THE NEWARK PUBLIC SCHOOLS

Group 3 Buildings

HAWKINS STREET SCHOOL

43 Hawkins St., Newark, NJ 07106

LOCAL GOVERNMENT ENERGY AUDIT PROGRAM

FOR

NEW JERSEY
BOARD OF PUBLIC UTILITIES

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CHA PROJECT NO. 27999

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

Building Name	Address	Square Feet	Construction Date
Hawkins Street School	43 Hawkins St., Newark, NJ 07106	69,161	1887,1904, 1922, 1950

The 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)	Oil Savings (gal)	Total Savings* ($)	Payback (years)
Hawkins Street School	70,562	4,426	0	15,203	10.3

*As of the summer of 2013, the school has been converted from oil to natural gas. The cost savings from switching to natural gas has been included as an ECM for informational purpose only and therefore is not included in the summary above. That being said; the cost savings may be available to fund future projects if has not yet been allocated elsewhere. The cost savings amounts to approximately $52,000.

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

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

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

Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
1	Install Blown-In Insulation in Attic Space	13,650	482	28.3	0	28.3	Y
2A* **	Heating Fuel Conversion (Fuel Switch)	48,557	52,311	0.9	0	0.9	N/A
2B	Convert Steam System to Hot Water	2,947,555	104,539	28.2	12,000	28.1	N
3	Install De-Stratification Fans	11,400	441	25.8	0	25.8	Y
4	Install Window A/C Controller	1,000	1,131	0.9	0	0.9	Y
5A	Install Basic Controls	21,309	3,596	5.9	0	5.9	Y
5B**	Install DDC Controls	311,117	12,677	24.5	0	24.5	N
6	Domestic Hot Water System Improvements	20,177	393	51.4	50	51.2	Y
7	Upgrade Plumbing Fixtures	195,380	1,131	172.8	0	172.8	N
L1**	Lighting Replacements / Upgrades	78,922	8,298	9.5	0	9.5	N
L2**	Install Lighting Controls (Occupancy Sensors)	9,450	1,833	5.2	1,225	4.5	N
L3	Lighting Replacements with Controls	88,372	9,159	9.6	1,225	9.5	Y
	Total**	**3,298,843**	**120,873**	**27.3**	**13,275**	**27.2**	
	Total (Recommended)	**155,908**	**15,203**	**10.3**	**1,275**	**10.2**	

* Incentive shown is per the New Jersey SmartStart Program.
** These ECMs are not included in the Total, as they are alternate measures not recommended.
*** This measure is shown for informational purpose only; the savings do not appear in the 'Total' nor does it appear in the 'Total Recommended'

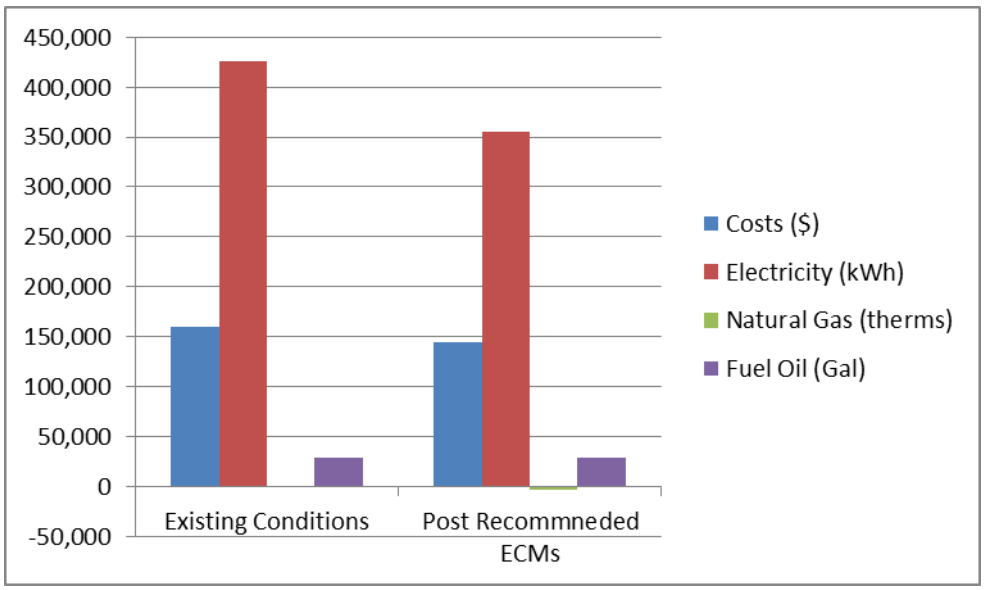
The following alternative energy measures are also recommended for further study:

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

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

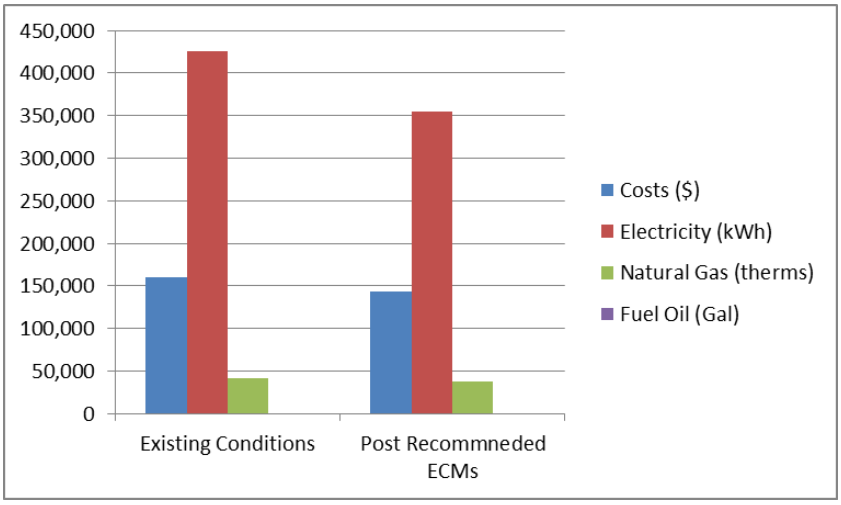
	Existing Conditions*	Post Recommended ECMs	Percent Savings
Costs ($)	159,954	144,751	10%
Electricity (kWh)	426,000	355,438	17%
Natural Gas (therms)	1,129	-3,297	-192%
Fuel Oil (Gal)	29,217	29,217	0%
Site EUI (kbtu/SF/Yr)	81.8	71.9	

*The existing conditions listed above display the utility data which was received by CHA. The information supplied for natural gas did not reflect the fuel switch from oil to natural gas which is the percent savings for natural gas is negative.



The following table shows a “what-if” scenario with extrapolated utility information and including the fuel switch from oil to natural gas. This table is included in an attempt to predict the realistic percent savings and site EUI.

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	159,954	143,935	10%
Electricity (kWh)	426,000	355,438	17%
Natural Gas (therms)	42,033	37,607	11%
Fuel Oil (Gal)	0	0	0%
Site EUI (kbtu/SF/Yr)	81.8	71.9	



2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

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

Building Name: Hawkins Street School (Index 75)
Address: 43 Hawkins Street, Newark NJ 07106
Gross Floor Area: 69,161 Square Feet
Number of Floors: 3
Year Built: 1887
Additions: 1904, 1922, 1950

Description of Spaces: Classrooms, offices, cafeteria, auditorium, gymnasium, media center (library), storage rooms, toilet rooms and mechanical room.
Description of Occupancy: The school serves 610 students from Pre-K to 8th grade. There are 40 school faculty and staff members.
Number of Computers: The school has approximately 75 desktop and laptop computers.
Building Usage: Hours of operation are 7:00 AM – 3:30 PM Monday through Friday, with various after-school activities. The building has no weekend use. In general the building is considered occupied 70 hours per week, 10 months per year.
Construction Materials: Generally, all construction vintages consist of a framing system (possibly wood in the original building) terracotta tile with either solid brick or terracotta and plaster interior walls. It is presumed that there is no insulation in the exterior walls.
Façade: Brick and limestone
Roof: The 1800s vintage building has a pitched roof (wood framed) with asphalt shingles that appear to be fairly new. The 1900s vintage construction has a flat roof that was not accessible

during the field visit. Facility personnel indicated that there was no insulation in the attic of the pitched roof.
Windows: Windows throughout the building are double paned, double hung aluminum framed windows. There are roller shades in all rooms that are adjustable by occupants.
Exterior Doors: The doors are newer FRP doors with steel frames. The door sweeps and seals are in good condition.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: The heating system consists of two (2) natural gas fired HB Smith 28A series steam boilers with Power Flame burners capable of 3,663 MBH on high fire and 900 MBH on low fire. The boilers were installed in the summer of 2013 and have a nameplate efficiency rating of 82.9%. Steam pressure at the time of our site visit was constant at 3 PSIG. As the utility data which was received reflects the older oil fired boilers which were replaced in the summer of 2013; a calculation has been performed to show the savings of a fuel switch from No. 2 oil to natural gas. Heating in corridors, auditorium and gymnasium is provided by wall mounted radiators; while the cafeteria uses recessed steam radiators. Heating in classrooms is provided by unit ventilators (UV) with steam coils. Visible steam traps in the building appeared to be new.

Condensate in the building is pumped by one (1) 1.5 HP motor into a 200 gallon boiler feed water / condensate recovery tank which is then pumped by one of two fractional horsepower motors to the boilers. There is a rather large steam trap on the main condensate return line to ensure that all steam has been separated from the condensate in the event any failed steam traps exist elsewhere in the building.

Although the steam boilers are brand new, steam heating itself, is fairly inefficient compared to that of hot water heating when using high efficiency condensing hot water boilers. A calculation for converting the steam system to hot water and installing high efficiency condensing hot water boilers has been evaluated.

Cooling: Only 20% of the building is cooled by window air conditioning units including room 107, the library, the main office, teachers' lounge, computer room and room 313. The remainder of the school is not cooled. The window A/Cs are not programmable and run the risk of operating when no occupants are present.

Ventilation: Ventilation in this school consists of UVs in classrooms which bring in a very small amount of ventilation air and provide steam heating. Classrooms were once gravity ventilated, but the dampers are no longer connected and remain closed for fire protection purposes. The gymnasium and auditorium used to be mechanically ventilated but the systems are no longer functioning. Most of the ventilation within the school is done so by opening or closing windows.

Exhaust: Mechanical exhaust systems are in place to exhaust air from toilet rooms through the school and in the kitchen to vent cooking fumes. Toilet room exhaust fans are fractional horsepower and operate 24/7. The kitchen exhaust fan horsepower is unknown and is manually turned on/off by kitchen staff.

Controls Systems

The boilers are operated manually when the outdoor temperature is 28 F or less and automatically for temperatures above this. The boiler controller was disabled based on past problems heating the building when the outdoor temperature was excessively cold outside;

therefore the district finds it safer to manually control boiler operation when the temperature is predicted to be lower than 28F outside. Teachers regulate the temperature of the building during the day by opening windows in classrooms, offices and corridors. Observed temperatures were 80-85 F with outdoor air temperatures of 35F. If controls were present in the building, the school would benefit from a reduction in energy consumption associated with heating the building as well as increased occupant comfort.

Domestic Hot Water Systems

Domestic hot water (DHW) is generated by two (2) Bradford White D80T1803N water heaters with an 80 gallon capacity, natural gas input of 180,000 btu/h and recovery rate of 174.5 gal/h each. Both DHW heaters were installed in 2013. The DHW heaters share a common piping system and serve toiler rooms throughout the building as well as sinks in the kitchen. One way to save energy in the DHW system would be to replace the existing DHW heater with one of smaller storage capacity, but higher recovery rate. Modern high efficiency condensing domestic hot water heaters provide near instantaneous DHW generation with the least amount of fuel consumption.

Kitchen Equipment

The kitchen in this building is used for warming only. Kitchen equipment includes natural gas fired kettle, range and steamer as well as an electric convection oven. The kitchen hood is approximately 6' x 8' in dimension. There are no walk-in coolers or freezers, instead all perishable food items are kept in side by side reach in freezers and coolers. There is no dishwasher and therefore no dishwasher booster heater in the kitchen.

Plumbing Systems

There are several gang toilet rooms on each floor that include urinals, water closets and lavatories. All flush valves and fixtures are high flow 3.5 gallons per flush (or more). Lavatory faucets are metered type. Drinking fountains are disconnected and bottled water is provided for drinking. An ECM is included to evaluate the water savings potential of installing low- flow water closet and urinals.

Plug Load

This school has computers, copiers, smart boards, residential appliances (microwave, refrigerator), printers and portable electric heaters (personal) which contribute to the plug load in the building. There are no ECMs associated with reducing the plug load in this building.

Lighting Systems

The lighting consisted mostly of 4' 2-lamp 32W T8 fluorescent fixtures with either wraparound prismatic or parabolic lenses. The auditorium has 20 100W CFL fixtures manually controlled by one switch in the room. The gymnasium has 12 flush mounted 2'x4' box fixtures with six (6) T5 lamps per fixture. There are a few 60W incandescent lamps scattered throughout the building in low use areas. Interior lighting is controlled manually by wall mounted switches.

Exterior lighting is only present on sides of the school which do not face the public street. There appeared to be ten (10) 250W metal halide spot lights and one (1) 1000W wall pack in use. Exterior lights are controlled by timers located inside the school.

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

3.0 UTILITIES

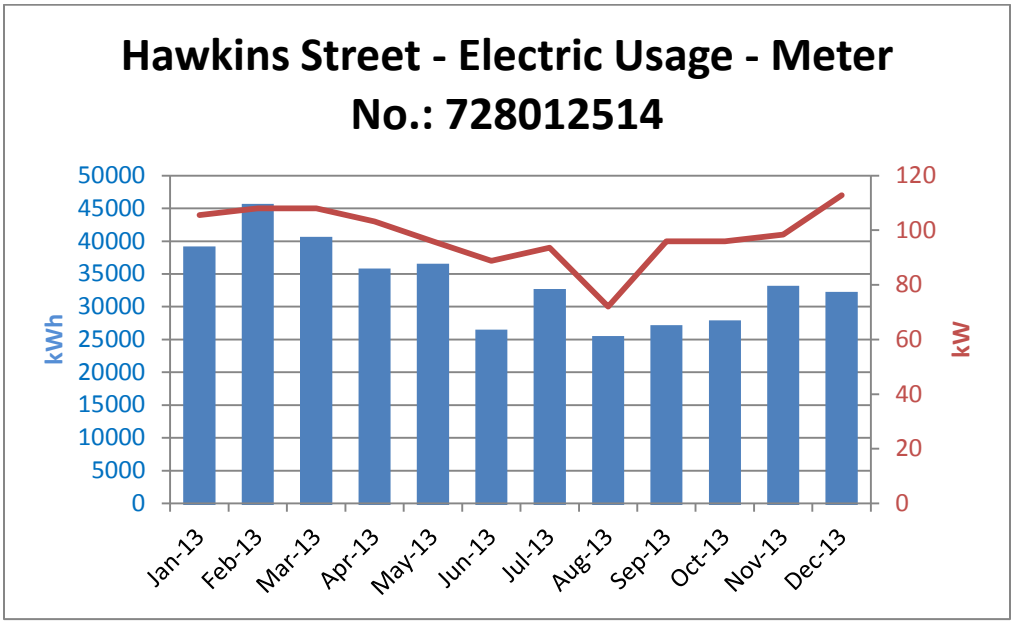
Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas	Fuel Oil
Deliverer	PSEG	PSEG	Varies
Supplier	PSEG	PSEG	Varies

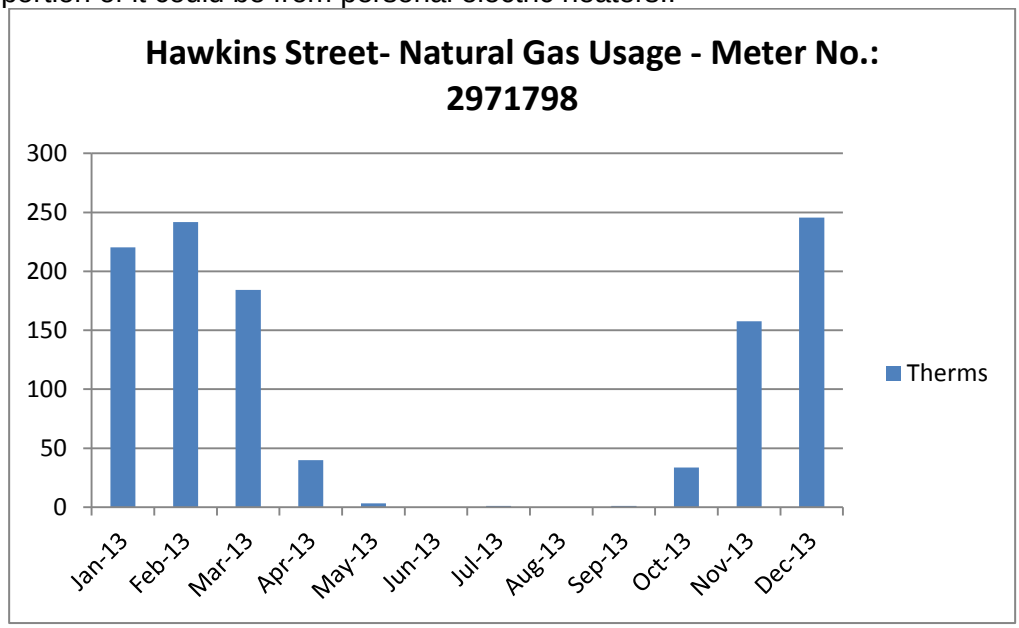
For the 12-month period ending in December 2013, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	426,000	kWh
Annual Cost	61,358	$
Blended Unit Rate	0.14	$/kWh
Supply Rate	0.13	$/kWh
Demand Rate	3.93	$/kW
Peak Demand	113	kW
Natural Gas		
Annual Consumption	1,129	Therms
Annual Cost	1,257	$
Unit Rate	1.11	$/therm
Fuel Oil		
Annual Consumption	29,217	Gal
Annual Cost	97,339	$
Unit Rate	3.33	$/gal

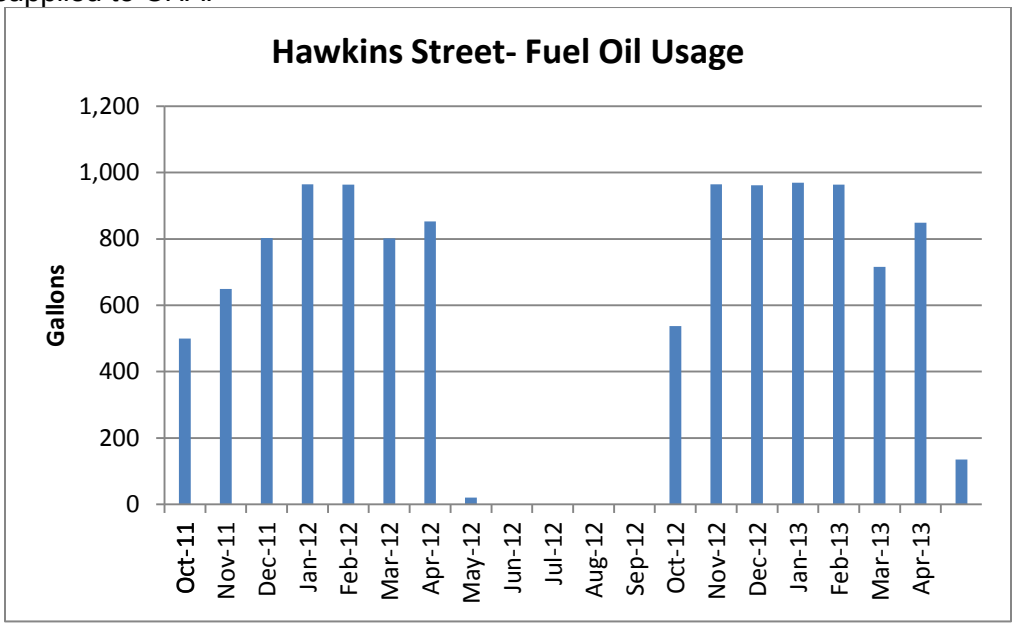
Blended Rate: Average rate charged determined by the annual cost / annual usage
Supply Rate: Actual rate charged for electricity usage in kWh (based on most recent electric bill)
Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)



The school is out of session during the summer months and therefore it can be seen that the electricity usage is reduced during those months. The electric remains fairly constant during the remaining months, with some increased using during winter. It is not known exactly what causes the increased electrical usage in February, however a portion of it could be from personal electric heaters..



Natural gas in 2013 was consumed strictly by the domestic hot water heater with some kitchen usage. The NG usage according to the graph above depicts pretty typical DHW generation and kitchen usage; the consumption remains fairly constant all year and is not used as much in the summer months. Natural gas consumed by the boilers is not included in this usage profile and may exist on a separate meter which was not supplied to CHA.



The graph above depicts the schedule of fuel oil purchasing for the utility data received. It can be seen that fuel oil was used for space heating and purchased between the months of October – May.

In addition, domestic water and sewer services are provided by City of Newark Division of Water at $7.55/1000 gal.

See Appendix A for a utility analysis.

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

Comparison of Utility Rates to NJ State Average Rates*				Recommended to Shop for Third Party Supplier?
Utility	Units	School Average Rate	NJ Average Rate	
Electricity	$/kWh	$0.13	$0.12	Y
Natural Gas	$/Therm	$1.11	$0.95	Y
Fuel Oil	$/Gal	$3.33	$3.62	N/A

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

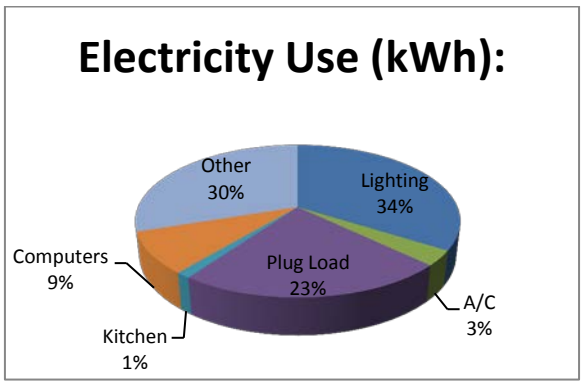
Additional information on selecting a third party energy supplier is available here:

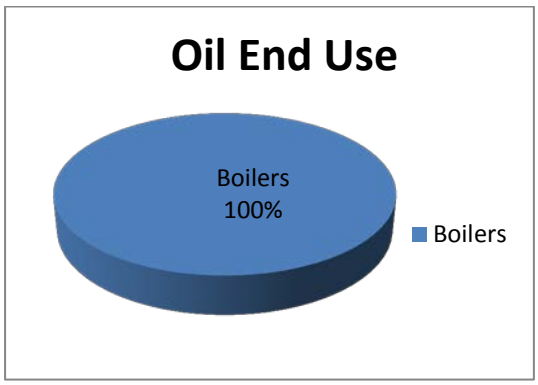
http://www.state.nj.us/bpu/commercial/shopping.html.

