MERCHANTVILLE BOARD OF EDUCATION

MERCHANTVILLE SCHOOL

130 South Centre Street, Merchantville NJ 08109

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

November 2014

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CHA PROJECT NO. 29141

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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 the Merchantville Board of Education 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 opportunities 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
Merchantville School	130 South Centre Street, Merchantville NJ 08109	84,800	1880,1950

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)
Merchantville School	171,223	4,133	$31,072	12.1

Each individual measure's annual savings are dependent on that measure alone, there are no interactive effects calculated. 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.

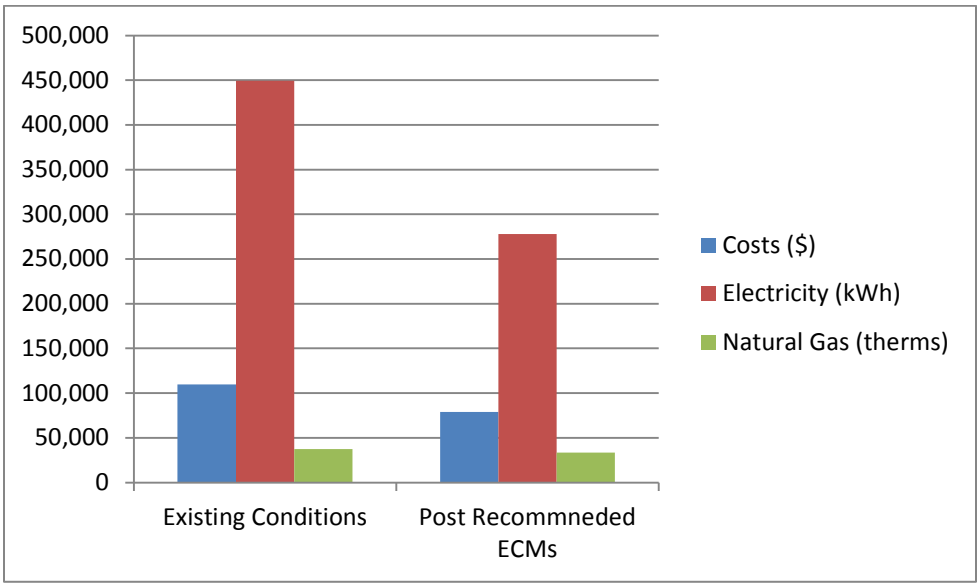
Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
ECM-1	Add Insulation to the Flat Roof	108,900	651	167.3	0	167.3	N
ECM-2	Install a High Efficiency Condensing HHW Boiler As the Main Boiler	91,803	3,681	24.9	2,000	24.4	Y
ECM-3	Install Variable Frequency Drive (VFD) on the HHW Pump Motor	66,606	6,226	10.7	1,500	10.5	Y
ECM-4	Blank off the Existing Unused Floor Mounted Unit Vents' (UV) Louvers and Install Heat Recovery Units for Classroom Ventilation	476,000	6,108	77.9	0	77.9	N
ECM-5	Replace the Two Sterling Heating Ventilating (HV) Units on the Roof with Heat Recovery Units	119,086	7,424	16.0	600	16.0	N
ECM-6	Install Window AC unit Controllers	7,700	3,492	2.2	0	2.2	Y
ECM-7	Install a Central Direct Digital Control (DDC) System to Control the Heating Systems based on the School Schedule	285,881	4,187	68.3	0	68.3	N
ECM-8	Replace DHW Heater with Gas Fired Condensing DHW Heater	18,718	1,415	13.2	200	13.1	Y
ECM-9	Replace Electric Booster Heater with Gas Booster Heater in the Dishwasher	19,800	745	26.6	1,700	24.3	Y
ECM-10	Replace High Flow Plumbing Fixtures with Low Flow Fixtures	40,182	805	49.9	0	49.9	N
ECM-11	Lighting Replacements with Controls (Occupancy Sensors)	172,454	15,513	11.1	1,340	11.0	Y
Total		1,407,130	50,246	28.0	7,340	27.9	
Total(Recommended)		377,081	31,072	12.1	6,740	11.9	

* Incentive shown is per the New Jersey SmartStart Program.

If Borough of Merchantville Implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	109,830	78,758	28%
Electricity (kWh)	449,280	278,057	38%
Natural Gas (therms)	37,481	33,348	11%
Site EUI (kbtu/SF/Yr)	62.3	50.5	



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 dom estic 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: Merchantville School
Address: 130 South Centre Street, Merchantville NJ 08109
Gross Floor Area: 84,800
Number of Floors: 2 and a basement
Year Built: 1880-1950

Building Envelope

Description of Spaces: This is a school building which has classrooms, offices, gymnasium, cafeteria, kitchen, auditorium, library, locker rooms and restrooms.
Description of Occupancy: The school has about 350 students from pre-K to grade 8 and 50 staff.
Number of Computers: The building has approximately 200 desktop and laptop computers.
Building Usage: The school operates approximately 40 weeks per year and about 60 hours per week and the library is open to public and operates about 50 weeks per year.
Construction Materials: Structural steel framing. concrete block with brick and limestone façade.
Roof: The building originally had a flat roof covered with gray rubber membrane which had leaking issues. A pitched steel roof was built over the top of the flat roof on the majority of the

building with added insulation below the pitched roof. The new pitched steel roof appears to be in good condition. A small section of the building still has the old flat roof. An ECM is included to evaluate the savings for adding insulation to that section of building.
Windows: The windows were upgrade a few years ago and are all double pane aluminum framed windows. Windows are in good condition and therefore no ECMs associated with window replacements are evaluated.
Exterior Doors: Exterior doors are wood frame with safety glass. Most of the sweeps on exterior doors are still in good condition, therefore no ECMs associated with the exterior doors are evaluated.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: Two H.B Smith heating hot water (HHW) boilers are used to provide HHW to fin tube baseboard heaters and unit ventilators (UV). Each of the boilers has a rated input of 4,775 MBH and a nameplate efficiency of 80%. The HHW is circulated by five HHW pumps to five zones in the building. Each of HHW pump is driven by a PACO 5HP high efficiency electric motor.

Additionally, two Sterling gas fired make up air units provide heating and ventilation for the common areas of the building. In discussions with school staff, it was noted that these two HV units were not working properly and break down often.

ECMs are included to evaluate the potential savings for installing a high efficiency condensing boiler; adding VFDs on the HHW pumps and replacing the Sterling units with heat recovery units.

Cooling: The building does not have a central cooling system. There are two split DX cooling systems used to cool the offices. The classrooms and library are cooled by window AC units. Each of window AC unit has a rated cooling capacity of 1 ton. The Window AC units are controlled by manual controllers. An ECM for adding window AC unit controllers is evaluated.

Ventilation and Exhaust: Each classroom has a floor mounted UV unit which has a louver to bring in outdoor air for ventilation, however most of the units are not working properly. Additional fan coil units have been mounted at the ceilings that also provide ventilation. The two sterling make up air units located on the roof provide ventilation to corridors (when that are operational). There are many gravity exhaust dampers and several roof mounted exhaust fans that maintain the building pressurization. We have included ECMs that evaluate the savings potential for adding individual classroom heat recovery ventilators as well as two central energy recovery ventilators to replace the ailing Sterling units.

Controls Systems

This building does not have a central control system. Most of the equipment is controlled by manual thermostats. Window AC units have remote controllers. ECMs are included to show the potential savings for installing a central Direct Digital Control (DDC) system.

Domestic Hot Water Systems

This building has an A.O.Smith gas fired DHW heater located in the mechanical room. The heater has a rated energy input of 670 MBH and energy output of 528.6 MBH which results in a nameplate efficiency of 79%. The DHW is stored in a 1,000 gallon storage tank, which seems

oversized for the present usage. An ECM is included that evaluates the savings associated with replacing the DHW heater with a high efficiency condensing water heater having less storage capacity.

Kitchen Equipment

This building has a kitchen which contains two (2) double door Continental coolers and three freezers. There are also a Blodgett oven and one Garland stove, and FWE heater. All the kitchen equipment is Energy Star rated. The kitchen also has a dishwasher which contains a Hobart electric booster heater which has a rated 12 kW capacity. An ECM is included that evaluated the cost savings for replacing the electric booster heater with a gas fired booster heater.

Plug Load

This building has computers, residential appliances (microwave, refrigerator), and printers which contribute to the plug load in the building. The staff usually turn off the appliances when they leave the school. No ECMs are associated with plug load reduction.

Plumbing Systems

The restrooms in the building have old style high volume plumbing fixtures. An ECM is included to evaluate the cost savings for replacing the plumbing fixtures with waterless and low flow fixtures to conserve water.

Lighting Systems

The building has a mixture of 32W T-8 fluorescent lighting and metal halides. The majority of lighting fixtures are linear T-8 fluorescent lights and U-shape T-8 fluorescent lights. The gymnasium has metal halides. The majority of the lights are controlled by switches. An ECM is included that evaluates the savings for replacing all of the lights with LED lights and adding occupancy sensors to the proposed LED lights.

3.0 UTILITIES

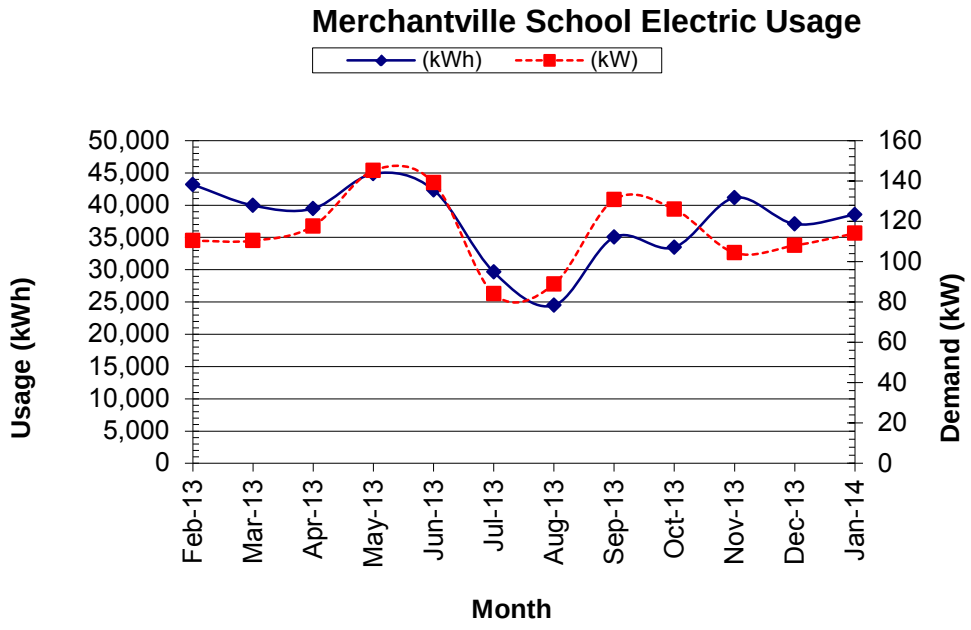
Natural gas and electricity are separately metered into this building. Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas
Deliverer	PSE&G	PSE&G
Supplier	Direct Energy Business LLC / Champion Energy Services LLC	HESS

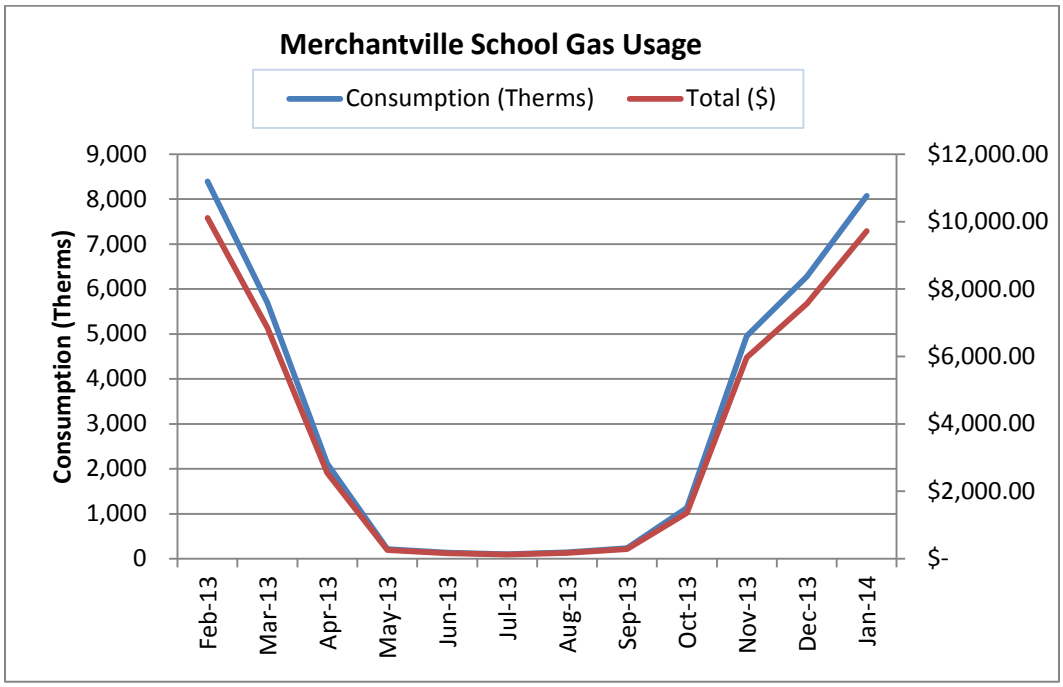
For the 12-month period ending in January 2014, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	449,280	kWh
Annual Cost	64,702	$
Blended Unit Rate	0.144	$/kWh
Supply Rate	0.123	$/kWh
Demand Rate	6.83	$/kW
Peak Demand	145.2	kW
Natural Gas		
Annual Consumption	37,481	Therms
Annual Cost	45,128	$
Unit Rate	1.204	$/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 varies with the usage of the building. In July and August, the electric usage is lower than other months because of the school is off and not occupied as other months.



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	Average Rate	NJ Average Rate	
Electricity	$/kWh	$0.144	$0.13	Y
Natural Gas	$/Therm	$1.204	$0.96	Y

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

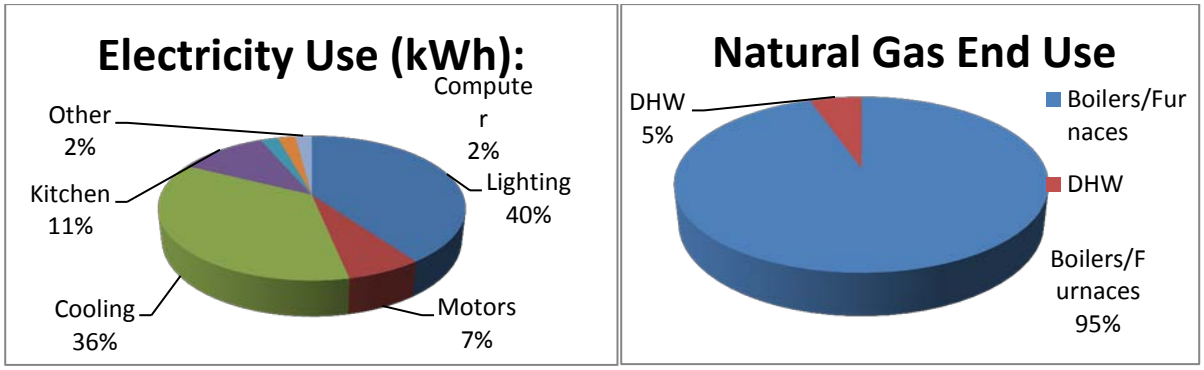
Additional information on selecting a third party energy supplier is available here:

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.

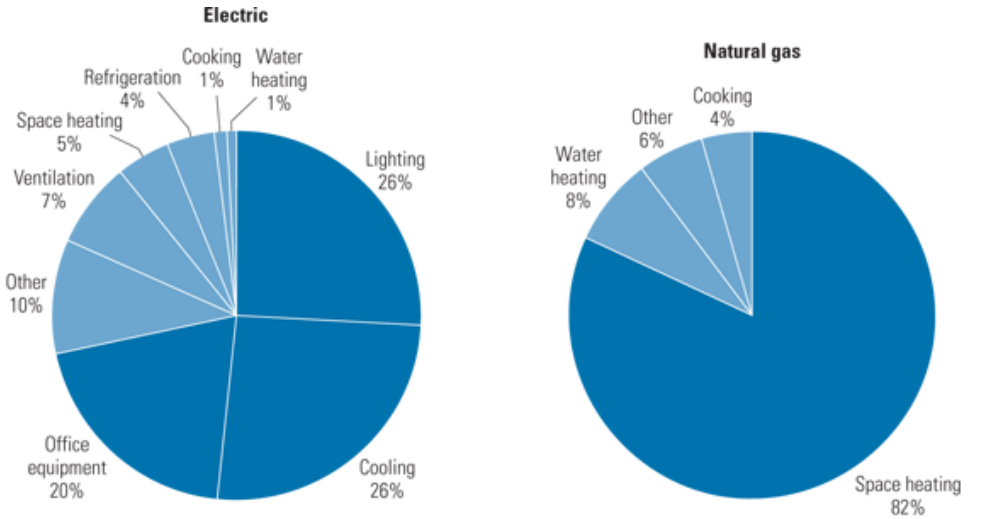
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.

