BURLINGTON CITY PUBLIC SCHOOLS

ELIAS BOUDINOT ELEMENTARY SCHOOL

Pearl and Ellis Street, Burlington NJ 08016

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

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CHA PROJECT NO. 28886

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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 ±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 Burlington City Public Schools 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
Elias Boudinot Elementary School	Pearl and Ellis Street, Burlington NJ 08016	12,600	1963

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)
Elias Boudinot Elementary School	39,013	3,411	11,809	18.8

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 choses to pursue an Energy Savings Improvement Plan (ESIP), high payback measures could be bundled with lower payback measures which ultimately can result in a payback which is favorable for an ESIP project to proceed. Occasionally, we will recommend an ECM that has a longer payback period, based on the need to replace that piece(s) of equipment due to its age, such as a boiler for example.

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

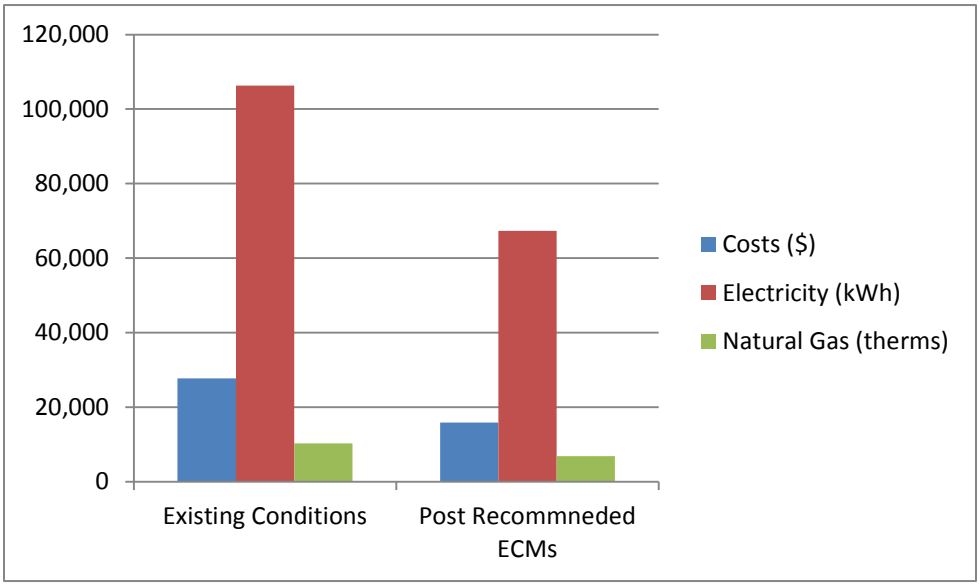
Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
ECM-1	Window Replacement	319,300	3,396	94.0	0	94.0	N
ECM-2	Replace Door Seals	922	150	6.2	0	6.2	Y
ECM-3	Replace Boilers with Condensing Boilers	98,722	2,615	37.8	3,500	36.4	Y
ECM-4	Replace Pneumatic Control System with DDC System	34,831	959	36.3	0	36.3	Y
ECM-5	Install Window AC Units Controller	2,300	622	3.7	0	3.7	Y
ECM-6	Replace Domestic Hot Water Heater with Condensing Heater	11,861	181	65.5	800	61.1	Y
ECM-7	Replace Dishwasher Electric Booster Heater With Gas Booster Heater	19,000	2,391	7.9	2,000	7.1	Y
ECM-L1**	Lighting Replacements / Upgrades	52,947	4,819	11.0	600	10.9	N
ECM-L2**	Install Lighting Controls (Add Occupancy Sensors)	1,080	217	5.0	140	4.3	N
ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	54,027	4,895	11.0	740	10.9	Y
	Total**	540,962	15,209	35.6	7,040	35.1	
	Total(Recommended)	221,662	11,814	18.8	7,040	18.2	

* Incentive shown is per the New Jersey SmartStart Program.
** These ECMs are not included in the Total, as they are alternate measures not recommended.

If Burlington City Public Schools implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	27,664	15,855	43%
Electricity (kWh)	106,281	67,268	37%
Natural Gas (therms)	10,225	6,814	33%
Site EUI (kbtu/SF/Yr)	109.9	72.3	



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: Elias Boudinot Elementary School
Address: Pearl and Ellis Street, Burlington NJ 08016
Gross Floor Area: 12,600
Number of Floors: 1
Year Built: 1963

Building Envelope

Description of Spaces: This is an academic and office building which has offices, classrooms, multipurpose room, mechanical room and restrooms.
Description of Occupancy: The facility serves about 100 students. There are about 13 school faculty and staff members
Number of Computers: The building has approximately 20 desktop and laptop computers.
Building Usage: Operates approximately 51 weeks per year and 60 hours per week.
Construction Materials: Structural steel framing with concrete masonry unit (CMU)
Façade: Brick.

Roof: The building has a flat roof which is covered with grey rubber membrane. It is believed that the roof is well insulated. The roof is in good condition and therefore no ECMs associated with roof replacement are included.
Windows: The windows throughout the building are single pane wood framed or aluminum framed windows. Single pane windows have low R-value and large heating/cooling loss and therefore an ECM associated with window replacement is evaluated.
Exterior Doors: Exterior doors throughout the school are steel frame with single pane safety glass. Sweeps on the exterior doors are in poor condition. An ECM relative to replacing the door seals is evaluated.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: An H.B. Smith hot water boiler is used to provide heating hot water for the unit ventilators (UV) and radiator heaters in the building. The boilers have 2,307 MBH input with efficiency in the range of 79%. The heating hot water (HHW) is circulated by two pumps driven by 3/4 HP motors. Each classroom and office has one unit ventilator equipped with hot water coil to provide heating for the rooms. The kitchen and common areas have hot water radiator heaters. These heaters are controlled by thermostats. An ECM in included to replace the boiler with a condensing boiler.

Cooling: This building does not have a central cooling system. The offices and classrooms are cooled by using (1) portable cooling unit and (12) window units. The guidance office is cooled by a portable cooling unit which has a rated cooling capacity of 6,800 Btu/hr. The classrooms and offices are cooled by window AC units. An ECM related to adding a window AC unit control system is evaluated.

Ventilation: This building is ventilated by unit ventilators installed in each classroom. In discussions with the school staff, it is believed that the unit ventilators provide the minimum required fresh air to the rooms. The unit ventilators appear to be in good condition and therefore, there is no ECM associated with ventilation.

Exhaust: This building has multiple fractional HP exhaust fans serving restrooms and general exhaust all located on the roof. The fans are enclosed and therefore the capacities of fan motors are unknown. The kitchen area has one for kitchen hood. It was found that this kitchen hood is barely used after discussing with kitchen staff. Therefore, there is no ECM associated with exhaust system.

Controls Systems

This building has an older pneumatic control system and some updated electronic thermostats. The classrooms are controlled by electronic thermostats; however, the offices and cafeteria are still controlled by the old pneumatic thermostats. A Speedair compressor located in the mechanical room is used to provide the compressed air for the thermostats. The school is interested in installing a campus wide DDC system to control all the schools in the district. Therefore, an ECM related to upgrade the existing pneumatic control system to a campus wide central direct digital system is included.

Domestic Hot Water Systems

This building has a gas fired DHW heater located in the mechanical room. The heater has a rated 75.1 MBH heating capacity. This heater provides domestic hot water for kitchen and the entire building. An ECM is included that evaluates the energy savings potential for replacing the DHW heater with a condensing heater.

Kitchen Equipment

The building has a small kitchen for warming up the food only. Kitchen equipment includes ovens, stoves and a 2' by 10' kitchen hood. There is a dishwasher that has an electric booster water heater which has a rated heating capacity of 15 kW. An ECM related to replacing the electric booster heater with a gas fired booster heater is evaluated.

Plug Load

This building has computers, residential appliances (microwave, refrigerator), and printers which contribute to the plug load in the building. No ECMs is associated with plug load.

Plumbing Systems

The toilets and urinals have been updated and appear to be low volume plumbing fixtures. The sink faucets appear to have low-flow type aerators. No ECMs associated with water conservation are included.

Lighting Systems

The building has a mixture of 32W T-8 fluorescent lighting and some incandescent lights. The majority of lighting fixtures are T-8 fluorescent linear fixtures. The toilet rooms and storage rooms still have incandescent lights. The majority of the lights in this building are controlled wall mounted occupancy sensors. However, there are still some rooms that can utilize the occupancy sensor technology. We have provided three alternatives for lighting that include adding occupancy sensors to the existing lights, replacing the lights with LED lights and a third ECM that evaluates adding occupancy sensors to the proposed LED lights.

3.0 UTILITIES

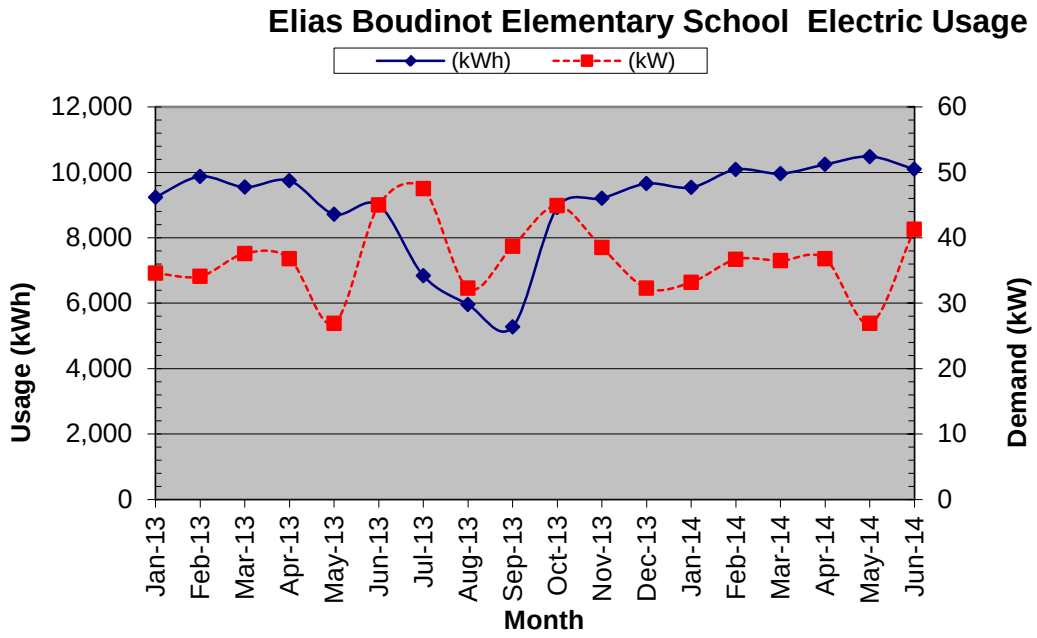
Natural gas and electricity are separately metered for this building. Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas
Deliverer	PSE&G	PSE&G
Supplier	ACES	HESS

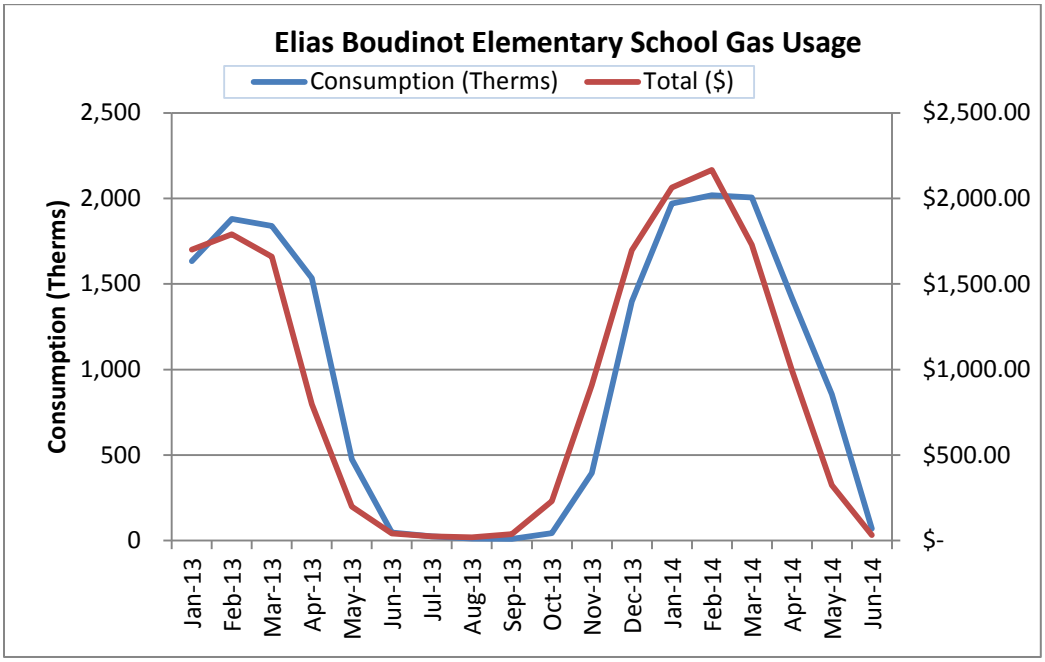
For the 12-month period ending in June 2014, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	106,281	kWh
Annual Cost	17,427	$
Blended Unit Rate	0.164	$/kWh
Supply Rate	0.113	$/kWh
Demand Rate	12.21	$/kW
Peak Demand	47.5	kW
Natural Gas		
Annual Consumption	10,225	Therms
Annual Cost	10,237	$
Unit Rate	1.001	$/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)
*Some months that do not have utility data and the missing demand usage are estimated and highlighted in the utility spreadsheet



The electric usage fluctuates with the building usage. The usage is higher when the building is utilized more.