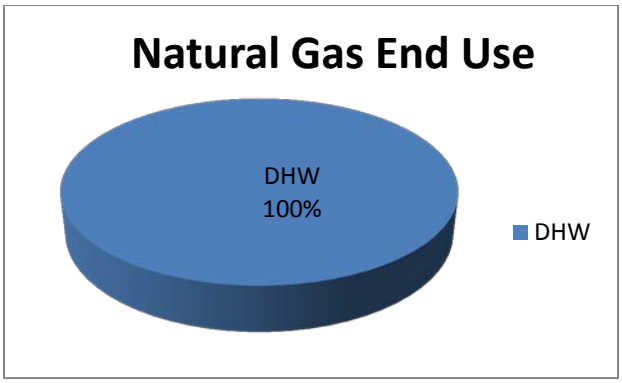
See Appendix A for a list of third-party energy suppliers licensed by the Board of Public Utilities to sell within the building's service area.

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 (Pre-Fuel Conversion)

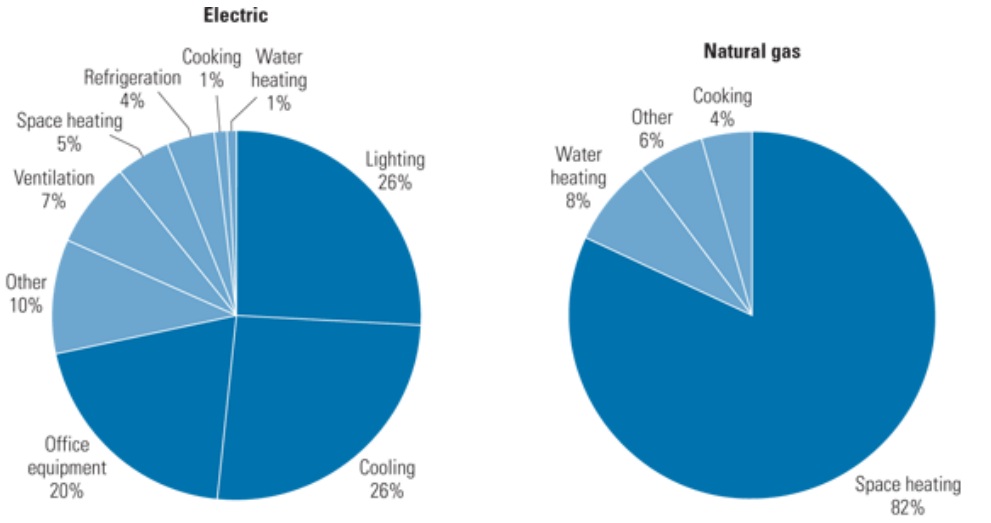






Most of the electricity consumed by educational facilities is used to for lighting and plug loads such as computers and copiers; the oil is used for space heating and the natural gas is used for DHW. Each school's energy profile is different, and the following charts represent typical utility profiles 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

TRC has previously benchmarked this building, the results of which have been provided to NPS. The results are summarized below. Copies of the benchmarking report are available in Appendix G.

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/ft^2/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.

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.

Site EUI kBtu/ft^2/yr	Energy Star Rating (1-100)
81.8*	36**

* Calculated by CHA using Utility Data provided by NPS
** Provided by TRC

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

5.0 ENERGY CONSERVATION MEASURES

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

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

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

Energy savings were quantified in the form of:

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

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

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

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

5.1 ECM-1 Install Blown-In Insulation in Attic Space

Presently there is no insulation within attic of the building which allows for a larger heat loss throughout the building than if insulation were present. The addition of insulation throughout the building attic will reduce heating and cooling costs by allowing building to maintain the internal temperature for longer.

The savings for this ECM is calculated by estimating the internal heat load of the building using 12-months of utility data and establishing a typical R-value of an existing attic; this is compared to a new R-value for the proposed scenario. The difference in R-values results in a difference of energy lost through the walls and ceiling. The difference multiplied by the annual hours is the energy savings.

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

ECM-1 Install Blown-In Insulation in Attic Space

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
13,650	0	0	435	482	0.6	0	28.3	28.3

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

This measure is recommended.

5.2.1 ECM-2A Heating Fuel Conversion (Fuel Switch)

This measure has been included for informational purpose only; as the school has already implemented this by installing steam boilers with natural gas fired burners; natural gas fired DHW heaters and natural gas fired back-up generator.

The previous boilers were steam and had high-low-high No. 2 fuel oil burners with estimated combustion efficiencies in the 78-80% range. Modulating natural gas burners are available that should increase the combustion efficiency to as high as 85%. For the purpose of this calculation, 85% efficiency is used. Although No. 2 fuel oil has a higher BTU content it is also significantly more expensive than natural gas on a per-btu basis. This ECM assesses the replacement of the existing No. 2 oil burners with new modulating natural gas fired burners.

ECM-2A Heating Fuel Conversion (Fuel Switch)

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Fuel Oil	Total				
$	kW	kWh	Therms	Gal	$		$	Years	Years
48,557	0	0	(40,524)	29,217	52,311	(42.7)	0	0.9	0.9

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

This measure has already been implemented by the client as of the summer of 2013. The actual cost to implement this measure may differ from the actual cost incurred by the school; however the savings from this measure can be used to fund future project if they have not yet been allocated elsewhere.

5.2.2 ECM-2B Convert Steam System to Hot Water

This ECM evaluates the conversion of the existing natural gas fired steam boilers to high efficiency condensing hot water boilers which will also enable additional savings through hot water temperature reset based on outdoor air temperature.

Steam heating systems are inherently inefficient and high maintenance as compared to re-circulated hot water heating systems or other modern heating systems. As steam systems age, the steam traps fail which then requires more untreated cold make-up water. This in turn requires more chemical treatment and increases the risk of boiler thermal shock. Steam piping becomes fouled with scale and corrosion over time resulting in poor heat transfer an ultimately pipe failure. Steam heating systems use boilers that only operate up to 84% combustion efficiency and have even lower thermal efficiency. Multiple condensate pumps and boiler feed water pumps consume electricity that would not be needed in other modern heating systems. The steam heating system for this school is nearly 100 years old and although maintained operational, replacement should be considered as part of any future major construction projects.

In lieu of replacing the boilers in kind, this ECM evaluates replacing the steam system in its entirety with a more efficient hot water system. New modulating condensing gas boilers are available that minimally operate at 88%, and can operate as high as 96%. To implement this ECM, the old steam boilers, distribution piping, venting and terminal units would be removed and the new hot water boilers, distribution piping and primary pumps put in their place. Significant piping and wiring modifications would be needed. New dedicated boiler venting would also need to be installed either through the roof or sidewall. Asbestos abatement may need to be performed prior to any work and the cost for this is not included in the payback analysis.

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

ECM-2B Convert Steam System to Hot Water

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Fuel Oil	Total				
$	kW	kWh	Therms	Gal	$		$	Years	Years
2,947,555	0	0	6,528	29,217	104,539	(0.8)	12,000	28.2	28.1

* 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 capital cost.

5.3 ECM-3 Install De-Stratification Fans

Implementation of this ECM will entail the installation of appropriately sized de-stratification fans at the ceiling of auditorium. In general spaces which have a high ceiling and no mechanical recirculation of air experience stratification; i.e. the ceiling is hotter than the floor. Installation of ceiling fans will decrease air stratification and improve occupant comfort while reducing a small amount of energy consumption to heat or cool the space. These fans can be installed partially recessed through an existing tile or drop ceiling; or they can be installed exposed attached to the ceiling.

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

ECM-3 Install De-Stratification Fans

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
11,400	0	0	398	441	0.7	0	25.8	25.8

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

This measure is recommended.

5.4 ECM-4 Install Window A/C Controller

Roughly 20% of the building is cooled by window air conditioners which are not programmable and are sometimes left on when the building is un-occupied.

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

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

ECM-4 Install Window A/C Controller

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
1,000	0	7,854	0	1,131	16.0	0	0.9	0.9

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

This measure is recommended.

5.5.1 ECM-5A Install Basic Controls

The building uses steam boilers that are currently controlled manually by the building operators. Steam pressure is maintained most of the day with no regard to space temperature. Classrooms are overheated as a result and the teachers open the windows in an attempt to cool the rooms down. No night temperature set-back is implemented, unless the operator remembers to turn the boilers off before their shift ends. This highly inefficient method of operation consumes excessive fuel (natural gas).

A Basic Control (system will provide automatic control of the boiler(s) to produce only enough steam (or hot water) needed to heat the building, based on a single or multiple averaging space thermostats and outdoor air temperatures. This system will not provide for independent room temperature control, but could be expanded in the future to provide this function, if desired using thermostatic radiator control valves. This system could also provide basic boiler and space temperature monitoring, trending and remote notification of boiler failure.

ECM-5A Install Basic Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
21,309	0	0	3,240	3,596	9.1	0	5.9	5.9

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

This measure is recommended.

5.5.2 ECM-5B Install DDC Controls

A Full Direct Digital Control (DDC) building automation system consists of automatic control of individual space heating and ventilation equipment, and provides monitoring, trending and alarms which notify an operator when a piece of equipment fails or operates outside a given set-point. This system allows for the implementation of energy efficient strategies, such as: time of day (TOD) optimization, set point optimization, staggered start, night setback, economizer (free cooling), demand control ventilation, exhaust fan TOD optimization, and holiday TOD optimization. It also allows for remote access and control of the building's systems.

Energy savings are seen from temperature reduction during the day and night as well as other controls sequences mentioned above.

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

ECM-5B Install DDC Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
311,117	0	0	11,421	12,677	1.4	0	24.5	24.5

* 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. If full DDC controls are to be pursued than ECM-2B may also be considered as there are a larger amount of controls which can be implemented with a hydronic heating system.

5.6 ECM-6 Domestic Hot Water System Improvements

The existing domestic hot water heating system consists of two (2) Bradford White D80T1803N water heaters with an 80 gallon capacity each. The amount of stored water is oversized for this type of school which only uses hot water at hand sinks.

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

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

ECM-6 Domestic Hot Water System Improvements

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
20,177	0	0	354	393	(0.1)	50	51.4	51.2

* 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 Low Flow Plumbing Fixtures

This ECM evaluates replacing the existing high flow urinals and toilets with low flow equivalents. The faucets in this school are high flow but have metering-type controls

which only allow water flow for a few seconds; therefore are not recommended for replacement.

The water savings associated from replacing existing high flow fixtures with low-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the estimate usage of each fixture, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 Gals/flush toilets, 1.0 gal/flush urinals, and 0.5 gpm faucets will conserve water which will result in lower annual water and sewer charges. Facets 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-7 Install Low Flow Plumbing Fixtures

Budgetary Cost	Annual Utility Savings					ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Water	Total				
$	kW	kWh	Therms	kGal	$		$	Years	Years
195,380	0	0	0	150	1,131	(0.8)	0	172.8	172.8

* 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 extremely long payback period.

5.8.1 ECM-L1 Lighting Replacement / Upgrades

The existing lighting system consists of mostly T8 linear fluorescent fixtures which until recently represented the most efficient lighting technology available. Exterior lighting includes 1000W wall mounted area light fixtures. Recent technological improvements in light emitting diode (LED) technologies have driven down the initial costs making it a viable option for installation.

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

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

ECM-L1 Lighting Replacement / Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
78,922	18.4	56,134	0	8,298	0.1	0	9.5	9.5

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

This measure is not recommended in lieu of ECM L3.

5.8.2 ECM-L2 Install Lighting Controls (Occupancy Sensors)

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

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in Section 5.8.1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

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

ECM-L2 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
9,450	0	13,994	0	1,833	1.1	1,225	5.2	4.5

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

This measure is not recommended in lieu of ECM L3.

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

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

ECM-L3 Lighting Replacements with Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
88,372	18.4	62,708	0	9,159	0.1	1,225	9.6	9.5

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

This measure is recommended.

5.9 Additional O&M Opportunities

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

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

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

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

6.1.1 New Jersey Smart Start Program

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

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

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

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

6.1.2 Direct Install Program

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

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

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

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

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

Refer to Appendix D for more information on this program.

6.1.3 New Jersey Pay For Performance Program (P4P)

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

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

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

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

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

Electric

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

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

For the purpose of demonstrating the eligibility of the ECM's to meet the minimum savings requirement of 15% annual savings and 10% IRR 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 D, along with more detailed program information.

6.1.4 Energy Savings Improvement Plan

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

ESIP allows local units to use "energy savings obligations" (ESO) to pay for the capital costs of energy improvements to their facilities. ESIP loans have a maximum loan term of 15 year. ESOs are not considered "new general obligation debt" of a local unit and do not count against debt limits or require voter approval. They may be issued as refunding

bonds or leases. Savings generated from the installation of energy conservation measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

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

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

6.1.5 Renewable Energy Incentive Program

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

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

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

7.0 ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

The building was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The amount of available roof area determines how large of a solar array can be installed on any given roof. The table below summarizes the approximate roof area available on the building and the associated solar array size that can be installed.

Available Roof Area (Ft^2)	Potential PV Array Size (kW)
3,857	30

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

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey Solar Renewable Energy Certificates Program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. Payments that will be received by the PV producer (school) will change from year to year dependent upon supply and demand. There is no definitive way to calculate an exact price that will be received by the PV producer for SREC credits over the next 15 years. Renewable Energy Consultants estimates an average of $155/SREC for 2014 and this number was utilized in the cash flow for this report.

The system costs for PV installations were derived from recent solar contractor budgetary pricing in the state of New Jersey and include the total cost of the system installation (PV panels, inverters, wiring, ballast, controls). The cost of installation is currently about $4.00 per watt or $4,000 per kW of installed system, for a typical system. There are other considerations that have not been included in this pricing, such as the condition of the roof and need for structural reinforcement. Photovoltaic systems can be ground mounted if the roof is not suitable, however, this installation requires a substantial amount of open property (not wooded) and underground wiring, which adds more cost. PV panels have an approximate 20 year life span; however, the inverter device that converts DC electricity to AC has a life span of 10 to 12 years and will most likely need to be replaced during the useful life of the PV system.

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

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

Budgetary Cost	Annual Utility Savings			Total Savings	New Jersey Renewable SREC	Payback (without SREC)	Payback (with SREC)	Recommended
	Electricity		Natural Gas					
$	kW	kWh	Therms	$	$	Years	Years	Y/N
120,000	30.0	37,469	0	5,246	5,808	22.9	10.9	FS

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

7.1.2 Solar Thermal Hot Water Generation

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

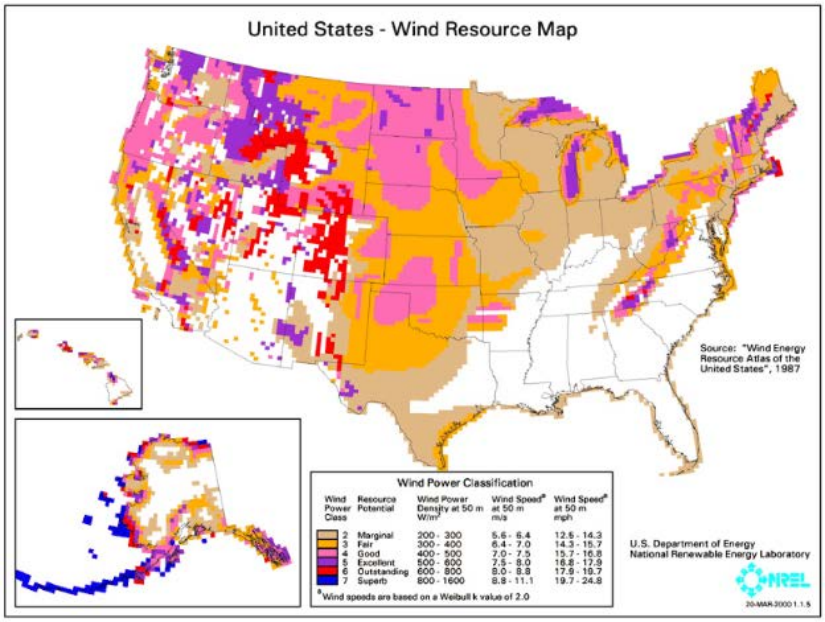
A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually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

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

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

7.2 Wind Powered Turbines

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



This measure is not recommended because the location does not have good wind resource and is located in an urban environment.

7.3 Combined Heat and Power Plant

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

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

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

7.4 Demand Response Curtailment

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

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

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

Building Electric Load Profile

Peak Demand kW	Min Demand kW	Avg Demand kW	Onsite Generation Y/N	Eligible? Y/N
113	72	98	Y	Y

This measure is not recommended because the building does not have enough onsite generation to cover the entire electrical load of the building.

8.0 CONCLUSIONS & RECOMMENDATIONS

The LGEA energy audit conducted by CHA for the building identified potential annual savings of $15,203/yr with an overall payback of 10.3 years, if the recommended ECMs are implemented.

The potential annual energy, cost savings and payback are shown in the following table.

Electric Savings (kWh)	Natural Gas Savings (therms)	Fuel Oil Savings (Gal)	Total Savings ($)	Payback (years)
70,562	4,426	0	15,203	10.3

The following projects should be considered for implementation:

- Add Blown-in Insulation in Attic Space
- Install De-Stratification Fans
- Window A/C Controllers
- Basic Controls
- Domestic Hot Water System Improvements
- Lighting Replacements with Controls (Occupancy Sensors)

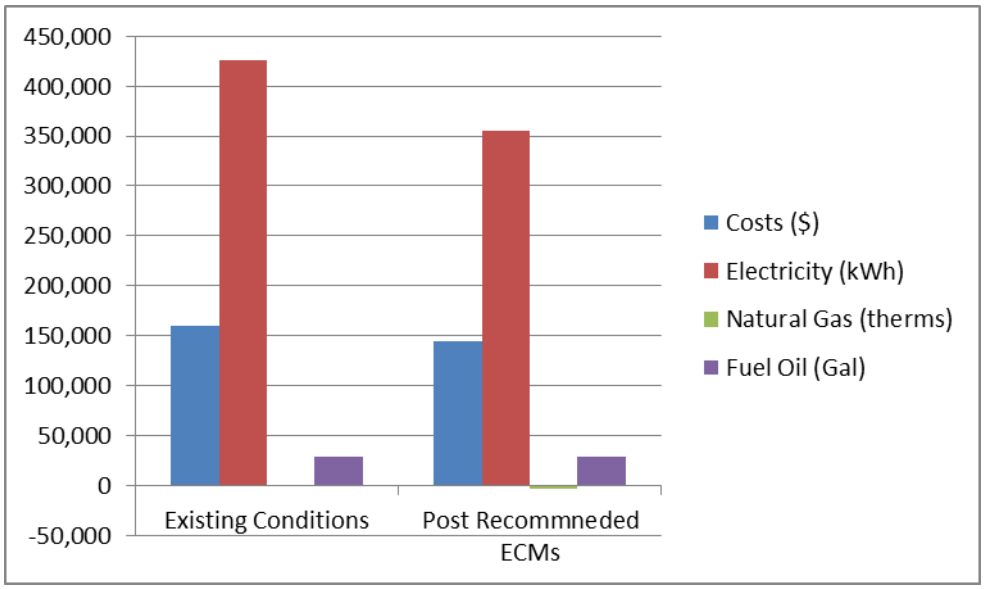
The following alternative energy measures are recommended for further study:

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

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

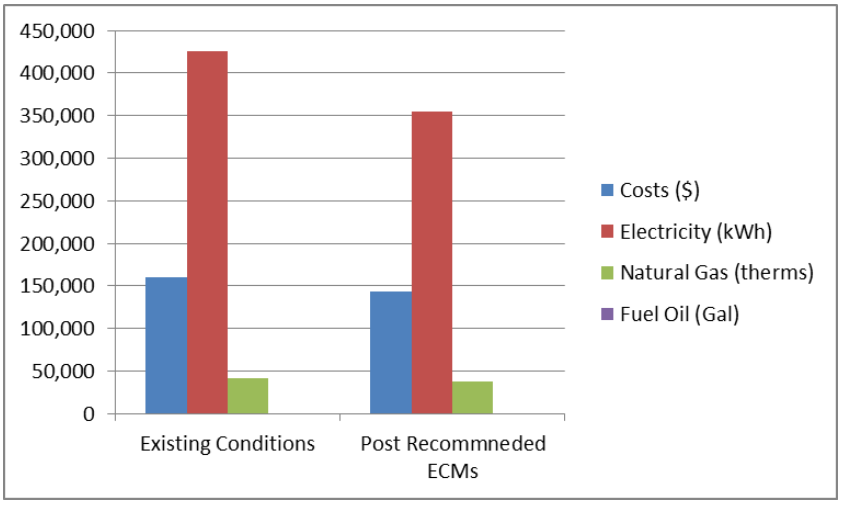
	Existing Conditions*	Post Recommended ECMs	Percent Savings
Costs ($)	159,954	144,751	10%
Electricity (kWh)	426,000	355,438	17%
Natural Gas (therms)	1,129	-3,297	-192%
Fuel Oil (Gal)	29,217	29,217	0%
Site EUI (kbtu/SF/Yr)	81.8	71.9	

*The existing conditions listed above display the utility data which was received by CHA. The information supplied for natural gas did not reflect the fuel switch from oil to natural gas which is the percent savings for natural gas is negative.


450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
-50,000
Existing Conditions
Post Recommneded ECMs
Costs ($)
Electricity (kWh)
Natural Gas (therms)
Fuel Oil (Gal)

The following table shows a “what-if” scenario with extrapolated utility information and including the fuel switch from oil to natural gas. This table is included in an attempt to predict the realistic percent savings and site EUI.