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)
62.3	103.2	72

The school has an above 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 Add Insulation to the Flat Roof

The building originally has a flat roof which is covered with gray rubber membrane. The school built a pitch steel roof over the top of the flat roof on the majority of the building and added insulation below the pitched roof to reduce energy losses. However, the Auditorium roof and a small section of office roof were not upgraded to the pitched steel roof and the insulation is not as good as the new roof section. Therefore, this measure looks at adding insulation on the flat roof which will help reduce energy usage. Adding the steel pitched roof on the flat roof sections is not included in this study since it does not help reduce the energy usage and adds cost to the project.

The calculation uses bin weather data to estimate the occupied and unoccupied bin hours. This is converted to existing energy for the occupied and unoccupied cases using the existing door U-factor and the heating and cooling temperature. The two are added together to create the annual utility usage for the baseline. The same steps are done to calculate the proposed utility usage.

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

ECM-1 Add Insulation to the Flat Roof

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
108,900	0	118	527	651	(0.9)	0	167.3	167.3

* 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 Install a High Efficiency Condensing HHW Boiler as the Main Boiler

Two H.B Smith heating hot water (HHW) boilers are used to provide HHW for baseboard heaters and unit ventilators (UV) in the building. Each of the boilers has a rated input energy of 4,775 MBH and a nameplate efficiency of 80%.These boilers appear to be approaching the end of their useful life. Adding a high efficiency condensing boiler as the main heating source is recommended to improve system efficiency and reduce the run hours on the existing boilers, therefore extending their life.

The energy saving calculations for this measure are based on annual gas usage to create HHW along with the nameplate data of the existing and proposed boilers. The gas usage of these two boilers was calculated by multiplying the capacity percentage with the annual HHW gas usage from the utility data. It is estimated that the proposed condensing boiler has a 90% average efficiency based on manufacturer's specification data.

The installation of this project requires one (1) 2,000 MBH condensing boiler, new flue piping, rebalance the HHW piping system, HHW piping cleaning and boiler control programming. Further study is required to determine the cost more accurately.

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

ECM-2 Install a High Efficiency Condensing HHW Boiler as the Main Boiler

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
91,803	0	0	3,057	3,681	(0.4)	2,000	24.9	24.4

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

This measure is recommended.

5.3 ECM-3 Install Variable Frequency Drives (VFD) on the HHW Pump Motors

The heating system is currently distributed by (5) 5 HP pumps that run at constant speed serving five zones. Installing VFDs and two-way valves will save energy when full load operation is not required. As the heating load is reduced and the two-way valves on the HHW coils close, the VFD will slow the motor down to maintain the required system pressure and the energy consumption of the HHW pump motors will be reduced.

The savings of this measure are calculated from the motor speed reduction the results when the HHW system is only partially loaded. The load percentage of the pumps is calculated by estimating the percentage of two-way valves open in each temperature bin. Therefore, partial energy savings in each bin can be calculated as the difference between the energy drawn by the full-load old motors and the energy drawn by the VFD driven motors.

Implementation of this measure will require installation of VFDs, two-way valves, and appropriate controls equipment. In addition, some small piping modifications and control programming will be needed to allow the system to operate with variable flow.

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

ECM-3 Install Variable Frequency Drive (VFD) on the HHW Pump Motor

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
66,606	0	43,235	0	6,226	0.4	1,500	10.7	10.5

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

This measure is recommended.

5.4 ECM-4 Install Heat Recovery Units for Classroom Ventilation

The school has many unit ventilators installed at different years to provide fresh air for the rooms. These units provide hydronic heating and draw in outside air through a louver in the exterior wall. During the site visit, it was found that many of them are not operative and lack of control. In discussions with the facility staff, it was noted that most of these units have reached the end of their useful lives.

It is recommended that classrooms be upgraded with new energy recovery ventilation (ERV) equipment and use the existing unit ventilators for heating only. The new ERV system would extract heat being exhausted from the space and use it to pre-heat incoming fresh air. The amount of air introduced would be controlled based on the amount of carbon dioxide in the space which is an impacted by the number of occupants. The fan speeds on the fresh air and exhaust air fans would modulate based on the amount of air needed.

Implementation of this ECM will entail insulating and blanking off of the existing outdoor air louvers as well as installing the new heat recovery units and ductwork. Asbestos abatement may need to be performed prior to any work and the cost for this is not included in the payback analysis.

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

ECM-4 Install Heat Recovery Units for Classroom Ventilation

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
476,000	0	6,202	4,332	6,108	(0.8)	0	77.9	77.9

* 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 high cost and long payback.

5.5 ECM-5 Replace the Two Sterling Heating Ventilating (HV) Units with Heat Recovery Units

The building has two gas fired make up air units which do not have energy recovery capacity. In discussions with the facility staff, it was noted that these two units do not function properly occasionally and the school is interested in replacing these units with HV units that can recover energy from the exhaust air. The new ERVs would be equipped with desiccant energy recovery wheels to capture the energy from the exhaust air to pre-condition the fresh air.

The energy savings are calculated based on BIN data and the estimated CFM of exhaust air. Also, the extra electric usage of the recovery wheel fan motors is considered.

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

ECM-5 Replace the Two Sterling Heating Ventilating Units with Heat Recovery Units

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
119,086	0	-2,056	6,412	7,424	(0.1)	600	16.0	16.0

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

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

5.6 ECM-6 Install Window A/C Units Controller

There are about 40 window A/C units which on occasion, are left on by the 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 the room is 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-6 Install Window A/C 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
7,700	0	24,248	0	3,492	5.8	0	2.2	2.2

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

This measure is recommended.

5.7 ECM-7 Install a Central Web-Based DDC System

The school does not have a central control system and all HVAC equipment is controlled by local controllers. This results in equipment operating when it does not need to. Installing a Full Direct Digital Control (DDC) building automation system is proposed. 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 for control and monitoring of the building's systems.

The energy savings are estimated based on previous DDC study in schools. It is estimated that the new DDC system would have precise temperature control in the building and reset the room temperature during unoccupied hours. Also, the new DDC

system could help save energy usage by monitoring the building energy usage and turning off the HVAC equipment when they are not needed.

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

ECM-7 Install a Central Web-Based DDC System for all Schools, Integrate the Existing Individual DDC System and Retro-Commissioning

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
285,881	0	14,260	1,772	4,187	(0.8)	0	68.3	68.3

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

This measure is recommended.

5.8 ECM-8 Replace Domestic Hot Water Heater with Condensing DHW Heater

This building has an A.O.Smith gas fired DHW heater located in the mechanical room. The heater has a rated energy input of 670 MBH and energy output of 528.6 MBH which results in a nameplate efficiency of 79%. This heater provides domestic hot water for kitchen as well as the entire building. It is suggested that a high efficiency condensing DHW heater be installed to replace the existing DHW and the large storage tank.

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% and have less standby energy loss from the storage tank.

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

ECM-8 Replace Domestic Hot Water Heaters with Condensing DHW Heater

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
18,718	0	0	1,175	1,415	0.1	200	13.2	13.1

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

This measure is recommended.

5.9 ECM-9 Replace Dishwasher Electric Booster Heater with Gas Booster Heater

The dishwasher has a 12kW 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-9 Replace Dishwasher Electric 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
19,800	7	2,345	-100	745	(0.4)	1,700	26.6	24.3

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

This measure is recommended.

5.10 ECM-10 Replace High Flow Plumbing Fixtures with Low Flow Fixtures

This building contains older style high flow water toilets (3.5 GPF), urinals (1.5 GPF), and high flow faucets (2.0 GPM). Waterless urinals and low-flow toilets/faucets are recommended to replace the existing plumbing fixtures.

The water savings associated from replacing existing high flow fixtures with low-flow/no-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the estimate usage of each fixture, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 Gals/flush toilets, 1.0 gal/flush urinals, and 0.5 gpm faucets will conserve water which will result in lower annual water and sewer charges. Faucets with low-flow push valves were not considered for replacement.

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

ECM-10 Replace High Flow Plumbing Fixtures with Low Flow Fixtures

Budgetary Cost	Annual Utility Savings			ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Water	Natural Gas	Total				
$	kGal	Therms	$		$	Years	Years
40,182	0	0	453	(0.7)	0	49.9	49.9

* 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.

5.11 ECM-11 Lighting Replacements with Controls (Occupancy Sensors)

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. Also, the majority of the lights in the building are controlled by manual switches. Therefore, replacing switches with occupancy sensors in proper areas is also recommended to work with the new LED lights.

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 and photometric study should be performed to determine correct replacement lighting fixtures and 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-11 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
172,454	37	101,396	0	15,513	0.5	1,340	11.1	11.0

* 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.

5.12 Additional O&M Opportunities

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

- Turn off the Window AC Units after Class
- Clean the HHW Piping System
- Purchase Energy Star Appliances when the Existing Appliances in Lounge Need Replacement

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

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

6.1.1 New Jersey Smart Start Program

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

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

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

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

6.1.2 Direct Install Program

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

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

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

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

The building does not qualify for this program because its electrical demand is more than the maximum peak electrical demand of 200 kW for the last 12 month period.

Refer to Appendix D for more information on this program.

6.1.3 New Jersey Pay For Performance Program (P4P)

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

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

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

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

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

Electric

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

Combining Incentives #2 and #3 will provide a total of $0.18/ kWh and $1.8/therm not to exceed 50% of total project cost. Additional Incentives for #2 and #3 a re 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 structure of the stainless steel and the pitched roof of this building, a solar PV system was determined to be not feasible. However, it is also recommended that the school consult with a certified solar PV contractor to study the roof structure and feasibility of installing solar PV panels.

7.1.2 Solar Thermal Hot Water Generation

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

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

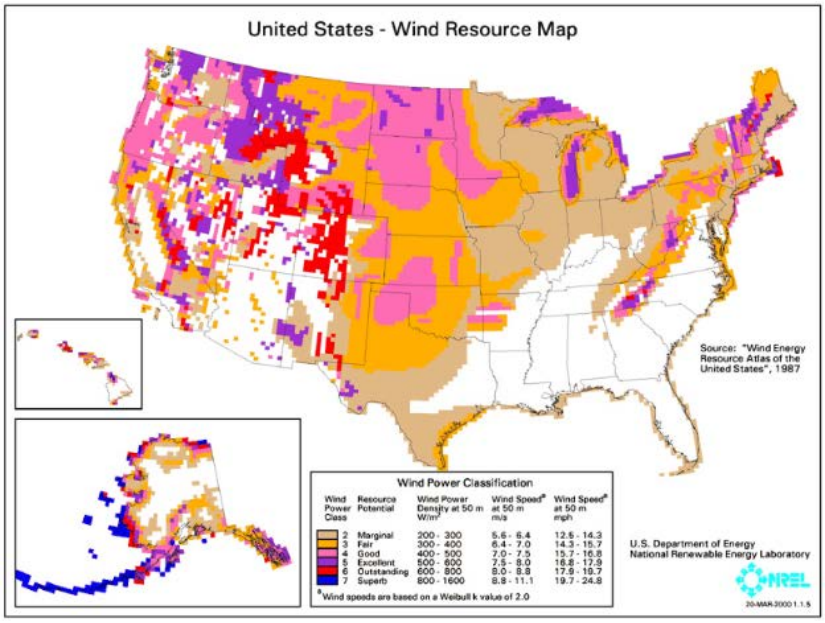
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping).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

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

7.2 Wind Powered Turbines

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

generally considered “good wind resource” according to the Wind Energy Development Programmatic EIS Information Center hosted by the Bureau of Land Management. According to the map below, published by NREL, 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 building.

7.3 Combined Heat and Power Plant

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

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

This measure is not recommended due to the absence of year-round thermal loads which are needed for efficiency CHP operation. However, a mini-size CHP could be an option for the Borough of Merchantville 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
145.2	84.0	111.9	N	Y

*the demand is estimated from one month bill

This measure is not recommended due to the lack of enough onsite generation.

8.0 CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for Merchantville Board of Education.

The following projects should be considered for implementation:

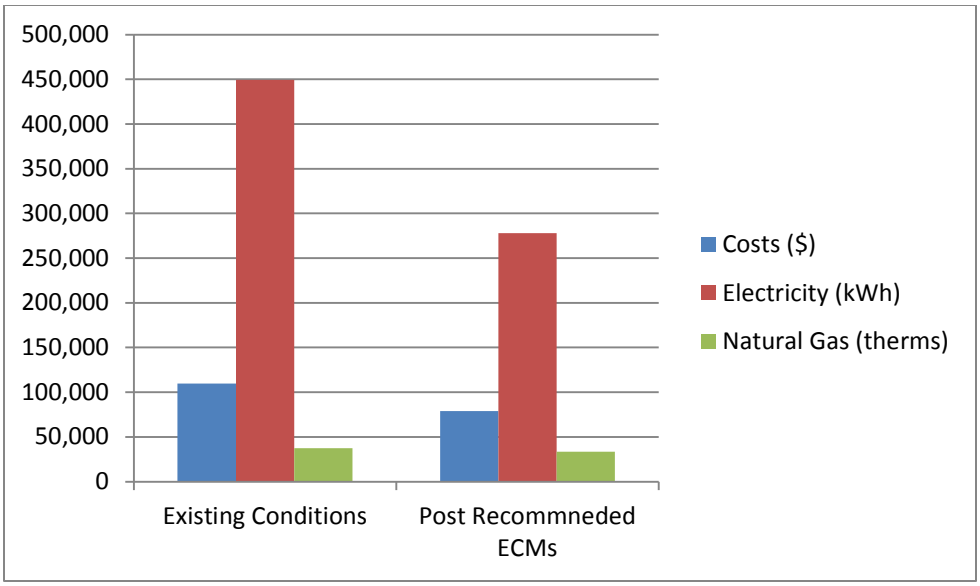
- Install a High Efficiency Condensing HHW Boiler As the Main Boiler
- Install Variable Frequency Drive (VFD) on the HHW Pump Motor
- Install Window AC unit Controllers
- Replace DHW Heater with Gas Fired Condensing DHW Heater
- Replace Electric Booster Heater with Gas Booster Heater in the Dishwasher
- 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)
171,223	4,133	$31,072	12.1

If Borough of Merchantville implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	109,830	78,758	28%
Electricity (kWh)	449,280	278,057	38%
Natural Gas (therms)	37,481	33,348	11%
Site EUI (kbtu/SF/Yr)	62.3	50.5	



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

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Merchantville LGEA
Merchantville SchoolElectric Usage

Annual Utilities

12-month Summary

Electric		
Annual Usage	449,280	kWh/yr
Annual Cost	64,702	$
Blended Rate	0.144	$/kWh
Consumption Rate	0.123	$/kWh
Demand Rate	6.83	$/kW
Peak Demand	145.2	kW
Min. Demand	84.0	kW
Avg. Demand	111.9	kW
Natural Gas		
Annual Usage	37,481	therms/yr
Annual Cost	45,128	$
Rate	1.204	$/therm

Merchantville LGEA
Merchantville School

Utility Bills: Account Numbers

Account Number	Building Name	Location	Type	Notes
67-384-540-07	Merchantville School	130 S. Centre St, Merchantville NJ 08109	Electricity	
67-384-540-07	Merchantville School	130 S. Centre St, Merchantville NJ 08109	Natural Gas	

