THE NEWARK PUBLIC SCHOOLS

Group 3 Buildings

Early Childhood Academy South School

534 Clinton Avenue, Newark, NJ 07108

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

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CHA PROJECT NO. 27999

TABLE OF CONTENTS

APPENDICES

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
Early Childhood Academy South School	534 Clinton Avenue, Newark, NJ 07108	43,531	1969

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

Building Name	Electric Savings (kWh)	NG Savings (therms)	Fuel Oil #2 Savings (Gallons)	Total Savings ($)	Payback (years)
Early Childhood Academy South School	165,022	3,242	3,153	73,191	5.0

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
1A**	Heating Fuel Conversion	40,420	33,514	1.2	2,000	1.1	N
1B	Boiler Replacement	243,491	36,732	6.6	4,000	6.5	Y
2	Install Premium Efficiency Motors on HW Pumps	3,348	92	36.5	0	36.5	Y
3	Install VFD & Premium motors on Chilled Water Pumps	5,306	2,195	2.4	488	2.2	Y
4A	Install Basic Controls	21,309	26,681	0.8	0	0.8	Y
4B**	Install Full DDC Controls	352,774	29,446	12.0	0	12.0	N
5	Replace DHW Heaters with Condensing Hot Water Heaters	34,838	761	45.8	400	45.3	N
6	Install Vending Machine Controls	560	930	0.6	0	0.6	Y
7	Install Low Flow Plumbing Fixtures	160,788	4,861	33.1	0	33.1	N
L1**	Lighting Replacements / Upgrades	71,141	5,244	13.6	0	13.6	N
L2**	Install Lighting Controls (Add Occupancy Sensors)	20,790	3,534	5.9	2,695	5.1	N
L3	Lighting Replacements with Controls (Occupancy Sensors)	91,931	6,561	14.0	2,695	13.6	Y
	Total**	**561,572**	**78,813**	**7.1**	**7,583**	**7.0**	
	Total (Recommended)	**365,946**	**73,191**	**5.0**	**7,183**	**4.9**	

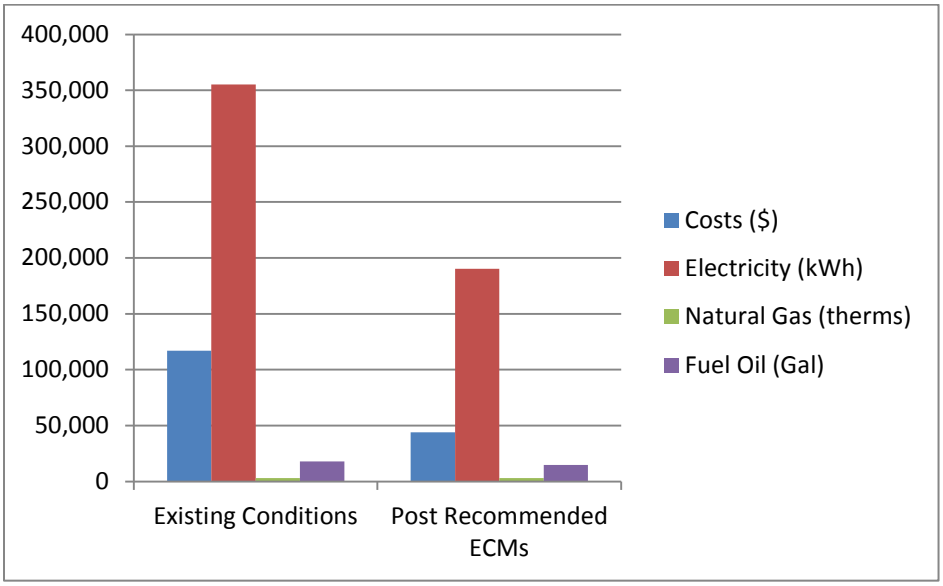
* Incentive shown is per the New Jersey SmartStart Program.
** These ECMs are not included in the Total, as they are alternate measures not recommended.