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	159,954	143,935	10%
Electricity (kWh)	426,000	355,438	17%
Natural Gas (therms)	42,033	37,607	11%
Fuel Oil (Gal)	0	0	0%
Site EUI (kbtu/SF/Yr)	81.8	71.9	



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

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Newark Public Schools LGEA
CHA Project# 27999

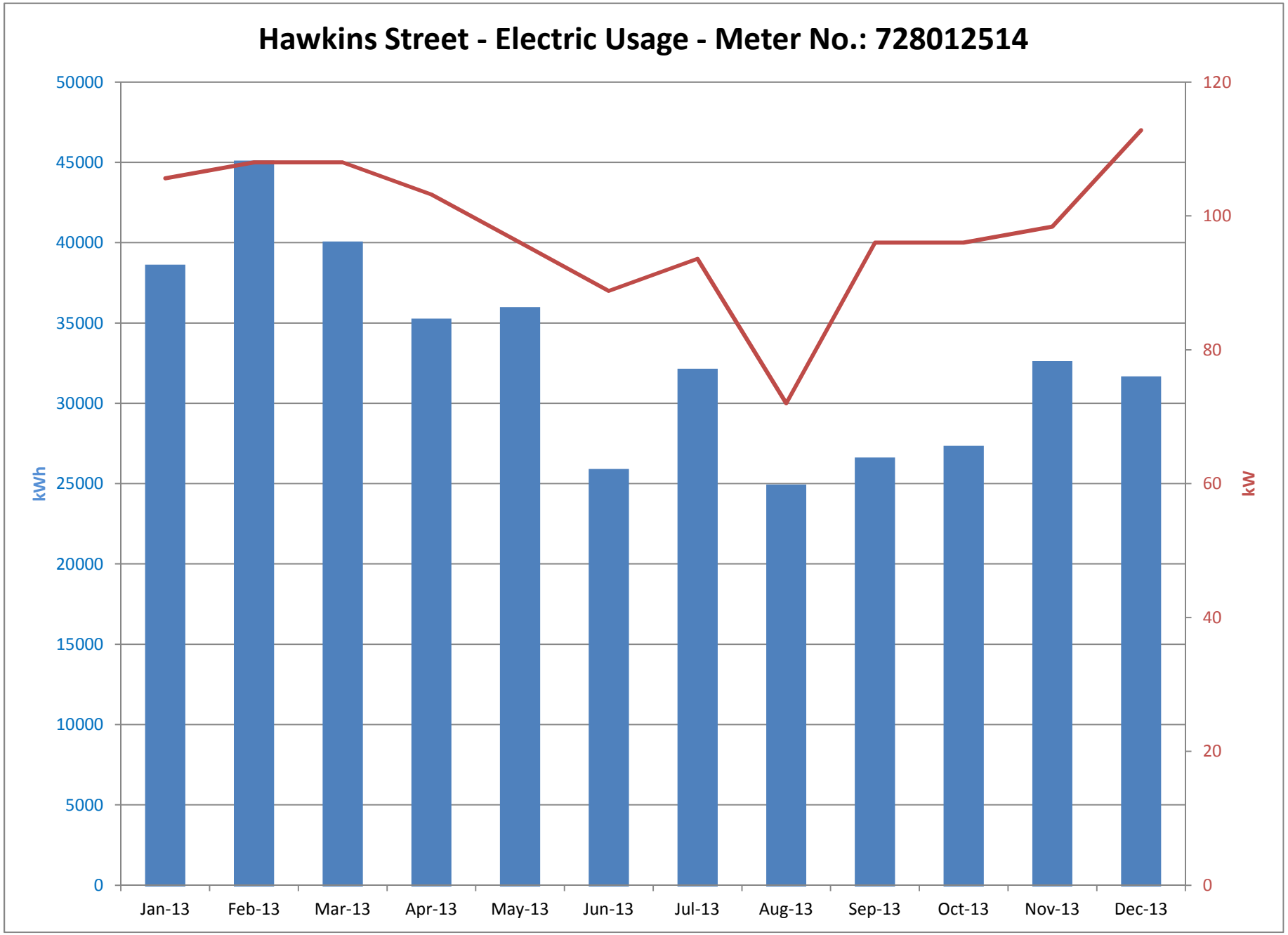
Hawkins Street - Electric Usage

Start Date	End Date	kWh	Demand Usage (KW)	Total Charge	Supply Charge	Delivery Charge	Demand Charge	Consumption ($)	Blended Rate ($/kWh)	Consumption Rate ($/kWh)	Demand Rate ($/kW)
12/3/2011	1/4/2012	36000	98.4	6,265.00	0	1,146.07	416.87	5,848.13	0.17	0.16	4.24
1/5/2012	2/2/2012	34080	103.2	5,930.00	0	1,097.05	437.21	5492.79	0.17	0.16	4.24
2/3/2012	3/5/2012	37680	117.6	6,555.00	0	1,212.48	498.22	6056.78	0.17	0.16	4.24
3/6/2012	4/2/2012	27600	117.6	4,805.00	0	889.3	498.21	4306.79	0.17	0.16	4.24
4/3/2012	5/3/2012	28080	84	4,885.00	0	904.68	355.87	4529.13	0.17	0.16	4.24
5/4/2012	6/4/2012	28800	88.8	5,010.00	0	1,811.82	376.21	4633.79	0.17	0.16	4.24
6/5/2012	7/3/2012	25680	88.8	4,491.78	2,387.01	1,728.57	376.2	4115.58	0.17	0.16	4.24
7/4/2012	8/2/2012	20160	40.8	3,346.01	2,040.42	1,132.74	172.85	3173.16	0.17	0.16	4.24
8/3/2012	8/30/2012	18960	50.4	3,275.16	1,900.40	1,161.24	213.52	3061.64	0.17	0.16	4.24
8/31/2012	12/3/2012	93600	105.6	12,624.44	8,229.27	3,144.56	1,250.61	11373.83	0.13	0.12	11.84
12/4/2012	1/3/2013	34560	112.8	4,599.06	2,964.06	1,156.64	478.36	4120.7	0.13	0.12	4.24
1/4/2013	2/1/2013	38400	105.6	5,010.98	3,252.20	1,306.76	452.02	4558.96	0.13	0.12	4.28
2/2/2013	3/5/2013	44880	108	5,682.03	3,778.37	1,441.37	462.29	5219.74	0.13	0.12	4.28
3/6/2013	4/4/2013	39840	108	5,178.22	3,435.94	1,279.99	462.29	4715.93	0.13	0.12	4.28
4/5/2013	5/3/2013	35040	103.2	4,724.48	3,156.44	1,126.29	441.75	4282.73	0.13	0.12	4.28
5/4/2013	6/4/2013	35760	96	5,828.21	3,262.98	2,154.30	410.93	5417.28	0.16	0.15	4.28
6/5/2013	7/3/2013	25680	88.8	4,647.31	2,516.11	1,751.09	380.11	4267.2	0.18	0.17	4.28
7/4/2013	8/2/2013	31920	93.6	5,372.14	2,929.22	2,042.27	400.65	4971.49	0.17	0.16	4.28
8/3/2013	9/4/2013	24720	72	4,119.11	2,232.22	1,578.69	308.2	3810.91	0.17	0.15	4.28
9/5/2013	10/2/2013	26400	96	3,697.79	2,383.92	902.94	410.93	3286.86	0.14	0.12	4.28
10/3/2013	10/31/2013	27120	96	3,789.91	2,448.94	930.04	410.93	3378.98	0.14	0.12	4.28
11/1/2013	12/3/2013	32400	98.4	4,457.19	2,925.72	1,110.27	421.2	4035.99	0.14	0.12	4.28
12/4/2013	1/3/2014	31440	112.8	4,393.89	2,839.03	1,072.02	482.84	3911.05	0.14	0.12	4.28

Hawkins Street	Start Date	End Date	Months
8 Hawkins St., 07105	12/3/2011	1/3/2014	25
Account Number 2147483647			
Meter Number 728012514			

ELECTRIC USAGE - MOST RECENT 12 MONTHS, PERIOD ENDING: 1/3/2014

Total Usage	393,600	**kwh**
Total Charges	$56,901	
Blended Rate	$0.14	**$/kWh**
Consumption Rat	$0.12	**$/kWh**
Demand Rate	$3.90	**$/kW**
Max Demand	113	**kW**
Min Demand	72	**kW**
Avg Demand	98	**kW**


Hawkins Street - Electric Usage - Meter No.: 728012514
kWh
kW
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
120
100
80
60
40
20
0
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13

Newark Public Schools LGEA
CHA Project# 27999

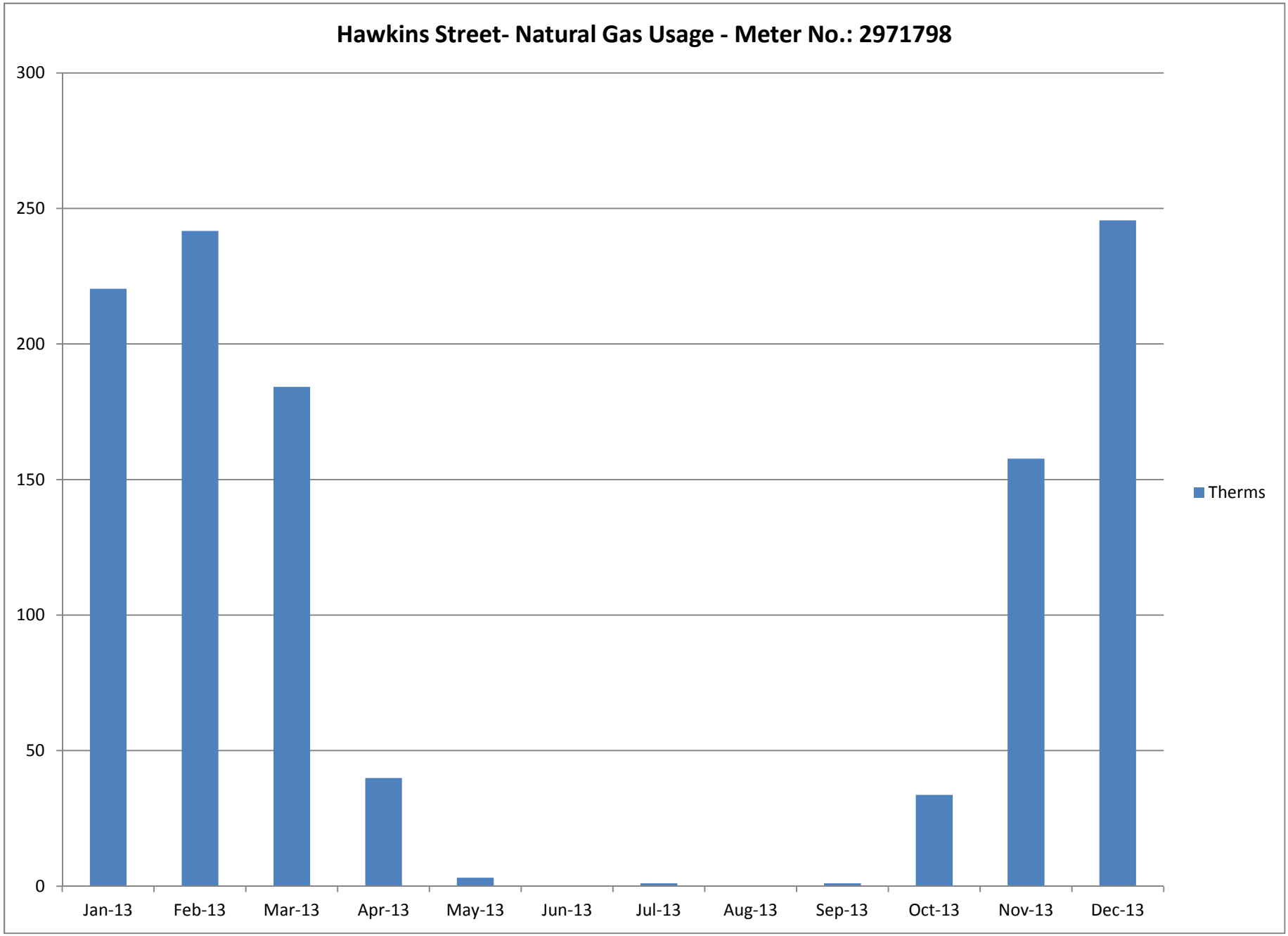
Hawkins Street - Natural Gas Usage

Index No	Current Name	Acct	Meter	Start Date	End Date	Therms	Total Charge	$/therm
5	Ann Street	6930902802	2971798	1/5/2012	2/2/2012	191.24	201.89	1.06
5	Ann Street	6930902802	2971798	2/3/2012	3/5/2012	195.11	193.77	0.99
5	Ann Street	6930902802	2971798	3/6/2012	4/2/2012	85.56	81.17	0.95
5	Ann Street	6930902802	2971798	4/3/2012	6/4/2012	64.76	73.2	1.13
5	Ann Street	6930902802	2971798	6/5/2012	7/3/2012	0	10.76	#DIV/0!
5	Ann Street	6930902802	2971798	7/4/2012	8/2/2012	0	10.76	#DIV/0!
5	Ann Street	6930902802	2971798	8/3/2012	8/30/2012	0	10.76	#DIV/0!
5	Ann Street	6930902802	2971798	8/31/2012	12/3/2012	162.8	204.49	1.26
5	Ann Street	6930902802	2971798	12/4/2012	1/3/2013	196.51	221.17	1.13
5	Ann Street	6930902802	2971798	1/4/2013	2/1/2013	220.39	238.85	1.08
5	Ann Street	6930902802	2971798	2/2/2013	3/5/2013	241.71	262.85	1.09
5	Ann Street	6930902802	2971798	3/6/2013	4/4/2013	184.18	182.61	0.99
5	Ann Street	6930902802	2971798	4/5/2013	5/3/2013	39.92	49.93	1.25
5	Ann Street	6930902802	2971798	5/4/2013	6/4/2013	3.16	14.38	4.55
5	Ann Street	6930902802	2971798	7/4/2013	8/2/2013	1.06	12.23	11.54
5	Ann Street	6930902802	2971798	8/3/2013	9/4/2013	0	0	#DIV/0!
5	Ann Street	6930902802	2971798	9/5/2013	10/2/2013	1.07	12.23	11.43
5	Ann Street	6930902802	2971798	10/3/2013	10/31/2013	33.71	45.39	1.35
5	Ann Street	6930902802	2971798	11/1/2013	12/3/2013	157.72	170.17	1.08
5	Ann Street	6930902802	2971798	12/4/2013	1/3/2014	245.58	268.57	1.09

Ann Street		Start Date	End Date	# Months
Account Number	6930902802	1/5/2012	1/3/2014	23
Meter Number	2971798			

NATURAL GAS USAGE - MOST RECENT 12 MONTHS, PERIOD ENDING: 1/3/2014

Annual Usage	1,129	**Therms**
Annual Cost	$1,257	
Rate	$1.11	**$/Therm**


Hawkins Street- Natural Gas Usage - Meter No.: 2971798
300
250
200
150
100
50
0
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Therms

Newark Public Schools LGEA
CHA Project# 27999

Hawkins Street - Fuel Oil Usage

Index No	Current Name	Address NJIT PSS	Ticket Number	Delivery Date	Gallons	Delivery $	$/Gallon
38	Hawkins Street	8 Hawkins St., 07105	74759208	10/31/2011	500	1,579.00	3.16
38	Hawkins Street	8 Hawkins St., 07105	74759339	11/2/2011	231	729	3.16
38	Hawkins Street	8 Hawkins St., 07105	74760097	11/4/2011	300	948	3.16
38	Hawkins Street	8 Hawkins St., 07105	74761299	11/7/2011	625	1,990.00	3.18
38	Hawkins Street	8 Hawkins St., 07105	74761281	11/9/2011	57	186	3.26
38	Hawkins Street	8 Hawkins St., 07105	74762437	11/14/2011	622	2,055.00	3.30
38	Hawkins Street	8 Hawkins St., 07105	74762438	11/18/2011	303	969	3.20
38	Hawkins Street	8 Hawkins St., 07105	74761789	11/21/2011	649	2,044.00	3.15
38	Hawkins Street	8 Hawkins St., 07105	74761982	11/23/2011	16	50	3.13
38	Hawkins Street	8 Hawkins St., 07105	74762680	11/30/2011	137	430	3.14
38	Hawkins Street	8 Hawkins St., 07105	74762760	12/2/2011	356	1,094.00	3.07
38	Hawkins Street	8 Hawkins St., 07105	74762917	12/5/2011	234	725	3.10
38	Hawkins Street	8 Hawkins St., 07105	74763472	12/7/2011	153	480	3.14
38	Hawkins Street	8 Hawkins St., 07105	74763524	12/9/2011	460	1,393.00	3.03
38	Hawkins Street	8 Hawkins St., 07105	74764082	12/12/2011	342	1,036.00	3.03
38	Hawkins Street	8 Hawkins St., 07105	74764081	12/14/2011	355	1,075.00	3.03
38	Hawkins Street	8 Hawkins St., 07105	74764699	12/16/2011	358	1,046.00	2.92
38	Hawkins Street	8 Hawkins St., 07105	74764677	12/19/2011	770	2,249.00	2.92
38	Hawkins Street	8 Hawkins St., 07105	74764776	12/21/2011	254	754	2.97
38	Hawkins Street	8 Hawkins St., 07105	74765662	12/23/2011	42	125	2.98
38	Hawkins Street	8 Hawkins St., 07105	74765661	12/27/2011	803	2,416.00	3.01
38	Hawkins Street	8 Hawkins St., 07105	74765949	12/29/2011	406	1,227.00	3.02
38	Hawkins Street	8 Hawkins St., 07105	74766406	1/3/2012	940	2,888.00	3.07
38	Hawkins Street	8 Hawkins St., 07105	74766635	1/5/2012	669	2,172.00	3.25
38	Hawkins Street	8 Hawkins St., 07105	74767204	1/6/2012	175	561	3.21
38	Hawkins Street	8 Hawkins St., 07105	74766405	1/9/2012	161	522	3.24
38	Hawkins Street	8 Hawkins St., 07105	74767203	1/9/2012	269	871	3.24
38	Hawkins Street	8 Hawkins St., 07105	74767286	1/11/2012	507	1,652.00	3.26
38	Hawkins Street	8 Hawkins St., 07105	74767492	1/13/2012	519	1,661.00	3.20
38	Hawkins Street	8 Hawkins St., 07105	74767767	1/16/2012	965	3,083.00	3.19
38	Hawkins Street	8 Hawkins St., 07105	74768428	1/18/2012	319	1,020.00	3.20
38	Hawkins Street	8 Hawkins St., 07105	74768966	1/25/2012	345	1,098.00	3.18
38	Hawkins Street	8 Hawkins St., 07105	74769605	2/1/2012	251	805	3.21
38	Hawkins Street	8 Hawkins St., 07105	74769949	2/3/2012	355	1,139.00	3.21
38	Hawkins Street	8 Hawkins St., 07105	74739129	2/6/2012	219	709	3.24
38	Hawkins Street	8 Hawkins St., 07105	74769130	2/6/2012	545	1,760.00	3.23
38	Hawkins Street	8 Hawkins St., 07105	74769607	2/6/2012	631	2,037.00	3.23
38	Hawkins Street	8 Hawkins St., 07105	74769606	2/6/2012	964	3,113.00	3.23
38	Hawkins Street	8 Hawkins St., 07105	74770891	2/6/2012	690	2,229.00	3.23
38	Hawkins Street	8 Hawkins St., 07105	74771377	2/8/2012	313	1,048.00	3.35
38	Hawkins Street	8 Hawkins St., 07105	74772267	2/10/2012	501	1,687.00	3.37
38	Hawkins Street	8 Hawkins St., 07105	74771266	2/13/2012	954	3,199.00	3.35
38	Hawkins Street	8 Hawkins St., 07105	74771279	2/15/2012	398	1,325.00	3.33
38	Hawkins Street	8 Hawkins St., 07105	74771688	2/17/2012	190	638	3.36
38	Hawkins Street	8 Hawkins St., 07105	74772119	2/21/2012	297	991	3.34
38	Hawkins Street	8 Hawkins St., 07105	74772481	2/24/2012	492	1,685.00	3.42