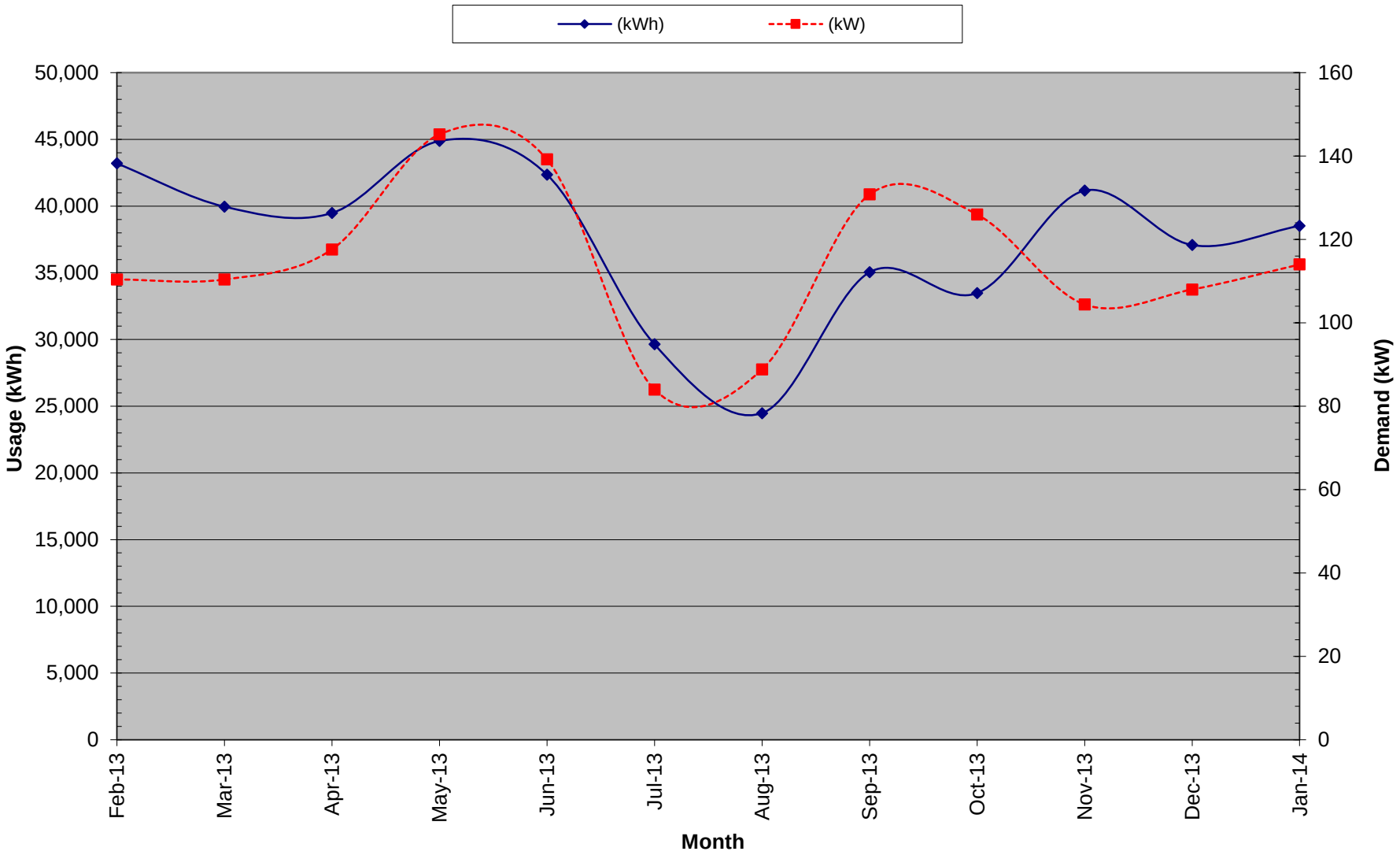
Merchantville LGEA
Merchantville SchoolElectric Usage

For Service at:
Account No.: **67-384-540-07** **Delivery -** PSE&G
Meter No.: **778012673** **Supplier -** Direct Energy Business LLC / Champion Energy Services LLC
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)**
February-13	43,200	110.40	1,860.15	3,153.60	5,013.75	4,541.18	472.57	0.12	0.11	4.28
March-13	39,960	110.40	1,756.40	2,917.08	4,673.48	4,200.91	472.57	0.12	0.11	4.28
April-13	39,480	117.60	1,771.85	2,900.44	4,672.29	4,168.90	503.39	0.12	0.11	4.28
May-13	44,880	145.20	2,071.84	4,100.39	6,172.23	5,550.70	621.53	0.14	0.12	4.28
June-13	42,360	139.20	3,423.74	3,788.76	7,212.50	5,510.86	1,701.64	0.17	0.13	12.22
July-13	29,640	84.00	2,233.11	2,921.91	5,155.02	4,128.17	1,026.85	0.17	0.14	12.22
August-13	24,480	88.80	2,082.54	2,413.24	4,495.78	3,410.25	1,085.53	0.18	0.14	12.22
September-13	35,040	130.80	3,024.34	3,454.24	6,478.58	4,879.62	1,598.96	0.18	0.14	12.22
October-13	33,480	126.00	1,686.49	2,898.43	4,584.92	4,045.58	539.34	0.14	0.12	4.28
November-13	41,160	104.40	1,856.19	3,405.45	5,261.64	4,814.76	446.88	0.13	0.12	4.28
December-13	37,080	108.00	1,727.90	3,655.35	5,383.25	4,920.95	462.30	0.15	0.13	4.28
January-14	38,520	114.00	1,739.38	3,858.74	5,598.12	5,110.14	487.98	0.15	0.13	4.28
Total (All)	**449,280**	**145.20**	**$25,233.93**	**$39,467.63**	**$64,701.56**	**$55,282.02**	**$9,419.54**	**$0.14**	**$0.12**	**$6.83**
Total (12 Months)	**449,280**	**145.20**	**$25,233.93**	**$39,467.63**	**$64,701.56**	**$55,282.02**	**$9,419.54**	**$0.14**	**$0.12**	**$6.83**
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 — Estimated due to missing data
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)

Merchantville SchoolElectric Usage



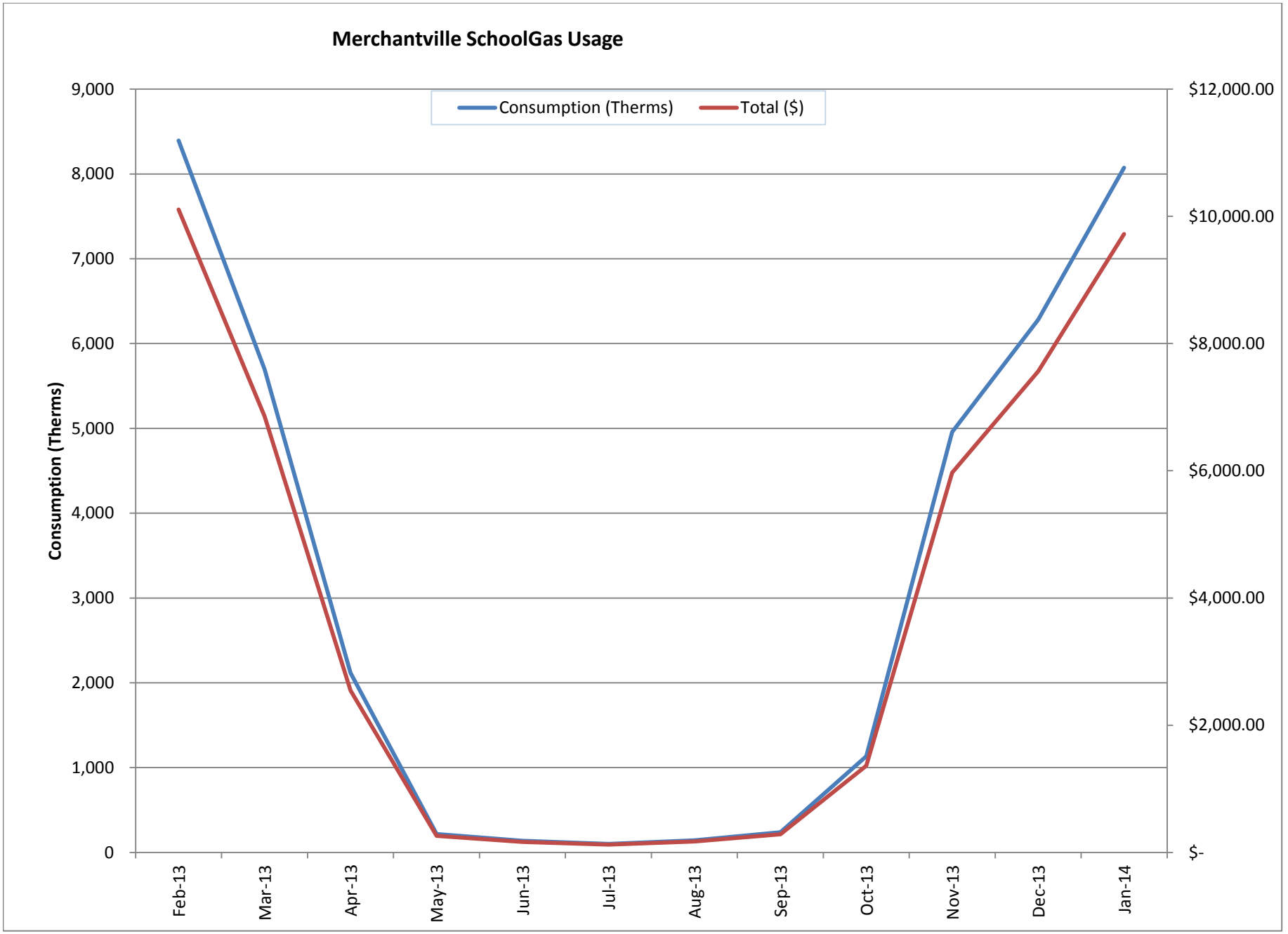
Merchantville School Utility Data
Electric Graph

Merchantville LGEA
Merchantville SchoolGas Usage

For Service at:
Account No.: **67-384-540-07**
Meter No: **2124611**
Natural Gas Service **Delivery -** **PSE&G**
Supplier - **HESS**

		Charges			Unit Costs		
Month	**Consumption (Therms)**	**Delivery ($)**	**Supply ($)**	**Total ($)**	**Delivery ($/Therm)**	**Supply ($/Therm)**	**Total ($/Therm)**
February-13	8,393	$3,082.59	$ 4,220.01	$ 10,105.73	$ 0.367	$ 0.503	$ 1.204
March-13	5,693	$2,453.98	$ 2,929.49	$ 6,854.21	$ 0.431	$ 0.515	$ 1.204
April-13	2,116	$363.31	$ 1,178.14	$ 2,547.20	$ 0.172	$ 0.557	$ 1.204
May-13	216	$134.60	$ 126.14	$ 260.02	$ 0.623	$ 0.584	$ 1.204
June-13	137	$123.94	$ 79.72	$ 165.21	$ 0.903	$ 0.581	$ 1.204
July-13	101	$118.74	$ 54.11	$ 121.54	$ 1.176	$ 0.536	$ 1.204
August-13	143	$124.72	$ 72.80	$ 171.76	$ 0.874	$ 0.510	$ 1.204
September-13	237	$138.16	$ 123.31	$ 284.83	$ 0.584	$ 0.521	$ 1.204
October-13	1,133	$255.82	$ 582.50	$ 1,363.53	$ 0.226	$ 0.514	$ 1.204
November-13	4,958	$2,195.51	$ 2,555.25	$ 5,969.74	$ 0.443	$ 0.515	$ 1.204
December-13	6,281	$2,478.54	$ 3,361.12	$ 7,562.86	$ 0.395	$ 0.535	$ 1.204
January-14	8,074	$2,819.62	$ 4,634.26	$ 9,720.95	$ 0.349	$ 0.574	$ 1.204
Total (All)	**37,481.39**			**45,127.60**			**$ 1.204**
Total (12 Months)	**37,481.39**			**45,127.60**			**$ 1.204**

Estimated due to missing data


Merchantville SchoolGas Usage
Consumption (Therms)
Total ($)
Consumption (Therms)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
$12,000.00
$10,000.00
$8,000.00
$6,000.00
$4,000.00
$2,000.00
$-
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14

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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PSE&G ELECTRIC SERVICE TERRITORY
Last Updated: 9/04/14

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

Supplier	Telephone & Web Site	*Customer Class
Abest Power & Gas of NJ, LLC 202 Smith Street Perth Amboy, NJ 08861	(888)987-6937 www.AbestPower.com	**R/C/I** **ACTIVE**
AEP Energy, Inc. 309 Fellowship Road, Fl. 2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	**R/C/I** **ACTIVE**
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Ambit Northeast, LLC d/b/a Ambit Energy 103 Carnegie Center Suite 300 Princeton, NJ 08540	877-282-6284 www.ambitenergy.com	**R/C** **ACTIVE**
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	**C/I** **ACTIVE**
Amerigreen Energy, Inc. 333Sylvan Avenue Englewood Cliffs, NJ 07632	888-559-4567 www.amerigreen.com	**R/C** **ACTIVE**
AP Gas & Electric, (NJ) LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apgellc.com	**R/C/I** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(888)850-1872 www.AstralEnergyLLC.com	**R/C/I** **ACTIVE**
Barclays Capital Services, Inc. 70 Hudson Street Jersey City, NJ 07302-4585	(800) 526-7000 www.barclays.com	**C** **ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200	(888) 651-4121	**C**

Princeton, NJ 08540	www.greateasternenergy.com	**ACTIVE**
Berkshire Energy Partners, LLC 9 Berkshire Road Landenberg, PA 19350 Attn: Dana A. LeSage, P.E.	(610) 255-5070 www.berkshireenergypartners.com	**C/I** **ACTIVE**
Blue Pilot Energy, LLC 197 State Rte. 18 South Ste. 3000 East Brunswick, NJ 08816	(800) 451-6356 www.bluepilotenergy.com	**R/C** **ACTIVE**
Brick Standard, LLC 235 Hudson Street Suite 1 Hoboken, NJ 07030	(201)706-8101 www.standardalternative.com	**C/I** **ACTIVE**
CCES LLC dba Clean Currents Energy Services 566 Terhune Street Teaneck, NJ 07666	(877) 933-2453 www.cleancurrents.com	**R/C** **ACTIVE**
Champion Energy Services, LLC 1200 Route 22 Bridgewater, NJ 08807	(888) 653-0093 www.championenergyservices.com	**R/C/I** **ACTIVE**
Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	(888) 565-4490 www.4choiceenergy.com	**R/C** **ACTIVE**
Clearview Electric, Inc. 1744 Lexington Avenue Pennsauken, NJ 08110	(888) CLR-VIEW (800) 746- 4702 www.clearviewenergy.com	**R/C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	**R/C** **ACTIVE**
Community Energy Inc. 51 Sandbrook Headquarters Road Stockton, NJ 08559	(866)946-3123 www.communityenergyinc.com	**R/C/I** **ACTIVE**
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	**C/I** **ACTIVE**

ConocoPhillips Company 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 646-4427 www.conocophillips.com	**C/I** **ACTIVE**
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(888) 635-0827 www.constellation.com	**R/C/I** **ACTIVE**
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	**R** **ACTIVE**
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com	**C** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 http://www.business.directenergy.com/	**R** **ACTIVE**
Direct Energy Business Marketing, LLC (fka Hess Energy Marketing) 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergy.com	**R** **ACTIVE**
Direct Energy Small Business, LLC (fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 464-4377 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, New Jersey 08002	(800) 282-3331 www.discountenergygroup.com	**R/C** **ACTIVE**
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**
Energy Service Providers, Inc., d/b/a New Jersey Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.njgande.com	**R/C** **ACTIVE**
FirstEnergy Solutions 150 West State Street Trenton, NJ 08608	(866) 625-7318 www.fes.com	**C/I** **ACTIVE**
Gateway Energy Services Corp. 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866)348-4193 www.directenergybusiness.com	**R/C** **ACTIVE**
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I** **ACTIVE**
GDF Suez Retail Energy Solutions LLC d/b/a THINK ENERGY 333 Thornall St. Sixth Floor Edison, NJ 08819	1-866-252-0078 www.mythinkenergy.com	**R/C/I** **ACTIVE**
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	(888) 452-2425 www.glacialenergy.com	**C/I** **ACTIVE**

Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	(800) 542-0778 www.globalp.com	**R/C/I** **ACTIVE**
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	**C/I** **ACTIVE**
Harborside Energy LLC 101 Hudson Street Suite 2100 Jersey City, NJ 07302	(877) 940-3835 www.harborsideenergynj.com	**R/C** **ACTIVE**
Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	**R/C/I** **ACTIVE**
Hudson Energy Services, LLC 7 Cedar Street Ramsey, New Jersey 07446	(877) Hudson 9 www.hudsonenergyservices.com	**C** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(877) 887-6866 www.idtenergy.com	**R/C** **ACTIVE**
Independence Energy Group, LLC 211 Carnegie Center Princeton, NJ 08540	(877) 235-6708 www.chooseindependence.com	**R/C** **ACTIVE**
Inspire Energy Holdings LLC 923 Haddonfield Road 3rd Fl. Building B2 Cherry Hill, NJ 08002	(866) 403-2620 www.inspireenergy.com	**R/C/I**
Integrys Energy Services, Inc. 33 Wood Ave, South, Suite 610 Iselin, NJ 08830	(800) 536-0151 www.integrysenergy.com	**C/I** **ACTIVE**
Jsynergy, LLC 445 Central Ave. Suite 204 Cedarhurst, NY 11516	(516) 331-2020 Jsynergyllc.com	**R/C/I** **ACTIVE**

