385136
0.140459302
0.072661695
0.088927155
0.003786929

0.997089874
0.009126477
0.002910126



Hopewell Valley Regional School District
CHA Project Number: 28724
Timberlane Middle School

ECM-1 Replace Roof and Insulate

Area of Roof	90,000 SF	Cooling System Efficiency	1.2 kW/ton	Heating System Efficiency	80%
Existing Infiltration Factor	0.05 cfm/SF	Ex Occupied Clng Temp.	74 °F	Heating On Point	55 °F
Proposed Infiltration Factor	0.02 cfm/SF	Ex Unoccupied Clng Temp.	85 °F	Ex Occupied Htg Temp.	72 °F
Existing U Value	0.077 Btuh/SF°F	Cooling Occ Enthalpy Setpoint	26.5 Btu/lb	Ex Unoccupied Htg Temp.	60 °F
Proposed U Value	0.033 Btuh/SF°F	Cooling Unocc Enthalpy Setpoint	26.5 Btu/lb	Electricity	\$ 0.122 \$/kWh
				Natural Gas	\$ 0.87 \$/Therm

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH	Roof Infiltration & Heat Load BTUH	Roof 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
97.5	55.7	9	3	6	-753,992	-677,838	-307,020	-274,020	635	257	0	0
92.5	49.1	69	25	44	-585,727	-509,573	-238,560	-205,560	3704	1500	0	0
87.5	42.5	132	47	85	-417,462	-341,308	-170,100	-137,100	4864	1965	0	0
82.5	39.5	344	123	221	-322,096	0	-130,800	0	3957	1607	0	0
77.5	36.6	566	202	364	-228,756	0	-92,310	0	4624	1866	0	0
72.5	34.0	755	270	485	0	0	0	0	0	0	0	0
67.5	31.6	780	279	501	0	0	0	0	0	0	0	0
62.5	29.2	889	318	572	0	0	0	0	0	0	0	0
57.5	27.0	742	265	477	0	0	0	0	0	0	0	0
52.5	24.5	627	224	403	229,770	88,373	96,408	37,080	0	0	1,088	457
47.5	21.4	725	259	466	288,685	147,288	121,128	61,800	0	0	1,792	752
42.5	18.7	795	284	511	347,601	206,204	145,848	86,520	0	0	2,551	1,070
37.5	16.2	784	280	504	406,516	265,119	170,568	111,240	0	0	3,093	1,298
32.5	14.4	682	244	438	465,432	324,035	195,288	135,960	0	0	3,193	1,340
27.5	12.6	345	123	222	524,347	382,950	220,008	160,680	0	0	1,869	784
22.5	10.7	229	82	147	583,262	441,865	244,728	185,400	0	0	1,409	591
17.5	8.6	189	68	122	642,178	500,781	269,448	210,120	0	0	1,302	546
12.5	6.8	70	25	45	701,093	559,696	294,168	234,840	0	0	534	224
7.5	5.5	20	7	13	760,008	618,612	318,888	259,560	0	0	167	70
2.5	4.1	8	3	5	818,924	677,527	343,608	284,280	0	0	73	31
TOTALS		8,760	3,129	5,631					17784	7195	17,073	7,164

Existing Ceiling Infiltration	4,500 cfm	Savings	9,909 Therms	\$ 8,621
Existing Ceiling Heat Transfer	6,923 Btuh/°F		10,589 kWh	\$ 1,292
Proposed Ceiling Infiltration	1,800 cfm			\$ 9,913
Proposed Ceiling Heat Transfer	3,000 Btuh/°F			

Hopewell Valley Regional School District
CHA Project Number: 28724
Hopewell Elementary School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-1 Replace Roof & Insulate - Cost

Description	Sq. FT	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						\$ -	\$ -	\$ -	\$ -	
Replace roof and insulate	90,000	sq. ft.	\$ 12.00	\$ 6.00		\$ 1,112,400	\$ 675,000	\$ -	\$ 1,787,400	Architect Estimate
						\$ -	\$ -	\$ -	\$ -	

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

\$ 1,787,400	Subtotal
\$ 446,850	25% Contingency
\$ 2,234,300	Total

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

ECM-2: Boiler Replacement

Description: This ECM evaluates the replacement of (7) existing modular hot water boilers with one (1) high efficiency condensing gas boiler. The existing modular boiler efficiency (combined average) is 80% and the proposed boiler efficiency is 90% (average seasonal efficiency). Electrical power consumption due to pumps is considered to be the same for both the proposed system and the baseline system.

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	\$ 1.05	/ 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	80%		
Heating Degree-Day	2,783	Degree-day	
Design Temperature Difference	56	F	
Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	2,000,000	btu/hr	
Efficiency	90%		
SAVINGS			
Fuel Savings	2,650	Therms	NJ Protocols Calculation
Fuel Cost Savings	\$ 2,775		

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

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ECM-2: Boiler Replacement - 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 BMK2.0 w/ condensate neutralizer	1	EA	\$ 32,000	\$ 16,000		\$ 32,864	\$ 19,936	\$ -	\$ 52,800	Vendor Estimate
Flue Installation	1	EA	\$ 10,000.0	\$ 5,000.00		\$ 10,270	\$ 6,230	\$ -	\$ 16,500	Vendor Estimate
Controls	1	EA	\$ 1,500.0	\$ 1,000.00		\$ 1,541	\$ 1,246	\$ -	\$ 2,787	RS Means 2012
Miscellaneous Electrical	1	LS	\$ 500	\$ 250		\$ 514	\$ 312	\$ -	\$ 825	RS Means 2012
Miscellaneous HW Piping	1	LS	\$ 5,000	\$ 2,500		\$ 5,135	\$ 3,115	\$ -	\$ 8,250	RS Means 2012
Primary Pump	1	LS	\$ 3,500	\$ 1,500		\$ 3,595	\$ 1,869	\$ -	\$ 5,464	RS Means 2012
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	
						\$ -	\$ -	\$ -	\$ -	

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

\$ 86,625	Subtotal
\$ 21,656	25% Contingency
\$ 108,281	Total

ECM-3: VRV System with DCV and Energy Recovery for Classroom Wings B & C

Description: This ECM evaluates energy savings for three systems in a typical classroom: A) installing a modern high efficiency VRV system (variable refrigerant volume); B) DCV (demand controlled ventilation); and C) air-to-air heat exchange for outside air ventilation. The existing classrooms are typically heated and cooled by a unit ventilator outfitted with a 2-pipe hydronic heating/cooling coil. As part of the installation the existing unit ventilators will have their fans removed and the outside air louvers insulated and blanked off.

A) Install VRV System		Equipment Tag	Equipment Description	General Type	Cooling Capacity (Btu/h)	Heating Capacity (Btu/h)
			Unit Ventilator	HVAC	48,000	40,000
Item	Value	Units	Formula/Comments			
Demand Rate	\$ 6.51	/ kW				
Electricity Rate	\$ 0.11	/kWh				
Natural Gas Rate	\$ 1.05	/ therm				
FORMULA CONSTANTS						
Coincidence Factor	0.67		NJ Protocols			
Conversion	3.412	btu/kW				
COOLING - Chiller vs. VRV						
Cooling Capacity	48,000	btu/hr	Average cooling load per classroom			
Baseline EER	9.0		Per existing McQuay air-cooled chiller			
Proposed EER	16.0		New VRV equipment summer cooling average			
Equivalent Full Load Hours	1,231	hrs	NJ Protocols			
Demand Savings	1.56	kW				
Energy Savings	2,872	kWh				
HEATING - Boiler vs. VRV						
Heating Capacity	30,000	btu/h	Actual avg. heat load per classroom			
Baseline Heating Efficiency	0.8		Per existing gas fired boiler			
Existing Natural gas usage	300	therms				
Proposed Heating EER	10.0		New VRV equipment winter heating average			
Proposed Heating kWh usage	2,400	kWh	New VRV equipment			
Proposed Demand	0.88	kW				
Equivalent Full Load Hours	800	hrs	NJ Protocols			
Existing Heating Cost	\$ 314.10					
Proposed Heating Cost	\$ 264.00					
COOLING - Heat Pump (Not Applicable)						
Cooling Capacity	-	btu/h				
Baseline Cooling EER	13.0		See Table Below			
Proposed Cooling EER	20.0		Equipment			
Equivalent Full Load Hours	-	hrs	NJ Protocols - 371 hrs			
SAVINGS						
Cooling Savings	2,872	kWh				
Demand Savings	0.42	kW	Per classroom			
KWH Energy Savings	472	kWh	Per classroom			
Natural Gas Savings	300	therms	Per classroom			
Number of classrooms	1					
Total KWH Savings	472	kWh				
Total Demand Savings	0.42	kW				
Total Natural Gas Savings	300	therms				
Overall Cost Savings	\$ 376					
Savings calculation formulas are taken from NJ Protocols document for Electric HVAC Equipment						

B) Demand Controlled Ventilation

Electric Cost	\$ 0.13	/kWh
Natural Gas Cost	\$ 1.05	/therm
Classroom Ventilation Heating Load	17,010	BTU/Hour ^{1,2,3}
Classroom Ventilation Cooling Load	4,860	BTU/Hour ^{1,2,3}
Existing Ventilation Heating Usage	952	Therms ²
Existing Ventilation Cooling Usage	4,254	kWh ³
Proposed Ventilation Heating Usage	905	Therms ⁷
Proposed Ventilation Cooling Usage	4,041	kWh ⁷
Total heating savings	48	Therms
Total cooling savings	213	kWh
Total cost savings	78	
Estimated Total Project Cost	\$0 ⁸	
Simple Payback	0.0	years

Note: costs are used for energy savings calculations only. Do not use for procurement

Assumptions

- 45% OA AHU airflow based existing equipment model numbers
- 35 °F, Assumed average heating Δt (mixed air and supply)
- 10 °F, Assumed average cooling Δt (mixed air and supply)
- 80% Heating Efficiency - %
- 0.7 Cooling Efficiency - kW/Ton
- 4,479 AHU run time per heating/cooling season bin data
- 5% Estimated savings for DCV based on NJ Protocols
- \$ - estimated measure cost for installation of sensors and associated controls

ECM-3 SUMMARY:

		Per Classroom	
A)	VRV System Total kWh Savings	472	kWh
	VRV System Demand Savings	0.42	kW
	VRV System Total Therms Savings	300	therms
B)	DCV Total kWh Savings	213	kWh
	DCV Total Therms Savings	48	therms
C)	Air to Air Heat Exchange Total kWh Savings	1,773	kWh
Number of Classrooms = 50			
TOTAL KWH SAVINGS = 122,898 kWh			
TOTAL DEMAND SAVINGS = 20.86 kW			
TOTAL THERMS SAVINGS = 17,381 therms			
Overall COST Savings = \$ 31,852			

C) Air-to-Air Heat Exchanger

Heat Exchanger Efficiency	76% note (1)	Occupied Temperature Heating	72	Occupied Temperature Cooling	74
CFM of outdoor air	427.5 note (2)	Unoccupied Temp. Heating	60	Unoccupied Temp. Cooling	85
Cooling Efficiency EER	16.0	kWh per BTUH	0.00029307	Cooling Occ Enthalpy Setpoint	27.1 Btu/lb
Heating Efficiency EER	10.0			Cooling Unocc Enthalpy Setpoint	27.1 Btu/lb

							EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
							Occupied	Unoccupied	Occupied	Unoccupied	Total	Total	Total	Total
							Outdoor Air Load BTUH	Outdoor Air Load BTUH	Outdoor Air Load BTUH	Outdoor Air Load BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy kWh	Proposed Heating Energy kWh
Avg Outdoor Air Temp. Bins °F	Avg Indoor Occupied Air Temps °F	Avg Heat Exch. Air Temps °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	G	H	I	J	K	L	M	N
102.5	74.0	80.8	33.1	0.0	0.0	0.0	-	-	-	-	-	-	-	-
97.5	74.0	79.6	35.4	6.0	2.5	3.5	39,953	55,934	21,255	29,757	28.10	14.95	-	-
92.5	74.0	78.4	37.4	31.0	12.9	18.1	255,988	358,383	136,185	190,660	180.05	95.79	-	-
87.5	74.0	77.2	35.0	131.0	54.6	76.4	827,934	1,159,108	440,461	616,645	582.34	309.81	-	-
82.5	74.0	76.0	33.0	500.0	208.3	291.7	2,383,472	3,336,861	1,268,007	1,775,210	1,676.46	891.88	-	-
77.5	74.0	74.8	31.5	620.0	258.3	361.7	2,210,421	3,094,590	1,175,944	1,646,322	1,554.75	827.12	-	-
72.5	74.0	73.6	29.9	664.0	276.7	387.3	1,493,430	2,090,802	794,505	1,112,307	1,050.43	558.83	-	-
67.5	74.0	72.4	27.2	854.0	355.8	498.2	58,228	81,519	30,977	43,368	40.96	21.79	-	-
62.5	74.0	71.2	24.0	927.0	386.3	540.8	37,152	52,013	29,722	31,624	26.13	17.98	-	-
57.5	72.0	68.5	20.3	600.0	250.0	350.0	1,673,663	2,343,128	401,679	562,351	-	-	1,177.20	282.53
52.5	72.0	67.3	18.2	730.0	304.2	425.8	2,738,458	3,833,841	657,230	920,122	-	-	1,926.15	462.28
47.5	72.0	66.1	16.0	491.0	204.6	286.4	2,314,175	3,239,845	555,402	777,563	-	-	1,627.72	390.65
42.5	72.0	64.9	14.5	656.0	273.3	382.7	3,722,841	5,211,977	893,482	1,250,875	-	-	2,618.54	628.45
37.5	72.0	63.7	12.5	1023.0	426.3	596.8	6,789,587	9,505,422	1,629,501	2,281,301	-	-	4,775.60	1,146.14
32.5	72.0	62.5	10.5	734.0	305.8	428.2	5,577,528	7,808,540	1,338,607	1,874,050	-	-	3,923.07	941.54
27.5	72.0	61.3	8.7	334.0	139.2	194.8	2,859,270	4,002,977	686,225	960,715	-	-	2,011.13	482.67
22.5	72.0	60.1	7.0	252.0	105.0	147.0	2,399,686	3,359,560	575,925	806,294	-	-	1,687.87	405.09
17.5	72.0	58.9	5.4	125.0	52.1	72.9	1,310,555	1,834,777	314,533	440,346	-	-	921.81	221.23
12.5	72.0	57.7	3.7	47.0	19.6	27.4	537,977	753,167	129,114	180,760	-	-	378.40	90.82
7.5	72.0	56.5	2.1	34.0	14.2	19.8	421,878	590,630	101,251	141,751	-	-	296.74	71.22
2.5	72.0	55.3	1.3	1.0	0.4	0.6	13,370	18,718	3,209	4,492	-	-	9.40	2.26
-2.5	72.0	54.1	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
-7.5	72.0	52.9	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
TOTALS				8760.0	3650.0	5110.0					5,139	2,738	21,354	5,125

Notes:

(1) BPE Inc. literature rates efficiency at 86%; minus 10% for safety

(2) CFM % reduction based on DCV

Savings	Cooling:	150.1	kWh
	Heating:	1622.9	kWh
Total:		1,773	kWh

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-3: Install VRV, DCV, and Air-to-Air heat Exchange System into Classrooms - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Install VRV units into classrooms, including:	70	classroom							\$ 25,000	Vendor quote
- Reprogram DDC system										
- Electrical - misc.										
- All cutting & patching & labor costs										
Install Air to Air Heat Exchanger System									\$ 9,500	Vendor quote
U.V. shut down and Louver blank off									\$ 2,000	Engineering estimate

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

\$ 36,500	Subtotal
\$ 9,125	25% Contingency
\$ -	0% Contractor O&P
\$ -	0% Engineering
\$ 3,192,000	Total

Hopewell Valley Regional School District
CHA Project Number: 28724
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ECM-4: Upgrade to Premium Efficiency Motors and Install Variable Speed Drives

Description: This ECM evaluates the energy (electrical) savings associated with replacing existing motors with high efficiency motors (based on ASHRAE 2010 NEMA ratings) and adding variable frequency drives to control motor speed based on actual load verses constant volume / constant flow.

Variable Inputs

Electric Rate \$0.13 \$/kWh
Demand Rate \$6.51 \$/kW

MOTOR SCHEDULE										Savings Factor		Existing Motor Energy		Proposed Motor Energy		Energy Savings	
Motor ID	Motor Type	Qty	HP	Total HP	Upgrade Motor	Load Factor	Existing Motor Eff.	New Motor Eff.	Annual Hours	Demand Savings Factor	Energy Savings Factor	Demand Energy (kW)	Electrical Energy (kWh)	Demand Energy (kW)	Electrical Energy (kWh)	Peak Demand Savings (kW)	Annual Energy Savings (kWh)
P-1	CHW/HW	1	5.0	5.0	Y	0.75	85.5%	89.5%	1,750	0.201	0.580	3.3	5,725	0.6	1,895	2.6	3,830
P-2	CHW/HW	1	5.0	5.0	Y	0.75	85.5%	89.5%	1,750	0.201	0.580	3.3	5,725	0.6	1,895	2.6	3,830
Total:																5.3	7,659.5
																\$ 413	\$ 1,003
																	\$ 1,416

Savings calculation formulas are taken from NJ Protocols document for VFDs

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

ECM-4: Upgrade to Premium Efficiency Motors and Install Variable Speed Drives - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						\$ -	\$ -	\$ -	\$ -	
VFD	2	ea	\$ 1,706	\$ 431		\$ 3,504	\$ 1,074	\$ -	\$ 4,578	RS Means 2012
Motor	2	ea	\$ 373	\$ 79		\$ 766	\$ 197	\$ -	\$ 963	RS Means 2012
Electrical - misc.	1	ls	\$ 1,500	\$ 1,500	\$ -	\$ 1,541	\$ 1,869	\$ -	\$ 3,410	RS Means 2012
						\$ -	\$ -	\$ -	\$ -	

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

\$ 8,951	Subtotal
\$ 2,238	25% Contingency
\$ 11,188 Total	

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AIR HANDLER	AREA SERVED	CFM	OA CFM	% OA
RTU-16	Library	10,000	3,330	33%
RTU-17	Computer Rm	2,500	835	33%
			4,165	CFM

ECM 5: Demand Controlled Ventilation

ECM Description: This ECM evaluates the energy savings associated with reducing the quantity of outdoor air being introduced to large space(s) such as gymnasiums, cafeterias and auditoriums. The reduction in outdoor air ventilation is achieved using carbon dioxide sensors installed within the space(s) that monitor the amount of CO2 being expelled by the occupants. The CO2 level threshold is measured against the CO2 level in the outdoor air and is maintained at 700 parts per million(ppm) in accordance with ASHRAE guidelines.

Electric Cost	\$	0.13	/kWh
Natural Gas Cost	\$	1.05	/therm
Facility Ventilation Heating Load		157,437	BTU/Hour ^{1,2,3}
Facility Ventilation Cooling Load		44,982	BTU/Hour ^{1,2,3}
Existing Ventilation Heating Usage		8,712	Therms ²
Existing Ventilation Cooling Usage		70,015	kWh ³
Proposed Ventilation Heating Usage		8,277	Therms ⁷
Proposed Ventilation Cooling Usage		66,515	kWh ⁷
Total heating savings		436	Therms
Total cooling savings		3,501	kWh
Total cost savings		915	
Estimated Total Project Cost		\$17,300	⁸
Simple Payback		18.9	years

Note: costs are used for enrgy savings calulations only. Do not use for procurment

Assumptions

- 1 4,165 OA AHU airflow based exsiting equipment model numbers
- 2 35 °F, Assumed average heating Δt (mixed air and supply)
- 3 10 °F, Assumed average cooling Δt (mixed air and supply)
- 4 80% Heating Efficiency - %
- 5 1.2 Cooling Efficiency - kW/Ton
- 6 4,427 AHU run time per heating/cooling season bin data
- 7 5% Estimated savings for DCV based on NJ Protocols
- 8 \$ 17,300 estimated measure cost for installation of sensors and associated controls

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ECM 5: Demand Controlled Ventilation - 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.		
						\$ -	\$ -	\$ -	\$ -	
Re-Program HVAC Controls to allow DCV	2	EA	\$ -	\$ 2,500		\$ -	\$ 6,230	\$ -	\$ 6,230	RS Means 2012
CO2 Sensor	2	EA	\$ 2,500	\$ 1,000		\$ 5,135	\$ 2,492	\$ -	\$ 7,627	RS Means 2012
						\$ -	\$ -	\$ -	\$ -	

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

\$ 13,857	Subtotal
\$ 3,464	25% Contingency
\$ 17,300	Total

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ECM-6: 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

\$0.13 \$/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	\$ 1,198	
Estimated Cost	\$ 20,625	
Simple Payback	17.2	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

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-6: 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
\$ 4,125	25% Contingency
\$ 20,625	Total

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ECM-7: Install Vending Machine Controls

Description : Vending machines generally operate 24/7 regardless of the actual usage. This measure proposes installing vending machine controls to reduce the total run time of these units. Cold beverage machines will cycle on for 15 minutes every two hours in order to keep beverages at a desired temperature. The result is a reduction in total electrical energy usage.

Unit Cost: \$0.131 \$/kWh blended

Energy Savings Calculations:

Existing	
Cold Beverage Vending Machine Electric usage	10,512 kWh ^{1,4,7}
Snack Vending Machine Electric usage	1,752 kWh ^{2,5,7}
Dual Vending Machine Electric Usage	- kWh ^{3,6,7}
Total Vending Machine Electric Usage	12,264 kWh

Proposed	
Cold Beverage Vending Machine Electric usage	1,654 kWh ⁸
Snack Vending Machine Electric usage	315 kWh
Dual Vending Machine Electric Usage	0 kWh
Total Vending Machine Electric Usage	1,969 kWh

Vending Machine Controls Usage Savings	10,295 kWh
Total cost savings	\$ 1,349
Estimated Total Project Cost	\$ 1,120 ⁹
Simple Payback	1 years

Assumptions

1	3	Number of cold beverage vending machines
2	1	Number of snack vending machines
3	0	Number of dual snack/beverage vending machines
4	400	Average wattage, typical of cold beverage machines based on prior project experience
5	200	Average wattage, typical of snack machines based on prior project experience
6	300	Average wattage, typical of dual snack/beverage machines based on prior project experience
7	8760	Hours per year vending machine plugged in
8	3150	Building Occupied Hours
9	0.50	Vending Machine Traffic Factor (0.75 for High Traffic, 0.5 for Medium, 0.25 for low)

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-7: Install Vending Machine Controls - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									\$ -	
Vending Miser	4	EA	\$ 200	\$ 15	\$ -	\$ 822	\$ 75	\$ -	\$ 896	Vendor Estimation
						\$ -	\$ -	\$ -	\$ -	

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

\$ 896	Subtotal
\$ 224	25% Contingency
\$ 1,120	Total

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

ECM-8: Kitchen Hood Control

Description: This ECM evaluates the thermal and electrical energy savings associated with the implementation of a variable flow controlled exhaust hood (Fan) and make-up air unit. The Hood controller uses infrared heat sensors to detect the level of smoke produced by the cooking operations and automatically adjusts the

Item	Value	Units	Formula/Comments
Fuel Cost	\$ 1.05	/ Therm	
Electricity Cost	\$ 0.13	/kWh	
FORMULA CONSTANTS			
Conversion	0.746	HP/kW	
Constant	8	hrs/day	
Constant	1.08	(btu/hr)/CFM-F	
Conversion	3.412	btu/kWh	
ELECTRIC FAN SAVINGS			
Facility Type	School		
Quantity of Kitchen Hood Fan Motors	1		
Kitchen Hood Fan Motor HP	3.0	HP	
Motor Load Factor	0.90		NJ Protocols
Efficiency of Fan Motor(s)	86.5%		
Kitchen Hood Fan Run Hours	1,020		
Fan Motor Power Reduction (From VFD)	0.584		
Fan Electricity Savings	1,387	kWh	
HEATING SAVINGS			
Kitchen is Heated?	Y		
Square Footage of Kitchen	800	ft²	Estimated
Code Required Ventilation Rate	0.70	CFM/ft²	NJ Protocols
Ventilation Oversize Factor	1.40		NJ Protocols
Flow Reduction (from VFD/Control)	0.310		
Heating Degree Day	2,783		NJ Protocols Table
Heating System Efficiency	80%		AFUE (%)
Heating Savings	73	MMbtu	
Heating Savings	730	Therms	
COOLING SAVINGS			
Kitchen is Cooled?	N		
Cooling Degree Day	-		NJ Protocols Table
Cooling System Efficiency	-		COP
Cooling Savings	-	kWh	
TOTAL SAVINGS			
Electricity Savings	1,387	kWh	
Fuel Savings	730	Therms	
Cost Savings	\$ 947		