Hawkins Street - Fuel Oil Usage

38 Hawkins Street	8 Hawkins St., 07105	74772480	2/27/2012	658	2,270.00	3.45
38 Hawkins Street	8 Hawkins St., 07105	74772802	2/29/2012	308	1,039.00	3.37
38 Hawkins Street	8 Hawkins St., 07105	74773113	3/2/2012	282	974	3.45
38 Hawkins Street	8 Hawkins St., 07105	74773388	3/5/2012	418	1,401.00	3.35
38 Hawkins Street	8 Hawkins St., 07105	74773583	3/7/2012	414	1,377.00	3.33
38 Hawkins Street	8 Hawkins St., 07105	74773664	3/9/2012	114	386	3.39
38 Hawkins Street	8 Hawkins St., 07105	74773663	3/12/2012	616	2,116.00	3.44
38 Hawkins Street	8 Hawkins St., 07105	74773995	3/14/2012	14	48	3.43
38 Hawkins Street	8 Hawkins St., 07105	74774084	3/16/2012	137	459	3.35
38 Hawkins Street	8 Hawkins St., 07105	74774173	3/19/2012	206	702	3.41
38 Hawkins Street	8 Hawkins St., 07105	74775163	3/30/2012	802	2,618.00	3.26
38 Hawkins Street	8 Hawkins St., 07105	74775650	4/5/2012	168	554	3.30
38 Hawkins Street	8 Hawkins St., 07105	74776415	4/13/2012	853	2,804.00	3.29
38 Hawkins Street	8 Hawkins St., 07105	74777419	4/27/2012	601	1,993.00	3.32
38 Hawkins Street	8 Hawkins St., 07105	74777518	5/2/2012	20	67	3.35
38 Hawkins Street	8 Hawkins St., 07105	74787154	10/16/2012	537	1,841.00	3.43
38 Hawkins Street	8 Hawkins St., 07105	74788558	10/22/2012	202	668	3.31
38 Hawkins Street	8 Hawkins St., 07105	74788557	10/26/2012	30	98	3.27
38 Hawkins Street	8 Hawkins St., 07105	74789522	11/4/2012	410	1,330.00	3.24
38 Hawkins Street	8 Hawkins St., 07105	74790384	11/9/2012	894	3,007.00	3.36
38 Hawkins Street	8 Hawkins St., 07105	74790494	11/15/2012	458	1,558.00	3.40
38 Hawkins Street	8 Hawkins St., 07105	74791137	11/20/2012	965	3,356.00	3.48
38 Hawkins Street	8 Hawkins St., 07105	74791561	11/23/2012	109	375	3.44
38 Hawkins Street	8 Hawkins St., 07105	74791117	11/27/2012	393	1,357.00	3.45
38 Hawkins Street	8 Hawkins St., 07105	74791848	12/3/2012	926	3,049.00	3.29
38 Hawkins Street	8 Hawkins St., 07105	74792454	12/10/2012	611	1,931.00	3.16
38 Hawkins Street	8 Hawkins St., 07105	74792891	12/12/2012	381	1,206.00	3.17
38 Hawkins Street	8 Hawkins St., 07105	74793552	12/17/2012	514	1,651.00	3.21
38 Hawkins Street	8 Hawkins St., 07105	74793858	12/19/2012	447	1,440.00	3.22
38 Hawkins Street	8 Hawkins St., 07105	74794049	12/21/2012	371	1,219.00	3.29
38 Hawkins Street	8 Hawkins St., 07105	74794893	12/24/2012	13	43	3.31
38 Hawkins Street	8 Hawkins St., 07105	74794475	12/28/2012	626	2,050.00	3.27
38 Hawkins Street	8 Hawkins St., 07105	74794476	12/30/2012	962	3,148.00	3.27
38 Hawkins Street	8 Hawkins St., 07105	74795527	1/1/2013	231	753	3.26
38 Hawkins Street	8 Hawkins St., 07105	74795619	1/4/2013	969	3,063.00	3.16
38 Hawkins Street	8 Hawkins St., 07105	74796086	1/7/2013	681	2,153.00	3.16
38 Hawkins Street	8 Hawkins St., 07105	74795667	1/9/2013	311	986	3.17
38 Hawkins Street	8 Hawkins St., 07105	74796920	1/11/2013	258	867	3.36
38 Hawkins Street	8 Hawkins St., 07105	74796919	1/14/2013	93	308	3.31
38 Hawkins Street	8 Hawkins St., 07105	74797058	1/16/2013	380	1,260.00	3.32
38 Hawkins Street	8 Hawkins St., 07105	74798464	1/18/2013	623	2,063.00	3.31
38 Hawkins Street	8 Hawkins St., 07105	74798613	1/23/2013	665	2,237.00	3.36
38 Hawkins Street	8 Hawkins St., 07105	74798468	1/24/2013	491	1,663.00	3.39
38 Hawkins Street	8 Hawkins St., 07105	74798466	1/25/2013	596	2,022.00	3.39
38 Hawkins Street	8 Hawkins St., 07105	74798465	1/26/2013	285	960	3.37
38 Hawkins Street	8 Hawkins St., 07105	74798467	1/27/2013	375	1,261.00	3.36
38 Hawkins Street	8 Hawkins St., 07105	74799014	1/29/2013	531	1,790.00	3.37

Hawkins Street - Fuel Oil Usage

38 Hawkins Street	8 Hawkins St., 07105	74799531	2/1/2013	265	917	3.46
38 Hawkins Street	8 Hawkins St., 07105	74799530	2/2/2013	274	954	3.48
38 Hawkins Street	8 Hawkins St., 07105	74799686	2/4/2013	646	2,250.00	3.48
38 Hawkins Street	8 Hawkins St., 07105	74800134	2/5/2013	246	858	3.49
38 Hawkins Street	8 Hawkins St., 07105	74800135	2/6/2013	359	1,261.00	3.51
38 Hawkins Street	8 Hawkins St., 07105	74802157	2/7/2013	314	1,092.00	3.48
38 Hawkins Street	8 Hawkins St., 07105	74800502	2/8/2013	354	1,237.00	3.49
38 Hawkins Street	8 Hawkins St., 07105	74800503	2/9/2013	148	519	3.51
38 Hawkins Street	8 Hawkins St., 07105	74800601	2/11/2013	518	1,838.00	3.55
38 Hawkins Street	8 Hawkins St., 07105	74801066	2/12/2013	229	808	3.53
38 Hawkins Street	8 Hawkins St., 07105	74801065	2/13/2013	250	882	3.53
38 Hawkins Street	8 Hawkins St., 07105	74801471	2/14/2013	208	733	3.52
38 Hawkins Street	8 Hawkins St., 07105	74801903	2/15/2013	179	632	3.53
38 Hawkins Street	8 Hawkins St., 07105	74801905	2/16/2013	247	871	3.53
38 Hawkins Street	8 Hawkins St., 07105	74801904	2/18/2013	964	3,378.00	3.50
38 Hawkins Street	8 Hawkins St., 07105	74802016	2/19/2013	114	400	3.51
38 Hawkins Street	8 Hawkins St., 07105	74802015	2/20/2013	244	851	3.49
38 Hawkins Street	8 Hawkins St., 07105	74802014	2/21/2013	451	1,571.00	3.48
38 Hawkins Street	8 Hawkins St., 07105	74802155	2/22/2013	308	1,056.00	3.43
38 Hawkins Street	8 Hawkins St., 07105	74802156	2/23/2013	297	1,018.00	3.43
38 Hawkins Street	8 Hawkins St., 07105	74802257	2/25/2013	443	1,524.00	3.44
38 Hawkins Street	8 Hawkins St., 07105	74803243	2/26/2013	242	821	3.39
38 Hawkins Street	8 Hawkins St., 07105	74803180	2/28/2013	269	882	3.28
38 Hawkins Street	8 Hawkins St., 07105	74803181	3/1/2013	112	366	3.27
38 Hawkins Street	8 Hawkins St., 07105	74803182	3/2/2013	271	888	3.28
38 Hawkins Street	8 Hawkins St., 07105	74803179	3/4/2013	230	789	3.43
38 Hawkins Street	8 Hawkins St., 07105	74803263	3/6/2013	389	1,270.00	3.26
38 Hawkins Street	8 Hawkins St., 07105	74803264	3/7/2013	223	733	3.29
38 Hawkins Street	8 Hawkins St., 07105	74803948	3/8/2013	151	519	3.44
38 Hawkins Street	8 Hawkins St., 07105	74803949	3/11/2013	582	1,938.00	3.33
38 Hawkins Street	8 Hawkins St., 07105	74804380	3/13/2013	259	842	3.25
38 Hawkins Street	8 Hawkins St., 07105	74804799	3/15/2013	377	1,220.00	3.24
38 Hawkins Street	8 Hawkins St., 07105	74804798	3/18/2013	716	2,322.00	3.24
38 Hawkins Street	8 Hawkins St., 07105	74805258	3/20/2013	395	1,245.00	3.15
38 Hawkins Street	8 Hawkins St., 07105	74805545	3/22/2013	322	1,021.00	3.17
38 Hawkins Street	8 Hawkins St., 07105	74805544	3/25/2013	622	1,972.00	3.17
38 Hawkins Street	8 Hawkins St., 07105	74806237	3/27/2013	117	371	3.17
38 Hawkins Street	8 Hawkins St., 07105	74806236	4/1/2013	24	76	3.17
38 Hawkins Street	8 Hawkins St., 07105	74806837	4/5/2013	849	2,671.00	3.15
38 Hawkins Street	8 Hawkins St., 07105	74806857	4/9/2013	35	108	3.09
38 Hawkins Street	8 Hawkins St., 07105	74807273	4/12/2013	33	100	3.03
38 Hawkins Street	8 Hawkins St., 07105	74807455	4/17/2013	11	31	2.82
38 Hawkins Street	8 Hawkins St., 07105	74807861	4/22/2013	106	309	2.92
38 Hawkins Street	8 Hawkins St., 07105	74808103	4/26/2013	351	1,070.00	3.05
38 Hawkins Street	8 Hawkins St., 07105	74808696	5/3/2013	135	412	3.05

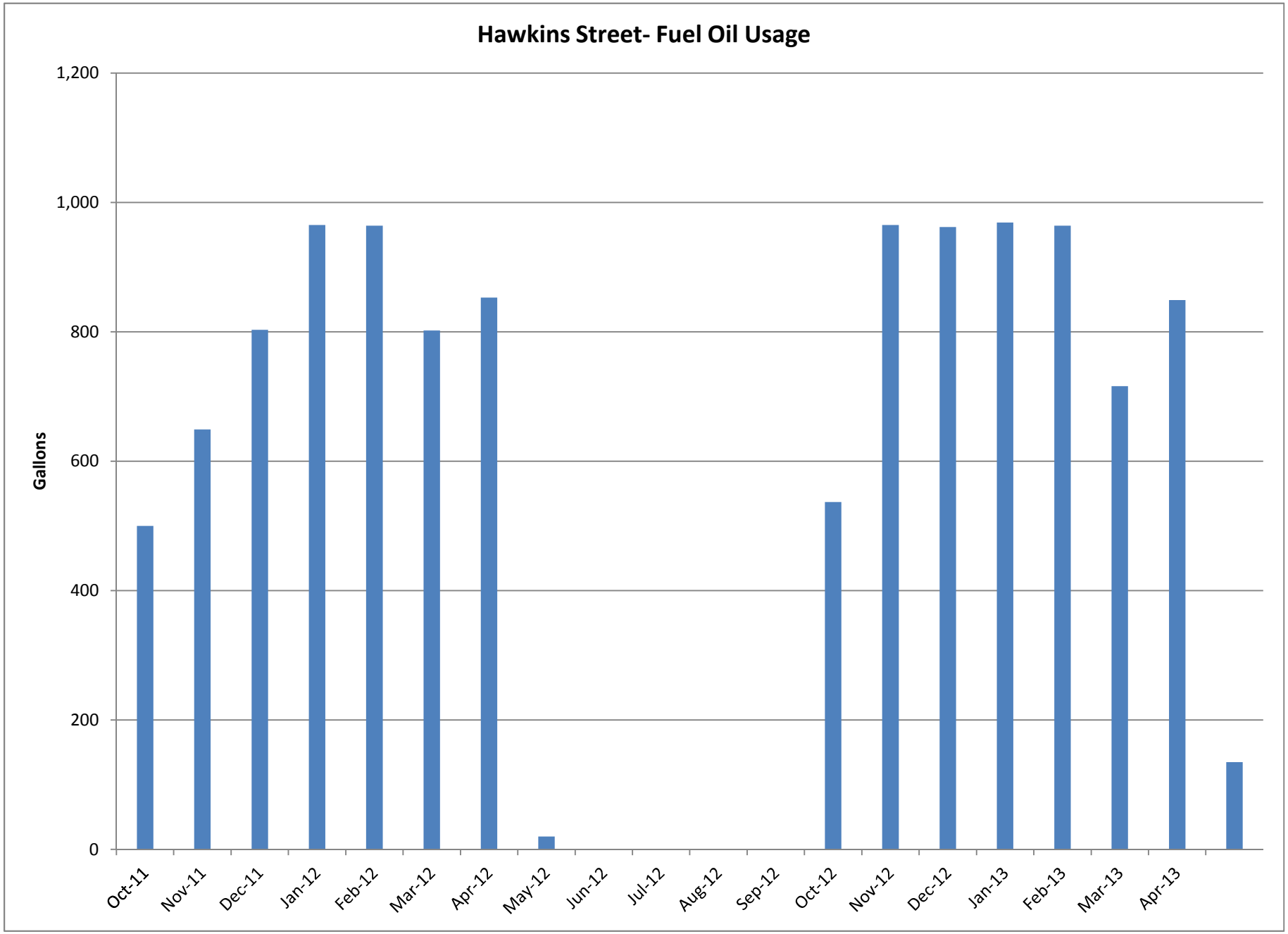
Hawkins Street	Start Date	End Date	# Months

Hawkins Street - Fuel Oil Usage

Address	8 Hawkins St., 07105	2/18/2013	5/3/2013	2

FUEL OIL USAGE - MOST RECENT 12 MONTHS, PERIOD ENDING: 5/3/2013

Annual Usage	29,217	**Gallons**
Annual Cost	$97,339	
Rate	$3.33	**$/Gallon**


Hawkins Street- Fuel Oil Usage
Gallons
1,200
1,000
800
600
400
200
0
Oct-11
Nov-11
Dec-11
Jan-12
Feb-12
Mar-12
Apr-12
May-12
Jun-12
Jul-12
Aug-12
Sep-12
Oct-12
Nov-12
Dec-12
Jan-13
Feb-13
Mar-13
Apr-13

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: 10/24/12

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

Supplier	Telephone & Web Site	*Customer Class
AEP Energy, Inc. 309 Fellowship Road, Fl. 2 Mount Laurel, NJ 08054	(866) 258-3782 www.aepenergy.com	**C/I** **ACTIVE**
Alpha Gas and Electric, LLC 641 5th Street Lakewood, NJ 08701	(855) 553-6374 www.alphagasandelectric.com	**R/C** **ACTIVE**
Ambit Northeast, LLC 103 Carnegie Center Suite 300 Princeton, NJ 08540	(877)-30-AMBIT (877) 302-6248 www.ambitenergy.com	**R/C** **ACTIVE**
American Powernet Management, LP 437 North Grove St. Berlin, NJ 08009	(877) 977-2636 www.americanpowernet.com	**C** **ACTIVE**
Amerigreen Energy, Inc. 1463 Lamberton Road Trenton, NJ 08611	888-423-8357 www.amerigreen.com	**R/C** **ACTIVE**
AP Gas & Electric, LLC 10 North Park Place, Suite 420 Morristown, NJ 07960	(855) 544-4895 www.apge.com	**R/C/I** **ACTIVE**
Astral Energy LLC 16 Tyson Place Bergenfield, NJ 07621	(201) 384-5552 www.astralenergyllc.com	**R/C/I** **ACTIVE**
Barclays Capital Services, Inc. 70 Hudson Street Jersey City, NJ 07302-4585	(888) 978-9974 www.group.barclays.com	**C** **ACTIVE**
BBPC, LLC d/b/a Great Eastern Energy 116 Village Blvd. Suite 200 Princeton, NJ 08540	(888) 651-4121 www.greateasternenergy.com	**C/I** **ACTIVE**
Champion Energy Services, LLC 72 Avenue L Newark, NJ 07105	(877) 653-5090 www.championenergyservices.com	**R/C/I** **ACTIVE**

Choice Energy, LLC 4257 US Highway 9, Suite 6C Freehold, NJ 07728	888-565-4490 www.4choiceenergy.com	**R/C** **ACTIVE**
Clearview Electric, Inc. 505 Park Drive Woodbury, NJ 08096	(888) CLR-VIEW (800) 746-4702 www.clearviewenergy.com	**R/C/I** **ACTIVE**
Commerce Energy, Inc. 7 Cedar Terrace Ramsey, NJ 07446	1-866-587-8674 www.commerceenergy.com	**R** **ACTIVE**
ConEdison Solutions Cherry Tree Corporate Center 535 State Highway Suite 180 Cherry Hill, NJ 08002	(888) 665-0955 www.conedsolutions.com	**C/I** **ACTIVE**
Constellation NewEnergy, Inc. 900A Lake Street, Suite 2 Ramsey, NJ 07446	(866) 237-7693 www.constellation.com	**R/C/I** **ACTIVE**
Constellation Energy 900A Lake Street, Suite 2 Ramsey, NJ 07446	(877) 997-9995 www.constellation.com	**R** **ACTIVE**
Credit Suisse, (USA) Inc. 700 College Road East Princeton, NJ 08450	(212) 538-3124 www.creditsuisse.com	**C** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergybusiness.com	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(866) 348-4193 www.directenergy.com	**R** **ACTIVE**
Discount Energy Group, LLC 811 Church Road, Suite 149 Cherry Hill, New Jersey 08002	(800) 282-3331 www.discountenergygroup.com	**R/C** **ACTIVE**
Dominion Retail, Inc. **d/b/a Dominion Energy Solutions** 395 Route #70 West Suite 125 Lakewood, NJ 08701	(866) 275-4240 www.dom.com/products	**R/C** **ACTIVE**

DTE Energy Supply, Inc. One Gateway Center, Suite 2600 Newark, NJ 07102	(877) 332-2450 www.dtesupply.com	**C/I** **ACTIVE**
Energy.me Midwest LLC 90 Washington Blvd Bedminster, NJ 07921	(855) 243-7270 www.energy.me	**R/C/I** **ACTIVE**
Energy Plus Holdings LLC 309 Fellowship Road East Gate Center, Suite 200 Mt. Laurel, NJ 08054	(877) 866-9193 www.energypluscompany.com	**R/C** **ACTIVE**
Ethical Electric Benefit Co. d/b/a Ethical Electric 100 Overlook Center, 2nd Fl. Princeton, NJ 08540	(888) 444-9452 www.ethicalelectric.com	**R/C** **ACTIVE**
FirstEnergy Solutions 300 Madison Avenue Morristown, NJ 07962	(800) 977-0500 www.fes.com	**C/I** **ACTIVE**
Gateway Energy Services Corp. 44 Whispering Pines Lane Lakewood, NJ 08701	(800) 805-8586 www.gesc.com	**R/C/I** **ACTIVE**
GDF SUEZ Energy Resources NA, Inc. 333 Thornall Street Sixth Floor Edison, NJ 08837	(866) 999-8374 www.gdfsuezenergyresources.com	**C/I** **ACTIVE**
Glacial Energy of New Jersey, Inc. 75 Route 15 Building E Lafayette, NJ 07848	(888) 452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Global Energy Marketing LLC 129 Wentz Avenue Springfield, NJ 07081	(800) 542-0778 www.globalp.com	**C/I** **ACTIVE**
Green Mountain Energy Company 211 Carnegie Center Drive Princeton, NJ 08540	(866) 767-5818 www.greenmountain.com/commercial-home	**C/I** **ACTIVE**

Hess Corporation 1 Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 www.hess.com	**C/I** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	(888) 264-4908 www.hikoenergy.com	**R/C** **ACTIVE**
HOP Energy, LLC d/b/a Metro Energy, HOP Fleet Fueling, HOP Energy Fleet Fueling 1011 Hudson Avenue Ridgefield, NJ 07657	(877) 390-7155 www.hopenergy.com	**R/C/I** **ACTIVE**
Hudson Energy Services, LLC 7 Cedar Street Ramsey, New Jersey 07446	(877) Hudson 9 www.hudsonenergyservices.com	**C** **ACTIVE**
IDT Energy, Inc. 550 Broad Street Newark, NJ 07102	(877) 887-6866 www.idtenergy.com	**R/C** **ACTIVE**
Independence Energy Group, LLC 3711 Market Street, 10th Fl. Philadelphia, PA 19104	(877) 235-6708 www.chooseindependence.com	**R/C** **ACTIVE**
Integrys Energy Services, Inc. 99 Wood Ave, South, Suite 802 Iselin, NJ 08830	(877) 763-9977 www.integrysenergy.com	**C/I** **ACTIVE**
Keil & Sons, Inc. **d/b/a Systrum Energy** 1 Bergen Blvd. Fairview, NJ 07022	(877) 797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Liberty Power Delaware, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**
Liberty Power Holdings, LLC 1973 Highway 34, Suite 211 Wall, NJ 07719	(866) 769-3799 www.libertypowercorp.com	**C/I** **ACTIVE**

Linde Energy Services 575 Mountain Avenue Murray Hill, NJ 07974	(800) 247-2644 www.linde.com	**C/I** **ACTIVE**
Marathon Power LLC 302 Main Street Paterson, NJ 07505	(888) 779-7255 www.mecny.com	**R/C/I** **ACTIVE**
MXenergy Electric Inc. 900 Lake Street Ramsey, NJ 07446	(800) 785-4374 www.mxenergy.com	**R/C/I** **ACTIVE**
NATGASCO, Inc. 532 Freeman St. Orange, NJ 07050	(973) 678-1800 x. 251 www.supremeenergyinc.com	**R/C** **ACTIVE**
NextEra Energy Services New Jersey, LLC 651 Jernee Mill Road Sayreville, NJ 08872	(877) 528-2890 Commercial (800) 882-1276 Residential www.nexteraenergyservices.com	**R/C/I** **ACTIVE**
New Jersey Gas & Electric 1 Bridge Plaza fl. 2 Fort Lee, NJ 07024	(866) 568-0290 www.NJGandE.com	**R/C** **ACTIVE**
Noble Americas Energy Solutions The Mac-Cali Building 581 Main Street, 8th Floor Woodbridge, NJ 07095	(877) 273-6772 www.noblesolutions.com	**C/I** **ACTIVE**
North American Power and Gas, LLC 222 Ridgedale Avenue Cedar Knolls, NJ 07927	(888) 313-9086 www.napower.com	**R/C/I** **ACTIVE**
Palmco Power NJ, LLC One Greentree Centre 10,000 Lincoln Drive East, Suite 201 Marlton, NJ 08053	(877) 726-5862 www.PalmcoEnergy.com	**R/C/I** **ACTIVE**
Pepco Energy Services, Inc. 112 Main St. Lebanon, NJ 08833	(800) ENERGY-9 (363-7499) www.pepco-services.com	**C/I** **ACTIVE**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	(855) 32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**

PPL Energy Plus, LLC 811 Church Road Cherry Hill, NJ 08002	(800) 281-2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Public Power & Utility of New Jersey, LLC 39 Old Ridgebury Rd. Suite 14 Danbury, CT 06810	(888) 354-4415 www.ppandu.com	**R/C/I** **ACTIVE**
Reliant Energy 211 Carnegie Center Princeton, NJ 08540	(877) 297-3795 (877) 297-3780 www.reliant.com/pjm	**R/C/I** **ACTIVE**
ResCom Energy LLC 18C Wave Crest Ave. Winfield Park, NJ 07036	(888) 238-4041 http://rescomenergy.com	**R/C/I** **ACTIVE**
Respond Power LLC 10 Regency CT Lakewood, NJ 08701	(877) 973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	(800) 266-6020 www.southjerseyenergy.com	**C/I** **ACTIVE**
Sperian Energy Corp. 1200 Route 22 East, Suite 2000 Bridgewater, NJ 08807	(888) 682-8082	**R/C/I** **ACTIVE**
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, N.J. 08007	(800) 695-0666 www.sjnaturalgas.com	**R/C** **ACTIVE**
Spark Energy, L.P. 2105 CityWest Blvd., Ste 100 Houston, Texas 77042	(800) 441-7514 www.sparkenergy.com	**R/C/I** **ACTIVE**
Sprague Energy Corp. 12 Ridge Road Chatham Township, NJ 07928	(800) 225-1560 www.spragueenergy.com	**C/I** **ACTIVE**
Starion Energy PA Inc. 101 Warburton Avenue Hawthorne, NJ 07506	(800) 600-3040 www.starionenergy.com	**R/C/I** **ACTIVE**
Stream Energy 309 Fellowship Rd., Suite 200 Mt. Laurel, NJ 08054	(877) 39-8150 www.streamenergy.net	**R** **ACTIVE**