Kuehne Chemical Company, Inc. 86 North Hackensack Avenue South Kearney, NJ 07032	(973) 589-0700 kuehnechemical@comcast.net	**I**
Liberty Power Delaware, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**
Liberty Power Holdings, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	**R/C/I** **ACTIVE**
Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	**R/C/I** **ACTIVE**
MP2 Energy NJ, LLC 111 River Street, Suite 1204 Hoboken, NJ 07030	(877) 238-5343 www.mp2energy.com	**R/C/I** **ACTIVE**
Natures Current, LLC 95 Fairmount Avenue Philadelphia, Pennsylvania 19123	(215) 464-6000 www.naturescurrent.com	**R/C/I** **ACTIVE**
MPower Energy NJ LLC One University Plaza, Suite 507 Hackensack, NJ 07601	(877) 286-7693 www.mpowerenergy.com	**R/C/I** **ACTIVE**
NATGASCO, Inc. (Supreme Energy, Inc.) 532 Freeman St. Orange, NJ 07050	(800) 840-4427 www.supremeenergyinc.com	**R/C** **ACTIVE**
New Jersey Gas & Electric 10 North Park Place Suite 420 Morristown, NJ 07960	(866) 568-0290 www.njgande.com	**R/C/** **ACTIVE**
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	**R/C/I** **ACTIVE**

Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
Nordic Energy Services, LLC 50 Tice Boulevard, Suite 340 Woodcliff Lake, NJ 07677	(877) 808-1027 www.nordiceenergy.us.com	**R/C/I** **ACTIVE**
North American Power and Gas, LLC 222 Ridgedale Avenue Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 535-6340 www.entrustenergy.com	**R/C/I** **ACTIVE**
Oasis Power, LLC d/b/a Oasis Energy 11152 Westheimer, Suite 901 Houston, TX 77042	(800)324-3046 www.oasisenergy.com	**R/C** **ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Park Power, LLC 1200 South Church St. Suite 23 Mount Laurel, NJ 08054	(856) 778-0079 www.parkpower.com	**R/C/I** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
Power Management Co., LLC b/b/a PMC Lightsavers Limited Liability Company 1600 Moseley Road Victor, NY 14564	(585) 249-1360 www.powermanagementco.com	**C/I** **ACTIVE**
PPL Energy Plus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**

PPL EnergyPlus Retail, LLC 788 Shrewsbury Avenue, Suite 220 Tinton Falls, NJ 07724	(732) 741-0505 – 2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Progressive Energy Consulting, LLC PO Box 4582 Wayne, New Jersey 07474	(917) 837-7400 Progressivenrg@optionline.net	**R/C/I** **ACTIVE**
Prospect Resources, Inc. 208 W. State Street Trenton, NJ 08608-1002	(847) 673-1959 www.prospectresources.com	**C** **ACTIVE**
Public Power & Utility of New Jersey, LLC One International Blvd, Suite 400 Mahwah, NJ 07495	(888) 354-4415 www.ppandu.com	**R/C/I** **ACTIVE**
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com	**R/C/I** **ACTIVE**
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	**R/C/I** **ACTIVE**
Residents Energy, LLC 550 Broad Street Newark, NJ 07102	(888) 828-7374 www.residentsenergy.com	**R/C**
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	(877) 973-7763 www.majorenergy.com	**R/C/I** **ACTIVE**
Save on Energy, LLC 1101 Red Ventures Drive Fort Mill, SC 29707	1 (877)-658-3183 www.saveonenergy.com	**R/C**
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	(800) 695-0666 www.sjnaturalgas.com	**C** **ACTIVE**
SmartEnergy Holdings, LLC 100 Overlook Center 2nd Floor Princeton, NJ NJ 08540 United States of America	(800) 443-4440 www.smartenergy.com	**R/C/I** **ACTIVE**

South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 266-6020 www.southjerseyenergy.com	**R/C/I** **ACTIVE**
Spark Energy Gas, LP/ Spark Energy 2105 City West Blvd. Suite 100 Houston, TX 77042	(713)600-2600 www.sparkenergy.com	**R/C/I** **ACTIVE**
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082 www.sperianenergy.com	**R/C/I** **ACTIVE**
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	**R/C/I** **ACTIVE**
Stream Energy New Jersey, LLC 309 Fellowship Rd., Suite 200 Mt. Laurel, NJ 08054	(877) 369-8150 www.streamenergy.net	**R/C** **ACTIVE**
Summit Energy Services, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	**C/I** **ACTIVE**
Texas Retail Energy LLC Park 80 West Plaza II, Suite 200 Saddle Brook, NJ 07663 Attn: Chris Hendrix	(866) 532-0761 Texasretailenergy.com	**C/I** **ACTIVE**
TransCanada Power Marketing Ltd. 190 Middlesex Essex Turnpike, Suite 200 Iselin, NJ 08830	(877) MEGAWAT www.transcanada.com/powermarketing	**C/I** **ACTIVE**
TriEagle Energy, LP 90 Washington Valley Rd Bedminster, NJ 07921	(877) 933-2453 www.trieagleenergy.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. dba UGI Energy Link 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(800) 427-8545 www.ugienergylink.com	**C/I** **ACTIVE**

Verde Energy USA, Inc. 2001 Route 46 Waterview Plaza Suite 301 Parsippany, NJ 07054	(800) 388-3862 www.lowcostpower.com	**R/C** **ACTIVE**
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	**R/C/I** **ACTIVE**
XOOM Energy New Jersey, LLC 744 Broad Street. 16th Floor Newark, NJ 07102	(888) 997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

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APPENDIX B

Equipment Inventory

CHA Project # 29141
Merchantville School
Camden County - Merchantville NJ

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.	Current year	Years Old	ASHRAE life expectancy
Boiler	2	H.B Smith	M450L	N/A	HHW Boiler	4775 MBH input, 3357 MBH output	70% Eff.	Boiler Room	the Whole Building	1987	-2		2014	27	25
HHW Pump	5	PACO	N/A	N/A	HHW Pump Motor	5HP	N/A	Boiler Room	the Whole Building	1997	8		2014	17	25
DHW	1	A O Smith	HW670 832	832 H87 73134	Gas DHW Heater	670 MBH Input and 528.6 MBH Output 1000 Gallon Storage	79%	Boiler Room	The Whole Building Except Annex	1987	-7		2014	27	20
HV	2	Sterling	N/A	N/A	Heating Ventilation Unit with gas furnace	N/A	N/A	Roof	The Classrooms	1987	-7		2014	27	20
Window AC Unis	40	Various	N/A	N/A	Window AC unit	10,000 BTH cooling capacity	EER of 9.8	Offices	Offices	2005	11		2014	9	20

Energy Audit of Merchantville School
CHA Project No.29141
Existing Lighting & Audit Input

Cost of Electricity: **$0.123** **$/kWh**
$6.83 **$/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	Mechanical Room	Mechanical Room	14	S 32 C F 2 (ELE)	F42LL	60	0.84	SW	6000	5,040	NONE	
32LED	Kitchen	Kitchen	8	1T 32 R F 2 (ELE)	F42LL	60	0.48	SW	2000	960	OCC	
20LED	Kitchen	Kitchen	1	S 28 P F 1 (ELE)	F41ILL	31	0.03	SW	2000	62	OCC	
20LED	Dishwasher	Kitchen	2	S 28 P F 1 (ELE)	F41ILL	31	0.06	SW	2000	124	OCC	
35LED	Hallway	Hallways	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	6000	1,080	NONE	
32LED	Hallway	Hallways	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	6000	360	NONE	
20LED	Café	Cafeteria	54	S 28 P F 1 (ELE)	F41ILL	31	1.67	SW	2000	3,348	OCC	
146LED	Gymnasium	Gymnasium	24	High Bay MH 400	MH400/1	458	10.99	SW	2000	21,984	OCC	
5LED	Boys Locker Room	Locker	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.36	SW	2000	720	OCC	
71	Boys Locker Room	Locker	1	I 60	I60/1	60	0.06	SW	2000	120	OCC	
5LED	Girls Locker Room	Locker	10	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.60	SW	2000	1,200	OCC	
20LED	Girls Locker Room	Locker	1	S 28 P F 1 (ELE)	F41ILL	31	0.03	SW	2000	62	OCC	
20LED	Library	Media Center	54	S 28 P F 1 (ELE)	F41ILL	31	1.67	SW	2500	4,185	OCC	
32LED	Library	Media Center	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2500	600	OCC	
196LED	Room 1	Classrooms	15	W 32 C F 4 (ELE)	F44ILL	112	1.68	SW	2500	4,200	OCC	
32LED	Room 2	Classrooms	9	1T 32 R F 2 (ELE)	F42LL	60	0.54	SW	2500	1,350	OCC	
32LED	Room 3	Classrooms	9	1T 32 R F 2 (ELE)	F42LL	60	0.54	SW	2500	1,350	OCC	
32LED	Room 4	Offices	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2250	405	OCC	
196LED	Room 7	Offices	2	W 32 C F 4 (ELE)	F44ILL	112	0.22	SW	2250	504	OCC	
196LED	Room 8	Offices	2	W 32 C F 4 (ELE)	F44ILL	112	0.22	SW	2250	504	OCC	
32LED	Room 9	Offices	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2250	135	OCC	
32LED	Room 10	Classrooms	18	1T 32 R F 2 (ELE)	F42LL	60	1.08	SW	2500	2,700	OCC	
196LED	Room 14	Classrooms	4	W 32 C F 4 (ELE)	F44ILL	112	0.45	SW	2500	1,120	OCC	
196LED	Room 14 Next	Classrooms	4	W 32 C F 4 (ELE)	F44ILL	112	0.45	SW	2500	1,120	OCC	
196LED	Room 15	Classrooms	6	W 32 C F 4 (ELE)	F44ILL	112	0.67	SW	2500	1,680	OCC	
196LED	Room 15 Next	Classrooms	4	W 32 C F 4 (ELE)	F44ILL	112	0.45	SW	2500	1,120	OCC	
35LED	100	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2500	1,350	OCC	
35LED	101	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	102	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	103	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
32LED	Hallway	Hallways	7	1T 32 R F 2 (ELE)	F42LL	60	0.42	SW	6000	2,520	NONE	
5LED	Restroom	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	SW	2000	240	OCC	
32LED	Stair	Hallways	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	SW	6000	1,080	NONE	
20LED	Auditorium Lobby	Hallways	4	S 28 P F 1 (ELE)	F41ILL	31	0.12	SW	6000	744	NONE	
196LED	Auditorium Lobby	Hallways	2	W 32 C F 4 (ELE)	F44ILL	112	0.22	SW	6000	1,344	NONE	
146LED	Auditorium	Auditorium	6	High Bay MH 400	MH400/1	458	2.75	SW	2000	5,496	OCC	
32LED	Hallway	Hallways	5	1T 32 R F 2 (ELE)	F42LL	60	0.30	SW	6000	1,800	NONE	
196LED	Stair	Hallways	2	W 32 C F 4 (ELE)	F44ILL	112	0.22	SW	6000	1,344	NONE	
35LED	Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2250	405	OCC	
35LED	Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2250	405	OCC	
35LED	Office	Offices	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.36	SW	2250	810	OCC	
35LED	Office	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2250	608	OCC	
35LED	Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2250	405	OCC	
35LED	106	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2500	1,800	OCC	
35LED	107	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2500	2,700	OCC	
35LED	108	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2500	2,700	OCC	
35LED	109	Classrooms	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2500	675	OCC	
32LED	Hallway	Hallways	22	1T 32 R F 2 (ELE)	F42LL	60	1.32	SW	6000	7,920	NONE	
196LED	111	Classrooms	12	W 32 C F 4 (ELE)	F44ILL	112	1.34	SW	2500	3,360	OCC	
196LED	112	Classrooms	12	W 32 C F 4 (ELE)	F44ILL	112	1.34	SW	2500	3,360	OCC	
35LED	114	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2500	2,700	OCC	
35LED	115	Classrooms	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	2500	2,250	OCC	
35LED	116	Classrooms	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	2500	2,250	OCC	
35LED	117	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	118	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	119	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
32LED	Hallway	Hallways	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	6000	2,160	NONE	
196LED	Nurse Office	Offices	5	W 32 C F 4 (ELE)	F44ILL	112	0.56	SW	2250	1,260	OCC	
35LED	200	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	201	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	202	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	203	Classrooms	11	T 32 R F 3 (ELE)	F43ILL/2	90	0.99	SW	2500	2,475	OCC	
35LED	204	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2500	2,700	OCC	
32LED	Hallway	Hallways	13	1T 32 R F 2 (ELE)	F42LL	60	0.78	SW	6000	4,680	NONE	
5LED	Men's Room	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	SW	2000	240	OCC	
35LED	206	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	207	Classrooms	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	2500	2,250	OCC	
35LED	208	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2500	1,800	OCC	
35LED	210	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2500	2,700	OCC	
35LED	211	Classrooms	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.63	SW	2500	1,575	OCC	
35LED	212	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2500	2,700	OCC	

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	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
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35LED	213	Classrooms	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2500	2,025	OCC	
35LED	214	Classrooms	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.08	SW	2500	2,700	OCC	
35LED	215	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2500	1,800	OCC	
35LED	216	Classrooms	8	T 32 R F 3 (ELE)	F43ILL/2	90	0.72	SW	2500	1,800	OCC	
5LED	Restroom	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	SW	2000	240	OCC	
32LED	Restroom	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2000	240	OCC	
5LED	Restroom	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.12	SW	2000	240	OCC	
32LED	Restroom	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2000	240	OCC	
32LED	Hallway	Hallways	9	1T 32 R F 2 (ELE)	F42LL	60	0.54	SW	6000	3,240	NONE	
32LED	Stair	Hallways	3	1T 32 R F 2 (ELE)	F42LL	60	0.18	SW	6000	1,080	NONE	
	Total		**667**				**60.85**			**162,694**		

APPENDIX C

ECM Calculations

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
$ 0.144	$/kWh blended		0.000420205	84,800	Electric	Natural Gas	Fuel Oil
$ 0.123	$/kWh supply	449,280	0.000420205		$ 64,702	$ 45,128	
$ 6.83	$/kW	145.2	0				
$ 1.20	$/Therm	37,481	0.00533471				
Estimated $ 7.50	$/kgals		0				
	$/Gal						

Merchantville School

Recommend? Y or N		Item	Savings kW	kWh	therms	No. 2 Oil gal	Water kgal	$	Cost	Simple Payback	Life Expectancy	Equivalent CO2 (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	Add Insulation to the Flat Roof	0.0	118	527	0	0	651	$ 108,900	167.3	25	2.9	$ -	N	167.3	0.0	2,953	13,167	0	$ 16,278	(0.9)	($97,562)	-11.3%
Y	ECM-2	Install a High Efficiency Condensing HHW Boiler As the Main Boiler	0.0	0	3,057	0	0	3,681	$ 91,803	24.9	15	16.3	$ 2,000	N	24.4	0.0	0	45,862	0	$ 55,218	(0.4)	($45,856)	-5.5%
Y	ECM-3	Install Variable Frequency Drive (VFD) on the HHW Pump Motor	0.0	43,235	0	0	0	6,226	$ 66,606	10.7	15	18.2	$ 1,500	N	10.5	0.0	648,520	0	0	$ 93,387	0.4	$9,217	4.9%
N	ECM-4	Blank off the Existing Unused Floor Mounted Unit Vents' (UV) Louvers and Install Heat Recovery Units for Classroom Ventilation	0.0	6,202	4,332	0	0	6,108	$ 476,000	77.9	15	25.7	$ -	N	77.9	0.0	93,023	64,976	0	$ 91,626	(0.8)	($403,078)	-15.9%
N	ECM-5	Replace the Two Sterling Heating Ventilating (HV) Units on the Roof with Heat Recovery Units	0.0	(2,056)	6,412	0	0	7,424	$ 119,086	16.0	15	33.3	$ 600	N	16.0	0.0	(30,837)	96,176	0	$ 111,355	(0.1)	($29,863)	-0.8%
Y	ECM-6	Install Window AC unit Controllers	0.0	24,248	0	0	0	3,492	$ 7,700	2.2	15	10.2	$ -	N	2.2	0.0	363,717	0	0	$ 52,375	5.8	$33,984	45.2%
N	ECM-7	Install a Central Direct Digital Control (DDC) System to Control the Heating Systems based on the School Schedule	0	14,260	1,772	0	0	4,187	$ 285,881	68.3	15	15.4	$ -	N	68.3	0.0	213,903	26,578	0	$ 62,802	(0.8)	($235,900)	-14.8%
Y	ECM-8	Replace DHW Heater with Gas Fired Condensing DHW Heater	0	0	1,175	0	0	1,415	$ 18,718	13.2	15	6.3	$ 200	N	13.1	0.0	0	17,631	0	$ 21,228	0.1	($1,624)	1.8%
Y	ECM-9	Replace Electric Booster Heater with Gas Booster Heater in the Dishwasher	7	2,345	(100)	0	0	745	$ 19,800	26.6	15	0.5	$ 1,700	N	24.3	105.5	35,170	(1,500)	0	$ 11,906	(0.4)	($9,212)	-5.5%
N	ECM-10	Replace High Flow Plumbing Fixtures with Low Flow Fixtures	0	0	453	0	35	805	$ 40,182	49.9	15	2.4	$ -	N	49.9	0.0	0	6,789	520	$ 12,073	(0.7)	($30,573)	-12.3%
Y	ECM-11	Lighting Replacements with Controls (Occupancy Sensors)	37	101,396	0	0	0	15,513	$ 172,454	11.1	15	42.6	$ 1,340	N	11.0	556.7	1,520,940	0	0	$ 264,638	0.5	$14,082	4.1%
		Total	**44.1**	**189,747**	**17,627**	**0**	**35**	**$ 50,246**	**$ 1,407,130**	**28.0**	**15.9**	**174**	**$ 7,340**		**27.9**	**662**	**2,847,390**	**269,679**	**520**	**$ 792,887**	**(0.4)**	**(796,385)**	**-6.9%**
		Recommended Measures (highlighted green above)	**44.1**	**171,223**	**4,133**	**0**	**0**	**$ 31,072**	**$ 377,081**	**12.1**	**15.0**	**94**	**$ 6,740**	**0**	**11.9**	**662**	**2,568,348**	**61,994**	**-**	**$ 498,753**	**0.3**	**590**	**3.0%**
		% of Existing	**30%**	**38%**	**11%**	**0**	**0**																