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

- Photovoltaic (PV) Rooftop Solar Power Generation – 220.0 kW System

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	117,032	43,841	63%
Electricity (kWh)	355,200	190,178	46%
Natural Gas (therms)	3,113	3,113	0%
Fuel Oil (Gal)	18,035	14,882	17%
Site EUI (kbtu/SF/Yr)	93.0	69.9	



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: Early Childhood Academy South School
Address: 534 Clinton Avenue, Newark NJ 07108
Gross Floor Area: 43,531
Number of Floors: 2 (including basement)
Year Built: 1969

Description of Spaces: Classrooms, offices, cafeteria / multipurpose room, media center, storage rooms, janitor closet, kitchen, toilet rooms and boiler room.
Description of Occupancy: The school serves 209 students from Pre-K3 and Pre-K4. There are about 40 school faculty and staff members.
Number of Computers: The school has approximately 30 computers.
Building Usage: School hours are 8:25 AM – 2:55 PM Monday through Friday. There are pre-school activities from 7:30 AM – 8:25 PM and after-school activities from 3:30 AM – 6:00 PM in the classrooms 107, 112, & 109. The office hours of the office staff is from 8:00 AM to 6:00PM.
Construction Materials: Concrete masonry blocks.
Façade: Brick and concrete veneer
Roof Type: Flat roof comprised of structural steel, metal trusses, and waterproof membrane. The roof is in fair condition. No ECMs were included for the roof.
Windows: The building has double pane windows. No ECMs included.
Exterior Doors: The school has aluminum frame doors with double pane windows. The door seals around the doors are in fair condition. No ECMs included.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: The building utilizes (2) two Compak heating hot water (HHW) boilers installed in 1969. These boilers were repaired and are in poor condition. The boilers did not have nameplate data visible but the burner had a maximum MBH input of 4,000 MBH with thermal efficiencies of 80%. The boilers operate on fuel oil #2 and run lead lag. These boilers are 45 years old and should be replaced. The HHW system in the school is separated into 4 zones and each zone has its own HHW circulation pump. There is another pump for the HVAC units 1-4. The pumps are inline pumps at the ceiling level of the boiler room. It is estimated that these pumps are 1-1/2 HP. Also, each boiler is equipped with a small HHW return pump to circulate heating hot water back to the combustion chamber. An ECM was evaluated to replace the motors on the HHW pumps with premium efficiency motors.

The offices and classrooms are heated using Nestbittaire unit ventilators with HHW coils. The Cafeteria / Multi-purpose room is heated by two HVAC units. Each unit serves half of the room. The administration zone is heated by HVAC-4. HVAC-3 heats zone 3. Each HV unit is equipped with a HHW coil and a supply fan driven by a 3/4 HP electric motor.

Oil is more expensive than natural gas on a per-btu basis; replacing the boiler burners with equivalent natural gas fired burners could save utility cost. This ECM is included.

Additionally the boilers has surpassed their useful life plus the existing boiler is fairly inefficient compared to that of hot water heating when using high efficiency condensing hot water boilers. A calculation for installing high efficiency condensing hot water boilers has also been evaluated.

Cooling: This building is 100% cooled. The system is a two pipe system which is manually switched by the maintenance staff to allow chilled water from the chilled water system to utilize the same piping the heating system. The offices and classrooms are cooled using Nestbittaire unit ventilators with CHW coils. The HV units serving the cafeteria / multipurpose room, administration zone, and zone 3 has a cooling coil to temper air to these zones. The chilled water comes from an air cooled McQuay chiller located on the roof. The water is circulated by a 7.5 HP pump in the basement mechanical room. An ECM is included to evaluate the energy savings for putting a VFD and replacing the motor with a premium efficiency motor.

Ventilation: The building has (4) four air handling units for cafeteria / multipurpose room, administration zone, and zone 3. Two of these units are located in the MER / Boiler Room and the other two are in closets above the ceiling adjacent to the cafeteria. There is also a rooftop unit on the roof that serves spaces in the kitchen. The spaces that are not served by these units have unit ventilators. Each classroom and office space has one. There are also operable windows in the office spaces.

Exhaust: The kitchen in this building has an exhaust hood. The exhaust hood is about 20’ by 6’; however, the capacity of exhaust fan is unknown due to inaccessibility to the fan. Normally a kitchen exhaust controller would be recommended anytime a kitchen has an exhaust system; however kitchen staff indicated that the exhaust fan is never used; therefore there would be no savings associated with this measure.