UGI Energy Services, Inc. d/b/a GASMARK 224 Strawbridge Drive Suite 107 Moorestown, NJ 08057	(856) 273-9995 www.ugienergyservices.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 50 East Palisades Avenue Englewood, NJ 07631	(800) 388-3862 www.lowcostpower.com	**R/C/I** **ACTIVE**
Viridian Energy 2001 Route 46, Waterview Plaza Suite 310 Parsippany, NJ 07054	(866) 663-2508 www.viridian.com	**R/C/I** **ACTIVE**
Xoom Energy New Jersey, LLC 744 Broad Street Newark, NJ 07102	(888) 997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
YEP Energy 89 Headquarters Plaza North #1463 Morristown, NJ 07960	(855) 363-7736 www.yepenergyNJ.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	(855) 732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

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APPENDIX B

Equipment Inventory

Newark Schools
CHA Project# 27999
Hawkins Street School

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)
B-1	1	HB Smith	A28-HE-12	L-52731	Steam Boiler / Gas	3663 MBH/3040 MBH (82%)	MER	School	2013	49
B-2	1	HB Smith	A28-HE-12	L-52732	Steam Boiler / Gas	3663 MBH/3040 MBH (82%)	MER	School	2013	49
Cond Pump	2	Shipco	80LPD-X	61058	Condensate pumps set	1-1/2 HP (85.5%)	MER	Boilers 1,2	2013	19
Boiler Feed	2	Shipco	CS-B	6.11E+04	Boiler Feed tanks set	3/4HP	MER	Boilers 1,2	2013	19
Unit Vents	30	AAF	AAAJAAAA1000	86-D-1	Unit Ventilator	1000 CFM	Classrooms	Classrooms	1986	-3
Window A/C	12	Varies	NA	NA	Air Conditioner	8-24000	Various classrooms	Various Classrooms	Varies	N/A
DHW	2	Bradford White	D80TI803N	ZA2677783/78	Water Heater / Gas	80 Gal (80%)	MER	TR sinks and kitchen	2003	-1
Misc Exh Fans	4	Varies	N/A	N/A	Exhaust Fans	varies	Varies	Toilet Rooms	N/A	N/A

Energy Audit of Newark Public Schools - Hawkins Street Elementary School
CHA Project No.27999
Existing Lighting & Audit Input

Cost of Electricity: **$0.131** **$/kWh**
$4.28 **$/kW**

			EXISTING CONDITIONS									Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh			
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)		Retrofit control device	Notes
15LED	Boiler Room	Boiler Room	21	S 32 C F 2 (ELE)	F42LL	60	1.26	SW	2000	2,520		NONE	
15LED	Custodial	Custodian	5	S 32 C F 2 (ELE)	F42LL	60	0.30	SW	3400	1,020		NONE	
50LED	Hallway	Hallways	9	W 32 P F 2 (ELE)	F42LL	60	0.54	SW	6240	3,370		NONE	
50LED	Hallway	Hallways	9	W 32 P F 2 (ELE)	F42LL	60	0.54	SW	6240	3,370		NONE	
50LED	Hallway	Hallways	4	W 32 P F 2 (ELE)	F42LL	60	0.24	SW	6240	1,498		NONE	
50LED	104	Classrooms	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	2400	288		C-OCC	
105LED	102	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
50LED	102 Closet	Classrooms	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	2400	144		NONE	
50LED	Café Hallway	Cafeteria	12	W 32 P F 2 (ELE)	F42LL	60	0.72	SW	2000	1,440		NONE	
50LED	Cafeteria	Cafeteria	42	W 32 P F 2 (ELE)	F42LL	60	2.52	SW	2000	5,040		NONE	
50LED	Locker Room	Locker	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	2800	168		NONE	
105LED	Locker Room Bathroom	Restroom	1	W 32 F 1	F41LL	32	0.03	SW	4300	138		NONE	
105LED	101	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
50LED	108	Classrooms	4	W 32 P F 2 (ELE)	F42LL	60	0.24	SW	2400	576		C-OCC	
18LED	Main Office	Office	9	T 32 R F 4 (ELE)	F44ILL	112	1.01	SW	3000	3,024		NONE	
18LED	Principal Office	Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	SW	3000	672		NONE	
18LED	Break Room	Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	SW	3000	672		C-OCC	
50LED	Hallway	Hallways	12	W 32 P F 2 (ELE)	F42LL	60	0.72	SW	6240	4,493		NONE	
105LED	117A	Classrooms	12	W 32 F 1	F41LL	32	0.38	SW	2400	922		C-OCC	
105LED	112	Classrooms	12	W 32 F 1	F41LL	32	0.38	SW	2400	922		C-OCC	
105LED	117B	Classrooms	12	W 32 F 1	F41LL	32	0.38	SW	2400	922		C-OCC	
105LED	113	Classrooms	12	W 32 F 1	F41LL	32	0.38	SW	2400	922		C-OCC	
50LED	Hallway	Hallways	5	W 32 P F 2 (ELE)	F42LL	60	0.30	SW	6240	1,872		NONE	
105LED	114	Classrooms	12	W 32 F 1	F41LL	32	0.38	SW	2400	922		C-OCC	
105LED	116	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
105LED	115	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
50LED	Exit	Hallways	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	6240	374		NONE	
105LED	111	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
50LED	109 Health Office	Office	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	3000	360		C-OCC	
50LED	Boys Room	Restroom	4	W 32 P F 2 (ELE)	F42LL	60	0.24	SW	4300	1,032		NONE	
50LED	Girls Room	Restroom	4	W 32 P F 2 (ELE)	F42LL	60	0.24	SW	4300	1,032		NONE	
50LED	Custodial	Custodian	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	3400	204		NONE	
105LED	102	Classrooms	22	W 32 F 1	F41LL	32	0.70	SW	2400	1,690		C-OCC	
50LED	Nurses Office	Office	3	W 32 P F 2 (ELE)	F42LL	60	0.18	SW	3000	540		C-OCC	
50LED	Nurses Restroom	Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	4300	258		NONE	
50LED	Nurses Storage	Storage	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	3200	192		NONE	
50LED	Stairwell	Hallways	6	W 32 P F 2 (ELE)	F42LL	60	0.36	SW	6240	2,246		NONE	
105LED	203	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
105LED	204	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
105LED	Stairwell	Hallways	1	W 32 F 1	F41LL	32	0.03	SW	6240	200		NONE	
50LED	Stairwell	Hallways	3	W 32 P F 2 (ELE)	F42LL	60	0.18	SW	6240	1,123		NONE	
18LED	Stairwell	Hallways	1	T 32 R F 4 (ELE)	F44ILL	112	0.11	SW	6240	699		NONE	
50LED	203 closet	Classrooms	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	2400	144		NONE	
50LED	204 closet	Classrooms	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	2400	144		NONE	
105LED	202	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
105LED	205	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
105LED	201	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
105LED	206	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
105LED	200	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
105LED	207	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
50LED	Teachers Lounge	Office	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	3000	360		NONE	
105LED	208	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
50LED	Stairwell	Hallways	6	W 32 P F 2 (ELE)	F42LL	60	0.36	SW	6240	2,246		NONE	
50LED	Boys Room	Restroom	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	4300	516		NONE	
50LED	Girls Room	Restroom	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	4300	516		NONE	
105LED	209	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
105LED	211	Classrooms	24	W 32 F 1	F41LL	32	0.77	SW	2400	1,843		C-OCC	
105LED	212	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
105LED	Restroom	Restroom	1	W 32 F 1	F41LL	32	0.03	SW	4300	138		NONE	
105LED	Auditorium	Auditorium	20	W 32 F 1	F41LL	32	0.64	SW	2000	1,280		NONE	
50LED	Stairwell to Auditorium	Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.42	SW	2000	840		NONE	
50LED	Stairwell to Auditorium	Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.42	SW	2000	840		NONE	
105LED	Stairwell to Auditorium	Auditorium	2	W 32 F 1	F41LL	32	0.06	SW	2000	128		NONE	
50LED	Auditorium Back Room Left	Auditorium	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	2000	240		NONE	
50LED	Auditorium Back Room Right	Auditorium	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	2000	240		NONE	
50LED	Hallway	Hallways	21	W 32 P F 2 (ELE)	F42LL	60	1.26	SW	6240	7,862		NONE	
50LED	Hallway	Hallways	21	W 32 P F 2 (ELE)	F42LL	60	1.26	SW	6240	7,862		NONE	
105LED	306	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
105LED	300	Classrooms	18	W 32 F 1	F41LL	32	0.58	SW	2400	1,382		C-OCC	
105LED	307	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	
105LED	312	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613		C-OCC	

Energy Audit of Newark Public Schools - Hawkins Street Elementary School
CHA Project No.27999
Existing Lighting & Audit Input

Cost of Electricity: **$0.131** **$/kWh**
$4.28 **$/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
50LED	Girls Room	Restroom	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	4300	516	NONE	
50LED	Boys Room	Restroom	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	4300	516	NONE	
50LED	Restroom	Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.06	SW	4300	258	NONE	
105LED	311	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613	C-OCC	
105LED	309	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613	C-OCC	
105LED	308	Classrooms	21	W 32 F 1	F41LL	32	0.67	SW	2400	1,613	C-OCC	
50LED	313 Vice Principal	Office	3	W 32 P F 2 (ELE)	F42LL	60	0.18	SW	3000	540	NONE	
71	313 Restroom	Office	1	I 60	I60/1	60	0.06	SW	3000	180	NONE	
50LED	Kitchen	Cafeteria	13	W 32 P F 2 (ELE)	F42LL	60	0.78	SW	2000	1,560	NONE	
50LED	Kitchen Storage	Cafeteria	2	W 32 P F 2 (ELE)	F42LL	60	0.12	SW	2000	240	NONE	
252	Gymnasium	Gymnasium	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.21	SW	2800	11,794	NONE	
231	Exterior Lights	Outdoor Lighting	12	MH 400 Pole/Spot	MH400/1	458	5.50	SW	4368	24,007	NONE	
	Total		**876**				**45.12**			**144,692**		

APPENDIX C

ECM Calculations

Newark Board of Education - NJBPU
CHA Project #27999

Rate of Discount (used for NPV) 3.0%

Utility Costs			Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
						Electric	Natural Gas	Fuel Oil
$ 0.144	$/kWh blended			0.000420205	69,161	$ 61,358	$ 1,257	$ 97,339
$ 0.131	$/kWh supply		426,000	0.000420205				
$ 4.28	$/kW		113.0	0				
$ 3.33	$/Gallon #2		29,217	0.00841661				
$ 1.11	$/Therm		1,128	0.00533471				
$ 7.55	$/kgals		10,000	0				

Hawkins Street

Recommend ? Y or N		Item	Savings						Cost		Simple Payback	Life Expectancy	Equivalent CO_2 (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings						ROI	NPV	IRR
			kW	kWh	therms	#2 Gal	Water kgal	$									kW	kWh	therms	#2 Gal	kgal/yr	$			
Y	ECM-1	Add Blown-in Insulation in Attic Space	0.0	0	435	0	0	482	$ 13,650		28.3	15.0	2.3	$ -	N	28.3	0.0	0	6,520	0	0	$ 21,712	0.6	($7,890)	-7.1%
N	ECM-2a	Heating Fuel Conversion (Fuel Switch)	0.0	0	(40,524)	29,217	0	52,311	$ 48,557		0.9	15	29.7	$ -	N	0.9	0.0	0	(607,860)	438,255	0	$ (2,024,173)	(42.7)	$575,928	107.7%
N	ECM-2b	Condensing Boiler Replacement w/ HW Reset	0.0	0	6,528	29,217	0	104,539	$ 2,947,555		28.2	30	280.7	$ 12,000	N	28.1	0.0	0	195,847	876,510	0	$ 652,169	(0.8)	($886,546)	0.4%
Y	ECM-3	Install De-stratification Fans	0.0	0	398	0	0	441	$ 11,400		25.8	15.0	2.1	$ -	N	25.8	0.0	0	5,965	0	0	$ 19,864	0.7	($6,130)	-6.1%
Y	ECM-4	Window A/C Controllers	0.0	7,854	0	0	0	1,131	$ 1,000		0.9	15.0	3.3	$ -	N	0.9	0.0	117,805	0	0	0	$ 16,964	16.0	$12,501	113.1%
Y	ECM-5a	Basic Controls	0.0	0	3,240	0	0	3,596	$ 21,309		5.9	20	17.3	$ -	N	5.9	0.0	0	64,800	0	0	$ 215,785	9.1	$32,196	16.0%
N	ECM-5b	Full DDC Controls	0.0	0	11,421	0	0	12,677	$ 311,117		24.5	20.0	60.9	$ -	N	24.5	0.0	0	228,416	0	0	$ 760,624	1.4	($122,514)	-1.9%
Y	ECM-6	Domestic Hot Water System Improvements	0.0	0	354	0	0	393	$ 20,177		51.4	15.0	1.9	$ 50	N	51.2	0.0	0	5,308	0	0	$ 17,677	(0.1)	($15,438)	-12.5%
N	ECM-7	Install Low Flow Plumbing Fixtures	0.0	0	0	0	150	1,131	$ 195,380		172.8	30.0	0.0	$ -	N	172.8	0.0	0	0	0	4,493	$ 33,920	(0.8)	($173,218)	-8.9%
N	ECM-L1	Lighting Replacements / Upgrades	18.4	56,134	0	0	0	8,298	$ 78,922		9.5	10.0	23.6	$ -	N	9.5	184.0	561,340	0	0	0	$ 90,283	0.1	($8,138)	0.9%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	13,994	0	0	0	1,833	$ 9,450		5.2	10.0	5.9	$ 1,225	N	4.5	0.0	139,940	0	0	0	$ 20,151	1.1	$7,411	18.0%
Y	ECM-L3	Lighting Replacements with Controls (Occupany Sensors)	18.4	62,708	0	0	0	9,159	$ 88,372		9.6	10.0	26.4	$ 1,225	N	9.5	184.0	627,080	0	0	0	$ 99,750	0.1	($9,019)	0.9%
		Total (Does Not Include ECM-2A, ECM-5B, ECM-L1 & ECM-L2)	**18.4**	**70,562**	**10,954**	**29,217**	**150**	**$ 120,873**	**$ 3,298,843**		**27.3**	**19**	**334**	**$ 13,275**		**27.2**	**184**	**744,885**	**278,441**	**876,510**	**4,493**	**$ 1,077,841**	**(0.7)**	**$ (1,623,144)**	**-4.0%**
		Recommended Measures (highlighted green above)	**18.4**	**70,562**	**4,426**	**0**	**0**	**$ 15,203**	**$ 155,908**		**10.3**	**15**	**53**	**$ 1,275**		**10.2**	**184**	**744,885**	**82,594**	**-**	**$ -**	**$ 391,752**	**1.5**	**$ 26,860**	**5.3%**
		% of Existing	**16%**	**17%**	**970%**	**100%**	**1%**																		

	City:	Newark, NJ				
	Occupied Hours/Week	70	70	70	70	50
		Building Operating	Auditorium Occupied	Gymnasium Occupied	Library Occupied	Classrooms Occupied
Temp	Enthalpy h (Btu/lb)	Bin Hours	Hours	Hours	Hours	Hours	Hours
102.5							
97.5	35.4	6	3	3	3	3	2
92.5	37.4	31	13	13	13	13	9
87.5	35.0	131	55	55	55	55	39
82.5	33.0	500	208	208	208	208	149
77.5	31.5	620	258	258	258	258	185
72.5	29.9	664	277	277	277	277	198
67.5	27.2	854	356	356	356	356	254
62.5	24.0	927	386	386	386	386	276
57.5	20.3	600	250	250	250	250	179
52.5	18.2	730	304	304	304	304	217
47.5	16.0	491	205	205	205	205	146
42.5	14.5	656	273	273	273	273	195
37.5	12.5	1,023	426	426	426	426	304
32.5	10.5	734	306	306	306	306	218
27.5	8.7	334	139	139	139	139	99
22.5	7.0	252	105	105	105	105	75
17.5	5.4	125	52	52	52	52	37
12.5	3.7	47	20	20	20	20	14
7.5	2.1	34	14	14	14	14	10
2.5	1.3	1	0	0	0	0	0
-2.5							
-7.5							
		8,760					

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

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

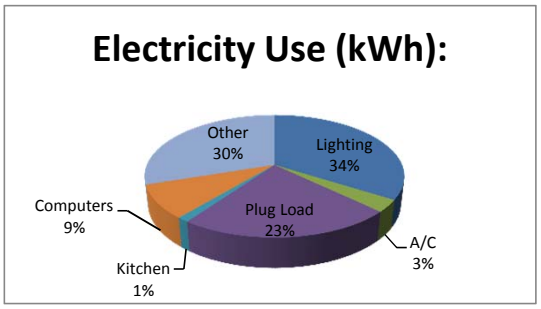
Heating		
Hours	4,427	Hrs
Weighted Avg	40	F
Avg	28	F

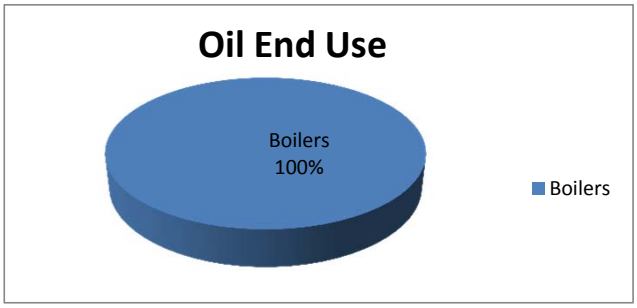
Cooling		
Hours	4,333	Hrs
Weighted Avg	68	F
Avg	78	F

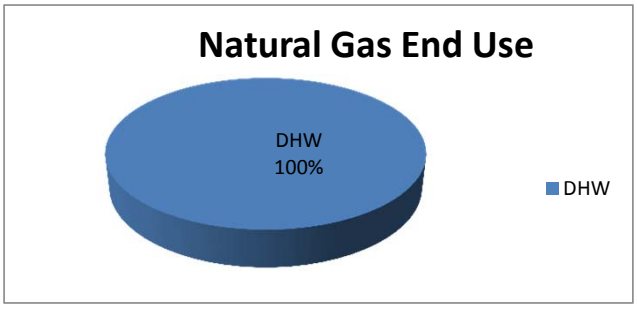
Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

Utility End Use Analysis		
Electricity Use (kWh):		**Notes/Comments:**
426,000	Total	Based on utility analysis
144,692	Lighting	From Lighting Calculations
	Motors	Estimated
13,487	A/C	See Window AC Calculation
96,825	Plug Load	Estimated
5,300	Kitchen	Estimated
37,500	Computers	Estimated
128,196	Other	Remaining
Oil Use (#2 Gal):		**Notes/Comments:**
29,217	Total	Based on utility analysis
29,217	Boilers	Total Oil Bill, only serves boilers
0	DHW	Based on utility analysis

Natural Gas Use (Therms):		**Notes/Comments:**
1,129	Total	Based on utility analysis
0	Boilers	Therms/SF x Square Feet Served
1,129	DHW	Based on utility analysis







Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-1 Install Additional Attic Insulation

Existing: Attic can lead to increased energy consumption due to infiltration/exfiltration and heat gain/loss.
Proposed: Install 9" fiberglass blown-in loose-fill insulation in attic cavity to reduce heat transfer.

Area of attic	10,500	SF	Cooling System Efficiency	0	kW/ton	Heating System Efficiency	80%	
Existing Infiltration Factor	**0.20**	**cfm/SF**	Ex Occupied Clng Temp.	72	*F	Heating On Point	55	*F
Proposed Infiltration Factor	**0.20**	**cfm/SF**	Ex Unoccupied Clng Temp.	85	*F	Ex Occupied Htg Temp.	80	*F
Existing U Value	**0.053**	**Btuh/SF/°F**	Cooling Occ Enthalpy Setpoint	27.5	Btu/lb	Ex Unoccupied Htg Temp.	75	*F
Proposed U Value	**0.033**	**Btuh/SF/°F**	Cooling Unocc Enthalpy Setpoint	27.5	Btu/lb	Cooling Electricity	$ 0.144	$/kWh
						Heating NG Cost	$ 1.11	$/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	35.4	6	3	4	-88,815	-81,631	-83,648	-79,098	0	0	0	0
92.5	37.4	31	13	18	-104,902	-97,718	-100,749	-96,199	0	0	0	0
87.5	35.0	131	55	76	-79,297	-72,112	-76,156	-71,606	0	0	0	0
82.5	33.0	500	208	292	-58,222	0	-56,095	0	0	0	0	0
77.5	31.5	620	258	362	-41,291	0	-40,177	0	0	0	0	0
72.5	29.9	664	277	387	-23,013	0	-22,911	0	0	0	0	0
67.5	27.2	854	356	498	0	0	0	0	0	0	0	0
62.5	24.0	927	386	541	0	0	0	0	0	0	0	0
57.5	20.3	600	250	350	0	0	0	0	0	0	0	0
52.5	18.2	730	304	426	77,567	63,464	71,995	58,905	0	0	633	587
47.5	16.0	491	205	286	91,671	77,567	85,085	71,995	0	0	512	475
42.5	14.5	656	273	383	105,774	91,671	98,175	85,085	0	0	800	742
37.5	12.5	1,023	426	597	119,877	105,774	111,265	98,175	0	0	1,428	1,325
32.5	10.5	734	306	428	133,980	119,877	124,355	111,265	0	0	1,154	1,071
27.5	8.7	334	139	195	148,083	133,980	137,445	124,355	0	0	584	542
22.5	7.0	252	105	147	162,186	148,083	150,535	137,445	0	0	485	450
17.5	5.4	125	52	73	176,289	162,186	163,625	150,535	0	0	263	244
12.5	3.7	47	20	27	190,393	176,289	176,715	163,625	0	0	107	99
7.5	2.1	34	14	20	204,496	190,393	189,805	176,715	0	0	83	77
2.5	1.3	1	0	1	218,599	204,496	202,895	189,805	0	0	3	2
TOTALS		**8,760**	**3,650**	**5,110**					0	0	**6,051**	**5,616**

Existing Ceiling Infiltration	**2,100**	**cfm**
Existing Ceiling Heat Transfer	**553**	**Btuh/°F**
Proposed Ceiling Infiltration	**2,100**	**cfm**
Proposed Ceiling Heat Transfer	**350**	**Btuh/°F**

Savings	**435**	**Therms**	**$ 482**
	0	**kWh**	**$ -**
			$ 482

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-1 Install Additional Attic Insulation - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Blown-In Attic Insulation (9" thick)	10,500	SF	$ 0.470	$ 0.330	$ 0.130	$ 5,068	$ 4,317	$ 1,534	$ 10,920	RS Means 2012
						$ -	$ -	$ -	$ -	

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

$ 10,920	Subtotal
$ 2,730	25% Contingency
$ 13,650	**Total**

Site Name - NJBPU
CHA Project #27999
Lafayette Street School

ECM-2a: Heating Fuel Conversion

Description: Convert existing oil fired boiler burners to NG fired burners. Leave existing boilers and heating system as-is.