City: Philadelphia, PA
Occupied Hours/Week: 60

Temp	Enthalpy h (Btu/lb)	Bin Hours	Building Operating Hours	Auditorium Occupied Hours	Gymnasium Occupied Hours	Library Occupied Hours	Classrooms Occupied Hours
102.5							
97.5	33	3	1	0	0	0	0
92.5	38	33	12	0	0	0	0
87.5	36	123	44	0	0	0	0
82.5	34	477	170	0	0	0	0
77.5	33	656	234	0	0	0	0
72.5	31	742	265	0	0	0	0
67.5	28	784	280	0	0	0	0
62.5	25	983	351	0	0	0	0
57.5	21	625	223	0	0	0	0
52.5	18	540	193	0	0	0	0
47.5	16	457	163	0	0	0	0
42.5	14	671	240	0	0	0	0
37.5	12	1,067	381	0	0	0	0
32.5	10	685	245	0	0	0	0
27.5	9	369	132	0	0	0	0
22.5	7	321	115	0	0	0	0
17.5	5	184	66	0	0	0	0
12.5	4	40	14	0	0	0	0
7.5		0	0	0	0	0	0
2.5		0	0	0	0	0	0
-2.5		0					
-7.5							

Multipliers	
Material:	1.027
Labor:	1.245
Equipment:	1.124

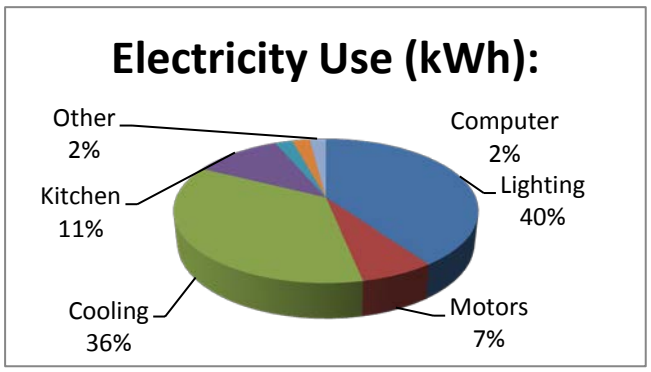
Heating System Efficiency	78%
Cooling Eff (kW/ton)	1.3

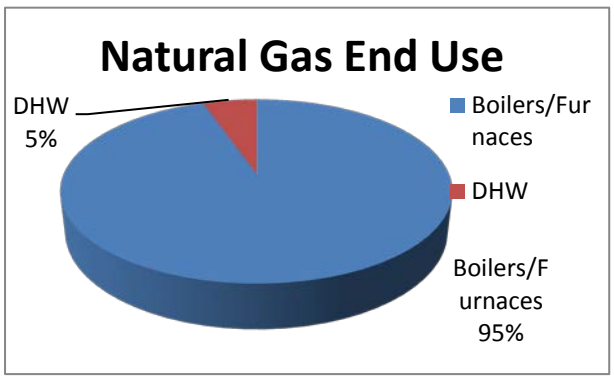
Heating		
Hours	4,427	Hrs
Weighted Avg	40	F
Avg	28	F

Cooling		
Hours	4,333	Hrs
Weighted Avg	66	F
Avg	78	F

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
449,280	Total	Based on utility analysis	
180,000	Lighting	From Lighting Calculations	40%
30,000	Motors	Estimated	7%
160,000	Cooling	Estimated	36%
50,000	Kitchen	Estimated	11%
10,000	Plug Load	Estimated	2%
10,000	Computer	Estimated	2%
9,280	Other	Remaining	2%
Natural Gas Use (Therms):		**Notes/Comments:**	
37,481	Total	Based on utility analysis	
35,481	Boilers/Furnaces	Therms/SF x Square Feet Served	95%
2,000	DHW	Based on utility analysis	5%





Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

ECM-1 Add Insulation to the Flat Roof

Description: The building originally has a flat roof which is covered with gray membrane. However, the flat roof has leaking issues after years. Therefore, the school built a pitch steel roof over the top of the flat roof on the majority of the building and added insulation below the pitched roof. The auditorium section and office section of the building still has the old flat roof. This measure looks at the energy savings associated with adding more insulation on the roof. Also the school is interested in installing the steel roof on the top of the flat roof.

Area of Roof	21,200	SF	Cooling System Efficiency	1.3	kW/ton	Heating System Efficiency	78%	
Existing Infiltration Factor	**0.23**	**cfm/SF**	Ex Occupied Clng Temp.	72	*F	Heating On Point	55	*F
Proposed Infiltration Factor	**0.23**	**cfm/SF**	Ex Unoccupied Clng Temp.	72	*F	Ex Occupied Htg Temp.	70	*F
Existing U Value	**0.040**	**Btuh/SF/°F**	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Ex Unoccupied Htg Temp.	70	*F
Proposed U Value	**0.026**	**Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Electricity	$ 0.144	$/kWh
Air Conditioned Area %	**30%**					Natural Gas	$ 1.20	$/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**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Wall Infiltration & Heat Load BTUH**	**Existing Cooling Energy kWh**	**Proposed Cooling Energy kWh**	**Existing Heating Energy therms**	**Proposed Heating Energy therms**
A		**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
97.5	33.1	3	1	2	-43,598	-43,598	-41,376	-41,376	14	13	0	0
92.5	38.0	33	12	21	-74,170	-74,170	-72,384	-72,384	265	259	0	0
87.5	36.2	123	44	79	-61,538	-61,538	-60,188	-60,188	820	802	0	0
82.5	33.8	477	170	307	-44,354	-44,354	-43,439	-43,439	2,292	2,245	0	0
77.5	32.7	656	234	422	-35,329	-35,329	-34,850	-34,850	2,511	2,477	0	0
72.5	31.0	742	265	477	-76,929	-76,929	-76,784	-76,784	6184	6172	0	0
67.5	28.1	784	280	504	0	0	0	0	0	0	0	0
62.5	24.6	983	351	632	0	0	0	0	0	0	0	0
57.5	21.2	625	223	402	0	0	0	0	0	0	0	0
52.5	18.3	540	193	347	106,996	106,996	101,914	101,914	0	0	741	706
47.5	16.0	457	163	294	137,567	137,567	131,032	131,032	0	0	806	768
42.5	14.4	671	240	431	168,137	168,137	160,150	160,150	0	0	1,446	1,378
37.5	12.5	1,067	381	686	198,708	198,708	189,268	189,268	0	0	2,718	2,589
32.5	10.5	685	245	440	229,278	229,278	218,387	218,387	0	0	2,014	1,918
27.5	8.5	369	132	237	259,848	259,848	247,505	247,505	0	0	1,229	1,171
22.5	7.0	321	115	206	290,419	290,419	276,623	276,623	0	0	1,195	1,138
17.5	5.3	184	66	118	320,989	320,989	305,741	305,741	0	0	757	721
12.5	3.8	40	14	26	351,560	351,560	334,859	334,859	0	0	180	172
7.5	0.0	0	0	0	382,130	382,130	363,978	363,978	0	0	0	0
2.5	0.0	0	0	0	412,700	412,700	393,096	393,096	0	0	0	0
-2.5	0.0	0	0	0	443,271	443,271	422,214	422,214	0	0	0	0
TOTALS		**8,760**	**3,129**	**5,631**					12,086	11,968	**11,087**	**10,560**

Existing Ceiling Infiltration	**4,876**	**cfm**
Existing Ceiling Heat Transfer	**848**	**Btuh/°F**
Proposed Ceiling Infiltration	**4,876**	**cfm**
Proposed Ceiling Heat Transfer	**558**	**Btuh/°F**

Savings	**527**	**Therms**	**$ 634**
	118	**kWh**	**$ 17**
			$ 651

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ECM-1 Add Insulation to the Flat Roof

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.		
New Steel Roof	21,200	SQFT	$ 5			$ 108,862	$ -	$ -	$ 108,862	Estimated

Note: Cost estimates are used for energy savings only. Do not use for procurement

$ 108,862	Subtotal
$ -	0% Contingency
$ -	0% Contractor O&P
$ -	0% Engineering
$ 108,900	**Total**

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ECM-2 Install a High Efficiency Condensing HHW Boiler As the Main Boiler

Description: This ECM evaluates adding a high efficiency condensing gas boiler with the existing boiler to run as the main 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. A comprehensive boiler control system is also recommended to operate the HHW system and do a HHW temperature reset according to the outdoor air temperature.

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.20	/ 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	78%		Estimated averaged Efficiency without HHW Reset
Heating Degree-Day	2,655	Degree-day	
Design Temperature Difference	57	F	
Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	2,000,000	btu/hr	
Efficiency	90%		Estimated Efficiency after the HHW Reset
SAVINGS			
Fuel Savings	3,057	therms	NJ Protocols Calculation
Fuel Cost Savings	$ 3,681		

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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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-2 Install a High Efficiency Condensing HHW Boiler As the Main Boiler - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
6,000 MBH NG Condensing Boiler	1	EA	$ 32,000	$ 16,000		$ 32,864	$ 19,936	$ -	$ 52,800	Vendor Estimate
Flue Installation	1	LS	$ 2,500.0	$ 2,500.00		$ 2,568	$ 3,115	$ -	$ 5,683	Vendor Estimate
Controls	1	EA	$ 1,000.0	$ 500.00		$ 1,027	$ 623	$ -	$ 1,650	Estimated
Electrical	1	LS	$ 1,500	$ 2,500		$ 1,541	$ 3,115	$ -	$ 4,656	Estimated
Miscellaneous HW Piping	1	LS	$ 5,000	$ 1,000		$ 5,135	$ 1,246	$ -	$ 6,381	Estimated
Cleaning HHW Piping	1	EA	$1,000	$1,000		$ 1,027	$ 1,246	$ -	$ 2,273	Estimated
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 73,442	Subtotal
$ 18,361	25% Contingency
$ 91,803	**Total**

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

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ECM-3 Install Variable Frequency Drive (VFD) on the HHW Pump Motor

Variable Inputs

Supply Electric Rate	$0.123
Demand Rate	$6.830
Heating System "On" Point	55
VFD Efficiency	98.5%

Electric Savings		**43,235**
Demand Savings		**0.0**
Cost Savings	**$**	**5,318**

ECM-3 Install Variable Frequency Drive (VFD) on the HHW Pump Motor

This measure evaluates the savings for installing variable frequency drives on the HHW pump motors.

PUMP SCHEDULE

Pump ID	Qty	HP	Total HP	Existing Motor Motor Eff.	New Motor Motor Eff.	Exist. Motor kW Note 1	New Motor kW Note 2
HHWP	**5**	**5.0**	**25.0**	**89.5%**	**89.5%**	**16.67**	**16.67**
					Total:	**16.67**	**16.67**

SAVINGS ANALYSIS

OAT - DB Avg Temp F	Annual Hours in Bin	Heating Hours Bin	Pump Load %	Existing Pump kWh	Proposed Pump kW	Speed efficiency %	Proposed Pump kWh	Proposed Savings kWh
(A)	**(B)**	**(C)**	**(D)**	**(E)**	**(F)**	**(G)**	**(H)**	**(I)**
		=IF(A>TP,0,C)	**=0.5+0.5* (55-A)/(55-12))**	**=D*AA**	**=BB*E^3.0/CC**		**=C*F/G**	**=E-H**
See Note 3	**See Note 3**		**See Note 4**		**See Note 5**			
102.5	0	0	0%	0	0.0	0.0%	0	0
97.5	3	0	0%	0	0.0	0.0%	0	0
92.5	33	0	0%	0	0.0	0.0%	0	0
87.5	123	0	0%	0	0.0	0.0%	0	0
82.5	477	0	0%	0	0.0	0.0%	0	0
77.5	656	0	0%	0	0.0	0.0%	0	0
72.5	742	0	0%	0	0.0	0.0%	0	0
67.5	784	0	0%	0	0.0	0.0%	0	0
62.5	983	0	0%	0	0.0	0.0%	0	0
57.5	625	0	0%	0	0.0	0.0%	0	0
52.5	540	540	53%	9,002	2.5	84.3%	1,609	7,393
47.5	457	457	59%	7,618	3.4	89.2%	1,765	5,854
42.5	671	671	65%	11,186	4.6	93.2%	3,300	7,886
37.5	1,067	1,067	71%	17,787	6.0	96.4%	6,588	11,199
32.5	685	685	76%	11,419	7.6	98.7%	5,253	6,166
27.5	369	369	82%	6,151	9.5	100.0%	3,488	2,663
22.5	321	321	88%	5,351	11.6	100.0%	3,732	1,619
17.5	184	184	94%	3,067	14.1	100.0%	2,596	471
12.5	40	40	100%	667	16.9	99.0%	684	-17
7.5	0	0	0%	0	0.0	0.0%	0	0
2.5	0	0	0%	0	0.0	0.0%	0	0
-2.5	0	0	0%	0	0.0	0.0%	0	0
-7.5	0	0	0%	0	0.0	0.0%	0	0
	8,760	**4,334**		**72,249**			**29,015**	**43,235**

Notes:

1) Existing motor power was determined using motor nameplate data. Formula: Motor HP x 0.746 x 0.8 / Exist. Motor Eff.
2) New motor power is the same as existing motor power adjusted for the new efficiency, if a new motor is proposed.
3) Weather data from NOAA for Philadephia PA
4) The pump load is estimated at 100% at 12 deg. OAT and 50% at 55 deg. OAT and varies linearly in between.
5) The required VFD motor draw is based on a 3 power relationship to load.

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-3 Install Variable Frequency Drive (VFD) on the HHW Pump Motor - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
VFD	5	ea	$ 1,706	$ 431		$ 8,762	$ 2,682	$ -	$ 11,444	RS Means 2012
Electrical - misc.	1	ls	$ 1,000	$ 2,000		$ 1,027	$ 2,492	$ -	$ 3,519	RS Means 2012
2-Way Valves	30	ea	$ 200	$ 100		$ 6,162	$ 3,738	$ -	$ 9,900	Estimated
T-stat installation	2	ea	$ 150	$ 100		$ 308	$ 249	$ -	$ 557	RS Means 2012
Control/Programming	5	ea	$ 3,000	$ 2,000		$ 15,405	$ 12,460	$ -	$ 27,865	RS Means 2012
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 53,285	Subtotal
$ 13,321	25% Contingency
$ 66,606	**Total**

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

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ECM-4 Blank off the Existing Unused Floor Mounted Unit Vents' (UV) Louvers and Install Heat Recovery Units for Classroom Ventilation

Description: This ECM evaluates energy savings for two systems in a typical classroom: B) DCV (demand controlled ventilation); and C) air-to-air heat exchange for outside air ventilation. The existing classrooms are typically ventilated by a unit ventilator outfitted with a 2-pipe hydronic heating. As part of the installation the existing unit ventilators will have their fans removed and the outside air louvers insulated and blanked off.