Q
HP
LF
FEFF
RH
PR

SF
CFM/SF
OF
FR
HDD
HEFF

CDD
CEFF

Savings calculation formulas are taken from NJ Protocols document for Kitchen Hood

Hopewell Valley Regional School District
 CHA Project Number: 28724
 Central Valley High School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-8: Kitchen Hood Control - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Me-Link Kitchen Hood Control System	1	ea	\$ 15,000	\$ 2,000		\$ 15,405	\$ 2,492	\$ -	\$ 17,897	Vendor Estimation
5.0 HP VFDs (1-exhaust fan)	1	ea	\$ 1,485	\$ 490		\$ 1,525	\$ 611	\$ -	\$ 2,136	RS Means 2012
5.0 HP Motor	1	ea	\$ 525	\$ 85		\$ 539	\$ 106	\$ -	\$ 645	RS Means 2012
Reprogram DDC system	1	ea	\$ 100	\$ 1,200		\$ 103	\$ 1,495	\$ -	\$ 1,598	RS Means 2012
Electrical - misc.	1	ls	\$ 200	\$ 500		\$ 205	\$ 623	\$ -	\$ 828	RS Means 2012
Remote bulb thermostat	2	ea	\$ 500	\$ 200		\$ 1,027	\$ 498	\$ -	\$ 1,525	RS Means 2012
						\$ -	\$ -	\$ -	\$ -	

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

\$ 24,629	Subtotal
\$ 6,157	25% Contingency
\$ 30,787	Total

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

ECM-9: Dishwasher Booster Heater Conversion

Description: This ECM evaluates the energy savings associated with replacing an electrically powered dishwasher booster heater with an equivalently sized natural gas booster heater

<u>Item</u>	<u>Value</u>	<u>Units</u>	<u>Formula/Comments</u>
Baseline Fuel Cost	\$ 1.05	/ Therm	
Electricity Cost	\$ 0.11	\$/kWh	
Demand Cost	\$ 6.51	\$/kWh	
FORMULA CONSTANTS			
CF	0.3		Coincidence Factor (NJ Protocols)
EFLH	1,000		Equivalent Full Load Hours (NJ Protocols)
PROPOSED EQUIPMENT			
Input Rating	100,000	btu/hr	New Gas Booster Heater
Efficiency	80%		
SAVINGS			
Electricity Savings	23,447	kWh	
Demand Savings	7	kW	
Fuel Usage	1,000	Therms	
Fuel Cost Savings	\$ 1,578		

Savings calculation formulas are taken from NJ Protocols document for Booster Heater

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

ECM-9: Dishwasher Booster Heater Conversion - 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.		
						\$ -	\$ -	\$ -	\$ -	
Natural Gas Fired Booster Heater	1	EA	\$ 5,000	\$ 2,500		\$ 5,135	\$ 3,115	\$ -	\$ 8,250	RS Means 2012
Venting, Piping, Ect.	1	LS	\$ 1,500	\$ 1,000		\$ 1,541	\$ 1,246	\$ -	\$ 2,787	RS Means 2012
						\$ -	\$ -	\$ -	\$ -	

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

\$ 11,037	Subtotal
\$ 2,759	25% Contingency
\$ 13,800	Total

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

ECM-10: 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	30	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	36,000	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	78%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	28,080	MBTU/yr	
Existing Tank Size	40	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)	0.6	MBH	
Annual Standby Hot Water Load	5,585	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	23,116	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	241	Therms	Standby Losses and inefficient DHW heater eliminated
Utility Cost	\$1.05	\$/Therm	
Existing Operating Cost of DHW	\$377	\$/yr	
Proposed Operating Cost of DHW	\$252	\$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	119	\$125

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-10: Replace Gas-Fired DHW Heater w/ Tankless Condensing Gas-Fired DHW Heater - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Gas-Fired DHW Heater Removal	1	LS		\$ 50		\$ -	\$ 62	\$ -	\$ 62	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

\$ 6,305	Subtotal
\$ 1,576	25% Contingency
\$ 7,881	Total

Hopewell Valley Regional School District
CHA Project Number: 28724
Central Valley High 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)		220,000	
Is this audit funded by NJ BPU (Y/N)		Yes	

Board of Public Utilites (BPU)

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	\$287,060	\$129,469
Existing Usage (from utility)	2,192,806	123,706
Proposed Savings	292,799	2,936
Existing Total MMBtus	19,855	
Proposed Savings MMBtus	1,293	
% Energy Reduction	6.5%	
Proposed Annual Savings	\$43,752	

	Min (Savings = 15%)		Increase (Savings >		Max Incentive		Achieved Incentive	
	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm	\$/kWh	\$/therm
Incentive #2	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.00	\$0.00
Incentive #3	\$0.09	\$0.90	\$0.005	\$0.05	\$0.11	\$1.25	\$0.00	\$0.00

	Incentives \$		
	Elec	Gas	Total
			\$11,000
Incentive #1	\$0	\$0	\$0
Incentive #2	\$0	\$0	\$0
Incentive #3	\$0	\$0	\$0
Total All Incentives	\$0	\$0	\$0

Total Project Cost	\$702,869
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	Allowable Incentive
% Incentives #1 of Utility Cost*	0.0% \$0
% Incentives #2 of Project Cost**	0.0% \$0
% Incentives #3 of Project Cost**	0.0% \$0
Total Eligible Incentives***	\$0
Project Cost w/ Incentives	\$702,869

Project Payback (years)	
w/o Incentives	w/ Incentives
16.1	16.1

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

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.
** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.
*** Maximum allowable amount of Incentive #1 is \$50,000 if not funded by NJ BPU, and \$25,000 if it is.
Maximum allowable amount of Incentive #2 & #3 is \$1 million per gas account and \$1 million per electric account; maximum 2 million per project

EXISTING CONDITIONS													RETROFIT CONDITIONS													COST & SAVINGS ANALYSIS									
Field Code	Area Description	No. of Fixtures before the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	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 daily hours for the usage group	Annual kWh (kW/Space) * (Annual Hours)	Number of Fixtures after the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 21 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Number of Fixtures)	Retrofit Control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/Space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual \$ Saved (kWh Saved) * (\$/kWh)	Retrofit Cost Cost for renovations to lighting system	NJ Smart Start With Out Lighting Incentive Prescriptive Lighting Measures	Simple Payback Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered											
35LED	Classroom 102	12	T 32 R F 3 (ELE)	F43ILU2	90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	SW	2,400	1,094	1,498	0.6	\$	213.48	\$ 2,835.00	\$0	13.3	13.3										
220	Classroom 102-Storage	1	S 17 C F 1 (ELE)	F21ILL	20	0.0	SW	1000	20	1	S 17 C F 1 (ELE)	F21ILL	20	0.0	SW	1,000	20	0	0.0	\$	-	\$ -	\$0		#DIV/0!										
35LED	Classroom 104	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
35LED	Classroom 104-Storage	2	T 32 R F 3 (ELE)	F43ILU2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	104	0.1	\$	19.56	\$ 472.50	\$0	24.2	24.2										
35LED	Classroom 106	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
35LED	Classroom 106-Storage	2	T 32 R F 3 (ELE)	F43ILU2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	104	0.1	\$	19.56	\$ 472.50	\$0	24.2	24.2										
40LED	Wood Shop	41	T 32 R F 2 (ELE)	F42LL	60	2.5	SW	2400	5,904	41	T 38 R LED	RTLED38	38	1.6	SW	2,400	3,739	2,165	0.9	\$	308.99	\$ 9,686.25	\$2,050	31.4	24.7										
40LED	109 Storage	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	1000	600	10	T 38 R LED	RTLED38	38	0.4	SW	1,000	380	220	0.2	\$	41.39	\$ 2,362.50	\$500	57.1	45.0										
274LED	Storage	2	T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	T 38 R LED	RTLED38	38	0.1	SW	1,000	76	68	0.1	\$	12.79	\$ 472.50	\$100	36.9	29.1										
40LED	Downstairs Wood Shop Storage	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	T 38 R LED	RTLED38	38	0.1	SW	1,000	114	70	0.1	\$	12.42	\$ 708.75	\$150	57.1	45.0										
40LED	Upstairs Wood Shop Storage	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.0	SW	1,000	38	22	0.0	\$	4.14	\$ 236.25	\$50	57.1	45.0										
40LED	Classroom 107	15	T 32 R F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160	15	T 38 R LED	RTLED38	38	0.6	SW	2,400	1,368	792	0.3	\$	112.90	\$ 3,543.75	\$750	31.4	24.7										
35LED	Classroom 108	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
35LED	Classroom 109	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
40LED	Nurse	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	\$	30.11	\$ 945.00	\$200	31.4	24.7										
40LED	Exam Room 1	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	T 38 R LED	RTLED38	38	0.0	SW	2,400	91	53	0.0	\$	7.53	\$ 236.25	\$50	31.4	24.7										
40LED	Exam Room 2	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	T 38 R LED	RTLED38	38	0.0	SW	2,400	91	53	0.0	\$	7.53	\$ 236.25	\$50	31.4	24.7										
126	Toilet Room	1	DC 23 C CF 2	CFQ22/2	48	0.0	SW	1000	48	1	DC 23 C CF 2	CFQ22/2	48	0.0	SW	1,000	48	0	0.0	\$	-	\$ -	\$0		#DIV/0!										
40LED	Office	4	T 32 R F 2 (ELE)	F42LL	60	1.8	SW	2400	576	4	T 38 R LED	RTLED38	38	1.1	SW	2,280	2,589	1,505	0.7	\$	30.11	\$ 945.00	\$200	31.4	24.7										
126	Toilet Room	1	DC 23 C CF 2	CFQ22/2	48	0.0	SW	1000	48	1	DC 23 C CF 2	CFQ22/2	48	0.0	SW	1,000	48	0	0.0	\$	-	\$ -	\$0		#DIV/0!										
254LED	Storage	1	CFQ26/2	CFQ26/2	66	0.1	SW	1000	66	1	EVO35/10	EVO35/10	39	0.0	SW	1,000	39	27	0.0	\$	5.08	\$ 438.75	\$35	86.4	79.5										
254LED	Storage	1	CFQ26/2	CFQ26/2	66	0.1	SW	1000	66	1	EVO35/10	EVO35/10	39	0.0	SW	1,000	39	27	0.0	\$	5.08	\$ 438.75	\$35	86.4	79.5										
274LED	Electrical Room (Locked)	2	T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	144	2	T 38 R LED	RTLED38	38	0.1	SW	1,000	76	68	0.1	\$	12.79	\$ 472.50	\$100	36.9	29.1										
40LED	Corridor	30	T 32 R F 2 (ELE)	F42LL	60	1.8	SW	2280	4,104	30	T 38 R LED	RTLED38	38	1.1	SW	2,280	2,589	1,505	0.7	\$	217.09	\$ 7,087.50	\$1,500	31.4	24.7										
65	Custodian's Office	1	I100	I100/1	100	0.1	SW	2400	240	1	CF 26	CFQ26/1-L	27	0.0	SW	2,400	65	175	0.1	\$	24.97	\$ 40.50	\$0	1.6	1.6										
35LED	Supply Room	1	T 32 R F 3 (ELE)	F43ILU2	90	0.1	SW	1000	90	1	T 59 R LED	RTLED38	38	0.0	SW	1,000	38	52	0.1	\$	9.78	\$ 236.25	\$0	24.2	24.2										
40LED	Supply Room	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	240	4	T 38 R LED	RTLED38	38	0.2	SW	1,000	152	88	0.1	\$	16.55	\$ 945.00	\$200	57.1	45.0										
35LED	Classroom 200	12	T 32 R F 3 (ELE)	F43ILU2	90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	SW	2,400	1,094	1,498	0.6	\$	213.48	\$ 2,835.00	\$0	13.3	13.3										
35LED	Classroom 201	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
35LED	Classroom 202	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
35LED	Classroom 203	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
35LED	Classroom 204	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
40LED	Conference Room 205	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1200	432	6	T 38 R LED	RTLED38	38	0.2	SW	1,200	274	158	0.1	\$	27.74	\$ 1,417.50	\$300	51.1	40.3										
35LED	Classroom 206	12	T 32 R F 3 (ELE)	F43ILU2	90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	SW	2,400	1,094	1,498	0.6	\$	213.48	\$ 2,835.00	\$0	13.3	13.3										
35LED	Classroom 207	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	SW	2,400	821	1,123	0.5	\$	160.11	\$ 2,126.25	\$0	13.3	13.3										
35LED	Classroom 210	9	T 32 R F 3 (ELE)	F43ILU2	90	0.8	SW	24																											