The natural gas usage in this building is for heating and DHW production, and therefore the usage in summer months is relatively small compared with heating months. The gas usage during the heating season is correlated to winter weather conditions.

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	$0.16	$0.13	Y
Natural Gas	$/Therm	$1.00	$0.96	Y

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

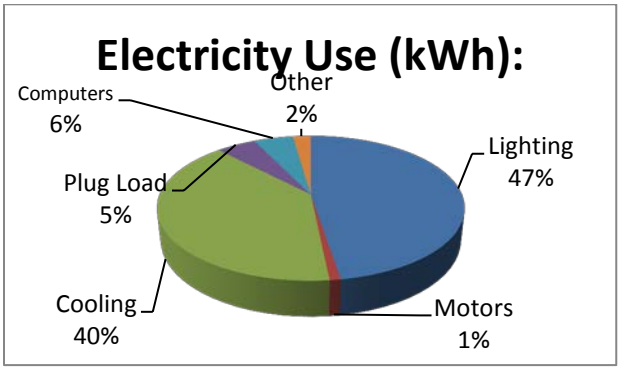
Additional information on selecting a third party energy supplier is available here:

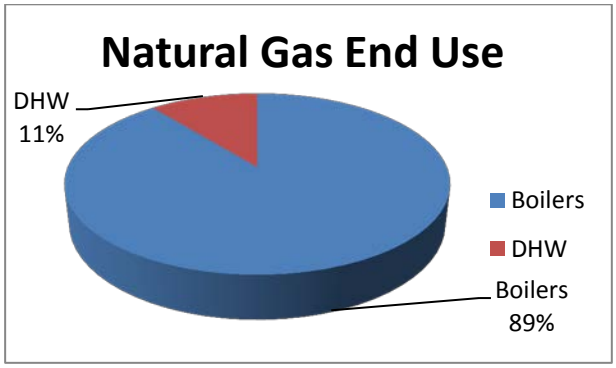
http://www.state.nj.us/bpu/commercial/shopping.html.

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.

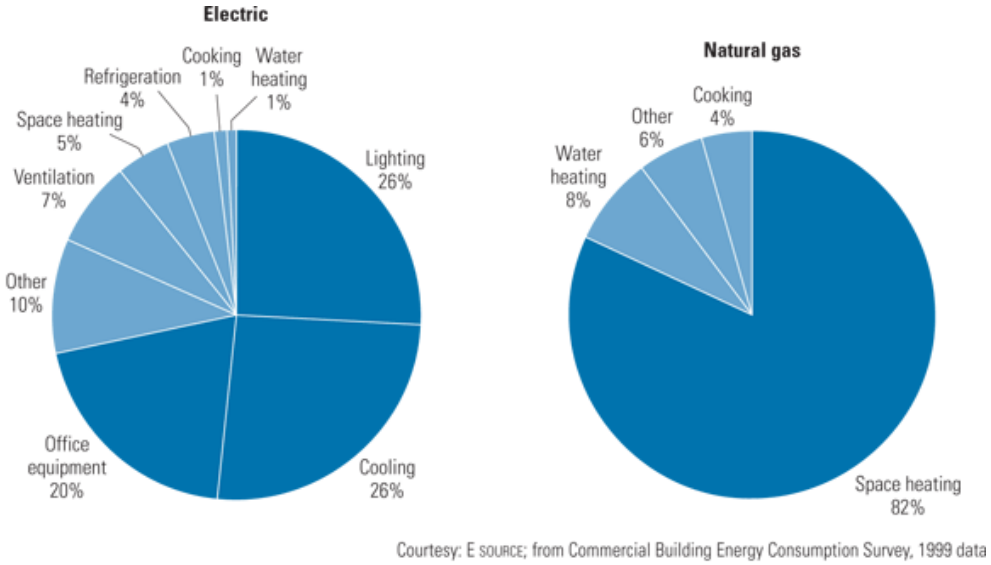
Site End-Use Utility Profile





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 and 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. However, the EPA does not have score for all types of buildings. The buildings that do not have energy rating now are compared with national median EUI.

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

Site EUI kBtu/ft^2/yr	Source EUI (kBtu/ft^2/yr)	Energy Star Rating (1-100)
109.9	175.6	38

The school has a below average Energy Star Rating Score (50 being the median score), and as such by implementing the measures discussed in this report, it is expected that the EUI can be further reduced and the Energy Star Rating further increased.

5.0 ENERGY CONSERVATION MEASURES

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

- Energy conservation measures (ECMs) are energy savings recommendations that typically require a financial investment. For these areas of opportunity, CHA prepared detailed calculations, as summarized in this section and in Appendix C. In general, additional savings may exist from reductions in maintenance activities associated with new equipment or better controls; however for conservatism, maintenance savings are not accounted for in this report; instead the only savings which are reported are those derived directly from reductions in energy which can be tracked by the utility bills.

- Operational and Maintenance measures (O&M) consist of low- or no-cost operational opportunities, which if implemented would have positive impacts on overall building operation, comfort levels, and/or energy usage. There are no estimated savings, costs or paybacks associated with the O&M measures included as part of this study.

Energy savings were quantified in the form of:

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

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

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

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

5.1 ECM-1 Window Replacement

This measure looks at replacing all the old single pane windows which are original to the building with double pane windows that have better seals and insulation. Replacement of these windows will result in a reduction of the buildings cooling/heating loads, therefore resulting in electric/natural gas savings.

Energy savings of this measure were calculated by estimating the reduction in the heat transfer loss and the infiltration rate through the windows. The U value of the windows will be reduced from 1.13 Btuh/SF/oF to 0.60 Btuh/SF/oF and the infiltration factor is reduced from 0.50 CFM/LF to 0.40CFM/LF after upgrading the windows to double glazed windows with better seals.

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

ECM-1 Window Replacement

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
319,300	0	1,834	3,092	3,396	(0.7)	0	94.0	94.0

* 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 Door Seals

Exterior doors have door sweeps and seals which have deteriorated over time. Presently, gaps exist which allow for infiltration of outdoor air or exfiltration of indoor air, wasting heating and cooling energy.

This measure calls for the replacement of all exterior door seals. Replacement of these seals will result in a reduction of the buildings heating and cooling loads, therefore providing natural gas and electricity savings. The linear footage of gap and wind speed is used to estimate the infiltration rate, which is then multiplied by the BIN weather data and the equipment efficiencies to determine the annual energy savings.

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

ECM-2 Replace Door Seals

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
922	0	254	108	150	3.9	0	6.2	6.2

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

This measure is recommended.

5.3 ECM-3 Replace Boilers with Condensing Boilers

The existing H.B. Smith hot water boiler is non-condensing type and has maximum thermal efficiencies in the 80% range. New modulating condensing gas boilers are available that minimally operate at 88%, and can operate as high as 96%. This ECM assesses the replacement of the boiler with three centrally located modulating condensing gas boilers which will provide the same amount of hot water for the heat pump water loop in the building.

To implement this ECM, The boiler would be removed it is suggested to install the new condensing boilers in the mechanical room at the same location of the old boiler. 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-3 Replace Boilers with Condensing Boilers

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
98,722	0	0	2,612	2,615	(0.3)	3,500	37.8	36.4

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

This measure is recommended since the overall payback period of the ECMs is favorable and the school is interested in implementing it.

5.4 ECM-4 Replace Pneumatic Control System with DDC System

The building currently has a pneumatic control system and therefore it is suggested to replace it with a full Direct Digital Control (DDC) system. A Full Direct Digital Control (DDC) building automation system consists of automatic control of individual space heating and ventilation equipment, and provides monitoring, trending and alarms which notify an operator when a piece of equipment fails or operates outside a given set-point. This system allows for the implementation of energy efficient strategies, such as: time of day (TOD) optimization, set point optimization, staggered start, night setback, temporary daytime setback, economizer (free cooling), demand control ventilation, exhaust fan shut down, and holiday TOD optimization. It also allows for remote access and control of the building's systems. This ECM is recommended only if the building HVAC system is to be fully renovated to include new boilers, pumps and ventilation equipment as it will optimize the energy savings potential of the new systems.

Energy savings are generated from temperature reduction during the day and night as well as other controls sequences mentioned above, as applicable to the proposed HVAC system improvements. The savings is estimated at 10% overall energy reduction based on past experience with similar sized school buildings having fully functioning digital controls.

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

ECM-4 Replace Pneumatic Control System with DDC System

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
34,831	0	1,517	710	959	(0.6)	0	36.3	36.3

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

This measure is recommended since the overall payback period of the ECMs is favorable and the school is interested in upgrading the control system.

5.5 ECM-5 Install Window AC Units Controller

The building is cooled by window a/c units which can be occasionally left on by occupants when they leave the room.

This ECM evaluates the installation of programmable “smart” timers that interrupt the electrical supply to the window air conditioners when cooling is not needed due to the room being unoccupied. The timers are configurable to operate as a standalone timer or they can be wirelessly interconnected to provide remote temperature control using software.

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

ECM-5 Install Window AC Units Controller

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
2,300	0	3,792	0	622	3.1	0	3.7	3.7

* 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 Replace Domestic Hot Water Heater with Condensing Heater

This building has a gas fired DHW heater located in the mechanical room. The heater has a rated 75.1 MBH heating capacity. It is suggested that this heater to be replaced by Condensing hot water heaters.

The gas fired heater has efficiency in the range of 80%. It is suggested to replace this heater with a gas fired condensing heater. Energy savings could be realized by replacing the heater with one high efficiency condensing gas fired heater, which can operate at efficiencies up to 96%.

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

ECM-6 Replace Domestic Hot Water Heater with Condensing Heater

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
11,861	0	0	181	181	(0.8)	800	65.5	61.1

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

This measure is recommended since the overall payback period of the ECMs is favorable and the school is interested in condensing water heaters.

5.7 ECM-7 Replace Electric Dishwasher Booster Heater with Gas Booster Heater

The dishwasher has a 15kW electric booster heater for the disinfection purposes. The facility uses this dishwasher almost every school day according to kitchen staff. Utilizing natural gas for the heater is assessed.

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-5 Replace Electric Dishwasher Booster Heater With Gas Booster Heater

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
19,000	14	4,689	-200	2,391	1.1	2,000	7.9	7.1

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

This measure is recommended

5.8.1 ECM-L1 Lighting Replacement / Upgrades

The existing lighting system consists of mostly 32 watt T8 linear fluorescent fixtures which until recently represented the most efficient lighting technology available. 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
52,947	11	28,083	0	4,819	0.8	600	11.0	10.9

* LED new fixtures are still qualified for prescribed incentives, however, LED retrofits must go through the custom incentive which is not calculated in LGEA study therefore, the potential incentive shown in the table is the possible prescribed incentive.

This measure is not recommended in lieu of ECM L3.

5.8.2 ECM-L2 Install Lighting Controls (Occupancy Sensors)

Presently, most of the interior lighting fixtures are controlled by wall mounted occupancy sensors. However, some rooms are still 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 ECM-L1, 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
1,080	0	1,916	0	217	3.4	140	5.0	4.3

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

This measure is not recommended in lieu of ECM L3.

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

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

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
54,027	11	28,761	0	4,895	0.8	740	11.0	10.9

* LED new fixtures are still qualified for prescribed incentives, however, LED retrofits must go through the custom incentive which is not calculated in LGEA study therefore, the potential incentive shown in the table is the possible prescribed incentive.

This measure is recommended.

5.9 Additional O&M Opportunities

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

- O&M-1 Replace Window AC Units with Energy Star Window AC Units When Necessary
- O&M-2 Look for the ENERGY STAR® label when purchasing Kitchen Appliances
- O&M-3 Train custodians to turn off lights and electric appliances when not used

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

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

6.1.1 New Jersey Smart Start Program

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

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

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

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

6.1.2 Direct Install Program

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

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

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

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

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

Refer to Appendix D for more information on this program.

6.1.3 New Jersey Pay For Performance Program (P4P)

This building may be eligible for incentives from the New Jersey Office of Clean Energy. The most significant incentives are available from the New Jersey Pay for Performance (P4P) Program. The P4P program is designed to offset the cost of energy conservation projects for facilities that pay the Societal Benefits Charge (SBC) and whose demand (kW) in any of the preceding 12 months exceeds 100 kW. This demand minimum has been waived for buildings owned by local governments or municipalities and non-profit organizations and *is not applicable to public schools*. Facilities that meet this criterion must also achieve a minimum performance target of 15% energy reduction by using the EPA Portfolio Manager benchmarking tool before and after implementation of the measure(s). Additionally, the overall return on investment (ROI) must exceed 10%. If the participant is a municipal electric company customer, and a customer of a regulated gas New Jersey Utility, only gas measures will be eligible under the Program. Available incentives are as follows:

Incentive #1: Energy Reduction Plan – This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP). The ERP must include a detailed energy audit of the desired ECMs, energy savings calculations (using building modeling software) and inputting of all utility bills into the EPA Portfolio Manager website.