Demand Controlled Ventilation

Electric Cost	$ 0.14	/kWh
Natural Gas Cost	$ 1.20	/therm
Classroom Ventilation Heating Load	302,400	BTU/Hour[1,2,3]
Classroom Ventilation Cooling Load	86,400	BTU/Hour[1,2,3]
Existing Ventilation Heating Usage	1,373	Therms[2,6,9]
Existing Ventilation Cooling Usage	8,935	kWh[3,7,9]
Proposed Ventilation Heating Usage	1,305	Therms[8]
Proposed Ventilation Cooling Usage	8,488	kWh[8]
Total heating savings	69	**Therms**
Total cooling savings	447	**kWh**
Total cost savings	$ 147.00	

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

Assumptions

1	8,000	CFM of OA - Estimated based on UV sizes (40UVs,200CFM OA Each)
2	35	°F, Assumed average heating Δt (mixed air and supply)
3	10	°F, Assumed average cooling Δt (mixed air and supply)
4	78%	Heating Efficiency - %
5	1.3	Cooling Efficiency - kW/Ton
6	1,771	Run time per heating season bin data
7	1,358	Run time per cooling season bin data
8	5%	Estimated savings for DCV based on NJ Protocols
9	20%	Estimated % when UV fans are turned on

SUMMARY:

TOTAL KWH SAVINGS =	**6,201.51**	kWh
TOTAL DEMAND SAVINGS =		kW
TOTAL THERMS SAVINGS =	**4,331.71**	therms
Overall COST Savings =	**$ 6,108**	

Air-to-Air Heat Exchanger

Heat Exchanger Efficiency	76%	note (1)	Occupied Temperature Heating	70		Occupied Temperature Cooling	72	
CFM of outdoor air	7600	note (2)	Unoccupied Temp. Heating	70		Unoccupied Temp. Cooling	72	
Cooling Efficiency	1.3	kW/ton	kWh per BTUH	0.000293071		Cooling Occ Enthalpy Setpoint	27.1	Btu/lb
Heating Efficiency	78%					Cooling Unocc Enthalpy Setpoint	27.1	Btu/lb

							EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
							Occupied	Unoccupied	Occupied	Unoccupied	Total	Total	Total	Total
Avg Outdoor Air Temp. Bins °F	Avg Indoor Occupied Air Temps °F	Avg Heat Exch. Air Temps °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Outdoor Air Load BTU	Outdoor Air Load BTU[3]	Outdoor Air Load BTU	Outdoor Air Load BTU	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy therm	Proposed Heating Energy therm
A	B	C		D	E	F	G	H	I	J	K	L	M	N
102.5	72.0	79.3	38.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
97.5	72.0	78.1	33.1	3.0	1.1	1.9	221,240		117,700		23.97	12.75	-	-
92.5	72.0	76.9	38.0	33.0	11.8	21.2	4,383,533		2,332,040		474.88	252.64	-	-
87.5	72.0	75.7	36.2	123.0	43.9	79.1	13,745,915		7,312,827		1,489.14	792.22	-	-
82.5	72.0	74.5	33.8	477.0	170.4	306.6	39,223,457		20,866,879		4,249.21	2,260.58	-	-
77.5	72.0	73.3	32.7	656.0	234.3	421.7	44,505,407		23,676,877		4,821.42	2,564.99	-	-
72.5	72.0	72.1	31.0	742.0	265.0	477.0	35,225,113		18,739,760		3,816.05	2,030.14	-	-
67.5	72.0	70.9	28.1	784.0	280.0	504.0	9,996,911		5,318,357		1,083.00	576.16	-	-
62.5	72.0	69.7	24.6	983.0	351.1	631.9	600,332		480,266		65.04	52.03	-	-
57.5	70.0	67.0	21.2	625.0	223.2	401.8	22,901,786		5,496,429		-	-	229.02	54.96
52.5	70.0	65.8	18.3	540.0	192.9	347.1	27,702,000		6,648,480		-	-	277.02	66.48
47.5	70.0	64.6	16.0	457.0	163.2	293.8	30,142,414		7,234,179		-	-	301.42	72.34
42.5	70.0	63.4	14.4	671.0	239.6	431.4	54,092,186		12,982,125		-	-	540.92	129.82
37.5	70.0	62.2	12.5	1067.0	381.1	685.9	101,654,614		24,397,107		-	-	1,016.55	243.97
32.5	70.0	61.0	10.5	685.0	244.6	440.4	75,301,071		18,072,257		-	-	753.01	180.72
27.5	70.0	59.8	8.5	369.0	131.8	237.2	45,972,129		11,033,311		-	-	459.72	110.33
22.5	70.0	58.6	7.0	321.0	114.6	206.4	44,696,957		10,727,270		-	-	446.97	107.27
17.5	70.0	57.4	5.3	184.0	65.7	118.3	28,317,600		6,796,224		-	-	283.18	67.96
12.5	70.0	56.2	3.8	40.0	14.3	25.7	6,742,286		1,618,149		-	-	67.42	16.18
7.5	70.0	55.0	0.0	0.0	0.0	0.0	-		-	-	-	-	-	-
2.5	70.0	53.8	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
-2.5	70.0	52.6	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
-7.5	70.0	51.4	0.0	0.0	0.0	0.0	-	-	-	-	-	-	-	-
TOTALS				**8760.0**	**3650.0**	**5110.0**					**16,023**	**8,542**	**4,375**	**1,050**
					1358									
					1771									

Notes:

(1) BPE Inc. literature rates efficiency at 86%; minus 10% for safety
(2) CFM % reduction based on DCV
(3) the Uvs are off during unoccupied hours

Savings **Cooling:** **5,755** **kWh**
Heating: **4,263** **therm**

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Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-4 Blank off the Existing Unused Floor Mounted Unit Vents' (UV) Louvers and Install Heat Recovery Units for Classroom Ventilation Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Air to air heat exchanger system	40	EA	$ 5,000	$ 3,500		$ 5,135.00	$ 4,361	$ -	$ 9,496	Vender quote

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

$	9,496	Subtotal
$	2,374	25% Contingency
$	-	0% Contractor O&P
$	-	0% Engineering
$	**476,000**	**Total**

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ECM-5 Replace the Two Sterling Heating Ventilating (HV) Units on the Roof with Heat Recovery Units

Currently the two sterling HV units do not have heat recovery capacity and use 100% outdoor air. In discussions with the school staff, it was noted these two units are near the end of their useful life span and break down often. This measure investigates replacing the units with units equipped with heat recovery loop.

Equipment Tag	Equipment Description	Supply CFM	Cooling Capacity (Btu/h)	Heating Capacity (Btu/h)
Sterling	HV	6,000	-	100,000
Sterling	HV	6,000	-	100,000

Utility Costs

Electric Rate	$0.14	/ kWh
Natural Gas Rate	$1.20	/ Therm

Building and System Inputs

Heating Efficiency	78%		Sterling	Maximum Exhaust Flow	6,000	CFM	Fan Size	0.3	HP
Cooling Efficiency	1.30	kW/ton	Sterling	Maximum Exhaust Flow	6,000	CFM	Recovery Factor	50%	
Average Indoor Air Temperature	70	*F					Additional Static on AHU Fans	0.10	inches W.C.
Air Density	0.073	lbm/ft^3					Estimated Fan Efficiency	0.8	
Specific Heat	0.24	BTU/lbm*F					Motor Efficiency	60%	
Cooling	N						Monthly Demand Savings	0	kW
			Total Average Exhaust Flow*		12,000	CFM			

**Fan affinity exponent of 3 was used to remain conservative.*

Avg Outdoor Air Temp. Bins °F	Bin Hours	Temperature Difference	Potential Recoverable Energy (MMBTU)	Energy Actually Recovered or Rejected (MMBTU)	Cooling Energy Saved (kWh)	Heating Energy Saved (MMBTU)	Additional Fan Energy Required (kWh)	Net Savings or Cost
A	B	C	D	E	F	G	I	J
102.5	0	-33	0.0	0.0	0	0	0	($0)
97.5	3	-28	-0.5	-0.3	0	0	1	($0)
92.5	33	-23	-4.7	-2.3	0	0	8	($1)
87.5	123	-18	-13.6	-6.8	0	0	29	($4)
82.5	477	-13	-37.6	-18.8	0	0	112	($16)
77.5	656	-8	-31.0	-15.5	0	0	154	($22)
72.5	742	-3	-11.7	-5.8	0	0	174	($25)
67.5	784	3	12.4	6.2	0	8	184	$69
62.5	983	8	46.5	23.2	0	30	231	$326
57.5	625	13	49.3	24.6	0	32	147	$359
52.5	540	18	59.6	29.8	0	38	127	$442
47.5	457	23	64.9	32.4	0	42	107	$485
42.5	671	28	116.4	58.2	0	75	157	$876
37.5	1,067	33	218.7	109.4	0	140	250	$1,652
32.5	685	38	162.0	81.0	0	104	161	$1,227
27.5	369	43	98.9	49.5	0	63	87	$751
22.5	321	48	96.2	48.1	0	62	75	$731
17.5	184	53	60.9	30.5	0	39	43	$464
12.5	40	58	14.5	7.3	0	9	9	$111
7.5	0	63	0.0	0.0	0	0	0	$0
2.5	0	68	0.0	0.0	0	0	0	$0
-2.5	0	73	0.0	0.0	0	0	0	$0
-7.5	0	78	0.0	0.0	0	0	0	$0
-12.5	0	83	0.0	0.0	0	0	0	$0
-17.5	0	88	0.0	0.0	0	0	0	$0
TOTALS					0	641	2,056	$7,424

If Loop is Run Year Round

Total Electric Savings	**-2,056**	**kWh**
Total Natural Gas Savings	**6,412**	**therms**
Total Natural Gas Used by Building	**37,481**	**therms**
% Saved	**17%**	

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

ECM-5 Replace the Two Sterling Heating Ventilating (HV) Units on the Roof with Heat Recovery Units- 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.		
HV with Heat Recovery Coils	2	ea	$ 25,000	$ 10,000	$ -	$ 51,350	$ 24,920	$ -	$ 76,270	Estimated based on RS Means
Controls Modifications and Additions	1	ea	$ 3,000	$ 5,000		$ 3,081	$ 6,230	$ -	$ 9,311	Estimated based on RS Means
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

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

$ 85,581	Subtotal	
$ 8,558	10%	Contingency
$ 9,414	10%	Contractor O&P
$ 15,533	15%	Engineering
$ 119,086	**Total**	

Merchantville Borough and BOE - Merchantville School
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EQUIPMENT	AREA/EQUIPMENT SERVED	COOLING CAPACITY (btu/h)
Window AC Units	Classrooms and Offices	480,000

Total btu/h of all window A/C Units: *480,000* *btu/h*

ECM-6 Install Window AC unit Controllers

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	$0.144	/ 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	480,000	Btu / Hr	Total BTU of window units
Average EER	10.0		
Existing Annual Electric Usage	46,491	kWh	

Item	Value	Units	Comments
Proposed Annual Electric Usage	22,244	kWh	Unit will cycle on w/ temp of room. Possible operating time shown below

ANNUAL SAVINGS		
Annual Electrical Usage Savings	24,248	kWh
Annual Cost Savings	$3,492	
Total Project Cost	$7,700	
Simple Payback	2	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	3	1	89%	1
92.5	33	16	79%	12
87.5	123	59	68%	40
82.5	477	227	58%	132
77.5	656	312	47%	148
72.5	742	353	37%	130
67.5	784	0	0%	0
62.5	983	0	0%	0
57.5	625	0	0%	0
52.5	540	0	0%	0
47.5	457	0	0%	0
42.5	671	0	0%	0
37.5	1,067	0	0%	0
32.5	685	0	0%	0
27.5	369	0	0%	0
22.5	321	0	0%	0
17.5	184	0	0%	0
12.5	40	0	0%	0
7.5	0	0	0%	0
2.5	0	0	0%	0
-2.5	0	0	0%	0
-7.5	0	0	0%	0
Total	8,760	**969**	48%	**463**

Merchantville Borough and BOE - Merchantville School
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ECM-6 Install Window AC unit Controllers - 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	40	EA	$ 150	$ -	$ -	6162	$ -	$ -	$ 6,162	Estimated
						$ -	$ -	$ -	$ -	

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

$	6,162	Subtotal
$	1,541	25% Contingency
$	**7,700**	**Total**

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

ECM-7 Install a Central Direct Digital Control (DDC) System to Control the Heating Systems based on the School Schedule

Description: This ECM evaluates the energy savings associated with installing a full direct digital control system that enable remote automatic control, monitoring and alarming of all HVAC equipment. The energy savings percentage is based on past performance of similar buildings which have a fully functioning DDC control system.

Building Information:

84,800	Sq Footage	$0.14	$/kWh Blended
Y	Cooling	$1.20	$/Therm
Y	Heating		

FULL DDC - TEMPERATURE SETBACK SAVINGS CALCULATION

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	70	F
Weekly Occupied Hours	60	hrs
Heating Season Setback Temp	65	F
Heating Season % Savings per Degree Setback	0.5%	
Annual Boiler Capacity	2,000	Mbtu/yr
Connected Heating Load Capacity	2,000,000	Btu/hr
Equivalent Full Load Heating Hours	900	hrs
Heating System Efficiency	78%	
Cooling		
Cooling Season Facility Temp	72	F
Weekly Occupied Hours	60	hrs
Cooling Season Setback Temp	77	F
Cooling Season % Savings per Degree Setback	0.5%	
Connected Cooling Load Capacity	40	Tons
Equivalent Full Load Cooling Hours	381	hrs
Cooling Equipment EER	10.0	
SAVINGS		
Natural Gas Savings	354	Therms
Cooling Electricity Savings	4,814	kWh

Nighttime Setback

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	70	F
Weekly Occupied Hours	60	hrs
Heating Season Setback Temp	65	F
Heating Season % Savings per Degree Setback	0.5%	
Annual Boiler Capacity	2,000	Mbtu/yr
Connected Heating Load Capacity	2,000,000	Btu/hr
Equivalent Full Load Heating Hours	900	hrs
Heating Equipment Efficiency	78%	
Cooling		
Cooling Season Facility Temp	72	F
Weekly Occupied Hours	60	hrs
Cooling Season Setback Temp	80	F
Cooling Season % Savings per Degree Setback	1%	
Connected Cooling Load Capacity	40	Tons
Equivalent Full Load Cooling Hours	381	hrs
Cooling Equipment EER	10.0	
SAVINGS		
Natural Gas Savings	354	Therms[3]
Cooling Electricity Savings	4,646	kWh

FULL DDC - ADDITIONAL CONTROLS SAVINGS CALCULATION

EXISTING CONDITIONS		
Existing Facility Total Electric usage	449,280	kWh
Existing Facility Total Gas usage	37,481	Therms
Existing Facility Cooling Electric usage	160,000.0	kWh[1]
Existing Facility Heating Natural Gas usage	35,481	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	4,800	kWh
Proposed Facility Natural Gas Savings	1,064	Therms
SAVINGS		
Electric Savings	4,800	**kWh**
Natural Gas Savings	1,064	**Therms**

Assumptions

1	36%	of facility total electricity dedicated to Cooling; based on utility information
2	95%	of facility total natural gas dedicated to Heating; based on utility information
3	3%	The building does not have a DDC system and It is estimated there would be 3% savings after upgrading the system

COMBINED SAVINGS		
Natural Gas Savings	1,772	Therms
Cooling Electricity Savings	14,260	kWh
Total Cost Savings	$ 4,187	
Estimated Total Project Cost	$ 285,881	
Simple Payback	68.3	Yrs

Merchantville Borough and BOE - Merchantville School
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Merchantville School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-7 Install a Central Direct Digital Control (DDC) System to Control the Heating Systems based on the School Schedule - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Unit Ventilator Controls	40	ea		$ 2,000		$ -	$ 99,680	$ -	$ 99,680	Estimated
Radiator Control	40	ea		$ 1,000		$ -	$ 49,840	$ -	$ 49,840	Estimated
HV Units	2	LS	$ 500	$ 4,000		$ 1,027	$ 9,968	$ -	$ 10,995	Estimated
Controller & Programming	1	LS	$ 30,000	$ 30,000		$ 30,810	$ 37,380	$ -	$ 68,190	Estimated
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 228,705	Subtotal
$ 57,176	25% Contingency
$ 285,881	**Total**