EXISTING CONDITIONS										RETROFIT CONDITIONS										COST & SAVINGS ANALYSIS									
Area Description		No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Pre-Inst. control device	Annual Hours	Annual kWh	No. of fixtures		Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit control device	Annual Hours	Annual kWh	Annual kWh Saved	Annual \$ Saved	Retrofit Cost	Net Smart Start Lighting Initiative	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" Example 40 R F (u) = 2x2' Troff 40 w Recess. Floor 2 40 R F U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fix) * (Fixt No.)	Ex-Inst. control device	Estimated daily hours for the usage group	(kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 27 40 R F (u) = 2x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fix) * (Number of Fixtures)	kW/Space	Retrofit control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kWh) - (Retrofit Annual kWh)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered				
35LED	Band Room 100 (Locked)	15	T 32 R F 3 (ELE)	F431L/2	90	1.4	SW	2400	3,240	15	T 59 R LED	RTLED38	38	0.6	SW	2,400	1,368	1,872	0.8	\$ 266.86	\$ 3,543.75	\$0	13.3	13.3					
35LED	Instrument Storage (Locked)	6	T 32 R F 3 (ELE)	F431L/2	90	0.5	SW	1000	540	6	T 59 R LED	RTLED38	38	0.2	SW	1,000	228	312	0.3	\$ 56.69	\$ 1,417.50	\$0	24.2	24.2					
35LED	Choral Music 101 (Locked)	15	T 32 R F 3 (ELE)	F431L/2	90	1.4	SW	2400	3,240	15	T 59 R LED	RTLED38	38	0.6	SW	2,400	1,368	1,872	0.8	\$ 266.86	\$ 3,543.75	\$0	13.3	13.3					
35LED	TV Studio (Locked)	15	T 32 R F 3 (ELE)	F431L/2	90	1.4	SW	2400	3,240	15	T 59 R LED	RTLED38	38	0.6	SW	2,400	1,368	1,872	0.8	\$ 266.86	\$ 3,543.75	\$0	13.3	13.3					
35LED	Corridor	7	T 32 R F 3 (ELE)	F431L/2	90	0.6	Breaker	2280	1,436	7	T 59 R LED	RTLED38	38	0.3	Breaker	2,280	606	830	0.4	\$ 119.73	\$ 1,653.75	\$0	13.8	13.8					
7LED	Main Lobby	21	2T 32 R F 2 (u)	F431L/2	60	1.3	Breaker	2120	1,392	21	2RTLED38	2RTLED38	76	0.1	Breaker	2,120	1,197	1,917	0.5	\$ 241.76	\$ 2,507.50	\$176.050	17.6	17.6					
35LED	Ceramics 302	12	T 32 R F 3 (ELE)	F431L/2	90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	SW	2,400	1,094	1,498	0.6	\$ 213.48	\$ 2,835.00	\$0	13.3	13.3					
35LED	Storage	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$0	24.2	24.2					
35LED	Art Office	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Kitchen	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Art Room 301	12	T 32 R F 3 (ELE)	F431L/2	90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	SW	2,400	1,094	1,498	0.6	\$ 213.48	\$ 2,835.00	\$0	13.3	13.3					
35LED	Art Room Storage	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$0	24.2	24.2					
7LED	Main Vestibule	5	2T 32 R F 2 (u)	FU2LL	60	0.3	Breaker	2280	684	5	2T 25 R LED	2RTLED	25	0.1	Breaker	2,280	285	399	0.2	\$ 57.56	\$ 1,012.50	\$250	17.6	13.2					
40LED	Mens Bathroom	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	360	3	T 38 R LED	RTLED38	38	0.1	SW	1,000	114	66	0.1	\$ 12.42	\$ 708.75	\$150	57.1	45.0					
40LED	Women's Bathroom	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	360	3	T 38 R LED	RTLED38	38	0.1	SW	1,000	114	66	0.1	\$ 12.42	\$ 708.75	\$150	57.1	45.0					
40LED	Corridor	12	T 32 R F 2 (ELE)	F42LL	60	0.7	Breaker	2280	1,642	12	T 38 R LED	RTLED38	38	0.5	Breaker	2,280	1,040	602	0.3	\$ 86.84	\$ 2,835.00	\$250	25.7	25.7					
7LED	Main Office	30	2T 32 R F 2 (u)	FU2LL	60	1.8	SW	2400	4,320	30	2T 25 R LED	2RTLED	25	0.8	SW	2,400	1,800	2,520	1.1	\$ 359.23	\$ 6,075.00	\$1,500	16.9	12.7					
40LED	IT Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.1	SW	1,000	38	22	0.0	\$ 4.14	\$ 236.25	\$50	57.1	45.0					
40LED	Principal's Office	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	T 38 R LED	RTLED38	38	0.2	SW	2,400	547	317	0.1	\$ 45.16	\$ 1,417.50	\$300	31.4	24.7					
40LED	Break Room	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	T 38 R LED	RTLED38	38	0.2	SW	2,400	547	317	0.1	\$ 45.16	\$ 1,417.50	\$300	31.4	24.7					
7LED	Office	6	2T 32 R F 2 (u)	FU2LL	60	0.4	SW	2400	864	6	2T 25 R LED	2RTLED	25	0.2	SW	2,400	360	504	0.2	\$ 71.85	\$ 1,215.00	\$300	16.9	12.7					
7LED	Vice Principal's Office	6	2T 32 R F 2 (u)	FU2LL	60	0.4	SW	2400	864	6	2T 25 R LED	2RTLED	25	0.2	SW	2,400	360	504	0.2	\$ 71.85	\$ 1,215.00	\$300	16.9	12.7					
35LED	Testing Office	5	T 32 R F 3 (ELE)	F431L/2	90	0.5	SW	2400	1,080	5	T 59 R LED	RTLED38	38	0.2	SW	2,400	456	624	0.3	\$ 88.95	\$ 1,181.25	\$0	13.3	13.3					
40LED	Mens Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.0	SW	1,000	38	22	0.0	\$ 4.14	\$ 236.25	\$50	57.1	45.0					
40LED	Women's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.0	SW	1,000	38	22	0.0	\$ 4.14	\$ 236.25	\$50	57.1	45.0					
40LED	Child Study Team	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	T 38 R LED	RTLED38	38	0.2	SW	2,400	547	317	0.1	\$ 45.16	\$ 1,417.50	\$300	31.4	24.7					
126	Break Room	2	DC 23 C CF 2	CFQ22/2	48	0.1	SW	3000	288	2	DC 23 C CF 2	CFQ22/2	48	0.1	SW	3,000	288	-	0.0	\$ -	\$ -	\$0	-	#DIV/0!					
40LED	Copy Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2125	128	1	T 38 R LED	RTLED38	38	0.0	SW	2,125	81	47	0.0	\$ 6.86	\$ 236.25	\$50	34.4	27.1					
40LED	Child Study Team Office 1	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	\$ 30.11	\$ 945.00	\$200	31.4	24.7					
40LED	Child Study Team Office 2	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	\$ 30.11	\$ 945.00	\$200	31.4	24.7					
40LED	Child Study Team Office 3	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	\$ 30.11	\$ 945.00	\$200	31.4	24.7					
40LED	Child Study Team Office 4	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	\$ 30.11	\$ 945.00	\$200	31.4	24.7					
40LED	Child Study Team Office 5	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	\$ 30.11	\$ 945.00	\$200	31.4	24.7					
40LED	Child Study Team Office 6	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	\$ 30.11	\$ 945.00	\$200	31.4	24.7					
40LED	Break Room	2	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1820	427	2	T 38 R LED	RTLED38	38	0.1	SW	1,820	277	249	0.1	\$ 35.58	\$ 495.00	\$0	38.1	38.1					
35LED	Supply Room	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$0	24.2	24.2					
40LED	Counseling Office	8	T 32 R F 2 (ELE)	F42LL	60	0.5	SW	2400	1,152	8	T 38 R LED	RTLED38	38	0.3	SW	2,400	730	422	0.2	\$ 62.71	\$ 1,890.00	\$400	31.4	24.7					
35LED	Conference Room	3	T 32 R F 3 (ELE)	F431L/2	90	0.3	SW	1200	324	3	T 59 R LED	RTLED38	38	0.1	SW	1,200	137	187	0.2	\$ 37.78	\$ 708.75	\$0	21.6	21.6					
35LED	Counseling Office 1	2	T 32 R F 3 (ELE)	F431L/2	90	0.3	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Counseling Office 2	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Counseling Office 3	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Counseling Office 4	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Counseling Office 5	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Counseling Office 6	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
35LED	Counseling Office 7	2	T 32 R F 3 (ELE)	F431L/2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$0	13.3	13.3					
40LED	Principal's Conference Room	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1200	288	4	T 38 R LED	RTLED38	38	0.2	SW	1,200	182	106	0.1	\$ 18.49	\$ 945.00	\$200	51.1	40.3					
40LED	Corridor	4	T 32 R F 2 (ELE)	F42LL	60	0.2	Breaker	2280	547	4	T 38 R LED	RTLED38	38	0.2	Breaker	2,280	347	201	0.1	\$ 28.95	\$ 945.00	\$200	32.6	25.7					
40LED	Girls Bathroom	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	120	2	T 38 R LED	RTLED38	38	0.1	OCC	1,000	76	44	0.0	\$ 8.28	\$ 472.50	\$100	57.1	45.0					
276	Cafeteria	234	F44GHL	F44GHL	234	6.6	SW	1600	10,483	234	F44GHL	F44GHL	10,483	0.0	SW	1,600	10,483	-	0.0	\$ -	\$ -	\$0	-	#DIV/0!					
35LED	Kitchen	16	T 32 R F 3 (ELE)	F431L/2	90	1.4	SW	1600	2,304	16	T 59 R LED	RTLED38	38	0.6	SW	1,600	973	1,331	0.8	\$ 211.43	\$ 3,780.00	\$0	17.9	17.9					
35LED	Cooking Area	7	T 32 R F 3 (ELE)	F431L/2	90	0.6	SW	3000	1,890	7	T 59 R LED	RTLED38	38	0.3	SW	3,000	798	1,092	0.4	\$ 148.56	\$ 1,653.75	\$0	11.1	11.1					
35LED	Office	1	T 32 R F 3 (ELE)	F431L/2	90	0.1	SW	2400	216	1	T 59 R LED	RTLED38	38	0.0	SW	2,400	91	125	0.1	\$ 17.79	\$ 236.25	\$0	13.3	13.3					
35LED	Locker Room	1	T 32 R F 3 (ELE)	F431L/2	90	0.1	SW	2800	252	1	T 59 R LED	RTLED38	38	0.0	SW	2,800	106	146	0.1	\$ 20.08	\$ 236.25	\$0	11.8	11.8					
35LED	Bathroom	1	T 32 R F 3 (ELE)	F431L/2	90	0.1	SW	1000	90	1	T 59 R LED	RTLED38	38	0.0	SW	1,000	52	78	0.0	\$ 9.78	\$ 236.25	\$0	24.2						