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

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

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

Electric

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

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

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

6.1.4 Energy Savings Improvement Plan

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

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

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs. Refer to Appendix D for more information on this program.

6.1.5 Renewable Energy Incentive Program

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

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

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

7.0 ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

Due to the pitched roof of this building and the minimal available space, a solar PV system was determined to be not feasible.

7.1.2 Solar Thermal Hot Water Generation

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

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

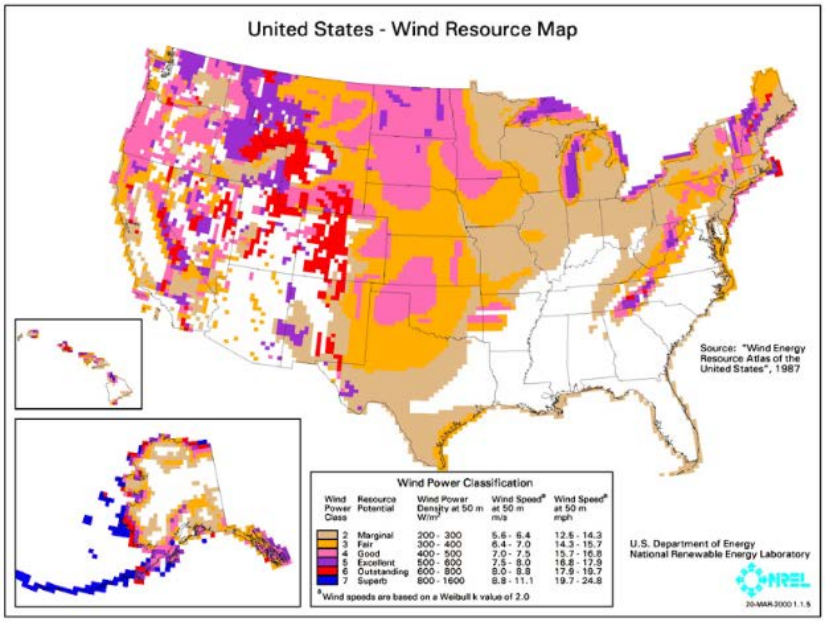
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping).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

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

7.2 Wind Powered Turbines

Wind power is the conversion of kinetic energy from wind into mechanical power that is used to drive a generator which creates electricity by means of a wind turbine. A wind turbine consists of rotor and blades connected to a gearbox and generator that are mounted onto a tower. Newer wind turbines also use advanced technology to generate electricity at a variety of frequencies depending on the wind speed, convert it to DC and then back to AC before sending it to the grid. Wind turbines range from 50 – 750 kW for utility scale turbines down to below 50 kW for residential use. On a scale of 1 (the lowest) to 7 (the highest), Class 3 and above (wind speeds of 13 mph or greater) are generally considered "good wind resource" according to the Wind Energy Development

Programmatic EIS Information Center hosted by the Bureau of Land Management. According to the map below, published by NREL, Newark, NJ is classified as Class 1 at 50m, meaning the city would not be a good candidate for wind power.



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

7.3 Combined Heat and Power Plant

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

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

This measure is not recommended due to the absence of year-round thermal loads which are needed for efficiency CHP operation. However, a mini-size CHP could be an option for the school to consider. The sizing and energy savings of the mini-size CHP require further study.

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 February 2013 through January 2014 the following table summarizes the electricity load profile for the building.

Building Electric Load Profile

Peak Demand kW	Min Demand kW	Avg Demand kW	Onsite Generation Y/N	Eligible? Y/N
47.5	26.9	38.3	N	N

*the demand is estimated from one month bill

This measure is not recommended since the facility is not eligible for the demand response curtailment.

8.0 CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for Elias Boudinot Elementary School.

The following projects should be considered for implementation:

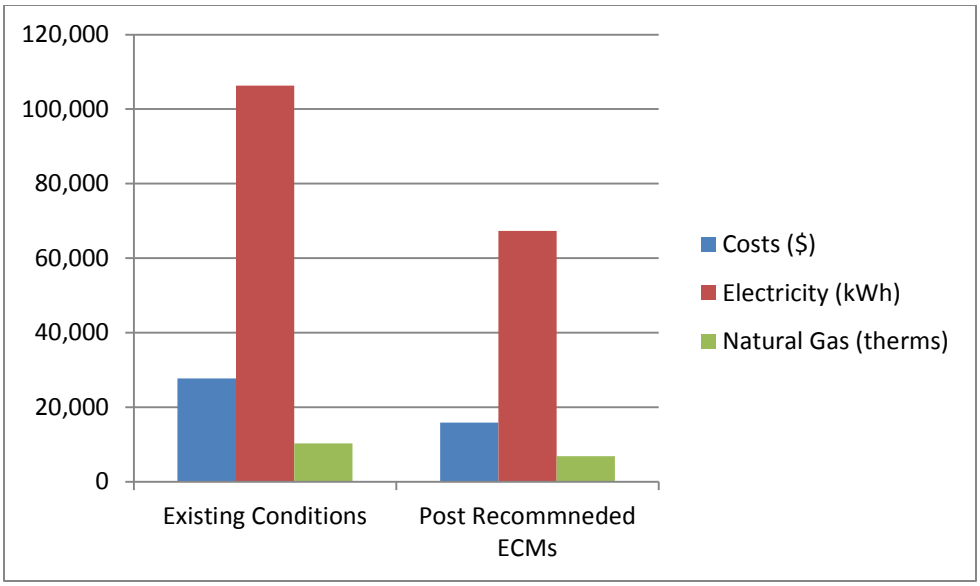
- Replace Door Seals
- Replace Boilers with Condensing Boilers
- Replace Pneumatic Control System with DDC System
- Install Window AC Units Controller
- Replace Domestic Hot Water Heater with Condensing Heater
- Replace Dishwasher Electric Booster Heater With Gas Booster Heater
- Lighting Replacements 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)
39,013	3,411	11,809	18.8

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	27,664	15,855	43%
Electricity (kWh)	106,281	67,268	37%
Natural Gas (therms)	10,225	6,814	33%
Site EUI (kbtu/SF/Yr)	109.9	72.3	



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

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Burlington City Public Schools LGEA
Elias Boudinot Elementary School Electric Usage

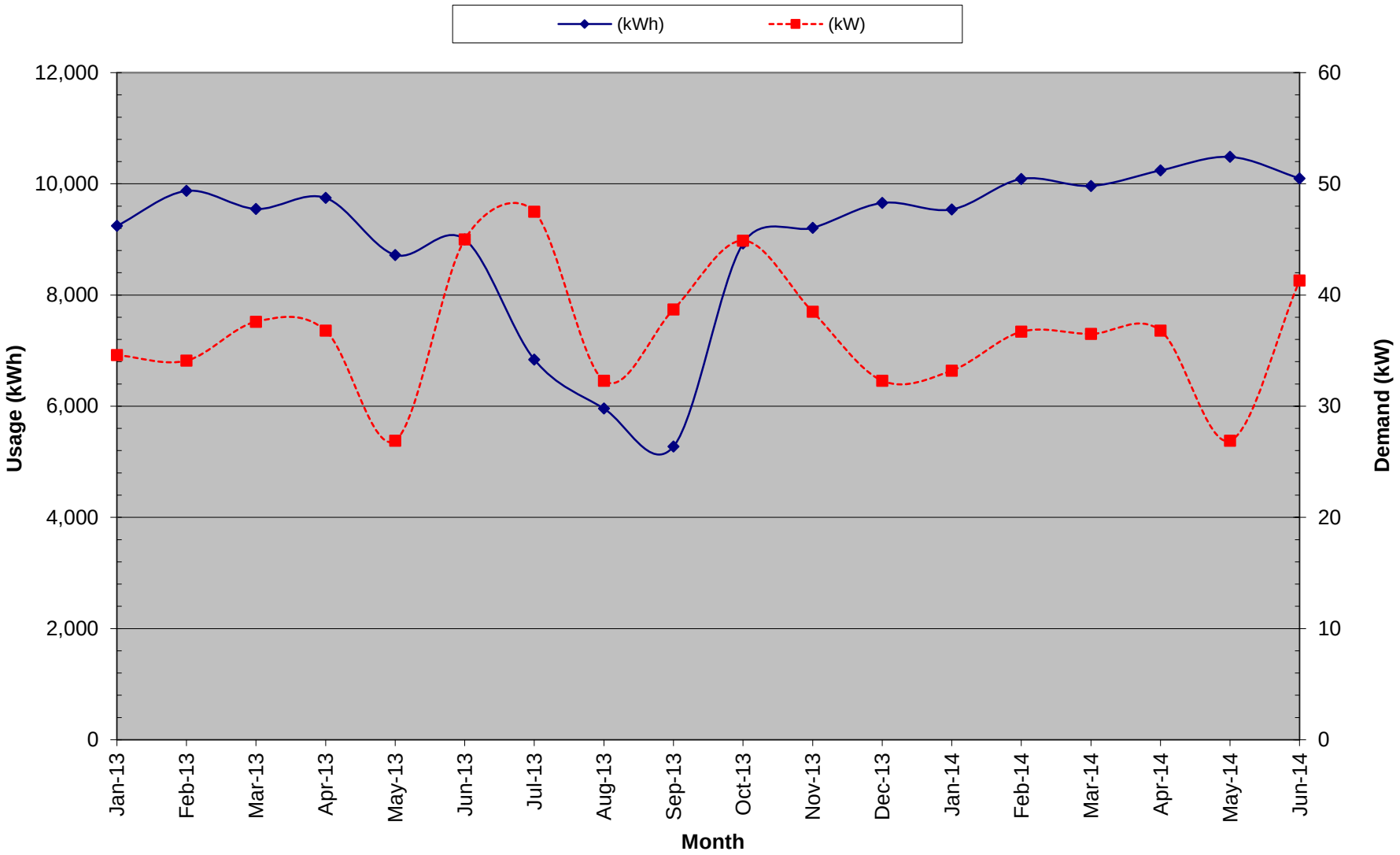
For Service at:
Account No.: **65-188-797-18** **Delivery -** PSE&G
Meter No.: **2660222232** **Supplier -** ACES
Electric Service

			Provider Charges			Usage (kWh) vs. Demand (kW) Charges		Unit Costs		
Month	**Consumption (kWh)**	**Demand (kW)**	**Delivery ($)**	**Supplier ($)**	**Total ($)**	**Consumption ($)**	**Demand ($)**	**Blended Rate ($/kWh)**	**Consumption ($/kWh)**	**Demand ($/kW)**
January-13	9,243	34.60	822.25	310.54	1,132.79	710.28	422.51	0.12	0.08	12.21
February-13	9,873	34.10	878.29	361.65	1,239.94	823.53	416.41	0.13	0.08	12.21
March-13	9,549	37.60	849.47	346.96	1,196.43	737.28	459.15	0.13	0.08	12.21
April-13	9,747	36.80	867.09	347.29	1,214.38	765.00	449.38	0.12	0.08	12.21
May-13	8,721	26.90	775.81	316.89	1,092.70	764.21	328.49	0.13	0.09	12.21
June-13	9,000	45.00	800.63	990.85	1,791.48	1,241.97	549.51	0.20	0.14	12.21
July-13	6,840	47.50	608.48	928.12	1,536.60	956.56	580.04	0.22	0.14	12.21
August-13	5,958	32.30	530.02	561.95	1,091.97	697.54	394.43	0.18	0.12	12.21
September-13	5,274	38.70	469.17	641.97	1,111.14	638.56	472.58	0.21	0.12	12.21
October-13	8,928	44.90	794.23	586.29	1,380.52	832.23	548.29	0.15	0.09	12.21
November-13	9,207	38.50	819.05	571.95	1,391.00	920.86	470.14	0.15	0.10	12.21
December-13	9,657	32.30	859.08	565.10	1,424.18	1,029.75	394.43	0.15	0.11	12.21
January-14	9,540	33.20	848.67	560.75	1,409.42	1,004.00	405.42	0.15	0.11	12.21
February-14	10,089	36.70	897.51	622.39	1,519.90	1,071.74	448.16	0.15	0.11	12.21
March-14	9,963	36.50	886.30	615.75	1,502.05	1,056.33	445.72	0.15	0.11	12.21
April-14	10,242	36.80	911.12	634.64	1,545.76	1,096.38	449.38	0.15	0.11	12.21
May-14	10,485	26.90	932.74	642.09	1,574.83	1,246.34	328.49	0.15	0.12	12.21
June-14	10,098	41.30	898.31	1,041.57	1,939.88	1,435.55	504.33	0.19	0.14	12.21
Total (All)	**162,414**	**47.50**	**$14,448.22**	**$10,646.75**	**$25,094.97**	**$17,028.13**	**$8,066.84**	**$0.15**	**$0.10**	**$12.21**
Total (12 Months)	**106,281**	**47.50**	**$9,454.67**	**$7,972.58**	**$17,427.25**	**$11,985.86**	**$5,441.39**	**$0.16**	**$0.11**	**$12.21**
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)