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

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

ECM-8 Replace DHW Heater with Gas Fired Condensing DHW Heater

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

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	167	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	200,000	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	79%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	158,000	MBTU/yr	
Existing Tank Size	1,000	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	Per building personnel
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	10.1	MBH	
Annual Standby Hot Water Load	88,038	MBTU/yr	
New Tank Size	100	Gallons	The tank stay
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	1.1	MBH	
Annual Standby Hot Water Load	9,198	MBTU/yr	
Total Annual Hot Water Demand	79,160	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on A.O Smith condensing DHW Heater
Proposed Fuel Use	825	Therns	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$1.20	$/Therm	
Existing Operating Cost of DHW	$2,408	$/yr	
Proposed Operating Cost of DHW	$993	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	1,175	$1,415

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

ECM-8 Replace DHW Heater with Gas Fired Condensing DHW 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 (does not include tank removal)	1	LS		$ 100		$ -	$ 125	$ -	$ 125	RS Means 2012
High Efficiency Gas-Fired DHW Heater	1	EA	$ 7,500	$ 2,000		$ 7,703	$ 2,492	$ -	$ 10,195	Estimated based on Internet Price
Miscellaneous Electrical	1	LS	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	RS Means 2012
Venting / Combustion air	1	EA	$ 500	$ 1,000		$ 514	$ 1,246	$ -	$ 1,760	RS Means 2012
Piping and Valves	1	LS	$ 500	$ 1,000		$ 514	$ 1,246	$ -	$ 1,760	Estimated

$ 14,975	Subtotal
$ 3,744	25% Contingency
$ 18,718	**Total**

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

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

ECM-9 Replace Electric Booster Heater with Gas Booster Heater in the Dishwasher

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	$ 1.20	/ Therm	
Electricity Cost	$ 0.12	$/kWh	
Demand Cost	$ 6.83	$/kWh	
FORMULA CONSTANTS			
CF	0.3		Coincidence Factor (NJ Protocols)
EFLH	100		Equivalent Full Load Hours (NJ Protocols)
PROPOSED EQUIPMENT			
Input Rating	100,000	btu/hr	
Efficiency	80%		
SAVINGS			
Electricity Savings	2,345	kWh	
Demand Savings	7	kW	
Additional Fuel Usag	(100)	Therms	
Fuel Cost Savings	$ 745		

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

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

ECM-9 Replace Electric Booster Heater with Gas Booster Heater in the Dishwasher - 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	$ 8,000	$ 2,500		$ 8,216	$ 3,115	$ -	$ 11,331	Internet price
Venting, Piping, Ect.	1	LS	$ 1,500	$ 1,000		$ 1,541	$ 1,246	$ -	$ 2,787	RS Means 2012
Electric	1	LS	$ 500	$ 1,000		$ 514	$ 1,246	$ -	$ 1,760	RS Means 2012

$ 15,877	Subtotal
$ 3,969	25% Contingency
$ 19,800	**Total**

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

Merchantville Borough and BOE - Merchantville School
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ECM: Replace urinals and flush valves with no flow

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

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$7.50	$ / kGal
Urinals in Building to be replaced	8	
Average Flushes / Urinal (per Day)	3	
Average Gallons / Flush	1.5	Gal

PROPOSED CONDITIONS		
Proposed Urinals to be Replaced	8	
Proposed Gallons / Flush	0.000	Gal
Proposed Material Cost of new urinal & valve	$1,200	RS Means 2012
Proposed Installation Cost of new urinal & valve	$1,000	RS Means 2012
Total cost of new urinals & valves		

SAVINGS		
Current Urinal Water Use	13.14	kGal / year
Proposed Urinal Water Use	0.00	kGal / year
Water Savings	13.14	kGal / year
Cost Savings	$99	/ year

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

Merchantville Borough and BOE - Merchantville School
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Merchantville School

ECM: Replace toilets and flush valves with low flow

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

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$7.50	$ / kGal
Toilets in Building	12	
Average Flushes / Toilet (per Day)	2	
Average Gallons / Flush	3.5	Gal

PROPOSED CONDITIONS		
Proposed Toilets to be Replaced	12	
Proposed Gallons / Flush	1.28	Gal

SAVINGS		
Current Toilet Water Use	30.66	kGal / year
Proposed Toilet Water Use	11.21	kGal / year
Water Savings	19.45	kGal / year
Cost Savings	$146	/ year

Merchantville Borough and BOE - Merchantville School
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ECM: Replace faucets with low flow

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

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$7.50	$ / kGal
Faucets in Building	12	
Average Uses / Faucet (per day)	3	# Uses
Average Time of Use	10.0	seconds
Average Flowrate	2.0	gpm

PROPOSED CONDITIONS		
Proposed Faucets to be Replaced	12	
Proposed Flowrate	0.5	gpm

HEATING SAVINGS		
Fuel Cost	$ 1.20	/kWh
Number of Faucets	12	
Hours per Day of Usage	0.5	hrs
Days per Year of Facility Usage	230	days
Average Flowrate	2.0	gpm
Proposed Flowrate	0.5	gpm
Heat Content of Water	8.33	Btu/gal/F
Temperature Difference (Intake and Output)	35	F
Water Heating Equipment Efficiency	80%	
Conversion Factor	100,000	Btu/Therm
SAVINGS		
Current Faucet Water Use	2.76	kGal / year
Proposed Faucet Water Use	0.69	kGal / year
Water Savings	2.07	kGal / year
Heating Savings	453	Therms
Cost Savings	$560	/ year

Savings calculation formulas are taken from NJ Protocols document for Faucet

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

Merchantville Borough and BOE - Merchantville School
CHA Project Numer: 29141
Merchantville School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Replace Plumbing Fixtures with Low-Flow Equivalents - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
									$ -	
Low-Flow Urinal	8	EA	$ 500	$ 500	$ -	$ 4,108	$ 4,984	$ -	$ 9,092	Vendor Estimate
Low-Flow Toilet	12	EA	$ 800	$ 500	$ -	$ 9,859	$ 7,476	$ -	$ 17,335	Vendor Estimate
Low-Flow faucet	12	EA	$ 100	$ 300	$ -	$ 1,232	$ 4,486	$ -	$ 5,718	Vendor Estimate
						$ -	$ -	$ -	$ -	

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

$ 32,145	Subtotal
$ 8,036	25% Contingency
$ 40,182	**Total**

Merchantville Borough and BOE - Merchantville School
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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)	84,800
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)	$64,702	$45,128
Existing Usage (from utility)	449,280	37,481
Proposed Savings	171,223	4,133
Existing Total MMBtus	5,281	
Proposed Savings MMBtus	998	
% Energy Reduction	**18.9%**	
Proposed Annual Savings	$31,072	

	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	$1.09
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.09

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,000
Incentive #2	$18,740	$4,523	$23,264
Incentive #3	$18,740	$4,523	$23,264
Total All Incentives	**$37,481**	**$9,047**	**$51,528**

Total Project Cost	$377,081

		Allowable Incentive
% Incentives #1 of Utility Cost*	4.6%	$5,000
% Incentives #2 of Project Cost**	6.2%	$23,264
% Incentives #3 of Project Cost**	6.2%	$23,264
Total Eligible Incentives***	**$51,528**	
Project Cost w/ Incentives	$325,553	

Project Payback (years)	
w/o Incentives	w/ Incentives
12.1	10.5

* 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 Merchantville School

CHA Project No.29141

ECM-11 Lighting Replacements with 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 daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
15LED	Mechanical Room	14	S 32 C F 2 (ELE)	F42LL	60	0.8	SW	6000	5,040	14	4 ft LED Tube	200732x2	30	0.4	NONE	6,000	2,520	2,520	0.4	$ 344.38	$ 3,271.80	$ -	9.5	9.5
32LED	Kitchen	8	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	2000	960	8	4 ft LED Tube	200732x2	30	0.2	OCC	1,600	384	576	0.2	$ 90.52	$ 1,997.85	$ 20	22.1	21.9
20LED	Kitchen	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	SW	2000	62	1	4 ft LED Tube	200732x1	15	0.0	OCC	1,600	24	38	0.0	$ 5.99	$ 273.45	$ 20	45.7	42.3
20LED	Dishwasher	2	S 28 P F 1 (ELE)	F41ILL	31	0.1	SW	2000	124	2	4 ft LED Tube	200732x1	15	0.0	OCC	1,600	48	76	0.0	$ 11.97	$ 418.65	$ 20	35.0	33.3
35LED	Hallway	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	6000	1,080	2	T 59 R LED	RTLED38	38	0.1	NONE	6,000	456	624	0.1	$ 85.28	$ 472.50	$ -	5.5	5.5
32LED	Hallway	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6000	360	1	4 ft LED Tube	200732x2	30	0.0	NONE	6,000	180	180	0.0	$ 24.60	$ 233.70	$ -	9.5	9.5
20LED	Café	54	S 28 P F 1 (ELE)	F41ILL	31	1.7	SW	2000	3,348	54	4 ft LED Tube	200732x1	15	0.8	OCC	1,800	1,458	1,890	0.9	$ 303.28	$ 7,969.05	$ 20	26.3	26.2
146LED	Gymnasium	24	High Bay MH 400	MH400/1	458	11.0	SW	2000	21,984	24	BAYLED78W	BAYLED78W	93	2.2	OCC	1,800	4,018	17,966	8.8	$ 2,927.84	$ 20,388.94	$ 20	7.0	7.0
5LED	Boys Locker Room	6	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.4	SW	2000	720	6	2T XX R LED	2RTLED	25	0.2	OCC	1,400	210	510	0.2	$ 79.94	$ 1,343.25	$ 20	16.8	16.6
71	Boys Locker Room	1	I 60	I60/1	60	0.1	SW	2000	120	1	CF 26	CFQ26/1-L	27	0.0	OCC	1,400	38	82	0.0	$ 12.82	$ 135.00	$ 20	10.5	9.0
5LED	Girls Locker Room	10	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.6	SW	2000	1,200	10	2T XX R LED	2RTLED	25	0.3	OCC	1,400	350	850	0.4	$ 133.24	$ 2,153.25	$ 20	16.2	16.0
20LED	Girls Locker Room	1	S 28 P F 1 (ELE)	F41ILL	31	0.0	SW	2000	62	1	4 ft LED Tube	200732x1	15	0.0	OCC	1,400	21	41	0.0	$ 6.35	$ 273.45	$ 20	43.0	39.9
20LED	Library	54	S 28 P F 1 (ELE)	F41ILL	31	1.7	SW	2500	4,185	54	4 ft LED Tube	200732x1	15	0.8	OCC	2,500	2,025	2,160	0.9	$ 336.49	$ 7,969.05	$ 20	23.7	23.6
32LED	Library	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2500	600	4	4 ft LED Tube	200732x2	30	0.1	OCC	2,500	300	300	0.1	$ 46.74	$ 1,063.05	$ 20	22.7	22.3
196LED	Room 1	15	W 32 C F 4 (ELE)	F44ILL	112	1.7	SW	2500	4,200	15	T 74 R LED	RTLED50	50	0.8	OCC	2,250	1,688	2,513	0.9	$ 385.26	$ 3,672.00	$ 20	9.5	9.5
32LED	Room 2	9	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	2500	1,350	9	4 ft LED Tube	200732x2	30	0.3	OCC	2,250	608	743	0.3	$ 113.46	$ 2,231.55	$ 20	19.7	19.5
32LED	Room 3	9	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	2500	1,350	9	4 ft LED Tube	200732x2	30	0.3	OCC	2,250	608	743	0.3	$ 113.46	$ 2,231.55	$ 20	19.7	19.5
32LED	Room 4	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2250	405	3	4 ft LED Tube	200732x2	30	0.1	OCC	1,800	162	243	0.1	$ 37.27	$ 829.35	$ 20	22.3	21.7
196LED	Room 7	2	W 32 C F 4 (ELE)	F44ILL	112	0.2	SW	2250	504	2	T 74 R LED	RTLED50	50	0.1	OCC	1,800	180	324	0.1	$ 50.02	$ 600.75	$ 20	12.0	11.6
196LED	Room 8	2	W 32 C F 4 (ELE)	F44ILL	112	0.2	SW	2250	504	2	T 74 R LED	RTLED50	50	0.1	OCC	1,800	180	324	0.1	$ 50.02	$ 600.75	$ 20	12.0	11.6
32LED	Room 9	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2250	135	1	4 ft LED Tube	200732x2	30	0.0	OCC	1,800	54	81	0.0	$ 12.42	$ 361.95	$ 20	29.1	27.5
32LED	Room 10	18	1T 32 R F 2 (ELE)	F42LL	60	1.1	SW	2500	2,700	18	4 ft LED Tube	200732x2	30	0.5	OCC	2,250	1,215	1,485	0.5	$ 226.91	$ 4,334.85	$ 20	19.1	19.0
196LED	Room 14	4	W 32 C F 4 (ELE)	F44ILL	112	0.4	SW	2500	1,120	4	T 74 R LED	RTLED50	50	0.2	OCC	2,250	450	670	0.2	$ 102.74	$ 1,073.25	$ 20	10.4	10.3
196LED	Room 14 Next	4	W 32 C F 4 (ELE)	F44ILL	112	0.4	SW	2500	1,120	4	T 74 R LED	RTLED50	50	0.2	OCC	2,250	450	670	0.2	$ 102.74	$ 1,073.25	$ 20	10.4	10.3
196LED	Room 15	6	W 32 C F 4 (ELE)	F44ILL	112	0.7	SW	2500	1,680	6	T 74 R LED	RTLED50	50	0.3	OCC	2,250	675	1,005	0.4	$ 154.10	$ 1,545.75	$ 20	10.0	9.9
196LED	Room 15 Next	4	W 32 C F 4 (ELE)	F44ILL	112	0.4	SW	2500	1,120	4	T 74 R LED	RTLED50	50	0.2	OCC	2,250	450	670	0.2	$ 102.74	$ 1,073.25	$ 20	10.4	10.3
35LED	100	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	OCC	2,250	513	837	0.3	$ 128.52	$ 1,545.75	$ 20	12.0	11.9
35LED	101	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	102	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	103	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
32LED	Hallway	7	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	6000	2,520	7	4 ft LED Tube	200732x2	30	0.2	NONE	6,000	1,260	1,260	0.2	$ 172.19	$ 1,635.90	$ -	9.5	9.5
5LED	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2000	240	2	2T XX R LED	2RTLED	25	0.1	OCC	1,400	70	170	0.1	$ 26.65	$ 533.25	$ 20	20.0	19.3
32LED	Stair	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	6000	1,080	3	4 ft LED Tube	200732x2	30	0.1	NONE	6,000	540	540	0.1	$ 73.80	$ 701.10	$ -	9.5	9.5
20LED	Auditorium Lobby	4	S 28 P F 1 (ELE)	F41ILL	31	0.1	SW	6000	744	4	4 ft LED Tube	200732x1	15	0.1	NONE	6,000	360	384	0.1	$ 52.48	$ 580.80	$ -	11.1	11.1
196LED	Auditorium Lobby	2	W 32 C F 4 (ELE)	F44ILL	112	0.2	SW	6000	1,344	2	T 74 R LED	RTLED50	50	0.1	NONE	6,000	600	744	0.1	$ 101.68	$ 472.50	$ -	4.6	4.6
146LED	Auditorium	6	High Bay MH 400	MH400/1	458	2.7	SW	2000	5,496	6	BAYLED78W	BAYLED78W	93	0.6	OCC	1,800	1,004	4,492	2.2	$ 731.96	$ 5,193.42	$ 20	7.1	7.1
32LED	Hallway	5	1T 32 R F 2 (ELE)	F42LL	60	0.3	SW	6000	1,800	5	4 ft LED Tube	200732x2	30	0.2	NONE	6,000	900	900	0.2	$ 122.99	$ 1,168.50	$ -	9.5	9.5
196LED	Stair	2	W 32 C F 4 (ELE)	F44ILL	112	0.2	SW	6000	1,344	2	T 74 R LED	RTLED50	50	0.1	NONE	6,000	600	744	0.1	$ 101.68	$ 472.50	$ -	4.6	4.6
35LED	Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2250	405	2	T 59 R LED	RTLED38	38	0.1	OCC	1,800	137	268	0.1	$ 41.51	$ 600.75	$ 20	14.5	14.0
35LED	Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2250	405	2	T 59 R LED	RTLED38	38	0.1	OCC	1,800	137	268	0.1	$ 41.51	$ 600.75	$ 20	14.5	14.0
35LED	Office	4	T 32 R F 3 (ELE)	F43ILL/2	90	0.4	SW	2250	810	4	T 59 R LED	RTLED38	38	0.2	OCC	1,800	274	536	0.2	$ 83.02	$ 1,073.25	$ 20	12.9	12.7
35LED	Office	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2250	608	3	T 59 R LED	RTLED38	38	0.1	OCC	1,800	205	402	0.2	$ 62.27	$ 837.00	$ 20	13.4	13.1
35LED	Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2250	405	2	T 59 R LED	RTLED38	38	0.1	OCC	1,800	137	268	0.1	$ 41.51	$ 600.75	$ 20	14.5	14.0
35LED	106	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	OCC	2,250	684	1,116	0.4	$ 171.36	$ 2,018.25	$ 20	11.8	11.7
35LED	107	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2500	2,700	12	T 59 R LED	RTLED38	38	0.5	OCC	2,250	1,026	1,674	0.6	$ 257.05	$ 2,963.25	$ 20	11.5	11.5
35LED	108	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2500	2,700	12	T 59 R LED	RTLED38	38	0.5	OCC	2,250	1,026	1,674	0.6	$ 257.05	$ 2,963.25	$ 20	11.5	11.5
35LED	109	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2500	675	3	T 59 R LED	RTLED38	38	0.1	OCC	2,250	257	419	0.2	$ 64.26	$ 837.00	$ 20	13.0	12.7
32LED	Hallway	22	1T 32 R F 2 (ELE)	F42LL	60	1.3	SW	6000	7,920	22	4 ft LED Tube	200732x2	30	0.7	NONE	6,000	3,960	3,960	0.7	$ 541.17	$ 5,141.40	$ -	9.5	9.5
196LED	111	12	W 32 C F 4 (ELE)	F44ILL	112	1.3	SW	2500	3,360	12	T 74 R LED	RTLED50	50	0.6	OCC	2,250	1,350	2,010	0.7	$ 308.21	$ 2,963.25	$ 20	9.6	9.5
196LED	112	12	W 32 C F 4 (ELE)	F44ILL	112	1.3	SW	2500	3,360	12	T 74 R LED	RTLED50	50	0.6	OCC	2,250	1,350	2,010	0.7	$ 308.21	$ 2,963.25	$ 20	9.6	9.5
35LED	114	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2500	2,700	12	T 59 R LED	RTLED38	38	0.5	OCC	2,250	1,026	1,674	0.6	$ 257.05	$ 2,963.25	$ 20	11.5	11.5
35LED	115	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	2500	2,250	10	T 59 R LED	RTLED38	38	0.4	OCC	2,250	855	1,395	0.5	$ 214.20	$ 2,490.75	$ 20	11.6	11.5
35LED	116	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	2500	2,250	10	T 59 R LED	RTLED38	38	0.4	OCC	2,250	855	1,395	0.5	$ 214.20	$ 2,490.75	$ 20	11.6	11.5
35LED	117	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	118	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	119	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
32LED	117	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	118	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
32LED	6	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	6000	2,160	6	4 ft LED Tube	200732x2	30	0.2	NONE	6,000	1,080	1,080	0.2	$ 147.59	$ 1,402.20	$ -	9.5	9.5
196LED	Nurse Office	5	W 32 C F 4 (ELE)	F44ILL	112	0.6	SW	2250	1,260	5	T 74 R LED	RTLED50	50	0.3	OCC	1,800	450	810	0.3	$ 125.04	$ 1,309.50	$ 20	10.5	10.3
35LED	200	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	201	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	202	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	203	11	T 32 R F 3 (ELE)	F43ILL/2	90	1.0	SW	2500	2,475	11	T 59 R LED	RTLED38	38	0.4	OCC	2,250	941	1,535	0.6	$ 235.62	$ 2,727.00	$ 20	11.6	11.5
35LED	204	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2500	2,700	12	T 59 R LED	RTLED38	38	0.5	OCC	2,250	1,026	1,674	0.6	$ 257.05	$ 2,963.25	$ 20	11.5	11.5
32LED	Hallway	13	1T 32 R F 2 (ELE)	F42LL	60	0.8	SW	6000	4,680	13	4 ft LED Tube	200732x2	30	0.4	NONE	6,000	2,340	2,340	0.4	$ 319.78	$ 3,038.10	$ -	9.5	9.5
5LED	Men's Room	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2000	240	2	2T XX R LED	2RTLED	25	0.1	OCC	1,400	70	170	0.1	$ 26.65	$ 533.25	$ 20	20.0	19.3
35LED	206	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	207	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	2500	2,250	10	T 59 R LED	RTLED38	38	0.4	OCC	2,250	855	1,395	0.5	$ 214.20	$ 2,490.75	$ 20	11.6	11.5
35LED	208	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	OCC	2,250	684	1,116	0.4	$ 171.36	$ 2,018.25	$ 20	11.8	11.7
35LED	210	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2500	2,700	12	T 59 R LED	RTLED38	38	0.5	OCC	2,250	1,026	1,674	0.6	$ 257.05	$ 2,963.25	$ 20	11.5	11.5
35LED	211	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.6	SW	2500	1,575	7	T 59 R LED	RTLED38	38	0.3	OCC	2,250	599	977	0.4	$ 149.94	$ 1,782.00	$ 20	11.9	11.8
35LED	212	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2500	2,700	12	T 59 R LED	RTLED38	38	0.5	OCC	2,250	1,026	1,674	0.6	$ 257.05	$ 2,963.25	$ 20	11.5	11.5
35LED	213	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	OCC	2,250	770	1,256	0.5	$ 192.78	$ 2,254.50	$ 20	11.7	11.6
35LED	214	12	T 32 R F 3 (ELE)	F43ILL/2	90	1.1	SW	2500	2,700	12	T 59 R LED	RTLED38	38	0.5	OCC	2,250	1,026	1,674	0.6	$ 257.05	$ 2,963.25	$ 20	11.5	11.5
35LED	215	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	OCC	2,250	684	1,116	0.4	$ 171.36	$ 2,018.25	$ 20	11.8	11.7
35LED	216	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	OCC	2,250	684	1,116	0.4	$ 171.36	$ 2,018.25	$ 20	11.8	11.7
5LED	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2000	240	2	2T XX R LED	2RTLED	25	0.1	OCC	1,400	70	170	0.1	$ 26.65	$ 533.25	$ 20	20.0	19.3
32LED	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	OCC	1,400	84	156	0.1	$ 24.11	$ 595.65	$ 20	24.7	23.9
5LED	Restroom	2	2T 32 R F 2 (u) (ELE)	FU2LL	60	0.1	SW	2000	240	2	2T XX R LED	2RTLED	25	0.1	OCC	1,400	70	170	0.1	$ 26.65	$ 533.25	$ 20	20.0	19.3
32LED	Restroom	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	OCC	1,400	84	156	0.1	$ 24.11	$ 595.65	$ 20	24.7	23.9
32LED	Hallway	9	1T 32 R F 2 (ELE)	F42LL	60	0.5	SW	6000	3,240	9	4 ft LED Tube	200732x2	30	0.3	NONE	6,000	1,620	1,620	0.3	$ 221.39	$ 2,103.30	$ -	9.5	9.5
32LED	Stair	3	1T 32 R F 2 (ELE)	F42LL	60	0.2	SW	6000	1,080	3	4 ft LED Tube	200732x2	30	0.1	NONE	6,000	540	540	0.1	$ 73.80	$ 701.10	$ -	9.5	9.5
															#REF!	#REF!								#VALUE!
S	**Total**	**0**				**60.8**			**162,694**	**667**				**23.7**				**61,298**	**37.1**	**15,513**	**172,454**	**$1,340**		
S																		**Demand Savings**		**37.1**	**$3,042**			
S																		**kWh Savings**		**101,396**	**$12,472**			