			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 (Watts/Fixt) * (Fixt No.)	Exist Control	Annual Hours	Annual kWh (kW/Space) * (Annual Hours)	Number of Fixtures after the retrofit	Standard Fixture Code Example 21 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code	Watts per Fixture	kW/Space (Watts/Fixt) * (Number of Fixtures)	Retrofit Control device	Annual Hours	Annual kWh (kW/Space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kWh Saved (kW Saved) * (\$/kWh)	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback Length of time for renovations cost to be recovered		
35LED	Classroom 102	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	1680	1,814.4	777.6	\$85.54	\$128.25	\$20.00	1.5	1.3		
220	Classroom 102-Storage	1	S 17 C F 1 (ELE)	F21ILL	20	0.0	SW	1000	20.0	1	S 17 C F 1 (ELE)	F21ILL	20	0.0	None	1000	20.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
35LED	Classroom 104	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 104-Storage	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	1000	180.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
35LED	Classroom 106	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 106-Storage	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	1000	180.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Wood Shop	41	T 32 R F 2 (ELE)	F42LL	60	2.5	SW	2400	5,904.0	41	T 32 R F 2 (ELE)	F42LL	60	2.5	None	2400	5,904.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	109 Storage	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	1000	600.0	10	T 32 R F 2 (ELE)	F42LL	60	0.6	None	1000	600.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
274LED	Storage	2	T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	T 34 R F 2 (MAG)	F42EE	72	0.1	None	1000	144.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Downstairs Wood Shop Storage	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	180.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	1000	180.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Upstairs Wood Shop Storage	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Classroom 107	15	T 32 R F 2 (ELE)	F42LL	60	0.9	SW	2400	2,160.0	15	T 32 R F 2 (ELE)	F42LL	60	0.9	OCC	1680	1,512.0	648.0	\$71.28	\$128.25	\$20.00	1.8	1.5		
35LED	Classroom 108	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 109	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
40LED	Nurse	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	576.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Exam Room 1	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2400	144.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Exam Room 2	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2400	144.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
126	Toilet Room	1	DC 23 C CF 2	CFQ22/2	48	0.0	SW	1000	48.0	1	DC 23 C CF 2	CFQ22/2	48	0.0	OCC	1000	48.0	0.0	\$0.00	\$128.25	\$20.00		#DIV/0!		
40LED	Office	4	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	8.1			
126	Toilet Room	1	DC 23 C CF 2	CFQ22/2	48	0.0	SW	1000	48.0	1	DC 23 C CF 2	CFQ22/2	48	0.0	OCC	1000	48.0	0.0	\$0.00	\$128.25	\$20.00		#DIV/0!		
254LED	Storage	1	CFQ26/2	CFQ26/2	66	0.1	SW	1000	66.0	1	CFQ26/2	CFQ26/2	66	0.1	None	1000	66.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
254LED	Storage	1	CFQ26/2	CFQ26/2	66	0.1	SW	1000	66.0	1	CFQ26/2	CFQ26/2	66	0.1	None	1000	66.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
274LED	Electrical Room (Locked)	2	T 34 R F 2 (MAG)	F42EE	72	0.1	SW	1000	144.0	2	T 34 R F 2 (MAG)	F42EE	72	0.1	None	1000	144.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Corridor	1	T 32 R F 2 (ELE)	F42LL	60	1.8	SW	2280	4,104.0	1	T 32 R F 2 (ELE)	F42LL	60	1.8	None	2280	4,104.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
65	Custodian's Office	1	I100/1	I100/1	100	0.1	SW	2400	240.0	1	I100/1	I100/1	100	0.1	None	2400	240.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
35LED	Supply Room	30	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	None	1000	90.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
40LED	Supply Room	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	240.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	None	1000	240.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
35LED	Classroom 200	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	1680	1,814.4	777.6	\$85.54	\$128.25	\$20.00	1.5	1.3		
35LED	Classroom 201	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 202	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 203	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 204	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
40LED	Conference Room 205	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1200	432.0	6	T 32 R F 2 (ELE)	F42LL	60	0.4	None	1200	432.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!		
35LED	Classroom 206	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	OCC	1680	1,814.4	777.6	\$85.54	\$128.25	\$20.00	1.5	1.3		
35LED	Classroom 207	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 211	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
35LED	Classroom 209	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2400	1,944.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	OCC	1680	1,360.8	583.2	\$64.15	\$128.25	\$20.00	2.0	1.7		
40LED	Corridor	30	T 32 R F 2 (ELE)	F42LL	60	1.8	SW	2280	4,104.0	30	T 32 R F 2 (ELE)	F42LL	60	1.8	None	2280									

EXISTING CONDITIONS										RETROFIT CONDITIONS										COST & SAVINGS ANALYSIS						
	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 Example 2T 40 R F(U) = 2x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control device	Annual Hours	Annual kWh	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual \$ Saved (kW Saved) * (\$/kWh)	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered		
35LED	Band Room 100 (Locked)	15	T 32 R F 3 (ELE)	F431LL/2	90	1.4	SW	2400	3,240.0	15	T 32 R F 3 (ELE)	F431LL/2	90	1.4	OCC	1680	2,268.0	972.0	0.0	\$106.92	\$128.25	\$20.00	1.2	1.0		
35LED	Instrument Storage (Locked)	6	T 32 R F 3 (ELE)	F431LL/2	90	0.5	SW	1000	540.0	6	T 32 R F 3 (ELE)	F431LL/2	90	0.5	None	1000	540.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
35LED	Choral Music 101 (Locked)	15	T 32 R F 3 (ELE)	F431LL/2	90	1.4	SW	2400	3,240.0	15	T 32 R F 3 (ELE)	F431LL/2	90	1.4	OCC	1680	2,268.0	972.0	0.0	\$106.92	\$128.25	\$20.00	1.2	1.0		
35LED	TV Studio (Locked)	15	T 32 R F 3 (ELE)	F431LL/2	90	1.4	SW	2400	3,240.0	15	T 32 R F 3 (ELE)	F431LL/2	90	1.4	None	2400	3,240.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
35LED	Corridor	7	T 32 R F 3 (ELE)	F431LL/2	90	0.6	Breaker	2280	1,438.4	7	T 32 R F 3 (ELE)	F431LL/2	90	0.6	None	2280	1,438.4	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
7LED	Main Lobby	21	2T 32 R F 2 (u)	FU2LL	60	1.3	Breaker	2280	2,872.8	21	2T 32 R F 2 (u)	FU2LL	60	1.3	None	2280	2,872.8	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
35LED	Ceramics 302	12	T 32 R F 3 (ELE)	F431LL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F431LL/2	90	1.1	None	2400	2,592.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
35LED	Storage	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	SW	1000	180.0	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	None	1000	180.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
35LED	Art Office	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	SW	2400	432.0	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	OCC	1800	324.0	108.0	0.0	\$11.88	\$128.25	\$20.00	10.8	9.1		
35LED	Kin	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	SW	2400	432.0	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	None	2400	432.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
35LED	Art Room 301	12	T 32 R F 3 (ELE)	F431LL/2	90	1.1	SW	2400	2,592.0	12	T 32 R F 3 (ELE)	F431LL/2	90	1.1	None	2400	2,592.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
35LED	Art Room Storage	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	SW	1000	180.0	2	T 32 R F 3 (ELE)	F431LL/2	90	0.2	None	1000	180.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
7LED	Main Vestibule	5	2T 32 R F 2 (u)	FU2LL	60	0.3	Breaker	2280	684.0	5	2T 32 R F 2 (u)	FU2LL	60	0.3	None	2280	684.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	Men's Bathroom	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	360.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	1000	360.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	Women's Bathroom	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	360.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	1000	360.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	Corridor	12	T 32 R F 2 (ELE)	F42LL	60	0.7	Breaker	2280	1,641.6	12	T 32 R F 2 (ELE)	F42LL	60	0.7	None	2280	1,641.6	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
7LED	Main Office	30	2T 32 R F 2 (u)	FU2LL	60	1.8	SW	2400	4,320.0	30	2T 32 R F 2 (u)	FU2LL	60	1.8	None	2400	4,320.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	IT Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	Principal's Office	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	1800	648.0	216.0	0.0	\$23.76	\$128.25	\$20.00	5.4	4.6		
40LED	Break Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1680	180.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
7LED	Office	6	2T 32 R F 2 (u)	FU2LL	60	0.4	SW	2400	864.0	6	2T 32 R F 2 (u)	FU2LL	60	0.4	OCC	1800	648.0	216.0	0.0	\$23.76	\$128.25	\$20.00	5.4	4.6		
7LED	Vice Principal's Office	6	2T 32 R F 2 (u)	FU2LL	60	0.4	SW	2400	864.0	6	2T 32 R F 2 (u)	FU2LL	60	0.4	OCC	1800	648.0	216.0	0.0	\$23.76	\$128.25	\$20.00	5.4	4.6		
35LED	Testing Office	5	T 32 R F 3 (ELE)	F431LL/2	90	0.5	SW	2400	1,080.0	5	T 32 R F 3 (ELE)	F431LL/2	90	0.5	OCC	1800	810.0	270.0	0.0	\$29.70	\$128.25	\$20.00	4.3	3.6		
40LED	Men's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	Women's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	Child Study Team	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	T 32 R F 2 (ELE)	F42LL	60	0.4	None	2400	864.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
126	Break Room	2	OC 23 C CF 2	CFQ22/2	48	0.1	SW	3000	288.0	2	OC 23 C CF 2	CFQ22/2	48	0.1	None	3000	288.0	0.0	0.0	\$0.00	\$0.00	\$0.00	#DIV/0!			
40LED	Copy Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2125	127.5	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1500	90.0	37.5	0.0	\$4.13	\$128.25	\$20.00	31.1	26.2		
40LED	Child Study Team Office 1	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1800	432.0	144.0	0.0	\$15.84	\$128.25	\$20.00	8.1	6.8		
40LED	Child Study Team Office 2	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1800	432.0	144.0	0.0	\$15.84	\$128.25	\$20.00	8.1	6.8		
40LED	Child Study Team Office 3	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1800	432.0	144.0	0.0	\$15.84	\$128.25	\$20.00	8.1	6.8		
40LED	Child Study Team Office 4	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1800	432.0	144.0	0.0	\$15.84	\$128.25	\$20.00	8.1	6.8		
40LED	Child Study Team Office 5	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1800	432.0	144.0	0.0	\$15.84	\$128.25	\$20.00	8.1	6.8		
40LED	Child Study Team Office 6	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1800	432.0	144.0	0.0	\$15.84	\$128.25	\$20.00	8.1	6.8		
40LED	Break Room	2	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1800	432.0	2	T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	1680	327.6	109.2	0.0	\$12						