Estimated due to missing data

Elias Boudinot Elementary School Electric Usage

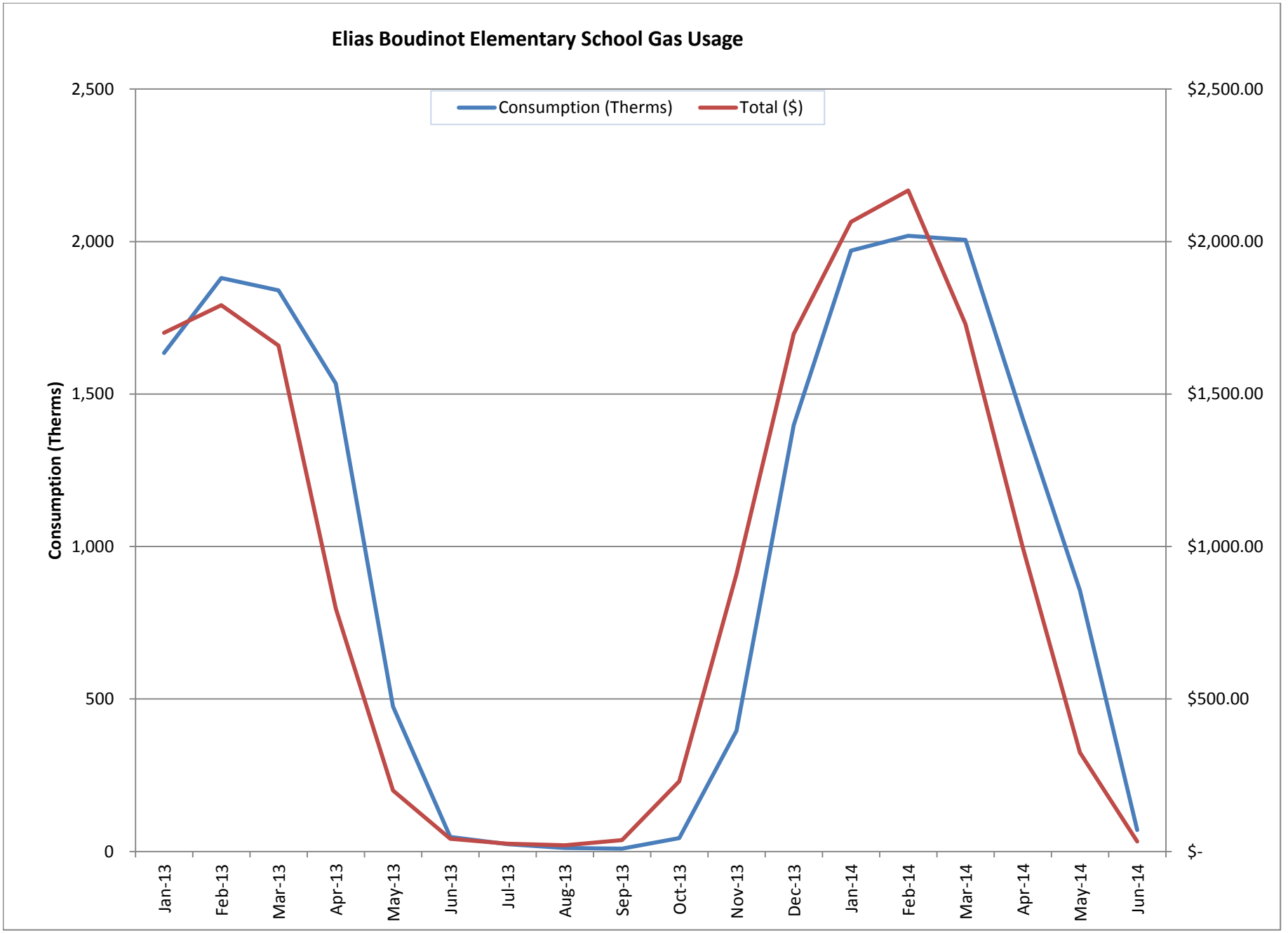


Elias Boudinot School Utility Data
Electric Graph

Burlington City Public Schools LGEA
Elias Boudinot Elementary School Gas Usage

For Service at:
Account No.: **65-188-797-18**
Meter No: **2283306**
Natural Gas Service **Delivery -** **PSE&G**
Supplier - **HESS**

		Charges			Unit Costs		
Month	**Consumption (Therms)**	**Delivery ($)**	**Supply ($)**	**Total ($)**	**Delivery ($/Therm)**	**Supply ($/Therm)**	**Total ($/Therm)**
January-13	1,634	$748.56	$952.09	$ 1,700.65	$ 0.458	$ 0.583	$ 1.041
February-13	1,880	$864.88	$926.28	$ 1,791.16	$ 0.460	$ 0.493	$ 0.953
March-13	1,840	$864.61	$794.32	$ 1,658.93	$ 0.470	$ 0.432	$ 0.902
April-13	1,535	$530.49	$266.46	$ 796.95	$ 0.346	$ 0.174	$ 0.519
May-13	475	$172.08	$27.69	$ 199.77	$ 0.362	$ 0.058	$ 0.420
June-13	47	$27.34	$14.05	$ 41.39	$ 0.577	$ 0.296	$ 0.873
July-13	24	$19.57	$6.23	$ 25.80	$ 0.805	$ 0.256	$ 1.062
August-13	12	$15.27	$4.91	$ 20.18	$ 1.306	$ 0.420	$ 1.726
September-13	10	$14.55	$22.71	$ 37.26	$ 1.518	$ 2.370	$ 3.889
October-13	44	$26.15	$203.79	$ 229.94	$ 0.599	$ 4.669	$ 5.268
November-13	396	$187.60	$722.19	$ 909.79	$ 0.474	$ 1.823	$ 2.297
December-13	1,398	$633.72	$1,063.75	$ 1,697.47	$ 0.453	$ 0.761	$ 1.214
January-14	1,970	$884.87	$1,179.54	$ 2,064.41	$ 0.449	$ 0.599	$ 1.048
February-14	2,018	$884.36	$1,282.80	$ 2,167.16	$ 0.438	$ 0.636	$ 1.074
March-14	2,006	$867.56	$861.74	$ 1,729.30	$ 0.433	$ 0.430	$ 0.862
April-14	1,421	$454.49	$543.38	$ 997.87	$ 0.320	$ 0.383	$ 0.702
May-14	856	$278.24	$46.18	$ 324.42	$ 0.325	$ 0.054	$ 0.379
June-14	71	$32.97	$0.00	$ 32.97	$ 0.467	$ -	$ 0.467
Total (All)	**17,637.05**			**16,425.42**			**$ 0.931**
Total (12 Months)	**10,225.12**			**10,236.57**			**$ 1.001**


Elias Boudinot Elementary School Gas Usage
Consumption (Therms)
Total ($)
Consumption (Therms)
2,500
2,000
1,500
1,000
500
0
$2,500.00
$2,000.00
$1,500.00
$1,000.00
$500.00
$-
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14
Feb-14
Mar-14
Apr-14
May-14
Jun-14

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 Lamberton 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.astralenergyllc.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.hopenergy.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**
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.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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PSE&G GAS SERVICE TERRITORY
Last Updated: 10/24/12

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

Supplier	Telephone & Web Site	*Customer Class
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877)-30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	888-850-1872 www.astralenergyllc.com	**R/C/I** **ACTIVE**
BBPC, LLC Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	888-651-4121 www.greateasternenergy.com	**C/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 Energy, Inc. **d/b/a Con Edison Solutions** 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-686-1383 x2130 www.conedenergy.com	

Consolidated Edison Solutions, Inc. Cherry Tree Corporate Center 535 State Highway 38, Suite 140 Cherry Hill, NJ 08002	888-665-0955 www.conedsolutions.com	**C/I** **ACTIVE**
Constellation NewEnergy-Gas Division, LLC 900A Lake Street, Suite 2 Ramsey, NJ 07466	(800) 900-1982 www.constellation.com	**C/I** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	888-925-9115 www.directenergy.com	**C/I** **ACTIVE**
Direct Energy Services, LLP 120 Wood Avenue, Suite 611 Iselin, NJ 08830	866-348-4193 www.directenergy.com	**R** **ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	800-805-8586 www.gesc.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. **d/b/a GASMARK** 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergyservices.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**

Hudson Energy Services, LLC 7 Cedar Street Ramsey, NJ 07446	877- Hudson 9 www.hudsonenergyservices.com	**C** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	877-887-6866 www.idtenergy.com	**R/C** **ACTIVE**
Integrys Energy Services – Natural Gas, LLC 99 Wood Avenue South Suite #802 Iselin, NJ 08830	800-536-0151 www.integrysenergy.com	**C/I** **ACTIVE**
Intelligent Energy 2050 Center Avenue, Suite 500 Fort Lee, NJ 07024	800-927-9794 www.intelligentenergy.org	**R/C/I** **ACTIVE**
Keil & Sons, Inc. **d/b/a Systrum Energy** 1 Bergen Blvd. Fairview, NJ 07022	1-877-797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Major Energy Services, LLC 10 Regency CT Lakewood, NJ 08701	888-625-6760 www.majorenergy.com	**R/C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	888-779-7255 www.mecny.com	**R/C/I** **ACTIVE**
Metromedia Energy, Inc. 6 Industrial Way Eatontown, NJ 07724	800-828-9427 www.metromediaenergy.com	**C** **ACTIVE**
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	888-53-Metro www.metroenergy.com	**R/C** **ACTIVE**
MxEnergy, Inc. 900 Lake Street Ramsey, NJ 07446	800-758-4374 www.mxenergy.com	**R/C/I** **ACTIVE**
NATGASCO (Mitchell Supreme) 532 Freeman Street Orange, NJ 07050	800-840-4GAS www.natgasco.com	**C** **ACTIVE**
New Energy Services LLC 101 Neptune Avenue Deal, New Jersey 07723	800-660-3643 www.newenergyservicesllc.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 fl. Woodbridge, NJ 07095	877-273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
North American Power & Gas, LLC d/b/a North American Power 197 Route 18 South Ste. 3000 East Brunswick, NJ 08816	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
Palmco Energy NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	877-726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main Street Lebanon, NJ 08833	800-363-7499 www.pepco-services.com	**C/I** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	855-32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
PPL EnergyPlus, LLC 811 Church Road - Office 105 Cherry Hill, NJ 08002	800-281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
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**
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	800-695-0666 www.sjnaturalgas.com	**R/C** **ACTIVE**
Spark Energy Gas, L.P. 2105 CityWest Blvd, Ste 100 Houston, Texas 77042	800-411-7514 www.sparkenergy.com	**R/C/I** **ACTIVE**
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	855-466-2842 www.spragueenergy.com	**C/I** **ACTIVE**

Stuyvesant Energy LLC 10 West Ivy Lane, Suite 4 Englewood, NJ 07631	800-640-6457 www.stuyfuel.com	**C** **ACTIVE**
Stream Energy New Jersey, LLC 309 Fellowship Road Suite 200 Mt. Laurel, NJ 08054	(973) 494-8097 www.streamenergy.net	**R/C** **ACTIVE**
Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	877-797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Woodruff Energy 73 Water Street Bridgeton, NJ 08302	800-557-1121 www.woodruffenergy.com	**R/C/I** **ACTIVE**
Woodruff Energy US LLC 73 Water Street, P.O. Box 777 Bridgeton, NJ 08302	856-455-1111 800-557-1121 www.woodruffenergy.com	**C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	888-997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

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APPENDIX B

Equipment Inventory

CHA Project # 28886
Elias Boudinot Elementary School
Burlington City Public Schools

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
Boiler	1	H.B Smith	N/A	N/A	HHW Boiler	2307MBH energy input	~79% efficiency	Mechanical Room	Whole Building	1963	-26	
HHW Pump Motors	2	Emerson	P63CZE	133-140	Electric Motor	0.75HP	N/A	Mechanical Room	Whole Building	1999	5	
DHW Heater	1	Rheem	42V75F	RHLN0608109544	DHW gas fired heater	75.1 MBH input and 75 gallon storage	~80%	Mechanical Room	Building	2007	13	
Movcool	1	Movcool	N/A	N/A	Cooling unit	0.5 ton cooling capacity	EER of 7.2	Guidance Office	Guidance Office	2007	13	
Window Units	12	Various	N/A	N/A	Window Cooling Unit	~1 ton cooling capacity	~7 EER	Classrooms and Offices	Classrooms and Offices	1990	-4	

Energy Audit of Wilbur Watts Intermediate School
CHA Project No.
Existing Lighting & Audit Input