Existing Fuel #2 Oil
Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 3.33	/ Gal #2	Based on blended rate
Proposed Fuel Cost	$ 1.11	/ Therm	Based on average cost from Utility Analysis
Baseline Fuel Use	29,217	Gals #2	Based on historical utility data
Existing Boiler Plant Efficiency	80%		Estimated or Measured
Baseline Boiler Load	3,241,918	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 138.7 Mbtu/Gals #2
Baseline Fuel Cost	$ 97,293		
Proposed Boiler Plant Efficiency	80%		New Burner Efficiency
Proposed Fuel Use	40,524	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 44,982		
Calculated Gas Penalty	(40,524)	Therms	
Estimated Annual Savings	29,217	Gals #2	

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-2b: Boiler Replacement

Description: Convert steam boilers (new) to hot water. Add one new condnesing ghas boiler for primary operation
Note: Requires full conversion of building from steam to hot water

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 1.11	/ Therm	Natural Gas
Baseline Fuel Cost	$ 1.11	/ Therm	Natural Gas
FORMULA CONSTANTS			
Oversize Factor	0.8		
Hours per Day	24		
Infrared Conversion Factor	1.0		1.0 if Boiler, 0.8 if Infrared Heater
EXISTING			
Capacity	1,061,758	btu/hr	
Heating Combustion Efficiency	80%		
Heating Degree-Day	2,783	Degree-day	
Design Temperature Difference	14	F	
Proposed Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	1,061,758	btu/hr	
Efficiency	90%		
SAVINGS			
Fuel Savings	5,628		NJ Protocols Calculation
Fuel Cost Savings	$ 6,247		

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

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-2B: Hot Water Boiler Reset Control

Notes:

1. Building heat is proposed to be provided by condensing gas-fired hot water boilers.
2. Boiler currently does not have hot water reset control, boiler water temprature remains constant throughout the year.
3. Recommend installation of condensing boiler and controls to allow for automatic boiler water reset based on OA temperature.
4. This measure has been interracted with the 'Boiler Replacement' measure.

BOILER WATER TEMPERATURE RESET:

90.0%	…BOILER COMBUSTION EFFICIENCY (OLDEFF)
5.0%	…BOILER/PIPING RADIANT& MISC. HEAT LOSSES (OLDLOSS)
80	…AMBIENT ROOM TEMPERATURE (AMBTEMP)
180	...CURRENT BOILER AVERAGE TEMPERATURE (OLDTEMP)
150	...NEW BOILER AVERAGE TEMPERATURE (NEWTEMP)
30	...AVERAGE REDUCTION IN BOILER TEMP (AVGRED) = (OLDTEMP-NEWTEMP)
0.75%	...REDUCTION IN COMBUSTION LOSSES BY RESET (COMBRED) = AVGRED/40/100
1.50%	...REDUCTION IN RADIANT LOSSES (RADRED)=(OLDLOSS-(OLDLOSS*(NEWTEMP-AMBTEMP)/(OLDTEMP-AMBTEMP)))
2.25%	...NET IMPROVEMENT IN BOILER FUEL-TO-HEAT EFFICIENCY (NETEFF) = COMBRED+RADRED
THERMS	...TYPE OF FUEL (GAS MCF, OIL GAL, COAL TONS)
$ 3.33	... COST / UNIT OF FUEL
100,000	...BTUs / UNIT (BTUs/UNIT)
34896	...ANNUAL TOTAL FUEL CONSUMPTION FROM BILLS (TOTFUEL)
0.00	…ESTIMATED NON-BOILER FUEL CONSUMPTION (OTHFUEL)
34895.65	...ANNUAL BOILER FUEL CONSUMPTION (HEATFUEL) = TOTFUEL-OTHFUEL
85.0%	…CURRENT BOILER FUEL-TO-HEAT EFFICIENCY (CEFF) = OLDEFF-OLDLOSS
87.3%	…RETROFIT BOILER FUEL-TO-HEAT EFFICIENCY (REFF) = CEFF+NETEFF
899.89	...CALCULATED ANNUAL FUEL SAVINGS (FUELSAVE) = ANNFUEL - (ANNFUEL*CEFF/REFF)

899.89 THERMS SAVINGS

FUELSAVE * COST/UNIT OF FUEL ========== **$2,996.63 COST SAVINGS**

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-3: Install Destratification Fans in Media Center

Summary: The Auditorium has an approximately 25' high ceiling. Due to the configuration of the HVAC system, this space often feels cold during the winter due to the warm air rising to the top of the room. It is recommended to install destratification fans in th ceiling of the room to push the heated air down towards where occupants can feel it. This will provide better occupant comfort as well as reduce the total heating and cooling loads within the space. This reduction in loads will result in electrical cooling and natural gas heating savings.

EXISTING CONDITIONS		
Existing Facility Total Electric usage	426,000	kWh
Existing Facility Oil Usage	29,217	Gal
BTU Content in Oil	140,000	btu/gal
BTU Content in Natural Gas	100,000	btu/therm
Equivalent Facility Natural Gas Usage	40,904	Therms
Auditorium HVAC Electric Use	0	kWh
Auditorium HVAC Gas Use	2,425	Therms
Cost of Electricty	$ 0.14	$/kWh
Cost of Natural Gas	$ 1.11	$/Therm
SAVINGS		
Annual Destratification Electric savings	**0**	**kWh[7]**
Annual Destratification Natural Gas savings	**398**	**Therms[7]**
Total Cost Savings	$ 441	

Assumptions

1	0%	Percent of total facility electric usage for HVAC fpr typical school buildings -No cooling in Auditorium
2	82%	Percent of total facility natural gas usage for HVAC for typical school buildings
3	69,161	Total Facility Area (SF)
4	5,000	Auditorium Area (SF)
5	6	Estimated floor to ceiling Δt (°F)
6	25	Estimated floor to ceiling height (Ft)
7	16.4%	Percent HVAC savings for destratification per manufacturer (see table below), Source: http://www.theairpear.com/hvacenergysavings.html

Potential Energy Savings Table

ΔT (°F)	5.4	7.2	9	10.8	12.6	14.4	16.2	18	19.8	
20 ft. Ceiling	12.7%	14.7%	16.2%	17.5%	18.7%	19.8%	21.0%	22.0%	23.0%	Percentage of Energy Savings
26 ft. Ceiling	15.8%	17.6%	19.0%	20.8%	22.1%	23.3%	24.4%	26.0%	27.0%	
33 ft. Ceiling	18.0%	20.0%	21.8%	23.2%	24.8%	26.3%	27.6%	28.8%	30.5%	
40 ft. Ceiling	20.0%	22.0%	23.6%	25.6%	27.0%	28.4%	30.0%	31.8%	33.2%	

Source: http://www.theairpear.com/hvacenergysavings.html

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-3: Install Destratification Fans in Media Center - 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.		
						$ -	$ -	$ -	$ -	
New Destratification Fans	4	EA	$ 450	$ 1,000		$ 1,849	$ 4,984	$ -	$ 6,833	Vendor Quote
Electrical - misc.	1	LS	$ 1,000	$ 1,000		$ 1,027	$ 1,246	$ -	$ 2,273	Vendor Quote
						$ -	$ -	$ -	$ -	

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

$ 9,106	Subtotal
$ 2,276	25% Contingency
$ 11,400	**Total**

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EQUIPMENT		AREA/EQUIPMENT SERVED	COOLING CAPACITY (btu/h)
Window A/C	5x	Offices	144,000

Total Electric DX Cooling: *144,000* *btu/h*

ECM-4: Install Window A/C Controller

ECM Description Summary

Window A/Cs are not programmable and run the risk of operating when no occupants are present. A plug-in window A/C controller will turn off the A/C when no occupants are detected.

ASSUMPTIONS			Comments
Electric Cost	$0.144	/ kWh	
Average run hours per Week	60	Hours	
Space Balance Point	55	F	
Space Temperature Setpoint	65	deg F	Setpoint.
BTU/Hr Rating of existing A/C	144,000	Btu / Hr	Total BTU/hr of existing equipment to be replaced.
Average EER	10.7		
Existing Annual Electric Usage	13,487	kWh	

Item	Value	Units	Comments
Average EER	10.7		
Proposed Annual Electric Usage	5,633	kWh	Savings resulting in reduced run hours of A/C unit

ANNUAL SAVINGS		
Annual Electrical Usage Savings	7,854	kWh
Annual Cost Savings	$1,131	
Total Project Cost	$1,000	
Simple Payback	1	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	6	2	89%	2
92.5	31	11	79%	9
87.5	131	47	68%	32
82.5	500	179	58%	103
77.5	620	221	47%	105
72.5	664	237	37%	87
67.5	854	305	26%	80
62.5	927	0	0%	0
57.5	600	0	0%	0
52.5	730	0	0%	0
47.5	491	0	0%	0
42.5	656	0	0%	0
37.5	1,023	0	0%	0
32.5	734	0	0%	0
27.5	334	0	0%	0
22.5	252	0	0%	0
17.5	125	0	0%	0
12.5	47	0	0%	0
7.5	34	0	0%	0
2.5	1	0	0%	0
-2.5	0	0	0%	0
-7.5	0	0	0%	0
Total	8,760	1,002	42%	419

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-4: Install Window A/C Controller - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						0	$ -	$ -	$ -	
Window AC Controller	5	EA	$ 150	$ -	$ -	770.25	$ -	$ -	$ 770	Est wireless A/C controller
						$ -	$ -	$ -	$ -	

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

$	770	Subtotal
$	193	25% Contingency
$	**1,000**	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-5A: Basic Controls

Day Setback

EXISTING CONDITIONS			
Heating			
Heating Season Facility Temp	80	F	Th
Weekly Occupied Hours	70	hrs	H
Heating Season Setback Temp	72	F	Sh
Heating Season % Savings per	3%		Ph
Annual Boiler Capacity		Mbtu/yr	
Connected Heating Load	1,061,758	Btu/hr	Caph
Equivalent Full Load Heating	900	hrs	EFLHh
Heating Equipment Efficiency	80%		AFUEh
Cooling			
Cooling Season Facility Temp	-	F	Tc
Weekly Occupied Hours	-	hrs	H
Cooling Season Setback Temp	-	F	Sc
Cooling Season % Savings per			Pc
Connected Cooling Load	-	Tons	Capc
Equivalent Full Load Cooling	-	hrs	EFLHc
Cooling Equipment EER	-		AFUEc
	No Significant Cooling in Bldg		
SAVINGS			
Natural Gas Savings	1,587	Therms[3]	
Cooling Electricity Savings	0	kWh	

Nighttime Setback

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	80	F
Weekly Occupied Hours	70	hrs
Heating Season Setback Temp	65	F
Heating Season % Savings per	3%	
Annual Boiler Capacity		Mbtu/yr
Connected Heating Load Capacity	1,061,758	Btu/hr
Equivalent Full Load Heating Hours	500	hrs
Heating Equipment Efficiency	80%	
Cooling		
Cooling Season Facility Temp	-	F
Weekly Occupied Hours	-	hrs
Cooling Season Setback Temp	80	F
Cooling Season % Savings per		
Connected Cooling Load Capacity	-	Tons
Equivalent Full Load Cooling Hours	-	hrs
Cooling Equipment EER	-	
	No Significant Cooling in Bldg	
SAVINGS		
Natural Gas Savings	1,653	Therms[3]
Cooling Electricity Savings	0	kWh

Algorithms

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

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

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

Definition of Variables

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

Occupancy Controlled Thermostats

Component	Type	Value	Source
T_h	Variable		Application
T_c	Variable		Application
S_h	Fixed	T_h-5°	
S_c	Fixed	T_c+5°	
H	Variable		Application; Default of 56 hrs/week
Cap_{hp}	Variable		Application
Cap_h	Variable		Application
$EFLH_c$	Fixed	381	1
$EFLH_h$	Fixed	900	PSE&G
P_h	Fixed	3%	2
P_c	Fixed	6%	2
$AFUE_h$	Variable		Application
EER_{hp}	Variable		Application

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

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-5A: Basic Controls - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Basic Controls (Incl. Setback)	1	ea	$ 7,500	$ 7,500		$ 7,703	$ 9,345	$ -	$ 17,048	Engineers estimate
						$ -	$ -	$ -	$ -	

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

$	17,048	Subtotal
$	4,262	25% Contingency
$	**21,309**	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-5B: Install Full DDC Controls

Summary: Presently boilers operate in manual mode. The proposed case involves installing full DDC controls to include morning warm-up, individual space regulation, temperature setback while unoccupied and scheduling

Building Information:

69,161	Sq Footage	$0.14	$/kWh Blended
N	Cooling	$3.33	$/Gallon
Y	Heating		

FULL DDC - TEMPERATURE SETBACK SAVINGS CALCULATION

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	80	F
Weekly Occupied Hours	80	hrs
Heating Season Setback Temp	75	F
Heating Season % Savings per Degree Setback	3%	
Annual Boiler Capacity	-	Mbtu/yr
Connected Heating Load Capacity	1,061,758	Btu/hr
Equivalent Full Load Heating Hours	900	hrs
Heating System Efficiency	80%	
Cooling		
Cooling Season Facility Temp		F
Weekly Occupied Hours		hrs
Cooling Season Setback Temp		F
Cooling Season % Savings per Degree Setback		
Connected Cooling Load Capacity		Tons
Equivalent Full Load Cooling Hours		hrs
Cooling Equipment EER	-	
	No Significant Cooling	
SAVINGS		
Natural Gas Savings	3,240	Therms
Cooling Electricity Savings	0	kWh
Total Cost Savings	$ 10,789	
Estimated Total Project Cost	$ 21,309	

FULL DDC - ADDITIONAL CONTROLS SAVINGS CALCULATION

EXISTING CONDITIONS		
Existing Facility Total Electric usage	426,000	kWh
Existing Facility Total Gas usage	29,217	Gallons
Existing Facility Cooling Electric usage	-	kWh[1]
Existing Facility Heating Oil usage	29,217	Gallons[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	0	kWh
Proposed Facility Natural Gas Savings	8,181	Therms
SAVINGS		
Electric Savings	0	**kWh**
Natural Gas Savings	8,181	**Therms**
Total cost savings	$ 27,242	
Estimated Total Project Cost	$ 311,117	[4]

Assumptions

1 0% of facility total electricity dedicated to Cooling; based on utility information
2 100% of facility total oil dedicated to Heating; based on utility information
3 20% Typical Savings associated with installation of DDC controls
4 $311,117 Based on wireless DDC cost

COMBINED SAVINGS		
Natural Gas Savings	11,421	Therms
Cooling Electricity Savings	0	kWh
Total Cost Savings	$ 38,031	
Estimated Total Project Cost	$ 332,426	
Simple Payback	8.7	Yrs

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-5B: Install Full DDC Controls - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Radiator Controls (cost per [4] units)	5	ea	$ 2,250	$ 2,250		$ 11,554	$ 14,018	$ -	$ 25,571	Vendor Quote
Unit Ventilator Controls	35	ea	$ 2,250	$ 2,250		$ 80,876	$ 98,123	$ -	$ 178,999	Vendor Quote
Boiler Controls	2	ea	$ 1,750	$ 1,750		$ 3,595	$ 4,361	$ -	$ 7,956	Vendor Quote
Controls Head End/Programming	1	ea	$ 16,000	$ 16,000		$ 16,432	$ 19,936	$ -	$ 36,368	Vendor Quote

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

$ 248,894	Subtotal
$ 62,223	25% Contingency
$ 311,117	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

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

Summary:

The existing domestic hot water heating system consists of (1) large natural gas fired 100 gallon tank type water heater and a supplemental 119 gallon storage tank. The amount of stored water is grossly oversized for this type of school that only uses hot water at hand sinks. It is proposed to replace this system with one smaller natural gas fired tank type domestic hot water heater. Energy savings will result from reduced hot water storage losses and increased combustion efficiency.

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	**94**	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	112,900	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	78%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	88,062	MBTU/yr	
Existing Tank Size	160	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	˚F	Per building personnel
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	2.3	MBH	
Annual Standby Hot Water Load	20,477	MBTU/yr	
New Tank Size	50	Gallons	Based on AO Smith Cyclone tank type, condensing DHW Heater
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	˚F	
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.8	MBH	
Annual Standby Hot Water Load	6,826	MBTU/yr	
Total Annual Hot Water Demand	74,411	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on AO Smith, condensing DHW Heater
Proposed Fuel Use	775	Therns	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$1.11	$/Therm	
Existing Operating Cost of DHW	$1,253	$/yr	
Proposed Operating Cost of DHW	$860	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	354	$393

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-6: Replace Gas-Fired DHW Heater w/ Condensing Gas-Fired 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.		
Gas-Fired DHW Heater Removal	1	LS		$ 50		$ -	$ 62	$ -	$ 62	Vendor Quote
High Efficiency Gas-Fired DHW Heater	1	EA	$ 5,500	$ 5,500		$ 5,649	$ 6,853	$ -	$ 12,502	Vendor Quote
Miscellaneous Electrical	1	LS	$ 300	$ 300		$ 308	$ 374	$ -	$ 682	Vendor Quote
Venting (Sch 40 CPVC)	1	LS	$ 500	$ 1,000		$ 514	$ 1,246	$ -	$ 1,760	Vendor Quote
Miscellaneous Piping and Valves	1	LS	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	Vendor Quote

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

$ 16,142	Subtotal
$ 4,035	25% Contingency
$ 20,177	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

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

Description: This ECM evaluates the water savings associated with replacing/ upgrading urinals with 0.125 GPF urinals and or flush valves.