		EXISTING CONDITIONS										RETROFIT CONDITIONS										COST & SAVINGS ANALYSIS						
Area Description		No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Fixt	Exist Control	Annual Hours	Annual kWh		Standard Fixture Code		Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive				
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 21 40 R F(U) = 2*22 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	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(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				
18LED	323 Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150.4	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	OCC	1680	1,505.3	645.1	0.0	\$70.96	\$128.25	\$20.00	1.8	1.5				
18LED	321 Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150.4	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	OCC	1680	1,505.3	645.1	0.0	\$70.96	\$128.25	\$20.00	1.8	1.5				
18LED	319 Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150.4	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	OCC	1680	1,505.3	645.1	0.0	\$70.96	\$128.25	\$20.00	1.8	1.5				
18LED	Corridor	11	T 32 R F 4 (ELE)	F44ILL	112	1.2	Breaker	2280	2,809.0	11	T 32 R F 4 (ELE)	F44ILL	112	1.2	None	2280	2,809.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
18LED	M-U300 Training	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	SW	2400	2,688.0	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	OCC	1680	1,881.6	806.4	0.0	\$88.70	\$128.25	\$20.00	1.4	1.2				
18LED	MF-U300 Training	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	SW	2400	2,688.0	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	OCC	1680	1,881.6	806.4	0.0	\$88.70	\$128.25	\$20.00	1.4	1.2				
18LED	WU-U300 Training	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	SW	2400	2,688.0	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	OCC	1680	1,881.6	806.4	0.0	\$88.70	\$128.25	\$20.00	1.4	1.2				
18LED	Corridor	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	Breaker	2280	1,532.2	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	None	2280	1,532.2	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	9V Studio Classroom	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440.0	10	T 32 R F 2 (ELE)	F42LL	60	0.6	OCC	1680	1,008.0	432.0	0.0	\$47.52	\$128.25	\$20.00	2.7	2.3				
35LED	Control Rm	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	None	2400	648.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
35LED	TV Studio	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	None	2400	648.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	100 Sound rm	148	T 32 R F 2 (ELE)	F42LL	60	8.9	SW	2400	21,312.0	148	T 32 R F 2 (ELE)	F42LL	60	8.9	OCC	1680	14,918.4	6,393.6	0.0	\$703.30	\$128.25	\$20.00	0.2	0.2				
40LED	100 Sound rm	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1680	201.6	86.4	0.0	\$9.50	\$128.25	\$20.00	13.5	11.4				
40LED	100A Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	432.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	100B office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	432.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	100C Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	432.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	100D Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	432.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	100E Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	432.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	Choral Rm	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440.0	10	T 32 R F 2 (ELE)	F42LL	60	0.6	OCC	1680	1,008.0	432.0	0.0	\$47.52	\$128.25	\$20.00	2.7	2.3				
40LED	Choral Rm	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440.0	10	T 32 R F 2 (ELE)	F42LL	60	0.6	OCC	1680	1,008.0	432.0	0.0	\$47.52	\$128.25	\$20.00	2.7	2.3				
40LED	Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	432.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	Corridor	7	T 32 R F 2 (ELE)	F42LL	60	0.4	Breaker	2280	957.6	7	T 32 R F 2 (ELE)	F42LL	60	0.4	None	2280	957.6	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	Dressing Rm A	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2400	288.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	Dressing Rm B	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	2400	288.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
40LED	Costume	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864.0	6	T 32 R F 2 (ELE)	F42LL	60	0.4	None	2400	864.0	0.0	0.0	\$0.00	\$0.00	\$0.00		#DIV/0!				
																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!			
Total		2,229				212.8			472174.1	2229.0					212.8				402876.4	69297.7	0.0	14492.3	2260.0					
									</																			

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 Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	Watts/Fixt) * (Fixt No.)	kW/Space	Exist Control Pre-inst. control device	Annual Hours Estimated daily hours for the usage group	Annual kWh (kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	Watts/Fixt) * (Number of Fixtures)	Retrofit Control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/Space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual \$ Saved (kWh Saved) * (\$/kWh)	Retrofit Cost Cost for renovations to lighting system	Prescriptive Lighting Measures	N3 Smart Start Incentive Length of time for renovations cost to be recovered	Simple Payback With Incentive Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered			
35LED	Classroom 102	12	T 32 R F 3 (ELE)	F43ILL/2		90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	OCC	1,680	766	1,826	0.6	\$ 249.60	\$ 2,963.25	\$ 20	11.9	11.8				
220	Classroom 102-Storage	1	S 17 C F 1 (ELE)	F21ILL		20	0.0	SW	1000	20	1	S 17 C F 1 (ELE)	F21ILL	20	0.0	None	1,000	20	0.0	\$ -	\$ -	\$ -	-	-					
35LED	Classroom 104	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
35LED	Classroom 104-Storage	2	T 32 R F 3 (ELE)	F43ILL/2		90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$ -	-	24.2				
35LED	Classroom 106	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
35LED	Classroom 106-Storage	2	T 32 R F 3 (ELE)	F43ILL/2		90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$ -	-	24.2				
40LED	Wood Shop	41	T 32 R F 2 (ELE)	F42LL		60	2.5	SW	2400	5,904	41	T 38 R LED	RTLED38	38	1.6	None	2,400	3,739	2,165	0.9	\$ 308.59	\$ 9,686.25	\$ 2,050	31.4	24.7				
40LED	109 Storage	10	T 32 R F 2 (ELE)	F42LL		60	0.6	SW	1000	600	10	T 38 R LED	RTLED38	38	0.4	None	1,000	380	220	0.2	\$ 41.39	\$ 2,362.50	\$ 500	57.1	45.0				
274LED	Storage	2	T 34 R F 2 (MAG)	F42EE		72	0.1	SW	1000	144	2	T 38 R LED	RTLED38	38	0.1	None	1,000	76	68	0.1	\$ 12.79	\$ 472.50	\$ 100	36.9	29.1				
40LED	Downstairs Wood Shop Storage	3	T 32 R F 2 (ELE)	F42LL		60	0.2	SW	1000	180	3	T 38 R LED	RTLED38	38	0.1	None	1,000	114	64	0.1	\$ 12.42	\$ 708.75	\$ 150	57.1	45.0				
40LED	Upstairs Wood Shop Storage	1	T 32 R F 2 (ELE)	F42LL		60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.0	None	1,000	38	22	0.0	\$ 4.14	\$ 236.25	\$ 50	57.1	45.0				
40LED	Classroom 107	15	T 32 R F 2 (ELE)	F42LL		60	0.9	SW	2400	2,160	15	T 38 R LED	RTLED38	38	0.6	OCC	1,680	958	1,202	0.3	\$ 158.04	\$ 3,672.00	\$ 770	23.2	18.4				
35LED	Classroom 108	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
35LED	Classroom 109	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
40LED	Nurse	4	T 32 R F 2 (ELE)	F42LL		60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	None	2,400	365	211	0.1	\$ 30.11	\$ 945.00	\$ 200	31.4	24.7				
40LED	Exam Room 1	1	T 32 R F 2 (ELE)	F42LL		60	0.1	SW	2400	144	1	T 38 R LED	RTLED38	38	0.0	None	2,400	91	53	0.0	\$ 7.53	\$ 236.25	\$ 50	31.4	24.7				
40LED	Exam Room 2	1	T 32 R F 2 (ELE)	F42LL		60	0.1	SW	2400	144	1	T 38 R LED	RTLED38	38	0.0	None	2,400	91	53	0.0	\$ 7.53	\$ 236.25	\$ 50	31.4	24.7				
126	Toilet Room	1	DC 23 C CF 2	CFQ222/2		48	0.0	SW	1000	48	1	DC 23 C CF 2	CFQ222/2	48	0.0	OCC	1,000	48	0.0	\$ -	\$ 128.25	\$ 20	48.0	24.7					
40LED	Office	4	T 32 R F 2 (ELE)	F42LL		60	1.9	SW	2400	576	4	T 38 R LED	RTLED38	38	1.1	None	2,280	2,599	1,505	0.7	\$ 217.09	\$ 7,087.50	\$ 1,500	32.6	25.7				
126	Toilet Room	1	DC 23 C CF 2	CFQ222/2		48	0.0	SW	1000	48	1	DC 23 C CF 2	CFQ222/2	48	0.0	OCC	1,000	48	0.0	\$ -	\$ 128.25	\$ 20	48.0	24.7					
254LED	Storage	1	CFQ26/2	CFQ26/2		66	0.1	SW	1000	66	1	EVO35/10	EVO35/10	39	0.0	None	1,000	39	27	0.0	\$ 5.08	\$ 438.75	\$ 35	86.4	79.5				
254LED	Storage	1	CFQ26/2	CFQ26/2		66	0.1	SW	1000	66	1	EVO35/10	EVO35/10	39	0.0	None	1,000	39	27	0.0	\$ 5.08	\$ 438.75	\$ 35	86.4	79.5				
274LED	Electrical Room (Locked)	2	T 34 R F 2 (MAG)	F42EE		72	0.1	SW	1000	144	2	T 38 R LED	RTLED38	38	0.1	None	1,000	76	68	0.1	\$ 12.79	\$ 472.50	\$ 100	36.9	29.1				
40LED	Corridor	30	T 32 R F 2 (ELE)	F42LL		60	1.8	SW	2280	4,104	30	T 38 R LED	RTLED38	38	1.1	None	2,280	2,599	1,505	0.7	\$ 217.09	\$ 7,087.50	\$ 1,500	32.6	25.7				
65	Custodian's Office	1	I100/1	I100/1		100	0.1	SW	2400	240	1	CF 26	CFQ26/1-L	27	0.0	None	2,400	65	175	0.1	\$ 24.97	\$ 405.00	\$ -	-	1.6				
35LED	Supply Room	1	T 32 R F 3 (ELE)	F43ILL/2		90	0.1	SW	1000	90	1	T 59 R LED	RTLED38	38	0.0	None	1,000	38	52	0.1	\$ 9.78	\$ 236.25	\$ -	-	24.2				
40LED	Supply Room	4	T 32 R F 2 (ELE)	F42LL		60	0.2	SW	1000	240	4	T 38 R LED	RTLED38	38	0.2	None	1,000	152	88	0.1	\$ 16.55	\$ 945.00	\$ 200	57.1	45.0				
35LED	Classroom 200	12	T 32 R F 3 (ELE)	F43ILL/2		90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	OCC	1,680	766	1,826	0.6	\$ 249.60	\$ 2,963.25	\$ 20	11.9	11.8				
35LED	Classroom 201	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
35LED	Classroom 202	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
35LED	Classroom 203	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
35LED	Classroom 204	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
40LED	Conference Room 205	6	T 32 R F 2 (ELE)	F42LL		60	0.4	SW	1200	432	6	T 38 R LED	RTLED38	38	0.2	None	1,200	274	158	0.1	\$ 27.74	\$ 1,417.50	\$ 300	51.1	40.3				
35LED	Classroom 206	12	T 32 R F 3 (ELE)	F43ILL/2		90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	OCC	1,680	766	1,826	0.6	\$ 249.60	\$ 2,963.25	\$ 20	11.9	11.8				
35LED	Classroom 207	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$ 187.20	\$ 2,254.50	\$ 20	12.0	11.9				
35LED	Classroom 211	9	T 32 R F 3 (ELE)	F43ILL/2		90	0.8	SW	2400	1,944	9	T 59 R LED	RTLED38	38	0.3	OCC	1,680	575	1,369	0.5	\$								