Cost of Electricity: **$0.113** **$/kWh**
$12.21 **$/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
15LED	Boiler Room	Mechanical Room	4	S 32 C F 2 (ELE)	F42LL	60	0.24	SW	2500	600	NONE	
35LED	Kitchen	Kitchen	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2500	1,350	NONE	
35LED	Multipurpose Room	Cafeteria	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2500	1,800	C-OCC	
41LED	Multipurpose Room	Cafeteria	28	1B 40 R F 2 (MAG)	F42SS	94	2.63	SW	2500	6,580	C-OCC	
15LED	Guidance Room	Classrooms	4	S 32 C F 2 (ELE)	F42LL	60	0.24	OCC	2500	600	NONE	
15LED	Guidance Room	Classrooms	1	S 32 C F 2 (ELE)	F42LL	60	0.06	OCC	2500	150	NONE	
5LED	Boys Room	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	OCC	2500	300	NONE	
15LED	Janitor Room	Storage Areas	2	S 32 C F 2 (ELE)	F42LL	60	0.12	SW	2500	300	C-OCC	
5LED	Girls Room	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	OCC	2500	300	NONE	
35LED	Hallway	Hallways	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2500	1,800	NONE	
35LED	Faculty Room	Cafeteria	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	2500	900	C-OCC	
35LED	Nurse Room	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	OCC	2500	675	NONE	
71	Toilet	Restroom	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
71	Toilet	Restroom	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
71	Toilet	Restroom	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
71	Toilet	Restroom	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
35LED	Main Office	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	OCC	2500	675	NONE	
35LED	Principle Office	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	OCC	2500	675	NONE	
35LED	Hallway	Hallways	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	NONE	
35LED	Room 111	Classrooms	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	OCC	2500	3,375	NONE	
71	Room 111	Classrooms	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
35LED	Room 109	Classrooms	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	OCC	2500	3,375	NONE	
71	Room 109	Classrooms	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
35LED	Room 110	Classrooms	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	OCC	2500	3,375	NONE	
71	Room 110	Classrooms	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
35LED	Room 107	Classrooms	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	OCC	2500	3,375	NONE	
71	Room 107	Classrooms	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
35LED	Media Center	Classrooms	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	OCC	2500	3,375	NONE	
71	Media Center	Classrooms	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
35LED	Room K5	Classrooms	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.35	OCC	2500	3,375	NONE	
71	Room K5	Classrooms	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
15LED	Room 106	Classrooms	23	S 32 C F 2 (ELE)	F42LL	60	1.38	OCC	2500	3,450	NONE	
71	Room 106	Classrooms	1	I 60	I60/1	60	0.06	OCC	2500	150	NONE	
64LED	Outdoor Lights	Outdoor Lighting	4	175 MH	MH175/1	215	0.86	SW	2500	2,150	NONE	
227LED	Outdoor Lights	Outdoor Lighting	6	70 W MH Wall Pack	MH70/1	95	0.57	SW	2500	1,425	NONE	
	Total		**221**				**19.06**			**47,655**		

APPENDIX C

ECM Calculations

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886

Rate of Discount (used for NPV) 3.0%

	Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
	$ 0.164	$/kWh blended		0.000420205	12,600	Electric	Natural Gas	Fuel Oil
	$ 0.113	$/kWh supply	106,281	0.000420205		$ 17,427	$ 10,237	
	$ 12.21	$/kW	47.5	0				
	$ 1.00	$/Therm	10,225	0.00533471				
Estimated	$ 7.50	$/kgals		0				
		$/Gal						

Elias Boudinot Elementary School

Recommend? Y or N		Item	Savings kW	kWh	therms	No. 2 Oil gal	Water kgal	$	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 kW	kWh	therms	kgal/yr	$	ROI	NPV	IRR
N	ECM-1	Window Replacement	0.0	1,834	3,092	0	0	3,396	$ 319,300	94.0	30	17.3	$ -	Y	94.0	0.0	55,017	92,750	0	$ 101,866	(0.7)	($252,746)	-6.2%
Y	ECM-2	Replace Door Seals	0.0	254	108	0	0	150	$ 922	6.2	15	0.7	$ -	Y	6.2	0.0	3,803	1,622	0	$ 2,248	1.4	$867	14.0%
Y	ECM-3	Replace Boilers with Condensing Boilers	0.0	0	2,612	0	0	2,615	$ 98,722	37.8	25	13.9	$ 3,500	Y	36.4	0.0	0	65,310	0	$ 65,375	(0.3)	($49,686)	-2.7%
Y	ECM-4	Replace Pneumatic Control System with DDC System	0.0	1,517	710	0	0	959	$ 34,831	36.3	15	4.4	$ -	Y	36.3	0.0	22,760	10,647	0	$ 14,390	(0.6)	($23,379)	-9.4%
Y	ECM-5	Install Window AC Units Controller	0.0	3,792	0	0	0	622	$ 2,300	3.7	15	1.6	$ -	Y	3.7	0.0	56,881	0	0	$ 9,328	3.1	$5,124	26.2%
Y	ECM-6	Replace Domestic Hot Water Heater with Condensing Heater	0.0	0	181	0	0	181	$ 11,861	65.5	15	1.0	$ 800	Y	61.1	0.0	0	2,714	0	$ 2,717	(0.8)	($8,898)	-13.9%
Y	ECM-7	Replace Electric Dishwasher Booster Heater with Gas Booster Heater	14	4,689	(200)	0	0	2,391	$ 19,000	7.9	15	0.9	$ 2,000	Y	7.1	211.0	70,340	(3,000)	0	$ 39,451	1.1	$11,543	11.2%
N	ECM-L1	Lighting Replacements / Upgrades	11	28,083	0	0	0	4,819	$ 52,947	11.0	15	11.8	$ 600	Y	10.9	168.5	421,245	0	0	$ 93,765	0.8	$5,180	4.3%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0	1,916	0	0	0	217	$ 1,080	5.0	15	0.8	$ 140	Y	4.3	0.0	28,740	0	0	$ 4,713	3.4	$1,645	21.8%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	11	28,761	0	0	0	4,895	$ 54,027	11.0	15	12.1	$ 740	Y	10.9	168.5	431,415	0	0	$ 95,433	0.8	$5,154	4.3%
		Total (Does Not Include ECM-L1 & ECM-L2)	**25.3**	**40,847**	**6,503**	**0**	**0**	**$ 15,209**	**$ 540,962**	**35.6**	**18.1**	**52**	**$ 7,040**		**35.1**	**379**	**640,215**	**170,043**	**-**	**$ 330,808**	**(0.4)**	**(312,022)**	**-6.2%**
		Recommended Measures (highlighted green above)	**25.3**	**39,013**	**3,411**	**0**	**0**	**$ 11,814**	**$ 221,662**	**18.8**	**16.4**	**35**	**$ 7,040**	**0**	**18.2**	**379**	**585,198**	**77,293**	**-**	**$ 228,943**	**0.0**	**(59,275)**	**-1.5%**
		% of Existing	**53%**	**37%**	**33%**	**0**	**0**																

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

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

Heating System Efficiency	80%
Cooling Eff (kW/ton)	1.3

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

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

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

Note: pricing is for energy calculations only -do not use for procurement

ECM-1 Window Replacement

Existing: The building has old wood frame single pane windows which lead to large amount of the heating/cooling loss. Replacing these old windows with high heat resistence double pane windows will help reduce the energy loss and save energy.
Proposed: Replace single pane windows with double windows.

Linear Feet of panel Edge	1,728.0	LF	Cooling System Efficiency	1.3	kW/ton	Heating System Efficiency	80%	
Area of Panel	2,304.0	SF	Ex Occupied Clng Temp.	72	*F	Heating On Temp.	60	*F
Existing Infiltration Factor	**0.50**	**cfm/LF**	Ex Unoccupied Clng Temp.	72	*F	Ex Occupied Htg Temp.	70	*F
Proposed Infiltration Factor	**0.40**	**cfm/LF**	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Ex Unoccupied Htg Temp.	70	*F
Existing U Value	**1.13**	**Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.164	$/kWh
Proposed U Value	**0.60**	**Btuh/SF/°F**				Natural Gas	$ 1.00	$/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	Panel Infiltration & Heat Load BTUH	Panel Infiltration & Heat Load BTUH	Panel Infiltration & Heat Load BTUH	Panel 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
102.5	50.1	0	0	0	-167,276	-167,276	-112,458	-112,458	0	0	0	0
97.5	42.5	6	2	4	-124,710	-124,710	-81,907	-81,907	81	53	0	0
92.5	39.5	45	16	29	-100,028	-100,028	-65,664	-65,664	488	320	0	0
87.5	36.6	146	52	94	-75,735	-75,735	-49,732	-49,732	1198	787	0	0
82.5	34.0	298	106	192	-52,609	-52,609	-34,733	-34,733	1699	1122	0	0
77.5	31.6	476	170	306	-30,260	-30,260	-20,356	-20,356	1561	1050	0	0
72.5	29.2	662	237	426	-7,911	-7,911	-5,979	-5,979	568	429	0	0
67.5	27.0	740	264	476	0	0	0	0	0	0	0	0
62.5	24.5	765	273	492	0	0	0	0	0	0	0	0
57.5	21.4	733	262	471	44,208	44,208	26,611	26,611	0	0	405	244
52.5	18.7	668	239	430	61,891	61,891	37,256	37,256	0	0	517	311
47.5	16.2	659	235	424	79,574	79,574	47,900	47,900	0	0	656	395
42.5	14.4	685	245	441	97,258	97,258	58,545	58,545	0	0	833	502
37.5	12.6	739	264	475	114,941	114,941	69,189	69,189	0	0	1,062	639
32.5	10.7	717	256	461	132,624	132,624	79,834	79,834	0	0	1,189	716
27.5	8.6	543	194	349	150,307	150,307	90,478	90,478	0	0	1,021	614
22.5	6.8	318	114	205	167,990	167,990	101,123	101,123	0	0	668	402
17.5	5.5	245	88	158	185,674	185,674	111,767	111,767	0	0	569	342
12.5	4.1	156	56	100	203,357	203,357	122,412	122,412	0	0	397	239
7.5	2.6	92	33	59	221,040	221,040	133,056	133,056	0	0	254	153
2.5	1.0	36	13	23	238,723	238,723	143,700	143,700	0	0	107	65
-2.5	0.0	19	7	12	256,406	256,406	154,345	154,345	0	0	61	37
-7.5	-1.5	8	3	5	274,090	274,090	164,989	164,989	0	0	27	16
TOTALS		**8,760**	**3,129**	**5,631**					5595	3761	**7,767**	**4,675**

Existing Panel Infiltration	**864**	**cfm**
Existing Panel Heat Transfer	**2,604**	**Btuh/°F**
Proposed Panel Infiltration	**691**	**cfm**
Proposed Panel Heat Transfer	**1,382**	**Btuh/°F**

Savings	**3,092**	**Therms**	**$ 3,095**
	1,834	**kWh**	**$ 301**
			$ 3,396

Panel ID	Location	Quantity	Width (ft)	Height (ft)	Linear Feet (LF)	Area (SF)	Infiltration Rate (CFM/LF)	U Value (Btuh/SF/°F)	Infiltration (CFM)	Heat Transfer (Btuh/°F)
1	Whole Building	72	4	8	1728.0	2304.0	0.5	1.13	864.0	2603.5
Total		**72**	**4**	**8**	**1,728.0**	**2,304.0**	**0.50**	**1.13**	**864.0**	**2603.5**

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-1 Window Replacement - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Window Replacement	2,304	sqft	$ 65	$ 40	$ -	$149,760	$ 92,160	$ -	$ 241,920	Vendor Est per SF

Cost estimated are for Energy Savings only- do not use for procurement

$ 241,920	Subtotal
$ 24,192	10% Contingency
$ 53,222	20% Contractor O&P
$ -	0% Engineering Fees
$ 319,300	**Total**

Burlington City Public Schools - Elias Boudinot Elementary School
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Elias Boudinot Elementary School

ECM-2 Replace Door Seals

Description: This ECM evaluates the thermal and electrical savings associate with adding door seals and sweeps to prevent infiltration of cold (hot) outdoor air.

Heating System Efficiency	80%		Ex Occupied Clng Temp.	72	*F	Ex Occupied Htg Temp.	70	*F
Cooling System Efficiency	1.30	kW/ton	Ex Unoccupied Clng Temp.	72	*F	Ex Unoccupied Htg Temp.	70	*F
Linear Feet of Door Edge	48	LF	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.16	$/kWh
Existing Infiltration Factor*	1.5	cfm/LF	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Natural Gas	$ 1.00	$/therm
Proposed Infiltration Factor*	0.45	cfm/LF						

*Infiltration Factor per Carrier Handbook of Air Conditioning System Design based on average door seal gap calculated below.