EXISTING CONDITIONS		
Cost of Water / 1000 Gallons	$7.55	$ / kGal
Urinals in Building to be replaced	23	
Average Flushes / Urinal (per Day)	3	
Average Gallons / Flush	2.5	Gal

PROPOSED CONDITIONS		
Proposed Urinals to be Replaced	23	
Proposed Gallons / Flush	0.125	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	62.96	kGal / year
Proposed Urinal Water Use	3.15	kGal / year
Water Savings	59.81	kGal / year
Cost Savings	$452	/ year

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

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

ECM-7: 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	$7.55	$ / kGal
Toilets in Building	37	
Average Flushes / Toilet (per Day)	3	
Average Gallons / Flush	3.5	Gal

PROPOSED CONDITIONS		
Proposed Toilets to be Replaced	37	
Proposed Gallons / Flush	1.28	Gal

SAVINGS		
Current Toilet Water Use	141.80	kGal / year
Proposed Toilet Water Use	51.86	kGal / year
Water Savings	89.94	kGal / year
Cost Savings	$679	/ year

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

Replace Plumbing Fixtures with Low-Flow Equivalents - 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.		
									$ -	
Low-Flow Urinal	23	EA	$ 1,200	$ 1,000	$ -	$ 28,345	$ 28,658	$ -	$ 57,003	Vendor Estimate
Low-Flow Toilet	37	EA	$ 1,400	$ 1,000	$ -	$ 53,199	$ 46,102	$ -	$ 99,301	Vendor Estimate

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

$ 156,304	Subtotal
$ 39,076	25% Contingency
$ 195,380	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Hawkins Street

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)	69,161
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)	$61,358	$1,257
Existing Usage (from utility)	426,000	1,129
Proposed Savings	70,562	4,426
Existing Total MMBtus	1,567	
Proposed Savings MMBtus	683	
% Energy Reduction	**43.6%**	
Proposed Annual Savings	$15,203	

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

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$3,458
Incentive #2	$7,762	$5,533	$13,295
Incentive #3	$7,762	$5,533	$13,295
Total All Incentives	**$15,524**	**$11,066**	**$30,047**

Total Project Cost	$155,908

		Allowable Incentive
% Incentives #1 of Utility Cost*	5.5%	$3,458
% Incentives #2 of Project Cost**	8.5%	$13,295
% Incentives #3 of Project Cost**	8.5%	$13,295
Total Eligible Incentives***	**$30,047**	
Project Cost w/ Incentives	$125,861	

Project Payback (years)	
w/o Incentives	w/ Incentives
10.3	8.3

* 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 Newark Public Schools - Hawkins Street Elementary School
CHA Project No.27999
ECM-L1 Lighting Replacements

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
15LED	Boiler Room	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2000	2,520	21	4 ft LED Tube	200732x2	30	0.6	SW	2,000	1,260	1,260	0.6	$ 197.42	$ 3,049.20	$0	15.4	15.4
15LED	Custodial	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	3400	1,020	5	4 ft LED Tube	200732x2	30	0.2	SW	3,400	510	510	0.2	$ 74.51	$ 726.00	$0	9.7	9.7
50LED	Hallway	9	W 32 P F 2 (ELE)	F42LL	60	0.5	SW	6240	3,370	9	4 ft LED Tube	200732x2	30	0.3	SW	6,240	1,685	1,685	0.3	$ 234.58	$ 1,306.80	$0	5.6	5.6
50LED	Hallway	9	W 32 P F 2 (ELE)	F42LL	60	0.5	SW	6240	3,370	9	4 ft LED Tube	200732x2	30	0.3	SW	6,240	1,685	1,685	0.3	$ 234.58	$ 1,306.80	$0	5.6	5.6
50LED	Hallway	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	6240	1,498	4	4 ft LED Tube	200732x2	30	0.1	SW	6,240	749	749	0.1	$ 104.26	$ 580.80	$0	5.6	5.6
50LED	104	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	4 ft LED Tube	200732x2	30	0.1	SW	2,400	144	144	0.1	$ 21.95	$ 290.40	$0	13.2	13.2
105LED	102	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
50LED	102 Closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	4 ft LED Tube	200732x2	30	0.0	SW	2,400	72	72	0.0	$ 10.97	$ 145.20	$0	13.2	13.2
50LED	Café Hallway	12	W 32 P F 2 (ELE)	F42LL	60	0.7	SW	2000	1,440	12	4 ft LED Tube	200732x2	30	0.4	SW	2,000	720	720	0.4	$ 112.81	$ 1,742.40	$0	15.4	15.4
50LED	Cafeteria	42	W 32 P F 2 (ELE)	F42LL	60	2.5	SW	2000	5,040	42	4 ft LED Tube	200732x2	30	1.3	SW	2,000	2,520	2,520	1.3	$ 394.83	$ 6,098.40	$0	15.4	15.4
50LED	Locker Room	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2800	168	1	4 ft LED Tube	200732x2	30	0.0	SW	2,800	84	84	0.0	$ 12.54	$ 145.20	$0	11.6	11.6
105LED	Locker Room Bathroom	1	W 32 F 1	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 10.45	$ 72.60	$0	6.9	6.9
105LED	101	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
50LED	108	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	4 ft LED Tube	200732x2	30	0.1	SW	2,400	288	288	0.1	$ 43.89	$ 580.80	$0	13.2	13.2
18LED	Main Office	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	3000	3,024	9	T 74 R LED	RTLED50	50	0.5	SW	3,000	1,350	1,674	0.6	$ 247.95	$ -	$0	0.0	0.0
18LED	Principal Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	3000	672	2	T 74 R LED	RTLED50	50	0.1	SW	3,000	300	372	0.1	$ 55.10	$ -	$0	0.0	0.0
18LED	Break Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	3000	672	2	T 74 R LED	RTLED50	50	0.1	SW	3,000	300	372	0.1	$ 55.10	$ -	$0	0.0	0.0
50LED	Hallway	12	W 32 P F 2 (ELE)	F42LL	60	0.7	SW	6240	4,493	12	4 ft LED Tube	200732x2	30	0.4	SW	6,240	2,246	2,246	0.4	$ 312.77	$ 1,742.40	$0	5.6	5.6
105LED	117A	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	SW	2,400	432	490	0.2	$ 74.62	$ 871.20	$0	11.7	11.7
105LED	112	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	SW	2,400	432	490	0.2	$ 74.62	$ 871.20	$0	11.7	11.7
105LED	117B	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	SW	2,400	432	490	0.2	$ 74.62	$ 871.20	$0	11.7	11.7
105LED	113	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	SW	2,400	432	490	0.2	$ 74.62	$ 871.20	$0	11.7	11.7
50LED	Hallway	5	W 32 P F 2 (ELE)	F42LL	60	0.3	SW	6240	1,872	5	4 ft LED Tube	200732x2	30	0.2	SW	6,240	936	936	0.2	$ 130.32	$ 726.00	$0	5.6	5.6
105LED	114	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	SW	2,400	432	490	0.2	$ 74.62	$ 871.20	$0	11.7	11.7
105LED	116	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
105LED	115	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
50LED	Exit	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	6240	374	1	4 ft LED Tube	200732x2	30	0.0	SW	6,240	187	187	0.0	$ 26.06	$ 145.20	$0	5.6	5.6
105LED	111	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
50LED	109 Health Office	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3000	360	2	4 ft LED Tube	200732x2	30	0.1	SW	3,000	180	180	0.1	$ 26.66	$ 290.40	$0	10.9	10.9
50LED	Boys Room	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	4300	1,032	4	4 ft LED Tube	200732x2	30	0.1	SW	4,300	516	516	0.1	$ 73.76	$ 580.80	$0	7.9	7.9
50LED	Girls Room	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	4300	1,032	4	4 ft LED Tube	200732x2	30	0.1	SW	4,300	516	516	0.1	$ 73.76	$ 580.80	$0	7.9	7.9
50LED	Custodial	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3400	204	1	4 ft LED Tube	200732x2	30	0.0	SW	3,400	102	102	0.0	$ 14.90	$ 145.20	$0	9.7	9.7
105LED	102	22	W 32 F 1	F41LL	32	0.7	SW	2400	1,690	22	4 ft LED Tube	200732x1	15	0.3	SW	2,400	792	898	0.4	$ 136.79	$ 1,597.20	$0	11.7	11.7
50LED	Nurses Office	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	3000	540	3	4 ft LED Tube	200732x2	30	0.1	SW	3,000	270	270	0.1	$ 39.99	$ 435.60	$0	10.9	10.9
50LED	Nurses Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	258	1	4 ft LED Tube	200732x2	30	0.0	SW	4,300	129	129	0.0	$ 18.44	$ 145.20	$0	7.9	7.9
50LED	Nurses Storage	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3200	192	1	4 ft LED Tube	200732x2	30	0.0	SW	3,200	96	96	0.0	$ 14.12	$ 145.20	$0	10.3	10.3
50LED	Stairwell	6	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	6240	2,246	6	4 ft LED Tube	200732x2	30	0.2	SW	6,240	1,123	1,123	0.2	$ 156.38	$ 871.20	$0	5.6	5.6
105LED	203	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
105LED	204	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
105LED	Stairwell	1	W 32 F 1	F41LL	32	0.0	SW	6240	200	1	4 ft LED Tube	200732x1	15	0.0	SW	6,240	94	106	0.0	$ 14.77	$ 72.60	$0	4.9	4.9
50LED	Stairwell	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	6240	1,123	3	4 ft LED Tube	200732x2	30	0.1	SW	6,240	562	562	0.1	$ 78.19	$ 435.60	$0	5.6	5.6
18LED	Stairwell	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	6240	699	1	T 74 R LED	RTLED50	50	0.1	SW	6,240	312	387	0.1	$ 53.87	$ -	$0	0.0	0.0
50LED	203 closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	4 ft LED Tube	200732x2	30	0.0	SW	2,400	72	72	0.0	$ 10.97	$ 145.20	$0	13.2	13.2
50LED	204 closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	4 ft LED Tube	200732x2	30	0.0	SW	2,400	72	72	0.0	$ 10.97	$ 145.20	$0	13.2	13.2
105LED	202	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
105LED	205	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
105LED	201	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	206	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	200	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	207	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
50LED	Teachers Lounge	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3000	360	2	4 ft LED Tube	200732x2	30	0.1	SW	3,000	180	180	0.1	$ 26.66	$ 290.40	$0	10.9	10.9
105LED	208	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
50LED	Stairwell	6	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	6240	2,246	6	4 ft LED Tube	200732x2	30	0.2	SW	6,240	1,123	1,123	0.2	$ 156.38	$ 871.20	$0	5.6	5.6
50LED	Boys Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	SW	4,300	258	258	0.1	$ 36.88	$ 290.40	$0	7.9	7.9
50LED	Girls Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	SW	4,300	258	258	0.1	$ 36.88	$ 290.40	$0	7.9	7.9
105LED	209	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	211	24	W 32 F 1	F41LL	32	0.8	SW	2400	1,843	24	4 ft LED Tube	200732x1	15	0.4	SW	2,400	864	979	0.4	$ 149.23	$ 1,742.40	$0	11.7	11.7
105LED	212	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	Restroom	1	W 32 F 1	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 10.45	$ 72.60	$0	6.9	6.9
105LED	Auditorium	20	W 32 F 1	F41LL	32	0.6	SW	2000	1,280	20	4 ft LED Tube	200732x1	15	0.3	SW	2,000	600	680	0.3	$ 106.54	$ 1,452.00	$0	13.6	13.6
50LED	Stairwell to Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	2000	840	7	4 ft LED Tube	200732x2	30	0.2	SW	2,000	420	420	0.2	$ 65.81	$ 1,016.40	$0	15.4	15.4
50LED	Stairwell to Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	2000	840	7	4 ft LED Tube	200732x2	30	0.2	SW	2,000	420	420	0.2	$ 65.81	$ 1,016.40	$0	15.4	15.4
105LED	Stairwell to Auditorium	2	W 32 F 1	F41LL	32	0.1	SW	2000	128	2	4 ft LED Tube	200732x1	15	0.0	SW	2,000	60	68	0.0	$ 10.65	$ 145.20	$0	13.6	13.6
50LED	Auditorium Back Room Lef	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	SW	2,000	120	120	0.1	$ 18.80	$ 290.40	$0	15.4	15.4
50LED	Auditorium Back Room Righ	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	SW	2,000	120	120	0.1	$ 18.80	$ 290.40	$0	15.4	15.4
50LED	Hallway	21	W 32 P F 2 (ELE)	F42LL	60	1.3	SW	6240	7,862	21	4 ft LED Tube	200732x2	30	0.6	SW	6,240	3,931	3,931	0.6	$ 547.34	$ 3,049.20	$0	5.6	5.6
50LED	Hallway	21	W 32 P F 2 (ELE)	F42LL	60	1.3	SW	6240	7,862	21	4 ft LED Tube	200732x2	30	0.6	SW	6,240	3,931	3,931	0.6	$ 547.34	$ 3,049.20	$0	5.6	5.6
105LED	306	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	300	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 111.92	$ 1,306.80	$0	11.7	11.7
105LED	307	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	312	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
50LED	Girls Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	SW	4,300	258	258	0.1	$ 36.88	$ 290.40	$0	7.9	7.9
50LED	Boys Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	SW	4,300	258	258	0.1	$ 36.88	$ 290.40	$0	7.9	7.9
50LED	Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	258	1	4 ft LED Tube	200732x2	30	0.0	SW	4,300	129	129	0.0	$ 18.44	$ 145.20	$0	7.9	7.9
105LED	311	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	309	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
105LED	308	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	SW	2,400	756	857	0.4	$ 130.58	$ 1,524.60	$0	11.7	11.7
50LED	313 Vice Principal	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	3000	540	3	4 ft LED Tube	200732x2	30	0.1	SW	3,000	270	270	0.1	$ 39.99	$ 435.60	$0	10.9	10.9
71	313 Restroom	1	I 60	I60/1	60	0.1	SW	3000	180	1	CF 26	CFQ26/1-L	27	0.0	SW	3,000	81	99	0.0	$ 14.66	$ 6.00	$0	0.4	0.4
50LED	Kitchen	13	W 32 P F 2 (ELE)	F42LL	60	0.8	SW	2000	1,560	13	4 ft LED Tube	200732x2	30	0.4	SW	2,000	780	780	0.4	$ 122.21	$ 1,887.60	$0	15.4	15.4
50LED	Kitchen Storage	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	SW	2,000	120	120	0.1	$ 18.80	$ 290.40	$0	15.4	15.4
252	Gymnasium	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.2	SW	2800	11,794	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.2	SW	2,800	11,794	-	0.0	$ -	$ -	$0		#DIV/0!
231	Exterior Lights	12	MH 400 Pole/Spot	MH400/1	458	5.5	SW	4368	24,007	12	MH 400 Pole/Spot	MH400/1	458	5.5	SW	4,368	24,007	-	0.0	$ -	$ -	$0		#DIV/0!
	Total	876				45.1			144,692	876			2,791	26.7				88,558	56,134	18.4	$8,298	$78,922	$0		
																		Demand Savings			18.4	$944			
																		kWh Savings			56,134	$7,354			
																		Total savings				$8,298		9.5	9.5

Energy Audit of Newark Public Schools - Hawkins Street Elementary School
CHA Project No.27999
ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of Fixtures No. of fixtures before the retrofit	Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Number of Fixtures No. of fixtures after the retrofit	Standard Fixture Code "Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Number of Fixtures)	Retrofit Control Retrofit control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual $ Saved (kW Saved) * ($/kWh)	Retrofit Cost Cost for renovations to lighting system	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered
15LED	Boiler Room	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2000	2,520.0	21	S 32 C F 2 (ELE)	F42LL	60	1.3	NONE	2000	2,520.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
15LED	Custodial	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	3400	1,020.0	5	S 32 C F 2 (ELE)	F42LL	60	0.3	NONE	3400	1,020.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Hallway	9	W 32 P F 2 (ELE)	F42LL	60	0.5	SW	6240	3,369.6	9	W 32 P F 2 (ELE)	F42LL	60	0.5	NONE	6240	3,369.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Hallway	9	W 32 P F 2 (ELE)	F42LL	60	0.5	SW	6240	3,369.6	9	W 32 P F 2 (ELE)	F42LL	60	0.5	NONE	6240	3,369.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Hallway	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	6240	1,497.6	4	W 32 P F 2 (ELE)	F42LL	60	0.2	NONE	6240	1,497.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	104	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	C-OCC	1680	201.6	86.4	0.0	$11.32	$270.00	$35.00	23.9	20.8
105LED	102	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
50LED	102 Closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	2400	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Café Hallway	12	W 32 P F 2 (ELE)	F42LL	60	0.7	SW	2000	1,440.0	12	W 32 P F 2 (ELE)	F42LL	60	0.7	NONE	2000	1,440.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Cafeteria	42	W 32 P F 2 (ELE)	F42LL	60	2.5	SW	2000	5,040.0	42	W 32 P F 2 (ELE)	F42LL	60	2.5	NONE	2000	5,040.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Locker Room	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2800	168.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	2800	168.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	Locker Room Bathroom	1	W 32 F 1	F41LL	32	0.0	SW	4300	137.6	1	W 32 F 1	F41LL	32	0.0	NONE	4300	137.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	101	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
50LED	108	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	W 32 P F 2 (ELE)	F42LL	60	0.2	C-OCC	1680	403.2	172.8	0.0	$22.64	$270.00	$35.00	11.9	10.4
18LED	Main Office	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	3000	3,024.0	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	NONE	3000	3,024.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Principal Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	3000	672.0	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	NONE	3000	672.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Break Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	3000	672.0	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	C-OCC	1500	336.0	336.0	0.0	$44.02	$270.00	$35.00	6.1	5.3
50LED	Hallway	12	W 32 P F 2 (ELE)	F42LL	60	0.7	SW	6240	4,492.8	12	W 32 P F 2 (ELE)	F42LL	60	0.7	NONE	6240	4,492.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	117A	12	W 32 F 1	F41LL	32	0.4	SW	2400	921.6	12	W 32 F 1	F41LL	32	0.4	C-OCC	1680	645.1	276.5	0.0	$36.22	$270.00	$35.00	7.5	6.5
105LED	112	12	W 32 F 1	F41LL	32	0.4	SW	2400	921.6	12	W 32 F 1	F41LL	32	0.4	C-OCC	1680	645.1	276.5	0.0	$36.22	$270.00	$35.00	7.5	6.5
105LED	117B	12	W 32 F 1	F41LL	32	0.4	SW	2400	921.6	12	W 32 F 1	F41LL	32	0.4	C-OCC	1680	645.1	276.5	0.0	$36.22	$270.00	$35.00	7.5	6.5
105LED	113	12	W 32 F 1	F41LL	32	0.4	SW	2400	921.6	12	W 32 F 1	F41LL	32	0.4	C-OCC	1680	645.1	276.5	0.0	$36.22	$270.00	$35.00	7.5	6.5
50LED	Hallway	5	W 32 P F 2 (ELE)	F42LL	60	0.3	SW	6240	1,872.0	5	W 32 P F 2 (ELE)	F42LL	60	0.3	NONE	6240	1,872.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	114	12	W 32 F 1	F41LL	32	0.4	SW	2400	921.6	12	W 32 F 1	F41LL	32	0.4	C-OCC	1680	645.1	276.5	0.0	$36.22	$270.00	$35.00	7.5	6.5
105LED	116	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
105LED	115	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
50LED	Exit	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	6240	374.4	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	6240	374.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	111	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
50LED	109 Health Office	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3000	360.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	C-OCC	1500	180.0	180.0	0.0	$23.58	$270.00	$35.00	11.5	10.0
50LED	Boys Room	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	4300	1,032.0	4	W 32 P F 2 (ELE)	F42LL	60	0.2	NONE	4300	1,032.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Girls Room	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	4300	1,032.0	4	W 32 P F 2 (ELE)	F42LL	60	0.2	NONE	4300	1,032.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Custodial	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3400	204.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	3400	204.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	107	22	W 32 F 1	F41LL	32	0.7	SW	2400	1,689.6	22	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,182.7	506.9	0.0	$66.40	$270.00	$35.00	4.1	3.5
50LED	Nurses Office	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	3000	540.0	3	W 32 P F 2 (ELE)	F42LL	60	0.2	C-OCC	1500	270.0	270.0	0.0	$35.37	$270.00	$35.00	7.6	6.6
50LED	Nurses Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	258.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	4300	258.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Nurses Storage	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3200	192.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	3200	192.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Stairwell	6	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	6240	2,246.4	6	W 32 P F 2 (ELE)	F42LL	60	0.4	NONE	6240	2,246.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	203	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
105LED	204	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
105LED	Stairwell	1	W 32 F 1	F41LL	32	0.0	SW	6240	199.7	1	W 32 F 1	F41LL	32	0.0	NONE	6240	199.7	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Stairwell	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	6240	1,123.2	3	W 32 P F 2 (ELE)	F42LL	60	0.2	NONE	6240	1,123.2	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
18LED	Stairwell	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	6240	698.9	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	NONE	6240	698.9	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	203 closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	2400	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	204 closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	2400	144.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	202	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
105LED	205	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
105LED	201	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	206	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	200	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	207	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
50LED	Teachers Lounge	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3000	360.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	3000	360.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	208	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
50LED	Stairwell	6	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	6240	2,246.4	6	W 32 P F 2 (ELE)	F42LL	60	0.4	NONE	6240	2,246.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Boys Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	4300	516.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Girls Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	4300	516.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	209	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	211	24	W 32 F 1	F41LL	32	0.8	SW	2400	1,843.2	24	W 32 F 1	F41LL	32	0.8	C-OCC	1680	1,290.2	553.0	0.0	$72.44	$270.00	$35.00	3.7	3.2
105LED	212	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	Restroom	1	W 32 F 1	F41LL	32	0.0	SW	4300	137.6	1	W 32 F 1	F41LL	32	0.0	NONE	4300	137.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	Auditorium	20	W 32 F 1	F41LL	32	0.6	SW	2000	1,280.0	20	W 32 F 1	F41LL	32	0.6	NONE	2000	1,280.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Stairwell to Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	2000	840.0	7	W 32 P F 2 (ELE)	F42LL	60	0.4	NONE	2000	840.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Stairwell to Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	2000	840.0	7	W 32 P F 2 (ELE)	F42LL	60	0.4	NONE	2000	840.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	Stairwell to Auditorium	2	W 32 F 1	F41LL	32	0.1	SW	2000	128.0	2	W 32 F 1	F41LL	32	0.1	NONE	2000	128.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Auditorium Back Room Lef	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	2000	240.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Auditorium Back Room Righ	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	2000	240.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Hallway	21	W 32 P F 2 (ELE)	F42LL	60	1.3	SW	6240	7,862.4	21	W 32 P F 2 (ELE)	F42LL	60	1.3	NONE	6240	7,862.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Hallway	21	W 32 P F 2 (ELE)	F42LL	60	1.3	SW	6240	7,862.4	21	W 32 P F 2 (ELE)	F42LL	60	1.3	NONE	6240	7,862.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	306	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	300	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382.4	18	W 32 F 1	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$54.33	$270.00	$35.00	5.0	4.3
105LED	307	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	312	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
50LED	Girls Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	4300	516.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Boys Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	4300	516.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	258.0	1	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	4300	258.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
105LED	311	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	309	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
105LED	308	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,612.8	21	W 32 F 1	F41LL	32	0.7	C-OCC	1680	1,129.0	483.8	0.0	$63.38	$270.00	$35.00	4.3	3.7
50LED	313 Vice Principal	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	3000	540.0	3	W 32 P F 2 (ELE)	F42LL	60	0.2	NONE	3000	540.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	313 Restroom	1	I 60	I60/1	60	0.1	SW	3000	180.0	1	I 60	I60/1	60	0.1	NONE	3000	180.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Kitchen	13	W 32 P F 2 (ELE)	F42LL	60	0.8	SW	2000	1,560.0	13	W 32 P F 2 (ELE)	F42LL	60	0.8	NONE	2000	1,560.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Kitchen Storage	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240.0	2	W 32 P F 2 (ELE)	F42LL	60	0.1	NONE	2000	240.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
252	Gymnasium	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.2	SW	2800	11,793.6	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.2	NONE	2800	11,793.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
231	Exterior Lights	12	MH 400 Pole/Spot	MH400/1	458	5.5	SW	4368	24,006.5	12	MH 400 Pole/Spot	MH400/1	458	5.5	NONE	4368	24,006.5	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
	Total	**876**				**45.1**			**144692.3**	**876.0**				**45.1**				**136698.6**	**13993.7**	**0.0**	**1833.2**	**9450.0**	**1225.0**		
																		Demand Savings			**0.0**	**$0**			
																		kWh Savings			**13,994**	**$1,833**			
																		Total Savings				**$1,833**		**5.2**	**4.5**