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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HURRICANE SANDY

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NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

FOOD SERVICE EQUIPMENT

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PAY FOR PERFORMANCE

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LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

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OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

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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

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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 progra 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

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DIRECT INSTALL

PARTICIPATION STEPS

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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)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

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ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

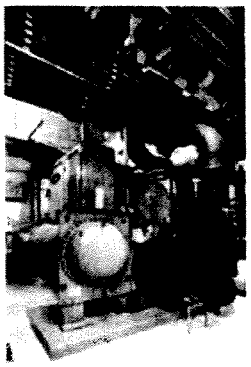
ENERGY BENCHMARKING

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

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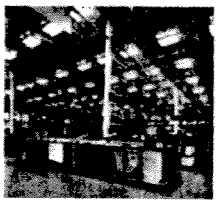
Pay for Performance incentives are awarded upon the satisfactory completion of three p milestones:

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 New Jersey Board of Public Utilities

PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2014 – June 30, 2015

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 for all accounts, organized in chronological order and separated by account. Utilize Utility Tool for applications with multiple accounts to organize data.
6. Provide brief description of facility, noting any special or unusual circumstances and/or site conditions.
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

*Incentives/Requirements subject to change.

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

ADMINISTRATOR – New Jersey Board of Public Utilities (NJBPU)

APPLICATION PROCESS – The Program pays incentives in phases upon satisfactory completion of each of three Program milestones - approval of a complete Energy Reduction Plan, installation of all recommended measures per the Energy Reduction Plan, completion of Post-Construction Benchmarking Report (for incentive amounts, please refer to Incentive Amounts). In order to be eligible for Program Incentives,a Participating Customer or an agent authorized by a Customer, must submit to the Market Manager a properly completed application package – application form, Participating Customer's company W-9, twelve consecutive months of the project's utility bills and executed Participation Agreement. All components of the application package must be filled out completely, truthfully and accurately. This application package must be received on or before June 30, 2015 in order to be eligible for the Fiscal Year 2015 Incentives. The Market Manager will review the application package to determine if the project is eligible for a Program Incentive. When approved, the Participating Customer will receive an approval letter from their Case Manager with the estimated authorized first incentive amount and the date by which the Energy Reduction Plan must be submitted. Upon receipt of the approval letter, the Participating Customer and Partner may proceed with work on the Energy Reduction Plan. The Market Manager or agent thereof reserves the right to conduct a pre-inspection of the facility prior to the installation of equipment. This will be done prior to the issuance of the Energy Reduction Plan approval letter. Approval of this Application is not an approval of the project's scope of work. Scope of work is only approved upon approval of the Energy Reduction Plan. See application and program guidelines for more information.

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

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

Equipment procured by participating Customer through another program offered by the New Jersey Utilities, as applicable, is not eligible for incentives through this Program. Customers who, from July 1, 2013 – June 30, 2014, have not contributed to the Societal benefits Charge of the applicable New Jersey Utility may not be eligible for incentives offered through this program.

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

ENERGY-EFFICIENT MEASURES – Any device eligible to receive a Program Incentive payment through the New Jersey's Clean Energy Commercial and Industrial Program. The total package of measures as presented in the Energy Reduction Plan must have at least a 10% internal rate of return (IRR).

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

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

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

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

INCENTIVE CAP – Program Incentives #2 and #3 will be capped not to exceed 50% of the total actual project cost. Incentive #1 will be capped not to exceed 50% of the project's annual energy cost. The Market Manager reserves the right to limit the amount of the Program Incentives (Incentive #1, #2 and #3) to $1M per gas and electric account (limited to $2M per project) in a program year. Campus style facilities, which are mastered-metered, are subject to the annual incentive cap of $1 million per gas and electric account. The Participating Customer will also be subject to an annual Entity Cap of $4M (Definition of an Entity can be found in the Board Order Docket No. EO07030203).

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

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

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

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

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

completely, truthfully and accurately. Upon review of the submittal package (by the Market Manager or agent thereof), the remaining 50% of the total performance-based incentive (Incentives #2 & #3) will be released to the Participating Customer. If the Post-Construction Benchmarking Report indicates that the project did not meet the minimum performance target, the post-installation completion period may be extended to up to twenty-four months subsequent to the Incentive Payment #2 package submission date. Upon approval of the submittal package, the Customer will receive an Incentive #3 Submittal approval letter indicating successful completion of the program.

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

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

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

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

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

PERFORMANCE TARGET – A minimum of a 15% annual source energy savings performance target must be achieved in order to participate. The performance target is based on reducing the total energy consumption for the facility. No more than 50% of the total source energy savings may be derived from lighting measures. The total energy savings may not come from a single measure. A 4% performance target may be offered to customers whose annual energy consumption is heavily weighted to manufacturing and process loads. This approach will be reviewed on a case-by-case basis and must be pre-approved by the Market Manager. In order to be considered, the project must involve: A manufacturing facility, including such industries as plastics and packaging, chemicals, petrochemicals, metals, paper and pulp, transportation, biotechnology, pharmaceutical, food and beverage, mining and mineral processing, general manufacturing, equipment manufacturers and data centers; and manufacturing and/or process-related loads, including data center consumption, consume 50% or more of total facility energy consumption. No more than 50% of the total source energy savings may be derived from non-investor owned utilities or fuels.

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

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

PRE-INSTALLED MEASURES - An Energy Reduction Plan must be approved by the program and an approval letter sent to the customer in order for incentives to be committed. Upon receipt of an Energy Reduction Plan, all project facilities must be preinspected. Measures installed prior to pre-inspection of the facility shall not be included as part of the ERP scope of work and will not be eligible for incentives. Measure installation undertaken prior to ERP approval, but after pre-inspection, is done at the customer's own risk. In the event that an Energy Reduction Plan is rejected by the program, the customer will not receive any incentives.

PRODUCT INSTALLATION OR EQUIPMENT INSTALLATION – Installation of the Energy-Efficient Measures.

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

PROGRAM – New Jersey's Clean Energy Pay for Performance Program offered herein by the New Jersey Board of Public Utilities pursuant to state regulatory approval under the New Jersey Electric Discount and Energy Competition Act, NJSA 48:3-49, et seq.

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

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

PROGRAM OFFER – The Program covers products purchased and/or services rendered on or after July 1, 2014. Program Incentives are available to non-residential retail electric and/or gas service customers of the New Jersey Utilities.

PROJECT – A commercial, industrial or multifamily existing building with peak demand in excess of 100 kW in any of the most recent preceding twelve months of electric usage. Multifamily building(s) must be four (4) stories or greater or three (3) stories and under having central heating, cooling, or metering serving more than one building. The 100 kW requirement is waived for the following customer classes: hospitals, non-profits (as defined by section 501(c)(3) of the Internal Revenue Code), public colleges and universities, local government entities, including K-12 schools, and affordable multifamily customers (defined as low income, subsidized, HUD, etc.)

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

TAX LIABILITY – The Market Manager will not be responsible for any tax liability that may be imposed on any Participating Customer as a result of the payment of Program Incentives. All Participating Customers must supply their federal tax identification number or social security number on the application form in addition to providing a copy of their W-9 form as part of the application package in order to receive a Program Incentive.

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

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

ACKNOWLEDGEMENT – I have read, understood and am in compliance with all rules and regulations concerning this incentive program. I certify that all information provided is correct to the best of my knowledge, and I give the Market Manager permission to share my records with the New Jersey Board of Public Utilities, and contractors it selects to manage, coordinate or evaluate the Pay For Performance Program, including the release of electric and natural gas utility billing information, as well as make available to the public non-sensitive information. I allow reasonable access to my property to inspect the installation and performance of the technologies and installations that are eligible for incentives under the guidelines of New Jersey's Clean Energy Program. This arrangement supersedes all other communications and representations.

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

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

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

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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 F

Photos

ECM-1 Add Insulation to the Flat Roof

Existing Roof

ECM-2 Install a High Efficiency Condensing HHW Boiler As the Main Boiler

Existing Boilers

ECM-3 Install Variable Frequency Drive (VFD) on the HHW Pump Motor

ECM-4 Blank off the Existing Unused Floor Mounted Unit Vents' (UV) Louvers and Install Heat Recovery Units for Classroom Ventilation

ECM-5 Replace the Two Sterling Heating Ventilating (HV) Units on the Roof with Heat Recovery Units

ECM-6 Install Window AC Unit Controllers

Existing Window ACs

ECM-7 Install a Central Direct Digital Control (DDC) System to Control the Heating Systems based on the School Schedule

ECM-8 Replace Domestic Hot Water Heaters with Condensing DHW Heater

Existing Heater

ECM-9 Replace Electric Booster Heater with Gas Booster Heater in the Dishwasher

ECM-10 Replace High Flow Plumbing Fixtures with Low Flow Fixtures

ECM-11 Lighting Replacements with Controls (Occupancy Sensors)

APPENDIX G

EPA Benchmarking Report

ENERGY STAR® Statement of Energy Performance

72

ENERGY STAR® Score[1]

Merchantville School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 84,800
Built: 1880

For Year Ending: January 31, 2014
Date Generated: November 10, 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
Merchantville School 130 South Centre Street Merchantville, New Jersey 08109	_____ , (____)____-_____	____ _____ , (____)____-_____ _____

Property ID: 4218254

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
62.3 kBtu/ft²

Source EUI
103.2 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	3,748,140 (71%)
Electric - Grid (kBtu)	1,532,943 (29%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	77.6
National Median Source EUI (kBtu/ft²)	128.6
% Diff from National Median Source EUI	-20%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	404

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)