					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	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration 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
102.5	0.0	0	0	0	8,910	8,910	2,673	2,673	0	0	0	0
97.5	38.6	17	5	12	-3,600	-3,600	-1,080	-1,080	7	2	0	0
92.5	38.5	61	17	44	-3,548	-3,548	-1,064	-1,064	23	7	0	0
87.5	37.5	132	38	94	-3,256	-3,256	-977	-977	47	14	0	0
82.5	34.8	344	98	246	-2,357	-2,357	-707	-707	88	26	0	0
77.5	32.4	566	162	404	-1,575	-1,575	-473	-473	97	29	0	0
72.5	31.3	755	216	539	-1,236	-1,236	-371	-371	101	30	0	0
67.5	27.8	780	223	557	194	194	58	58	0	0	2	1
62.5	24.7	889	254	635	583	583	175	175	0	0	6	2
57.5	21.8	742	212	530	972	972	292	292	0	0	9	3
52.5	19.0	710	203	507	1,361	1,361	408	408	0	0	12	4
47.5	17.0	642	183	459	1,750	1,750	525	525	0	0	14	4
42.5	15.0	795	227	568	2,138	2,138	642	642	0	0	21	6
37.5	12.8	784	224	560	2,527	2,527	758	758	0	0	25	7
32.5	10.7	682	195	487	2,916	2,916	875	875	0	0	25	7
27.5	8.7	345	99	246	3,305	3,305	991	991	0	0	14	4
22.5	7.1	229	65	164	3,694	3,694	1,108	1,108	0	0	11	3
17.5	5.4	189	54	135	4,082	4,082	1,225	1,225	0	0	10	3
12.5	4.1	70	20	50	4,471	4,471	1,341	1,341	0	0	4	1
7.5	2.5	22	6	16	4,860	4,860	1,458	1,458	0	0	1	0
2.5	1.3	6	2	4	5,249	5,249	1,575	1,575	0	0	0	0
-2.5	0.0	0	0	0	5,638	5,638	1,691	1,691	0	0	0	0
-7.5	0.0	0	0	0	6,026	6,026	1,808	1,808	0	0	0	0
TOTALS		**8,760**	**2,503**	**6,257**					**362**	**109**	**154**	**46**

Existing Door Infiltration	**72**	**cfm**
Existing Unoccupied Door Infiltration	**72**	**cfm**
Proposed Door Infiltration	**22**	**cfm**
Proposed Unoccupied Door Infiltration	**22**	**cfm**

Savings	**108**	**therms**	**$ 108**
	254	**kWh**	**$ 42**
			$ 150

Door	Width (ft)	Height (ft)	Linear Feet (LF)	gap (in)	gap location	LF of gap	% door w/ gap	Average gap for door (in)
1	4	8	24	0.25	all sides	24	100%	0.25
2	4	8	24	0.25	all sides	24	100%	0.25
Total	**8**	**16**	**48**	**0.191**		**48**	**100%**	**0.250**

Note: Doors labeled 'a', 'b', etc. are a part of the same door assembly.

Burlington City Public Schools - Elias Boudinot Elementary School
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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-2 Replace Door Seals - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Door Weatherization Seals & Sweeps	4	EA	$ 40	$ 115	$ -	$ 164	$ 573	$ -	$ 737	RS Means 2012
						$ -	$ -	$ -	$ -	

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

$ 737	Subtotal
$ 184	25% Contingency
$ 922	**Total**

Burlington City Public Schools - Elias Boudinot Elementary School
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Elias Boudinot Elementary School

ECM-3 Replace Boilers with Condensing Boilers

Description: This ECM evaluates the replacement of an existing boiler with high efficiency condensing gas boiler. The existing boiler efficiency is 80% (per NJBPU protocals) 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	$ 1.00	/ Therm	Natural Gas
Baseline Fuel Cost		/ Gal	No. 2 Oil
FORMULA CONSTANTS			
Oversize Factor	0.8		
Hours per Day	24		
Infrared Conversion Factor	1.0		1.0 if Boiler, 0.8 if Infrared Heater
EXISTING			
Capacity	2,000,000	btu/hr	Estimated Boiler Load % and Capacity
Heating Combustion Efficiency	80%		Estimated averaged Efficiency
Heating Degree-Day	2,792	Degree-day	
Design Temperature Difference	57	F	
Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	2,000,000	btu/hr	
Efficiency	90%		
SAVINGS			
Fuel Savings	2,612	therms	NJ Protocols Calculation
Fuel Cost Savings	$ 2,615		

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

Algorithms

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

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-3 Replace Boilers with Condensing Boilers - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
1,000 MBH NG Condensing Boiler	2	EA	$ 20,000	$ 4,600		$ 41,080	$ 11,463	$ -	$ 52,543	Vendor Estimate
Flue Installation	1	LS	$2,500.0	$ 2,500.00		$ 2,568	$ 3,115	$ -	$ 5,683	Vendor Estimate
controls	1	EA	$ 500.0	$ 1,500.00		$ 514	$ 1,869	$ -	$ 2,383	Estimated
Miscellaneous Electrical	1	LS	$ 1,000	$ 2,500		$ 1,027	$ 3,115	$ -	$ 4,142	Estimated
Miscellaneous HW Piping	1	LS	$ 2,000	$ 1,000		$ 2,054	$ 1,246	$ -	$ 3,300	Estimated
Pumps	2	EA	$ 3,500	$ 1,500		$ 7,189	$ 3,738	$ -	$ 10,927	Estimated
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 78,977	Subtotal
$ 19,744	25% Contingency
$ 98,722	**Total**

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

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ECM-4 Replace Pneumatic Control System with DDC System

Description: This ECM evaluates the energy savings associated with implementing a full wireless direct digital control system that enable remote automatic control, monitoiring and alarming of all HVAC equipment. Specific energy savings sequences would include optium Start/ Stop, night setback, temporary occupied set back, economizer control of UVs and AHU's. This energy savings percentage is based on past performance of similar buildings which have a fully functioning DDC control system.

Building Information:

12,600	Sq Footage	$0.16	$/kWh Blended
N	Cooling	$1.00	$/Therm
Y	Heating		

FULL DDC - TEMPERATURE SETBACK SAVINGS CALCULATION

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	72	F
Weekly Occupied Hours	48	hrs
Heating Season Setback Temp	67	F
Heating Season % Savings per Degree Setback	3%	
Annual Boiler Capacity	2,000	Mbtu/yr
Connected Heating Load Capacity	2,000,000	Btu/hr
Equivalent Full Load Heating Hours	100	hrs
Heating System Efficiency	80%	
Cooling		
Cooling Season Facility Temp	72	F
Weekly Occupied Hours	48	hrs
Cooling Season Setback Temp	77	F
Cooling Season % Savings per Degree Setback	3%	
Connected Cooling Load Capacity	7	Tons
Equivalent Full Load Cooling Hours	100	hrs
Cooling Equipment EER	10.0	
SAVINGS		
Natural Gas Savings	257	Therms
Cooling Electricity Savings	1,028	kWh

FULL DDC - ADDITIONAL CONTROLS SAVINGS CALCULATION

EXISTING CONDITIONS		
Existing Facility Total Electric usage	106,281	kWh
Existing Facility Total Gas usage	10,225	Therms
Existing Facility Cooling Electric usage	-	kWh[1]
Existing Facility Heating Natural Gas usage	9,113	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	0	kWh
Proposed Facility Natural Gas Savings	273	Therms
SAVINGS		
Electric Savings	0	**kWh**
Natural Gas Savings	273	**Therms**

Assumptions

1 38% of facility total electricity dedicated to Cooling; based on utility information
2 89% of facility total natural gas dedicated to Heating; based on utility information
3 3% Typical Savings associated with installation of DDC controls

Nighttime Setback

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	72	F
Weekly Occupied Hours	48	hrs
Heating Season Setback Temp	65	F
Heating Season % Savings per Degree Setback	3%	
Annual Boiler Capacity	2,000	Mbtu/yr
Connected Heating Load Capacity	2,000,000	Btu/hr
Equivalent Full Load Heating Hours	50	hrs
Heating Equipment Efficiency	80%	
Cooling		
Cooling Season Facility Temp	72	F
Weekly Occupied Hours	48	hrs
Cooling Season Setback Temp	80	F
Cooling Season % Savings per Degree Setback	3%	
Connected Cooling Load Capacity	7	Tons
Equivalent Full Load Cooling Hours	50	hrs
Cooling Equipment EER	10.0	
SAVINGS		
Natural Gas Savings	180	Therms[3]
Cooling Electricity Savings	489	kWh

COMBINED SAVINGS		
Natural Gas Savings	710	Therms
Cooling Electricity Savings	1,517	kWh
Total Cost Savings	$ 959	
Estimated Total Project Cost	$ 34,831	
Simple Payback	36.3	Yrs

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

Savings calculations for additional controls are estimated based on the level of control to be added and prior experience

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-4 Replace Pneumatic Control System with DDC System - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Sensors and Calibration	1	ea	$ 5,000	$ 5,000		$ 5,135	$ 6,230	$ -	$ 11,365	RS Means 2012
Controller & Programming	1	ls	$ 10,000	$ 5,000		$ 10,270	$ 6,230	$ -	$ 16,500	Estimated
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 27,865	Subtotal
$ 6,966	25% Contingency
$ 34,831	**Total**

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

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

ECM-5 Install Window AC Units Controller

EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (btu/h)
Window AC Units	Classrooms and Offices	81,600

Total btu/h of all window A/C Units: *81,600* *btu/h*

ECM Description : Window A/C units are currently controlled manually by the occupants and are not turned off when the room is unoccupied. This ECM evaluates implementation of a digital timer device that will automatically turn the window A/C unit off at a preset time .

ASSUMPTIONS			Comments
Electric Cost	$0.164	/ kWh	
Average run hours per Week	80	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	72	deg F	Setpoint.
BTU/Hr Rating of existing DX equipment	81,600	Btu / Hr	Totla of all window A/C units
Average EER	10.0		
Existing Annual Electric Usage	7,286	kWh	

Item	Value	Units	Comments
Proposed Annual Electric Usage	3,494	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	3,792	kWh
Annual Cost Savings	$622	
Total Project Cost	$2,300	
Simple Payback	4	years

OAT - DB Bin Temp F	Annual Hours	**Existing Hours of Operation**	Proposed % of time of operation	**Proposed hrs of Operation**
102.5	0	0	100%	0
97.5	17	8	89%	7
92.5	61	29	79%	23
87.5	132	63	68%	43
82.5	344	164	58%	95
77.5	566	270	47%	128
72.5	755	360	37%	132
67.5	780	0	0%	0
62.5	889	0	0%	0
57.5	742	0	0%	0
52.5	710	0	0%	0
47.5	642	0	0%	0
42.5	795	0	0%	0
37.5	784	0	0%	0
32.5	682	0	0%	0
27.5	345	0	0%	0
22.5	229	0	0%	0
17.5	189	0	0%	0
12.5	70	0	0%	0
7.5	22	0	0%	0
2.5	6	0	0%	0
-2.5	0	0	0%	0
-7.5	0	0	0%	0
Total	8,760	**893**	48%	**428**

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

ECM-5 Install Window AC Units Controller - 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.		
						0	$ -	$ -	$ -	
Window AC Controller	12	EA	$ 150	$ -	$ -	1848.6	$ -	$ -	$ 1,849	Estimated
						$ -	$ -	$ -	$ -	

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

$	1,849	Subtotal
$	462	25% Contingency
$	**2,300**	**Total**

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

ECM-6 Replace Domestic Hot Water Heater with Condensing 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	93	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	111,200	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	78%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	86,736	MBTU/yr	
Existing Tank Size	75	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	130	˚F	Per building personnel
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	1.0	MBH	
Annual Standby Hot Water Load	8,468	MBTU/yr	
New Tank Size	100	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	130	˚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)	1.3	MBH	
Annual Standby Hot Water Load	11,114	MBTU/yr	
Total Annual Hot Water Demand	89,382	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	931	Therns	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$1.00	$/Therm	
Existing Operating Cost of DHW	$1,113	$/yr	
Proposed Operating Cost of DHW	$932	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	181	$181

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

ECM-6 Replace Domestic Hot Water Heater with Condensing Heater - 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.		
DHW Heater Removal	1	LS		$ 50		$ -	$ 62	$ -	$ 62	RS Means 2012
High Efficiency Gas-Fired DHW Heater	1	EA	$ 2,000	$ 1,000		$ 2,054	$ 1,246	$ -	$ 3,300	From Internet Price/ Estimated Labor Cost*
Miscellaneous Electrical	1	LS	$ 300			$ 308	$ -	$ -	$ 308	RS Means 2012
Venting Kit	1	EA	$ 450	$ 650		$ 462	$ 810	$ -	$ 1,272	RS Means 2012
Miscellaneous Piping and Valves	1	LS	$ 2,000	$ 2,000		$ 2,054	$ 2,492	$ -	$ 4,546	Estimated

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

$ 9,488	Subtotal
$ 2,372	25% Contingency
$ 11,861	**Total**

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

ECM-7 Replace Electric Dishwasher Booster Heater with Gas Booster Heater

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

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.00	/ Therm	
Electricity Cost	$ 0.11	$/kWh	
Demand Cost	$ 12.21	$/kWh	
FORMULA CONSTANTS			
CF	0.3		Coincidence Factor (NJ Protocols)
EFLH	100		Equivalent Full Load Hours (NJ Protocols)
PROPOSED EQUIPMENT			
Input Rating	200,000	btu/hr	
Efficiency	80%		
SAVINGS			
Electricity Savings	4,689	kWh	
Demand Savings	14	kW	
Additional Fuel Usag	(200)	Therms	
Fuel Cost Savings	$ 2,391		