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 kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual \$ Saved (\$/kWh)	Retrofit Cost	Lighting Incentive	Simple Payback	Simple Payback					
																									Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	(kW/Space) * (Annual Hours)
35LED	Band Room 100 (Locked)	15	T 32 R F 3 (ELE)	F43ILU2	90	1.4	SW	2400	3,240	15	T 59 R LED	RTLED38	38	0.6	OCC	1,680	958	2,282	0.8	\$ 312.00	\$ 3,672.00	\$ 20	11.8	11.7					
35LED	Instrument Storage (Locked)	6	T 32 R F 3 (ELE)	F43ILU2	90	0.5	SW	1000	540	6	T 59 R LED	RTLED38	38	0.2	None	1,000	228	312	0.3	\$ 58.89	\$ 1,417.50	\$ -	24.2	24.2					
35LED	Choral Music 101 (Locked)	15	T 32 R F 3 (ELE)	F43ILU2	90	1.4	SW	2400	3,240	15	T 59 R LED	RTLED38	38	0.6	OCC	1,680	958	2,282	0.8	\$ 312.00	\$ 3,672.00	\$ 20	11.8	11.7					
35LED	TV Studio (Locked)	15	T 32 R F 3 (ELE)	F43ILU2	90	1.4	SW	2400	3,240	15	T 59 R LED	RTLED38	38	0.6	None	2,400	1,368	1,872	0.8	\$ 266.86	\$ 3,543.75	\$ -	13.3	13.3					
35LED	Corridor	7	T 32 R F 3 (ELE)	F43ILU2	90	0.6	Breaker	2280	1,436	7	T 59 R LED	RTLED38	38	0.3	None	2,280	606	830	0.4	\$ 119.73	\$ 1,653.75	\$ -	13.8	13.8					
7LED	Main Lobby	21	2T 32 R F 2 (u)	FU2LL	60	1.3	Breaker	2280	2,873	21	2T 25 R LED	2RTLED	25	0.5	None	2,280	1,197	1,676	0.7	\$ 241.76	\$ 4,252.50	\$ 1,050	17.6	13.2					
35LED	Ceramics 302	12	T 32 R F 3 (ELE)	F43ILU2	90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	None	2,400	1,094	1,498	0.6	\$ 213.48	\$ 2,835.00	\$ -	13.3	13.3					
35LED	Storage	2	T 32 R F 3 (ELE)	F43ILU2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$ -	24.2	24.2					
35LED	Art Office	2	T 32 R F 3 (ELE)	F43ILU2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	OCC	1,680	137	295	0.1	\$ 40.60	\$ 600.75	\$ 20	14.8	14.3					
35LED	Kitchen	2	T 32 R F 3 (ELE)	F43ILU2	90	0.2	SW	2400	432	2	T 59 R LED	RTLED38	38	0.1	None	2,400	182	250	0.1	\$ 35.58	\$ 472.50	\$ -	13.3	13.3					
35LED	Art Room 301	12	T 32 R F 3 (ELE)	F43ILU2	90	1.1	SW	2400	2,592	12	T 59 R LED	RTLED38	38	0.5	None	2,400	1,094	1,498	0.6	\$ 213.48	\$ 2,835.00	\$ -	13.3	13.3					
35LED	Art Room Storage	2	T 32 R F 3 (ELE)	F43ILU2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$ -	24.2	24.2					
7LED	Main Vestibule	5	2T 32 R F 2 (u)	FU2LL	60	0.3	Breaker	2280	684	5	2T 25 R LED	2RTLED	25	0.1	None	2,280	285	399	0.2	\$ 57.56	\$ 1,012.50	\$ 250	17.6	13.2					
40LED	Men's Bathroom	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	T 38 R LED	RTLED38	38	0.1	None	1,000	114	66	0.1	\$ 12.42	\$ 708.75	\$ 150	57.1	45.0					
40LED	Women's Bathroom	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1000	180	3	T 38 R LED	RTLED38	38	0.1	None	1,000	114	66	0.1	\$ 12.42	\$ 708.75	\$ 150	57.1	45.0					
40LED	Corridor	12	T 32 R F 2 (ELE)	F42LL	60	0.7	Breaker	2280	1,642	12	T 38 R LED	RTLED38	38	0.5	None	2,280	1,040	602	0.3	\$ 86.84	\$ 2,835.00	\$ 600	32.6	25.7					
7LED	Main Office	30	2T 32 R F 2 (u)	FU2LL	60	1.8	SW	2400	4,320	30	2T 25 R LED	2RTLED	25	0.8	None	2,400	1,800	2,520	1.1	\$ 359.23	\$ 6,075.00	\$ 1,500	16.9	12.7					
40LED	IT Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.0	None	1,000	38	22	0.0	\$ 4.14	\$ 236.25	\$ 50	57.1	45.0					
40LED	Principal's Office	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	T 38 R LED	RTLED38	38	0.2	OCC	1,680	410	454	0.1	\$ 60.21	\$ 1,545.75	\$ 320	25.7	20.4					
40LED	Break Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	180	1	T 38 R LED	RTLED38	38	0.1	None	1,000	114	66	0.0	\$ 12.42	\$ 708.75	\$ -	20.7	20.7					
7LED	Office	6	2T 32 R F 2 (u)	FU2LL	60	0.4	SW	2400	864	6	2T 25 R LED	2RTLED	25	0.2	OCC	1,680	270	594	0.2	\$ 81.75	\$ 1,343.25	\$ 320	16.4	12.5					
7LED	Vice Principal's Office	6	2T 32 R F 2 (u)	FU2LL	60	0.4	SW	2400	864	6	2T 25 R LED	2RTLED	25	0.2	OCC	1,680	270	594	0.2	\$ 81.75	\$ 1,343.25	\$ 320	16.4	12.5					
35LED	Testing Office	5	T 32 R F 3 (ELE)	F43ILU2	90	0.5	SW	2400	1,080	5	T 59 R LED	RTLED38	38	0.2	OCC	1,800	342	738	0.3	\$ 101.49	\$ 1,309.50	\$ 20	12.9	12.7					
40LED	Men's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.0	None	1,000	38	22	0.0	\$ 4.14	\$ 236.25	\$ 50	57.1	45.0					
40LED	Women's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	T 38 R LED	RTLED38	38	0.0	None	1,000	38	22	0.0	\$ 4.14	\$ 236.25	\$ 50	57.1	45.0					
40LED	Child Study Team	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	T 38 R LED	RTLED38	38	0.2	None	2,400	547	317	0.1	\$ 45.16	\$ 1,417.50	\$ 300	31.4	24.7					
40LED	Break Room	2	DC 23 C CF 2	CFQ222	48	0.1	SW	3000	288	2	DC 23 C CF 2	CFQ222	48	0.1	None	3,000	288	0	0.0	\$ -	\$ -	\$ -	-	-					
40LED	Copy Room	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1215	128	1	T 38 R LED	RTLED38	38	0.0	OCC	1,500	57	71	0.0	\$ 9.47	\$ 364.50	\$ 70	38.5	31.1					
40LED	Child Study Team Office 1	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	OCC	1,800	274	302	0.1	\$ 40.14	\$ 1,073.25	\$ 220	26.7	21.3					
40LED	Child Study Team Office 2	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	OCC	1,800	274	302	0.1	\$ 40.14	\$ 1,073.25	\$ 220	26.7	21.3					
40LED	Child Study Team Office 3	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	OCC	1,800	274	302	0.1	\$ 40.14	\$ 1,073.25	\$ 220	26.7	21.3					
40LED	Child Study Team Office 4	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	OCC	1,800	274	302	0.1	\$ 40.14	\$ 1,073.25	\$ 220	26.7	21.3					
40LED	Child Study Team Office 5	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	OCC	1,800	274	302	0.1	\$ 40.14	\$ 1,073.25	\$ 220	26.7	21.3					
40LED	Child Study Team Office 6	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 38 R LED	RTLED38	38	0.2	OCC	1,800	274	302	0.1	\$ 40.14	\$ 1,073.25	\$ 220	26.7	21.3					
40LED	Break Room	2	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	1820	437	4	T 38 R LED	RTLED38	38	0.2	OCC	1,365	207	229	0.1	\$ 32.10	\$ 1,073.25	\$ 220	33.4	26.6					
35LED	Supply Room	2	T 32 R F 3 (ELE)	F43ILU2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	104	0.1	\$ 19.56	\$ 472.50	\$ -	24.2						

		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 after the retrofit	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual \$ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback				
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/Space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/Space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * (\$/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered				
18LED	323 Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150	8	T 74 R LED	RTL5D50	50	0.4	OCC	1,680	672	1,478	0.5	\$ 201.37	\$ 2,018.25	\$ 20	10.0	9.9				
18LED	321 Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150	8	T 74 R LED	RTL5D50	50	0.4	OCC	1,680	672	1,478	0.5	\$ 201.37	\$ 2,018.25	\$ 20	10.0	9.9				
18LED	319 Classroom	8	T 32 R F 4 (ELE)	F44ILL	112	0.9	SW	2400	2,150	8	T 74 R LED	RTL5D50	50	0.4	OCC	1,680	672	1,478	0.5	\$ 201.37	\$ 2,018.25	\$ 20	10.0	9.9				
18LED	Corridor	11	T 32 R F 4 (ELE)	F44ILL	112	1.2	Breaker	2280	2,809	11	T 74 R LED	RTL5D50	50	0.6	None	2,280	1,254	1,555	0.7	\$ 224.32	\$ 2,598.75	-	11.6	11.6				
18LED	M-U300 Training	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	SW	2400	2,688	10	T 74 R LED	RTL5D50	50	0.5	OCC	1,680	840	1,848	0.6	\$ 251.72	\$ 2,490.75	\$ 20	9.9	9.8				
18LED	MF-U300 Training	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	SW	2400	2,688	10	T 74 R LED	RTL5D50	50	0.5	OCC	1,680	840	1,848	0.6	\$ 251.72	\$ 2,490.75	\$ 20	9.9	9.8				
18LED	WU-U300 Training	10	T 32 R F 4 (ELE)	F44ILL	112	1.1	SW	2400	2,688	10	T 74 R LED	RTL5D50	50	0.5	OCC	1,680	840	1,848	0.6	\$ 251.72	\$ 2,490.75	\$ 20	9.9	9.8				
18LED	Corridor	6	T 32 R F 4 (ELE)	F44ILL	112	0.7	Breaker	2280	1,532	6	T 74 R LED	RTL5D50	50	0.3	None	2,280	684	848	0.4	\$ 122.36	\$ 1,417.50	-	11.6	11.6				
40LED	Corridor	8	T 32 R F 2 (ELE)	F42LL	60	0.5	Breaker	2280	1,094	8	T 38 R LED	RTL5D38	38	0.3	None	2,280	693	401	0.2	\$ 57.89	\$ 1,890.00	\$ 400	32.6	25.7				
40LED	9V Studio Classroom	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440	10	T 38 R LED	RTL5D38	38	0.4	OCC	1,680	638	802	0.2	\$ 105.36	\$ 2,490.75	\$ 520	23.6	18.7				
35LED	Control Rm	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648	3	T 59 R LED	RTL5D38	38	0.1	None	2,400	274	374	0.2	\$ 53.37	\$ 708.75	\$ -	13.3	13.3				
35LED	TV Studio	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2400	648	3	T 59 R LED	RTL5D38	38	0.1	None	2,400	274	374	0.2	\$ 53.37	\$ 708.75	\$ -	13.3	13.3				
40LED	100 Sound rm	148	T 32 R F 2 (ELE)	F42LL	60	8.9	SW	2400	21,312	148	T 38 R LED	RTL5D38	38	5.6	OCC	1,680	9,448	11,864	3.3	\$ 1,559.37	\$ 35,093.25	\$ 7,420	22.5	17.7				
40LED	100 Sound rm	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 38 R LED	RTL5D38	38	0.1	OCC	1,680	128	21.07	\$ 600.75	\$ 120	28.5	22.8						
40LED	100A Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 38 R LED	RTL5D38	38	0.1	None	2,400	274	22.58	\$ 708.75	\$ 150	31.4	24.7						
40LED	100B office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 38 R LED	RTL5D38	38	0.1	None	2,400	274	22.58	\$ 708.75	\$ 150	31.4	24.7						
40LED	100C Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 38 R LED	RTL5D38	38	0.1	None	2,400	274	22.58	\$ 708.75	\$ 150	31.4	24.7						
40LED	100D Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 38 R LED	RTL5D38	38	0.1	None	2,400	274	22.58	\$ 708.75	\$ 150	31.4	24.7						
40LED	100E Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 38 R LED	RTL5D38	38	0.1	None	2,400	274	22.58	\$ 708.75	\$ 150	31.4	24.7						
40LED	Choral Rm	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440	10	T 38 R LED	RTL5D38	38	0.4	OCC	1,680	638	802	0.2	\$ 105.36	\$ 2,490.75	\$ 520	23.6	18.7				
40LED	Choral Rm	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440	10	T 38 R LED	RTL5D38	38	0.4	OCC	1,680	638	802	0.2	\$ 105.36	\$ 2,490.75	\$ 520	23.6	18.7				
40LED	Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 38 R LED	RTL5D38	38	0.1	None	2,400	274	22.58	\$ 708.75	\$ 150	31.4	24.7						
40LED	Corridor	7	T 32 R F 2 (ELE)	F42LL	60	0.4	Breaker	2280	958	7	T 38 R LED	RTL5D38	38	0.3	None	2,280	606	351	0.2	\$ 50.65	\$ 1,653.75	\$ 350	32.6	25.7				
40LED	Dressing Rm A	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 38 R LED	RTL5D38	38	0.1	None	2,400	182	15.05	\$ 472.50	\$ 100	31.4	24.7						
40LED	Dressing Rm B	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 38 R LED	RTL5D38	38	0.1	None	2,400	182	15.05	\$ 472.50	\$ 100	31.4	24.7						
40LED	Costume	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	2400	864	6	T 38 R LED	RTL5D38	38	0.2	None	2,400	547	317	0.1	\$ 45.16	\$ 1,417.50	\$ 300	31.4	24.7				
															0	#N/A							#VALUE!					
															0	#N/A							#VALUE!					
															0	#N/A							#VALUE!					
S	Total	2,229				212.8			472,174	2,229				122.5			234,807		90.3	33,165	491,886	\$44,580						
S																		Demand Savings		90.3	\$7,055							
S																		kWh Savings		237,368	\$26,110							
S																		Total Savings			\$33,165		14.8	13.5				

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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SBC CREDIT PROGRAM



With New Jersey SmartStart Buildings ...