Energy Audit of Newark Public Schools - Hawkins Street Elementary School
CHA Project No.27999
ECM-L3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
Field Code	Area Description Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of Fixtures No. of fixtures before the retrofit	Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Fixt No.)	Exist Control Pre-inst. control device	Annual Hours Estimated daily hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Number of Fixtures No. of fixtures after the retrofit	Standard Fixture Code Lighting Fixture Code	Fixture Code Code from Table of Standard Fixture Wattages	Watts per Fixture Value from Table of Standard Fixture Wattages	kW/Space (Watts/Fixt) * (Number of Fixtures)	Retrofit Control Retrofit control device	Annual Hours Estimated annual hours for the usage group	Annual kWh (kW/space) * (Annual Hours)	Annual kWh Saved (Original Annual kWh) - (Retrofit Annual kWh)	Annual kW Saved (Original Annual kW) - (Retrofit Annual kW)	Annual $ Saved (kWh Saved) * ($/kWh)	Retrofit Cost Cost for renovations to lighting system	NJ Smart Start Lighting Incentive Prescriptive Lighting Measures	Simple Payback With Out Incentive Length of time for renovations cost to be recovered	Simple Payback Length of time for renovations cost to be recovered
15LED	Boiler Room	21	S 32 C F 2 (ELE)	F42LL	60	1.3	SW	2000	2,520	21	4 ft LED Tube	200732x2	30	0.6	NONE	2,000	1,260	1,260	0.6	$ 197.42	$ 3,049.20	$ -	15.4	15.4
15LED	Custodial	5	S 32 C F 2 (ELE)	F42LL	60	0.3	SW	3400	1,020	5	4 ft LED Tube	200732x2	30	0.2	NONE	3,400	510	510	0.2	$ 74.51	$ 726.00	$ -	9.7	9.7
50LED	Hallway	9	W 32 P F 2 (ELE)	F42LL	60	0.5	SW	6240	3,370	9	4 ft LED Tube	200732x2	30	0.3	NONE	6,240	1,685	1,685	0.3	$ 234.58	$ 1,306.80	$ -	5.6	5.6
50LED	Hallway	9	W 32 P F 2 (ELE)	F42LL	60	0.5	SW	6240	3,370	9	4 ft LED Tube	200732x2	30	0.3	NONE	6,240	1,685	1,685	0.3	$ 234.58	$ 1,306.80	$ -	5.6	5.6
50LED	Hallway	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	6240	1,498	4	4 ft LED Tube	200732x2	30	0.1	NONE	6,240	749	749	0.1	$ 104.26	$ 580.80	$ -	5.6	5.6
50LED	104	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,680	101	187	0.1	$ 27.60	$ 560.40	$ 35	20.3	19.0
105LED	102	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
50LED	102 Closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,400	72	72	0.0	$ 10.97	$ 145.20	$ -	13.2	13.2
50LED	Café Hallway	12	W 32 P F 2 (ELE)	F42LL	60	0.7	SW	2000	1,440	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,000	720	720	0.4	$ 112.81	$ 1,742.40	$ -	15.4	15.4
50LED	Cafeteria	42	W 32 P F 2 (ELE)	F42LL	60	2.5	SW	2000	5,040	42	4 ft LED Tube	200732x2	30	1.3	NONE	2,000	2,520	2,520	1.3	$ 394.83	$ 6,098.40	$ -	15.4	15.4
50LED	Locker Room	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2800	168	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,800	84	84	0.0	$ 12.54	$ 145.20	$ -	11.6	11.6
105LED	Locker Room Bathroom	1	W 32 F 1	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	NONE	4,300	65	73	0.0	$ 10.45	$ 72.60	$ -	6.9	6.9
105LED	101	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
50LED	108	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,680	202	374	0.1	$ 55.21	$ 850.80	$ 35	15.4	14.8
18LED	Main Office	9	T 32 R F 4 (ELE)	F44ILL	112	1.0	SW	3000	3,024	9	T 74 R LED	RTLED50	50	0.5	NONE	3,000	1,350	1,674	0.6	$ 247.95	$ -	$ -	0.0	0.0
18LED	Principal Office	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	3000	672	2	T 74 R LED	RTLED50	50	0.1	NONE	3,000	300	372	0.1	$ 55.10	$ -	$ -	0.0	0.0
18LED	Break Room	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	SW	3000	672	2	T 74 R LED	RTLED50	50	0.1	C-OCC	1,500	150	522	0.1	$ 74.75	$ 270.00	$ 35	3.6	3.1
50LED	Hallway	12	W 32 P F 2 (ELE)	F42LL	60	0.7	SW	6240	4,493	12	4 ft LED Tube	200732x2	30	0.4	NONE	6,240	2,246	2,246	0.4	$ 312.77	$ 1,742.40	$ -	5.6	5.6
105LED	117A	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	C-OCC	1,680	302	619	0.2	$ 91.59	$ 1,141.20	$ 35	12.5	12.1
105LED	112	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	C-OCC	1,680	302	619	0.2	$ 91.59	$ 1,141.20	$ 35	12.5	12.1
105LED	117B	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	C-OCC	1,680	302	619	0.2	$ 91.59	$ 1,141.20	$ 35	12.5	12.1
105LED	113	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	C-OCC	1,680	302	619	0.2	$ 91.59	$ 1,141.20	$ 35	12.5	12.1
50LED	Hallway	5	W 32 P F 2 (ELE)	F42LL	60	0.3	SW	6240	1,872	5	4 ft LED Tube	200732x2	30	0.2	NONE	6,240	936	936	0.2	$ 130.32	$ 726.00	$ -	5.6	5.6
105LED	114	12	W 32 F 1	F41LL	32	0.4	SW	2400	922	12	4 ft LED Tube	200732x1	15	0.2	C-OCC	1,680	302	619	0.2	$ 91.59	$ 1,141.20	$ 35	12.5	12.1
105LED	116	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
105LED	115	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
50LED	Exit	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	6240	374	1	4 ft LED Tube	200732x2	30	0.0	NONE	6,240	187	187	0.0	$ 26.06	$ 145.20	$ -	5.6	5.6
105LED	111	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
50LED	109 Health Office	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3000	360	2	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,500	90	270	0.1	$ 38.45	$ 560.40	$ 35	14.6	13.7
50LED	Boys Room	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	4300	1,032	4	4 ft LED Tube	200732x2	30	0.1	NONE	4,300	516	516	0.1	$ 73.76	$ 580.80	$ -	7.9	7.9
50LED	Girls Room	4	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	4300	1,032	4	4 ft LED Tube	200732x2	30	0.1	NONE	4,300	516	516	0.1	$ 73.76	$ 580.80	$ -	7.9	7.9
50LED	Custodial	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3400	204	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,400	102	102	0.0	$ 14.90	$ 145.20	$ -	9.7	9.7
105LED	102	22	W 32 F 1	F41LL	32	0.7	SW	2400	1,690	22	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	554	1,135	0.4	$ 167.92	$ 1,867.20	$ 35	11.1	10.9
50LED	Nurses Office	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	3000	540	3	4 ft LED Tube	200732x2	30	0.1	C-OCC	1,500	135	405	0.1	$ 57.68	$ 705.60	$ 35	12.2	11.6
50LED	Nurses Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	258	1	4 ft LED Tube	200732x2	30	0.0	NONE	4,300	129	129	0.0	$ 18.44	$ 145.20	$ -	7.9	7.9
50LED	Nurses Storage	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3200	192	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,200	96	96	0.0	$ 14.12	$ 145.20	$ -	10.3	10.3
50LED	Stairwell	6	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	6240	2,246	6	4 ft LED Tube	200732x2	30	0.2	NONE	6,240	1,123	1,123	0.2	$ 156.38	$ 871.20	$ -	5.6	5.6
105LED	203	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
105LED	204	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
105LED	Stairwell	1	W 32 F 1	F41LL	32	0.0	SW	6240	200	1	4 ft LED Tube	200732x1	15	0.0	NONE	6,240	94	106	0.0	$ 14.77	$ 72.60	$ -	4.9	4.9
50LED	Stairwell	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	6240	1,123	3	4 ft LED Tube	200732x2	30	0.1	NONE	6,240	562	562	0.1	$ 78.19	$ 435.60	$ -	5.6	5.6
18LED	Stairwell	1	T 32 R F 4 (ELE)	F44ILL	112	0.1	SW	6240	699	1	T 74 R LED	RTLED50	50	0.1	NONE	6,240	312	387	0.1	$ 53.87	$ -	$ -	0.0	0.0
50LED	203 closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,400	72	72	0.0	$ 10.97	$ 145.20	$ -	13.2	13.2
50LED	204 closet	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2400	144	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,400	72	72	0.0	$ 10.97	$ 145.20	$ -	13.2	13.2
105LED	202	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
105LED	205	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
105LED	201	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	206	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	200	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	207	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
50LED	Teachers Lounge	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	3000	360	2	4 ft LED Tube	200732x2	30	0.1	NONE	3,000	180	180	0.1	$ 26.66	$ 290.40	$ -	10.9	10.9
105LED	208	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
50LED	Stairwell	6	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	6240	2,246	6	4 ft LED Tube	200732x2	30	0.2	NONE	6,240	1,123	1,123	0.2	$ 156.38	$ 871.20	$ -	5.6	5.6
50LED	Boys Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	NONE	4,300	258	258	0.1	$ 36.88	$ 290.40	$ -	7.9	7.9
50LED	Girls Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	NONE	4,300	258	258	0.1	$ 36.88	$ 290.40	$ -	7.9	7.9
105LED	209	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	211	24	W 32 F 1	F41LL	32	0.8	SW	2400	1,843	24	4 ft LED Tube	200732x1	15	0.4	C-OCC	1,680	605	1,238	0.4	$ 183.19	$ 2,012.40	$ 35	11.0	10.8
105LED	212	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	Restroom	1	W 32 F 1	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	NONE	4,300	65	73	0.0	$ 10.45	$ 72.60	$ -	6.9	6.9
105LED	Auditorium	20	W 32 F 1	F41LL	32	0.6	SW	2000	1,280	20	4 ft LED Tube	200732x1	15	0.3	NONE	2,000	600	680	0.3	$ 106.54	$ 1,452.00	$ -	13.6	13.6
50LED	Stairwell to Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	2000	840	7	4 ft LED Tube	200732x2	30	0.2	NONE	2,000	420	420	0.2	$ 65.81	$ 1,016.40	$ -	15.4	15.4
50LED	Stairwell to Auditorium	7	W 32 P F 2 (ELE)	F42LL	60	0.4	SW	2000	840	7	4 ft LED Tube	200732x2	30	0.2	NONE	2,000	420	420	0.2	$ 65.81	$ 1,016.40	$ -	15.4	15.4
105LED	Stairwell to Auditorium	2	W 32 F 1	F41LL	32	0.1	SW	2000	128	2	4 ft LED Tube	200732x1	15	0.0	NONE	2,000	60	68	0.0	$ 10.65	$ 145.20	$ -	13.6	13.6
50LED	Auditorium Back Room Left	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,000	120	120	0.1	$ 18.80	$ 290.40	$ -	15.4	15.4
50LED	Auditorium Back Room Right	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,000	120	120	0.1	$ 18.80	$ 290.40	$ -	15.4	15.4
50LED	Hallway	21	W 32 P F 2 (ELE)	F42LL	60	1.3	SW	6240	7,862	21	4 ft LED Tube	200732x2	30	0.6	NONE	6,240	3,931	3,931	0.6	$ 547.34	$ 3,049.20	$ -	5.6	5.6
50LED	Hallway	21	W 32 P F 2 (ELE)	F42LL	60	1.3	SW	6240	7,862	21	4 ft LED Tube	200732x2	30	0.6	NONE	6,240	3,931	3,931	0.6	$ 547.34	$ 3,049.20	$ -	5.6	5.6
105LED	306	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	300	18	W 32 F 1	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	454	929	0.3	$ 137.39	$ 1,576.80	$ 35	11.5	11.2
105LED	307	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	312	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
50LED	Girls Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	NONE	4,300	258	258	0.1	$ 36.88	$ 290.40	$ -	7.9	7.9
50LED	Boys Room	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	516	2	4 ft LED Tube	200732x2	30	0.1	NONE	4,300	258	258	0.1	$ 36.88	$ 290.40	$ -	7.9	7.9
50LED	Restroom	1	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	4300	258	1	4 ft LED Tube	200732x2	30	0.0	NONE	4,300	129	129	0.0	$ 18.44	$ 145.20	$ -	7.9	7.9
105LED	311	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	309	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
105LED	308	21	W 32 F 1	F41LL	32	0.7	SW	2400	1,613	21	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	529	1,084	0.4	$ 160.29	$ 1,794.60	$ 35	11.2	11.0
50LED	313 Vice Principal	3	W 32 P F 2 (ELE)	F42LL	60	0.2	SW	3000	540	3	4 ft LED Tube	200732x2	30	0.1	NONE	3,000	270	270	0.1	$ 39.99	$ 435.60	$ -	10.9	10.9
71	313 Restroom	1	I 60	I60/1	60	0.1	SW	3000	180	1	CF 26	CFO26/1-L	27	0.0	NONE	3,000	81	99	0.0	$ 14.66	$ 6.00	$ -	0.4	0.4
50LED	Kitchen	13	W 32 P F 2 (ELE)	F42LL	60	0.8	SW	2000	1,560	13	4 ft LED Tube	200732x2	30	0.4	NONE	2,000	780	780	0.4	$ 122.21	$ 1,887.60	$ -	15.4	15.4
50LED	Kitchen Storage	2	W 32 P F 2 (ELE)	F42LL	60	0.1	SW	2000	240	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,000	120	120	0.1	$ 18.80	$ 290.40	$ -	15.4	15.4
252	Gymnasium	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.2	SW	2800	11,794	12	T 54 W F 6 (ELE) (T-5)	F46GHL	351	4.2	NONE	2,800	11,794	-	0.0	$ -	$ -	$ -		
231	Exterior Lights	12	MH 400 Pole/Spot	MH400/1	458	5.5	SW	4368	24,007	12	MH 400 Pole/Spot	MH400/1	458	5.5	NONE	4,368	24,007	-	0.0	$ -	$ -	$ -		
S	**Total**	**876**				**45.1**			**144,692**	**876**				**26.7**				**81,984**	**18.4**	**9,159**	**88,372**	**$1,225**		
S																		**Demand Savings**		**18.4**	**$944**			
S																		**kWh Savings**		**62,708**	**$8,215**			
S																		**Total Savings**			**$9,159**		**9.6**	**9.5**

APPENDIX D

New Jersey Board of Public Utilities Incentives

i. **Smart Start**

ii. **Direct Install**

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

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

I. SMART START

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

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CONTACT US

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

Support for Custom Energy-Efficiency Measures

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

Incentives for Qualifying Equipment and Projects

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

Find out more about equipment incentives

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

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COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

FOOD SERVICE EQUIPMENT

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

Special Notice

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

Visit the Sandy web page for details and important links.

More reasons for a smart start on your next project!

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

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

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

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

Electric Chillers

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

Gas Cooling

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

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Desiccant Systems ($1.00 per cfm - gas or electric)

Electric Unitary HVAC

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

Ground Source Heat Pumps

Closed Loop ($450-750 per ton)

Gas Heating

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

Variable Frequency Drives

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

Natural Gas Water Heating

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

Premium Motors

Three-phase motors ($45 - $700 per motor) **(Incentive was discor effective March 1, 2013 except for buildings impacted by Hurri Sandy. Approved applications will have the standard timefram year from the program commitment date to complete the instal**

Refrigerator/Freezer Case Premium Efficiency Motors (ECM)

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

Prescriptive Lighting

New Linear Fluorescent

- T-12, HID and Incandescent to T-5 and T-8 ($25 - $200 p fixture) **(Note: T12 replacements are only available for buildings impacted by Hurricane Sandy)**
- New Induction ($70 per replaced HID fixture)
- New LED
  - Screw-in/Plug-in ($10 - $20 per lamp)
  - Refrigerator/Freezer Case ($30 - $65 per fixture)
  - Outdoor pole/arm/wall-mounted luminaires ($100 - $175 p fixture)
  - Display case ($30 per case)
  - Shelf-mounted display and task ($15 per linear foot)
  - Wall-wash, desk, recessed ($20 - $35 per fixture)
  - Parking garage luminaires ($100 per fixture)
  - Track or Mono-Point directional ($50 per fixture)
  - Stairwell and Passageway luminaires ($40 per fixture)
  - High-Bay, Low-Bay ($150 per fixture)
  - Bollard ($50 per fixture)
  - luminaires for Ambient Lighting of Interior Commercial Spa *Linear panels ($50 per fixture)*
  - Fuel pump canopy ($100 per fixture)
  - LED retrofit kits (custom measures)
- New Pulse-Start Metal Hallide ($25 per fixture)
- Linear Fluorescent Retrofit ($10 - $20 per fixture)
- Induction Retrofit ($50 per retrofitted HID fixture)
- New Construction/Complete Renovation (performance-based)

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

Lighting Controls

- Occupancy Sensors
  - Wall mounted ($20 per control)
  - Remote mounted ($35 per control)
  - Daylight dimmers ($25 per fixture controlled, $50 per fixtu office applications only)
  - Occupancy controlled hi-low fluorescent controls ($25 per controlled)
- HID or Fluorescent Hi-Bay Controls
  - Occupancy hi-low ($35 per fixture controlled)
  - Daylight dimming ($45 per fixture controlled)

Refrigeration

- Covers and Doors
  - Energy-Efficient doors for open refrigerated doors/covers per door)
  - Aluminum Night Curtains for open refrigerated cases ($3.5 linear foot)
- Controls
  - Door Heater Control ($50 per control)
  - Electric Defrost Control ($50 per control)
  - Evaporator Fan Control ($75 per control)
  - Novelty Cooler Shutoff ($50 per control)

Food Service Equipment

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

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

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

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

Other Equipment Incentives*

- Performance Lighting ($1.00 per watt per square foot below prograi incentive threshold, currently 5% more energy efficient than ASHR/ 2007 for New Construction only.)
- Custom electric and gas equipment incentives (not prescriptive)

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

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

PARTICIPATION STEPS

PARTICIPATING CONTRACTORS

SUSTAINABLE JERSEY

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Direct Install

NEW JERSEY'S CLEAN ENERGY PROGRAM
DIRECT Install

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

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

ELIGIBILITY

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

SYSTEMS & EQUIPMENT ADDRESSED BY THE PROGRAM

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

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

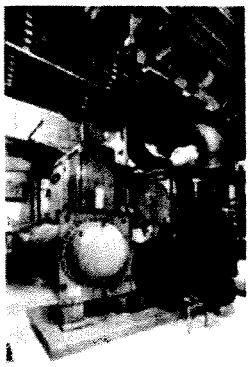
III. PAY FOR PERFORMANCE (P4P)

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

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



Eligibility

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

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

ENERGY STAR Portfolio Manager

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

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

Incentives

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

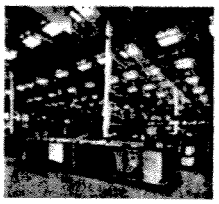
TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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

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



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

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

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

Steps to Participation

Click here for a step-by-step description of the program.

Home | Residential | Commercial & Industrial | Renewable Energy
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New Jersey's Clean Energy PROGRAM
Your Power to Save
njcleanenergy.com

BPU

PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2013 - June 30, 2014

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

Instructions

1. Read the program material to determine project qualification.
2. Read the Participation Agreement and sign where indicated.
3. Fill out all applicable spaces on this form.
4. Provide a copy of the customer's company W-9 form.
5. Provide the most recent consecutive 12 month period of utility bills for the project.
6. Provide brief description of facility.
7. Partner must submit the application package via e-mail, mail or fax DIRECTLY to the Market Manager – see back of this form.

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

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

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

Partner Information

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

Project Information

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

Funding

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

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

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

Additional Project information

Additional Utility Account(s)

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

Additional Comments:

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

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

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

Visit our website: NJCleanEnergy.com/P4P

*Incentives/Requirements subject to change.

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

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

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

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

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

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

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

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

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

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

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

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

Program Manager – TRC Energy Services.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

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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 E

Photovoltaic Analysis

NEWARK PUBLIC SCHOOL DISTRICT
HAWKINS STREET SCHOOL

Cost of Electricity	$0.14	/kWh
Electricity Usage	426,000	kWh/yr
System Unit Cost	$4,000	/kW

Photovoltaic (PV) Solar Power Generation - Screening Assessment

Budgetary Cost	Annual Utility Savings				Estimated Maintenance Savings	Total Savings	Federal Tax Credit	New Jersey Renewable ** SREC	Payback (without SREC	Payback (with SREC
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$120,000	**30.0**	**37,469**	**0**	**$5,246**	**0**	**$5,246**	**$0**	**$5,808**	**22.9**	**10.9**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $155 /1000kwh

Area Output*
1,271 m2
13,677 ft2

Perimeter Output*
279 m
914 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
3,857 ft2

Approximate System Size: Is the roof flat? (Yes/No) Yes

8	watt/ft2	
30,859	DC watts	
30	kW	Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle	20	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	07106	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
37,469 annual kWh calculated in PV Watts program

% Offset Calc

Usage	426,000	(from utilities)
PV Generation	37,469	(generated using PV Watts)
% offset	9%	

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

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

Hawkins Street School

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	30.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	24.9 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	14.0 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	2.78	2191	306.74
2	3.54	2525	353.50
3	4.35	3343	468.02
4	4.95	3543	496.02
5	5.69	4114	575.96
6	5.86	3979	557.06
7	5.73	3973	556.22
8	5.47	3753	525.42
9	4.91	3362	470.68
10	3.99	2916	408.24
11	2.68	1957	273.98
12	2.35	1813	253.82
Year	4.36	37469	5245.66

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

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

APPENDIX F

Photos

1: Existing steam boilers located in boiler room

2: Auditorium high ceiling (25')

3: Typical window a/c unit

4: Existing DHW system

5: High flow urinals - typical of building plumbing fixtures

6: Example of existing lighting in classroom

APPENDIX G

EPA Portfolio Manager

ENERGY STAR® Statement of Energy Performance

36

ENERGY STAR® Score[1]

Hawkins Street Elementary School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 69,660
Built: 1887

For Year Ending: May 31, 2013
Date Generated: April 14, 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
Hawkins Street Elementary School 8 Hawkins Street Newark, New Jersey 07105	Newark Public Schools 2 Cedar Street Newark, NJ 07102 (____)____-_____	Gregory Coleman 10 Maxwell Drive Suite 200 Clifton Park, NY 12065 000-000-0000 mvadney@trcsolutions.com

Property ID: 3877126

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
79.3 kBtu/ft²

Source EUI
120.6 kBtu/ft²

Annual Energy by Fuel	
Fuel Oil (No. 2) (kBtu)	4,031,946 (73%)
Natural Gas (kBtu)	175,351 (3%)
Electric - Grid (kBtu)	1,320,035 (24%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	70.5
National Median Source EUI (kBtu/ft²)	107.2
% Diff from National Median Source EUI	12%
Annual Emissions	
Greenhouse Gas Emissions (MtCO2e/year)	476

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)