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

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

ECM-7 Replace Electric Dishwasher Booster Heater with Gas Booster Heater - 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	$ 6,000	$ 5,000		$ 6,162	$ 6,230	$ -	$ 12,392	RS Means 2012
Venting, Piping, Ect.	1	LS	$ 1,500	$ 1,000		$ 1,541	$ 1,246	$ -	$ 2,787	RS Means 2012
						$ -	$ -	$ -	$ -	

$ 15,179	Subtotal
$ 3,795	25% Contingency
$ 19,000	**Total**

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

Burlington City Public Schools - Elias Boudinot Elementary School
CHA Project Numer: 28886
Elias Boudinot Elementary School

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012.
Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements 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)	12,600
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

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

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$17,427	$10,237
Existing Usage (from utility)	106,281	10,225
Proposed Savings	39,013	3,411
Existing Total MMBtus	1,385	
Proposed Savings MMBtus	474	
% Energy Reduction	**34.2%**	
Proposed Annual Savings	$11,814	

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

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,000
Incentive #2	$4,291	$4,264	$8,556
Incentive #3	$4,291	$4,264	$8,556
Total All Incentives	**$8,583**	**$8,528**	**$22,111**

Total Project Cost	$221,662

		Allowable Incentive
% Incentives #1 of Utility Cost*	18.1%	$5,000
% Incentives #2 of Project Cost**	3.9%	$8,556
% Incentives #3 of Project Cost**	3.9%	$8,556
Total Eligible Incentives***	**$22,111**	
Project Cost w/ Incentives	$199,551	

Project Payback (years)	
w/o Incentives	w/ Incentives
18.8	16.9

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

Energy Audit of Wilbur Watts Intermediate School
CHA Project No.
ECM-L1 Lighting Replacements

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start 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" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (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" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape**	**Code from Table of Standard Fixture Wattages**	**Value from Table of Standard Fixture Wattages**	**(Watts/Fixt) * (Number of Fixtures)**	**Retrofit control device**	**Estimated annual hours for the usage group**	**(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**
15LED	Boiler Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2500	600	4	4 ft LED Tube	200732x2	30	0.1	SW	2,500	300	300	0.1	$ 51.48	$ 934.80	$0	18.2	18.2
35LED	Kitchen	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2500	1,350	6	T 59 R LED	RTLED38	38	0.2	SW	2,500	570	780	0.3	$ 133.85	$ 1,417.50	$0	10.6	10.6
35LED	Multipurpose Room	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2500	1,800	8	T 59 R LED	RTLED38	38	0.3	SW	2,500	760	1,040	0.4	$ 178.47	$ 1,890.00	$0	10.6	10.6
41LED	Multipurpose Room	28	1B 40 R F 2 (MAG)	F42SS	94	2.6	SW	2500	6,580	28	4 ft LED Tube	200732x2	30	0.8	SW	2,500	2,100	4,480	1.8	$ 768.80	$ 6,543.60	$0	8.5	8.5
15LED	Guidance Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	OCC	2500	600	4	4 ft LED Tube	200732x2	30	0.1	OCC	2,500	300	300	0.1	$ 51.48	$ 934.80	$0	18.2	18.2
15LED	Guidance Room	1	S 32 C F 2 (ELE)	F42LL	60	0.1	OCC	2500	150	1	4 ft LED Tube	200732x2	30	0.0	OCC	2,500	75	75	0.0	$ 12.87	$ 233.70	$0	18.2	18.2
5LED	Boys Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	OCC	2500	300	2	2T XX R LED	2RTLED	25	0.1	OCC	2,500	125	175	0.1	$ 30.03	$ 405.00	$0	13.5	13.5
15LED	Janitor Room	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2500	300	2	4 ft LED Tube	200732x2	30	0.1	SW	2,500	150	150	0.1	$ 25.74	$ 467.40	$0	18.2	18.2
5LED	Girls Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	OCC	2500	300	2	2T XX R LED	2RTLED	25	0.1	OCC	2,500	125	175	0.1	$ 30.03	$ 405.00	$0	13.5	13.5
35LED	Hallway	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2500	1,800	8	T 59 R LED	RTLED38	38	0.3	SW	2,500	760	1,040	0.4	$ 178.47	$ 1,890.00	$0	10.6	10.6
35LED	Faculty Room	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2500	900	4	T 59 R LED	RTLED38	38	0.2	SW	2,500	380	520	0.2	$ 89.24	$ 945.00	$0	10.6	10.6
35LED	Nurse Room	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675	3	T 59 R LED	RTLED38	38	0.1	OCC	2,500	285	390	0.2	$ 66.93	$ 708.75	$0	10.6	10.6
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
35LED	Main Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675	3	T 59 R LED	RTLED38	38	0.1	OCC	2,500	285	390	0.2	$ 66.93	$ 708.75	$0	10.6	10.6
35LED	Principle Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675	3	T 59 R LED	RTLED38	38	0.1	OCC	2,500	285	390	0.2	$ 66.93	$ 708.75	$0	10.6	10.6
35LED	Hallway	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2500	2,025	9	T 59 R LED	RTLED38	38	0.3	SW	2,500	855	1,170	0.5	$ 200.78	$ 2,126.25	$0	10.6	10.6
35LED	Room 111	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375	15	T 59 R LED	RTLED38	38	0.6	OCC	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$0	10.6	10.6
71	Room 111	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
35LED	Room 109	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375	15	T 59 R LED	RTLED38	38	0.6	OCC	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$0	10.6	10.6
71	Room 109	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
35LED	Room 110	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375	15	T 59 R LED	RTLED38	38	0.6	OCC	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$0	10.6	10.6
71	Room 110	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
35LED	Room 107	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375	15	T 59 R LED	RTLED38	38	0.6	OCC	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$0	10.6	10.6
71	Room 107	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
35LED	Media Center	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375	15	T 59 R LED	RTLED38	38	0.6	OCC	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$0	10.6	10.6
71	Media Center	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
35LED	Room K5	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375	15	T 59 R LED	RTLED38	38	0.6	OCC	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$0	10.6	10.6
71	Room K5	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
15LED	Room 106	23	S 32 C F 2 (ELE)	F42LL	60	1.4	OCC	2500	3,450	23	4 ft LED Tube	200732x2	30	0.7	OCC	2,500	1,725	1,725	0.7	$ 296.02	$ 5,375.10	$0	18.2	18.2
71	Room 106	1	I 60	I60/1	60	0.1	OCC	2500	150	1	CF 26	CFQ26/1-L	27	0.0	OCC	2,500	68	83	0.0	$ 14.16	$ 6.75	$0	0.5	0.5
64LED	Outdoor Lights	4	175 MH	MH175/1	215	0.9	SW	2500	2,150	4	BAYLED78W	BAYLED78W	93	0.4	SW	2,500	930	1,220	0.5	$ 209.36	$ 3,376.78	$0	16.1	16.1
227LED	Outdoor Lights	6	70 W MH Wall Pack	MH70/1	95	0.6	SW	2500	1,425	6	FXLED18	FXLED18/1	18	0.1	SW	2,500	270	1,155	0.5	$ 198.21	$ 2,539.35	$600	12.8	9.8
	Total	**221**				**19.1**			**47,655**	**221**			**1,170**	**7.8**			**19,573**	**28,083**	**11.2**	**$4,819**	**$52,947**	**$600**		
																	Demand Savings			**11.2**	**$1,646**			
																	kWh Savings			**28,083**	**$3,173**			
																	Total savings				**$4,819**		**11.0**	**10.9**

Energy Audit of Wilbur Watts Intermediate School
CHA Project No.
ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS								RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(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	Length of time for renovations cost to be recovered
15LED	Boiler Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2500	600.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	NONE	2500	600.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Kitchen	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2500	1,350.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	NONE	2500	1,350.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Multipurpose Room	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2500	1,800.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	C-OCC	2000	1,440.0	360.0	0.0	$40.68	$270.00	$35.00	6.6	5.8
41LED	Multipurpose Room	28	1B 40 R F 2 (MAG)	F42SS	94	2.6	SW	2500	6,580.0	28	1B 40 R F 2 (MAG)	F42SS	94	2.6	C-OCC	2000	5,264.0	1,316.0	0.0	$148.71	$270.00	$35.00	1.8	1.6
15LED	Guidance Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	OCC	2500	600.0	4	S 32 C F 2 (ELE)	F42LL	60	0.2	NONE	2500	600.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
15LED	Guidance Room	1	S 32 C F 2 (ELE)	F42LL	60	0.1	OCC	2500	150.0	1	S 32 C F 2 (ELE)	F42LL	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
5LED	Boys Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	OCC	2500	300.0	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	NONE	2500	300.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
15LED	Janitor Room	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2500	300.0	2	S 32 C F 2 (ELE)	F42LL	60	0.1	C-OCC	2000	240.0	60.0	0.0	$6.78	$270.00	$35.00	39.8	34.7
5LED	Girls Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	OCC	2500	300.0	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	NONE	2500	300.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Hallway	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2500	1,800.0	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	NONE	2500	1,800.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Faculty Room	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2500	900.0	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	C-OCC	2000	720.0	180.0	0.0	$20.34	$270.00	$35.00	13.3	11.6
35LED	Nurse Room	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	NONE	2500	675.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Main Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	NONE	2500	675.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Principle Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	NONE	2500	675.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Hallway	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2500	2,025.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	NONE	2500	2,025.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Room 111	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375.0	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	NONE	2500	3,375.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Room 111	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Room 109	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375.0	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	NONE	2500	3,375.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Room 109	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Room 110	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375.0	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	NONE	2500	3,375.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Room 110	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Room 107	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375.0	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	NONE	2500	3,375.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Room 107	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Media Center	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375.0	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	NONE	2500	3,375.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Media Center	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Room K5	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375.0	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	NONE	2500	3,375.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Room K5	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
15LED	Room 106	23	S 32 C F 2 (ELE)	F42LL	60	1.4	OCC	2500	3,450.0	23	S 32 C F 2 (ELE)	F42LL	60	1.4	NONE	2500	3,450.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Room 106	1	I 60	I60/1	60	0.1	OCC	2500	150.0	1	I 60	I60/1	60	0.1	NONE	2500	150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
64LED	Outdoor Lights	4	175 MH	MH175/1	215	0.9	SW	2500	2,150.0	4	175 MH	MH175/1	215	0.9	NONE	2500	2,150.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
227LED	Outdoor Lights	6	70 W MH Wall Pack	MH70/1	95	0.6	SW	2500	1,425.0	6	70 W MH Wall Pack	MH70/1	95	0.6	NONE	2500	1,425.0	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!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
	Total	**221**				**19.1**			**47,655.00**	**221.0**				**19.1**			**45739.0**	**1916.0**	**0.0**	**216.5**	**1080.0**	**140.0**		
																	Demand Savings			0.0	$0			
																	kWh Savings			1,916	$217			
																	Total Savings				$217		**5.0**	**4.3**

Energy Audit of Wilbur Watts Intermediate School
CHA Project No.
ECM-L3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS							
	Area Description	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)	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)
15LED	Boiler Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	SW	2500	600
35LED	Kitchen	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2500	1,350
35LED	Multipurpose Room	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2500	1,800
41LED	Multipurpose Room	28	1B 40 R F 2 (MAG)	F42SS	94	2.6	SW	2500	6,580
15LED	Guidance Room	4	S 32 C F 2 (ELE)	F42LL	60	0.2	OCC	2500	600
15LED	Guidance Room	1	S 32 C F 2 (ELE)	F42LL	60	0.1	OCC	2500	150
5LED	Boys Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	OCC	2500	300
15LED	Janitor Room	2	S 32 C F 2 (ELE)	F42LL	60	0.1	SW	2500	300
5LED	Girls Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	OCC	2500	300
35LED	Hallway	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.7	SW	2500	1,800
35LED	Faculty Room	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2500	900
35LED	Nurse Room	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150
71	Toilet	1	I 60	I60/1	60	0.1	OCC	2500	150
35LED	Main Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675
35LED	Principle Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	OCC	2500	675
35LED	Hallway	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2500	2,025
35LED	Room 111	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375
71	Room 111	1	I 60	I60/1	60	0.1	OCC	2500	150
35LED	Room 109	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375
71	Room 109	1	I 60	I60/1	60	0.1	OCC	2500	150
35LED	Room 110	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375
71	Room 110	1	I 60	I60/1	60	0.1	OCC	2500	150
35LED	Room 107	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375
71	Room 107	1	I 60	I60/1	60	0.1	OCC	2500	150
35LED	Media Center	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375
71	Media Center	1	I 60	I60/1	60	0.1	OCC	2500	150
35LED	Room K5	15	T 32 R F 3 (ELE)	F43ILL/2	90	1.4	OCC	2500	3,375
71	Room K5	1	I 60	I60/1	60	0.1	OCC	2500	150
15LED	Room 106	23	S 32 C F 2 (ELE)	F42LL	60	1.4	OCC	2500	3,450
71	Room 106	1	I 60	I60/1	60	0.1	OCC	2500	150
64LED	Outdoor Lights	4	175 MH	MH175/1	215	0.9	SW	2500	2,150
227LED	Outdoor Lights	6	70 W MH Wall Pack	MH70/1	95	0.6	SW	2500	1,425
S	Total	0				19.1			47,655

		RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	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
15LED	Boiler Room	4	4 ft LED Tube	200732x2	30	0.1	NONE	2,500	300	300	0.1	$ 51.48	$ 934.80	$ -	18.2	18.2
35LED	Kitchen	6	T 59 R LED	RTLED38	38	0.2	NONE	2,500	570	780	0.3	$ 133.85	$ 1,417.50	$ -	10.6	10.6
35LED	Multipurpose Room	8	T 59 R LED	RTLED38	38	0.3	C-OCC	2,000	608	1,192	0.4	$ 195.65	$ 2,160.00	$ 35	11.0	10.9
41LED	Multipurpose Room	28	4 ft LED Tube	200732x2	30	0.8	C-OCC	2,000	1,680	4,900	1.8	$ 816.26	$ 6,813.60	$ 35	8.3	8.3
15LED	Guidance Room	4	4 ft LED Tube	200732x2	30	0.1	NONE	2,500	300	300	0.1	$ 51.48	$ 934.80	$ -	18.2	18.2
15LED	Guidance Room	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,500	75	75	0.0	$ 12.87	$ 233.70	$ -	18.2	18.2
5LED	Boys Room	2	2T XX R LED	2RTLED	25	0.1	NONE	2,500	125	175	0.1	$ 30.03	$ 405.00	$ -	13.5	13.5
15LED	Janitor Room	2	4 ft LED Tube	200732x2	30	0.1	C-OCC	2,000	120	180	0.1	$ 29.13	$ 737.40	$ 35	25.3	24.1
5LED	Girls Room	2	2T XX R LED	2RTLED	25	0.1	NONE	2,500	125	175	0.1	$ 30.03	$ 405.00	$ -	13.5	13.5
35LED	Hallway	8	T 59 R LED	RTLED38	38	0.3	NONE	2,500	760	1,040	0.4	$ 178.47	$ 1,890.00	$ -	10.6	10.6
35LED	Faculty Room	4	T 59 R LED	RTLED38	38	0.2	C-OCC	2,000	304	596	0.2	$ 97.82	$ 1,215.00	$ 35	12.4	12.1
35LED	Nurse Room	3	T 59 R LED	RTLED38	38	0.1	NONE	2,500	285	390	0.2	$ 66.93	$ 708.75	$ -	10.6	10.6
71	Toilet	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
71	Toilet	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
71	Toilet	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
71	Toilet	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
35LED	Main Office	3	T 59 R LED	RTLED38	38	0.1	NONE	2,500	285	390	0.2	$ 66.93	$ 708.75	$ -	10.6	10.6
35LED	Principle Office	3	T 59 R LED	RTLED38	38	0.1	NONE	2,500	285	390	0.2	$ 66.93	$ 708.75	$ -	10.6	10.6
35LED	Hallway	9	T 59 R LED	RTLED38	38	0.3	NONE	2,500	855	1,170	0.5	$ 200.78	$ 2,126.25	$ -	10.6	10.6
35LED	Room 111	15	T 59 R LED	RTLED38	38	0.6	NONE	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$ -	10.6	10.6
71	Room 111	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
35LED	Room 109	15	T 59 R LED	RTLED38	38	0.6	NONE	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$ -	10.6	10.6
71	Room 109	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
35LED	Room 110	15	T 59 R LED	RTLED38	38	0.6	NONE	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$ -	10.6	10.6
71	Room 110	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
35LED	Room 107	15	T 59 R LED	RTLED38	38	0.6	NONE	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$ -	10.6	10.6
71	Room 107	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
35LED	Media Center	15	T 59 R LED	RTLED38	38	0.6	NONE	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$ -	10.6	10.6
71	Media Center	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
35LED	Room K5	15	T 59 R LED	RTLED38	38	0.6	NONE	2,500	1,425	1,950	0.8	$ 334.64	$ 3,543.75	$ -	10.6	10.6
71	Room K5	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
15LED	Room 106	23	4 ft LED Tube	200732x2	30	0.7	NONE	2,500	1,725	1,725	0.7	$ 296.02	$ 5,375.10	$ -	18.2	18.2
71	Room 106	1	CF 26	CFQ26/1-L	27	0.0	NONE	2,500	68	83	0.0	$ 14.16	$ 6.75	$ -	0.5	0.5
64LED	Outdoor Lights	4	BAYLED78W	BAYLED78W	93	0.4	NONE	2,500	930	1,220	0.5	$ 209.36	$ 3,376.78	$ -	16.1	16.1
227LED	Outdoor Lights	6	FXLED18	FXLED18/1	18	0.1	NONE	2,500	270	1,155	0.5	$ 198.21	$ 2,539.35	$ 600	12.8	9.8
								#N/A								#VALUE!
								#N/A								#VALUE!
								#N/A								#VALUE!
								#N/A								#VALUE!
								#N/A								#VALUE!
S	Total	221				7.8			18,895		11.2	4,896	54,027	$740		
S									Demand Savings			11.2	$1,646			
S									kWh Savings			28,761	$3,250			
S									Total Savings				$4,896		11.0	10.9

APPENDIX D

New Jersey Board of Public Utilities Incentives

i. **Smart Start**

ii. **Direct Install**

iii. **Pay for Performance (P4P)**

iv. **Energy Savings Improvement Plan (ESIP)**

I. SMART START

NJ SmartStart Buildings

Program Overview

With New Jersey SmartStart Buildings ...

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

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have 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 — 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. T you must submit an application form (and applicable worksheets) and receive an approv from the program before any equipment is installed (click here for complete Terms and (Upon receipt of an approval letter, you may proceed to install the equipment listed on yc approved application. Equipment installed prior to the date of the approval letter is not e an incentive. **Any customer and/or agent who purchases equipment prior to the re 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 constructi 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 c install. The application should be accompanied by a related worksheet, where applicabl manufacturer's specification sheet (refer to the specific program requirements on the ba application for specs needed for your project) for the equipment you are planning to inst (Program representatives will review your application package and approve it, reject it, a advise you of upgrades in equipment that will save energy costs and/or increase your in

Support for Custom Energy-Efficiency Measures

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

Incentives for Qualifying Equipment and Projects

Financial incentives are available for large and small projects. These incentives offset s maybe even all! — of the added cost to purchase qualifying energy-efficient equipment, provides significant long-term energy savings. Ranges of incentives are available for qu 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 ince equipment not listed here, contact a program representative. Fiscal year financial incent be limited to a maximum of $500,000 per customer utility account and are available as f permits.

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COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

FOOD SERVICE EQUIPMENT

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL 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

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

Special Notice

Enhanced incentives are available for NJ SmartStart Building upgrades in buildings im Hurricane Sandy. Eligible projects receive an additional 50% and new incentives have 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 types 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 specificatic needed for your project) and a current utility bill(s).

In order to be eligible to receive financial incentives under this Program, Applicants mus receive electric and/or gas service from one of the regulated electric and/or gas utilities 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 Measur
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 discor effective March 1, 2013 except for buildings impacted by Hurri Sandy. Approved applications will have the standard timefram year from the program commitment date to complete the instal**

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/freeze

Prescriptive Lighting

New Linear Fluorescent

- T-12, HID and Incandescent to T-5 and T-8 ($25 - $200 p 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 p 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 Spa *Linear panels ($50 per fixture)*
  - Fuel pump canopy ($100 per fixture)
  - LED retrofit kits (custom measures)
- New Pulse-Start Metal Hallide ($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. Appr applications will have the standard timeframe of one year from the pro 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 fixtu office applications only)
  - Occupancy controlled hi-low fluorescent controls ($25 per 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 per door)
  - Aluminum Night Curtains for open refrigerated cases ($3.5 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 prograi incentive threshold, currently 5% more energy efficient than ASHR/ 2007 for New Construction only.)
- Custom electric and gas equipment incentives (not prescriptive)

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

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

PARTICIPATION STEPS

PARTICIPATING CONTRACTORS

SUSTAINABLE JERSEY

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Direct Install

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 t and how to get through the process. Created specifically for existing small to mediun facilities, Direct Install is a turnkey solution that makes it easy and affordable to upgr high efficiency equipment. Direct Install is designed to cut your facility's energy costs replacing lighting, HVAC and other outdated operational equipment with energy effic alternatives. The program pays up to 70% of retrofit costs, dramatically improving yo payback on the project. There is a $125,000 incentive cap on each project.

ELIGIBILITY

Existing small to mid-sized commercial and industrial f with a peak electric demand that did not exceed 200 k any of the preceding 12 months are eligible to participa Direct Install. Applicants will submit the last 12 months electric utility bills indicating that they are below the de threshold and have occupied the building during that ti Buildings must be located in New Jersey and served b the state's public, regulated electric or natural gas utilit 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, type capacities. Boilers may not exceed 500,000 Btuh and furnaces may not exceed 140,

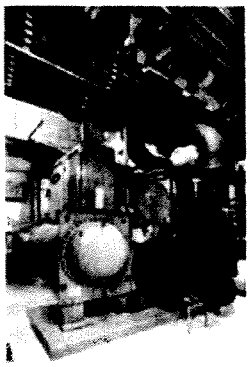
III. PAY FOR PERFORMANCE (P4P)

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 facilit earn incentives that are directly linked to your savings. Pay for Performance relies on a program partners who provide technical services under direct you. Acting as your energy expert, your partner will develop a reduction plan for each project with a whole-building technica component of a traditional energy audit, a financial plan for fu energy efficient measures and a construction schedule for ins



Eligibility

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

Exceptions to the 15% threshold requirement may be made for certain industrial, manuf water treatment and datacenter building types whose annual energy consumption is hea weighted on process loads. Details are available in the high energy intensity section of t 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 ir facilities and comparing it to similar buildings. That can be a big help in locating opportu cost-justified energy efficiency upgrades. And, based on our findings, you may be invite participate in the Building Performance with ENERGY STAR initiative and receive speci recognition as an industry leader in energy efficiency.

Incentives

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

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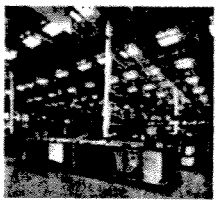
CONTACT US

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

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.



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

Incentive #3 - Completion of Post-Construction Benchmarking Report - A completed report verifying energy reductions based on one year of post-implementation results. Incentives for electricity and natural gas savings will be based on actual savings, provided that the minimum performance threshold of savings has been achieved.

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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New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

BPU

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.

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)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Program

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

This Local Finance Notice outlines how local governments can develop and implement a 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 effic improvements. Local units should carefully consider all alternatives to develop an appro best meets their needs. Local units considering an ESIP should carefully review the Loc Notice, the law, and consult with qualified professionals to determine how they should a task.

The NJ Board of Public Utilities sponsored Sustainable Jersey in the creation of an ESIF Guidebook that explains how to implement the program. The guidebook also includes ca 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 ene 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, plea 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

APPENDIX F

Photos

ECM-1 Window Replacement

Existing Windows

ECM-2 Replace Door Seals

Existing Doors

ECM-3 Replace Boilers with Condensing Boilers

Existing Boiler

ECM-4 Replace Pneumatic Control System with DDC System

Existing Air Compressor

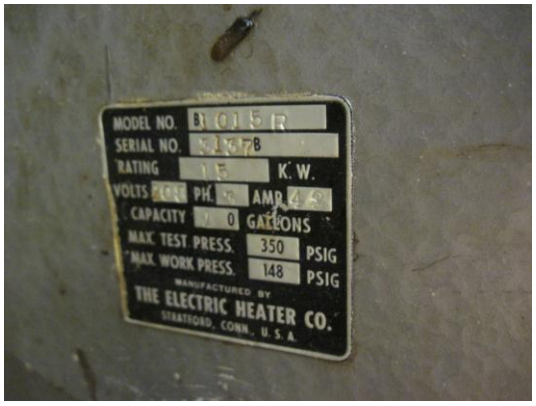
ECM-5 Install Window AC Units Controller

Existing Window AC

ECM-6 Replace Domestic Hot Water Heater with Condensing Heater

Existing Heater

ECM-7 Replace Dishwasher Electric Booster Heater with Gas Booster Heater



Existing Heater

ECM-L1 Lighting Replacement / Upgrades

Existing Lights

ECM-L2 Install Lighting Controls (Occupancy Sensors)

Existing Control

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

See ECM L-1 and L-2

APPENDIX G

EPA Benchmarking Report

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Elias Boudinot Elementary School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 12,600
Built: 1963

For Year Ending: June 30, 2014
Date Generated: August 22, 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	Property Owner	Primary Contact
Elias Boudinot Elementary School Pearl and Ellis Street Burlington, New Jersey 08016	_____ , (____)____-_____	____ _____ , (____)____-_____ _____

Property ID: 4137875

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
109.9 kBtu/ft²

Source EUI
175.6 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	1,022,513 (74%)
Electric - Grid (kBtu)	362,631 (26%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	99.6
National Median Source EUI (kBtu/ft²)	159.1
% Diff from National Median Source EUI	10%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	100

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)