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

Special Notice

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

Visit the Sandy web page for details and important links.

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

[Project Categories](#)

[Custom Measures](#)

[Incentives for Qualifying Equipment and Projects](#)

[Program Terms and Conditions](#)

[Find a Trade Ally](#)

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

Getting Started

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

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

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

Support for Custom Energy-Efficiency Measures

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

Incentives for Qualifying Equipment and Projects

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

Find out more about equipment incentives

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

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Equipment Incentives

Special Notice

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

Visit the Sandy web page for details and important links.

More reasons for a smart start on your next project!

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

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

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

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



Electric Chillers

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

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

Gas Cooling

Gas absorption chillers (\$185-\$450 per ton)

Gas Engine-Driven Chillers (Calculated through Custom Measure F)

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

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

Ground Source Heat Pumps

Closed Loop (\$450-750 per ton)

Gas Heating

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

Variable Frequency Drives

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

Natural Gas Water Heating

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

Premium Motors

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

Refrigerator/Freezer Case Premium Efficiency Motors (ECM)

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

Prescriptive Lighting

New Linear Fluorescent

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

New Induction (\$70 per replaced HID fixture)

New LED

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

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

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

Display case (\$30 per case)

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

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

Parking garage luminaires (\$100 per fixture)

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

Stairwell and Passageway luminaires (\$40 per fixture)

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

Bollard (\$50 per fixture)

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

Fuel pump canopy (\$100 per fixture)

LED retrofit kits (custom measures)

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

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

Induction Retrofit (\$50 per retrofitted HID fixture)

New Construction/Complete Renovation (performance-based)

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

Lighting Controls

Occupancy Sensors

Wall mounted (\$20 per control)

Remote mounted (\$35 per control)

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

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

HID or Fluorescent Hi-Bay Controls

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

Daylight dimming (\$45 per fixture controlled)

Refrigeration

Covers and Doors

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

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

Controls

Door Heater Control (\$50 per control)

Electric Defrost Control (\$50 per control)

Evaporator Fan Control (\$75 per control)

Novelty Cooler Shutoff (\$50 per control)

Food Service Equipment

Cooking

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

Holding

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

Cooling

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

Cleaning

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

Other Equipment Incentives*

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

Custom electric and gas equipment incentives (not prescriptive)

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

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II. DIRECT INSTALL



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NEW JERSEY'S CLEAN ENERGY PROGRAM

DIRECT Install

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

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

ELIGIBILITY



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

SYSTEMS & EQUIPMENT ADDRESSED BY THE PROGRAM

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



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

III. PAY FOR PERFORMANCE (P4P)



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Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

Take a comprehensive, whole-building approach to saving energy in your existing facility. Earn incentives that are directly linked to your savings. Pay for Performance relies on a



program partners who provide technical services under direct contract to you. Acting as your energy expert, your partner will develop a whole-building energy reduction plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for full implementation of energy efficient measures and a construction schedule for installation.

Eligibility

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following customer classes are not required to meet the 100 kW demand threshold to participate in the program: hospitals, public colleges and universities, 501(c)(3) non-profit organizations, affordable multifamily housing, and local governmental entities. Your energy reduction plan defines a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more.

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

ENERGY STAR Portfolio Manager

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



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

Incentives

**OIL, PROPANE & MUNICIPAL
ELECTRIC CUSTOMERS**

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

EDA PROGRAMS

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

SBC CREDIT PROGRAM

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

PAST PROGRAMS

TOOLS AND RESOURCES

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

PROGRAM UPDATES

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

CONTACT US



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

Steps to Participation

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

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PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2013 - June 30, 2014

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

Instructions

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

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

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

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

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

Partner Information

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

Project Information

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

Funding

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

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

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

Additional Project information

Additional Utility Account(s)

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

Additional Comments:

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

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

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

Visit our website: NJCleanEnergy.com/P4P

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

*Incentives/Requirements subject to change.



002-FY14-04/14

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

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

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

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

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

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

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

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

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

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

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

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

Program Manager – TRC Energy Services.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)



Your Power to Save

At Home, for Business, and for the Future

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HOME

RESIDENTIAL

COMMERCIAL, INDUSTRIAL
AND LOCAL GOVERNMENT

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND
FUEL CELLSLOCAL GOVERNMENT ENERGY
AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT
PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL
ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

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Home » Commercial & Industrial » Programs

Energy Savings Improvement Program

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

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

Local Government
School Districts (K-12)

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

The Board also adopted protocols to measure energy savings:

Measuring Energy Savings
Procedures for Implementation

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Local units considering an ESIP should carefully review the Local Finance Notice, the law, and consult with qualified professionals to determine how they should approach the task.

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

FIRST STEP – ENERGY AUDIT

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

ENERGY REDUCTION PLANS

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

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

ESIP PROGRAM

Final version 42413

BPU RULES

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

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

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

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

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

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

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

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

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

APPENDIX E

Photovoltaic Analysis

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Hopewell Valley Regional School District
Hopewell Valley Central High School

Cost of Electricity	\$0.131	/kWh
Electricity Usage	2,192,806	kWh/yr
System Unit Cost	\$4,000	/kW

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
\$3,280,000	820.0	1,028,784	0	\$134,678	0	\$134,678	\$0	\$168,721	24.4	10.8

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= \$164 /1000kwh

Area Output*
15,413 m2
165,908 ft2

Perimeter Output*
1,341 m
4,401 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
103,615 ft2

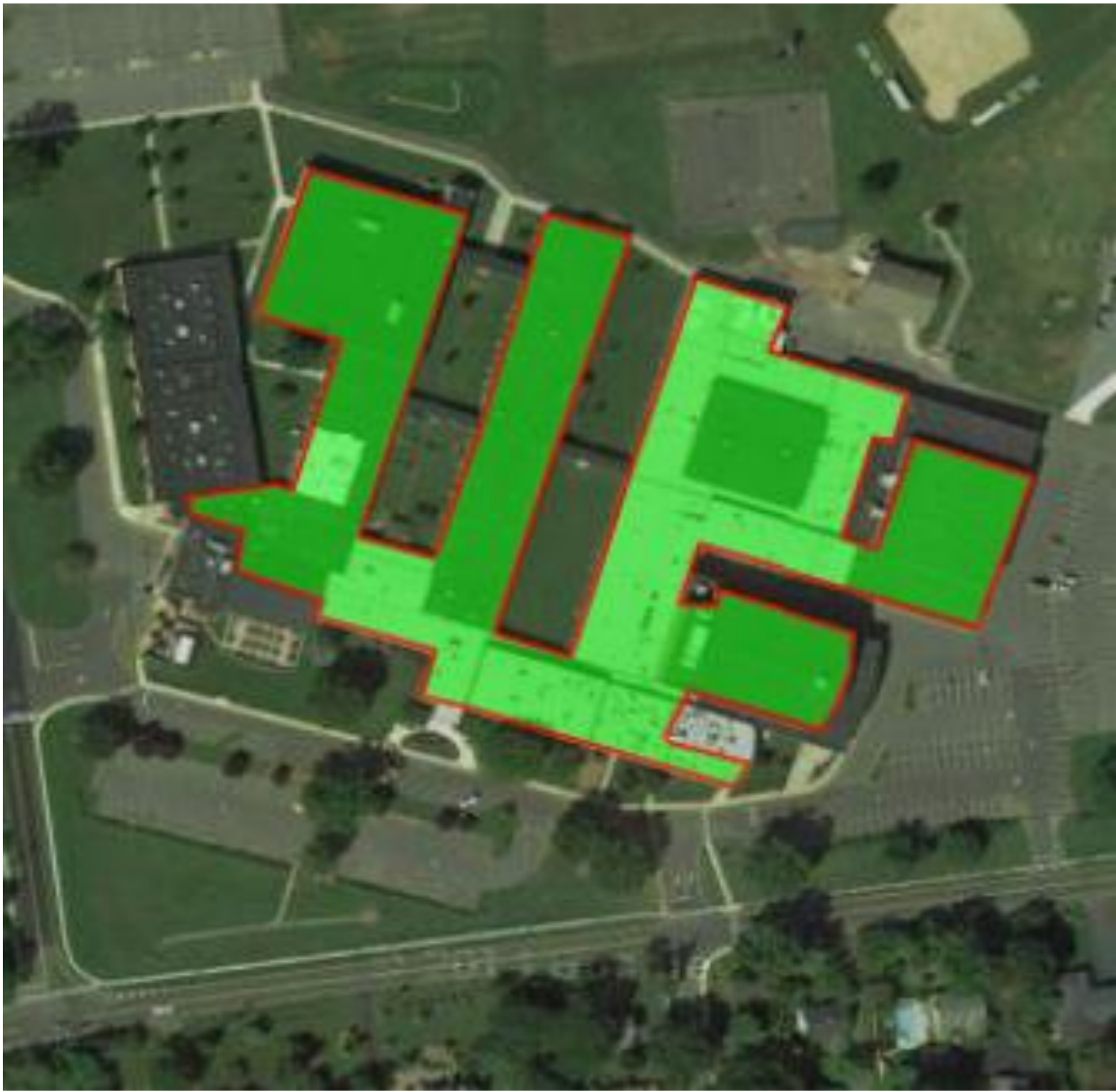
Approximate System Size: Is the roof flat? (Yes/No) Yes
8 watt/ft2
828,923 DC watts
820 kW Enter into PV Watts

PV Watts Inputs***
Array Tilt Angle 20 Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth 180 Enter into PV Watts (default)
Zip Code 08534 Enter into PV Watts
DC/AC Derate Factor 0.83 Enter info PV Watts

PV Watts Output
1,028,784 annual kWh calculated in PV Watts program

% Offset Calc
Usage 2,192,806 (from utilities)
PV Generation 1,028,784 (generated using PV Watts)
% offset 47%

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





AC Energy & Cost Savings



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

Station Identification		Results			
Cell ID:	0267372	Month	Solar Radiation (kWh/m ² /day)	AC Energy (kWh)	Energy Value (\$)
State:	New Jersey	1	2.65	56276	7372.16
Latitude:	40.2 ° N	2	3.42	66329	8689.10
Longitude:	74.8 ° W	3	4.74	97988	12836.43
PV System Specifications		4	5.18	100846	13210.83
DC Rating:	820.0 kW	5	5.74	112573	14747.06
DC to AC Derate Factor:	0.830	6	5.98	109816	14385.90
AC Rating:	680.6 kW	7	5.65	106284	13923.20
Array Type:	Fixed Tilt	8	5.42	101775	13332.53
Array Tilt:	20.0 °	9	4.92	91308	11961.35
Array Azimuth:	180.0 °	10	3.94	78435	10274.99
Energy Specifications		11	2.89	57296	7505.78
Cost of Electricity:	13.1 ¢/kWh	12	2.42	49859	6531.53
		Year	4.42	1028784	134770.71
Output Hourly Performance Data (Gridded data is monthly, hourly output not available.)		Output Results as Text Saving Text from a Browser			
Run PVWATTS v.2 for another location		Run PVWATTS v.1			

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

[Disclaimer and copyright notice.](#)



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

APPENDIX F

Photos



1: Hopewell Valley Central High School



2: Hydrotherm modular hot water boilers



3: Trane rooftop units



4: Base mounted hot water pumps



5: Hobart dishwasher in kitchen

APPENDIX G

EPA Benchmarking Report



ENERGY STAR[®] Statement of Energy Performance

77

ENERGY STAR[®]
Score¹

Hopewell Valley Central High School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 220,000
Built: 1955

For Year Ending: May 31, 2014
Date Generated: July 21, 2014

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

Property & Contact Information

Property Address

Hopewell Valley Central High School
259 Pennington-Titusville Road
Pennington, New Jersey 08534

Property Owner

,
() -

Primary Contact

,
() -

Property ID: 4104001

Energy Consumption and Energy Use Intensity (EUI)

Site EUI

36.7 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	599,795 (7%)
Electric - Grid (kBtu)	7,481,854 (93%)

National Median Comparison

National Median Site EUI (kBtu/ft ²)	48.4
National Median Source EUI (kBtu/ft ²)	144.4
% Diff from National Median Source EUI	-24%

Source EUI

109.6 kBtu/ft²

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO ₂ e/year)	979
---	-----

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)**