The building utilizes exhaust fans of various sizes located on the roof to exhaust air from restrooms and storage areas

Controls Systems

A pneumatic system is used in this building to control the thermostats in each room. The compressed air is provided by a Quincy compressor located in the boiler room. The compressor has two 1HP electric motors and the compressed air pressure is set at 15 psig. The boilers are controlled by a Honeywell control system which converts the pneumatic signals to analog signals and controls the operation of the boilers. This control system is not functioning properly. There isn't control on the zone loop or u/v's or the air handling units.

The set point of the heating system is 68 ^{0}F and there is no night set-back associated with the heating system.

A Basic Controls ECM is included to address the boiler operation. An alternate ECM is also included that evaluates the energy savings potential of adding a full DDC controls system.

Domestic Hot Water Systems

Hot water for the restrooms in the building comes from (2) gas fired hot water heaters. The first is an A.O. Smith hot water heater with an input of 365 MBH, a capacity of 85 gallons and a thermal efficiency of 80%. This unit was installed in 2007. The second is an A.O. Smith hot water heater with an input of 251 MBH, a capacity of 65 gallons and a thermal efficiency of 80%. This unit was installed in 2004.

ECM is included to evaluate the replacement of the water heaters with a smaller capacity condensing gas domestic water heaters.

Kitchen Equipment

The kitchen has electric ovens, a refrigerators and freezers. There are break rooms with microwaves, refrigerators and other electrical appliances as well. The cooking and refrigeration equipment appears to be new and therefore no kitchen equipment upgrades are being considered.

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. The installation of vending machine occupancy sensors has been evaluated in an effort to reduce the plug load in the building.

Plumbing Systems

The bathrooms contain older style toilets and urinals that utilize a higher volume of water per flush than currently available new units. The sinks have metered faucets and sinks were not included in replacement.

An ECM is included to evaluate the water savings potential of installing low- flow water closet and urinals.

Lighting Systems

The majority lighting fixtures in the building are 32W T8 fluorescent pendent or recessed lensed fixtures. There are a few storage closets and the oil tank room that have incandescent bulbs. All the lights in this building are controlled by manual switches or key switches. After discussion with facility staff, it was noted that the classroom and office lights are typically turned off after the janitor cleaning the rooms and the hallway lights are on 24/7.

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

3.0 UTILITIES

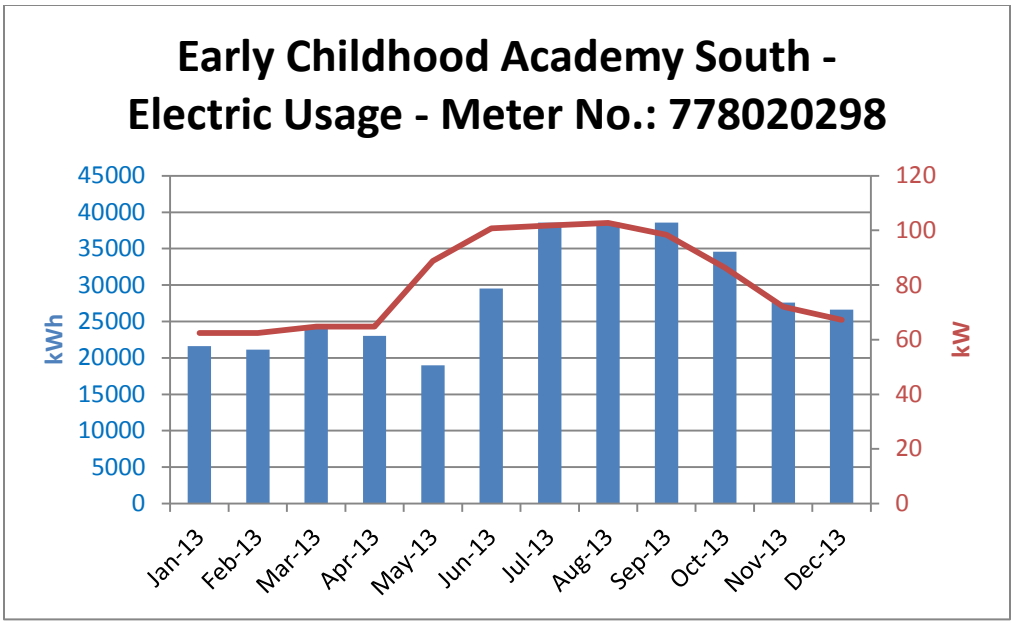
Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas
Deliverer	PSEG	PSEG
Supplier	Nextera Energy Services	PSEG

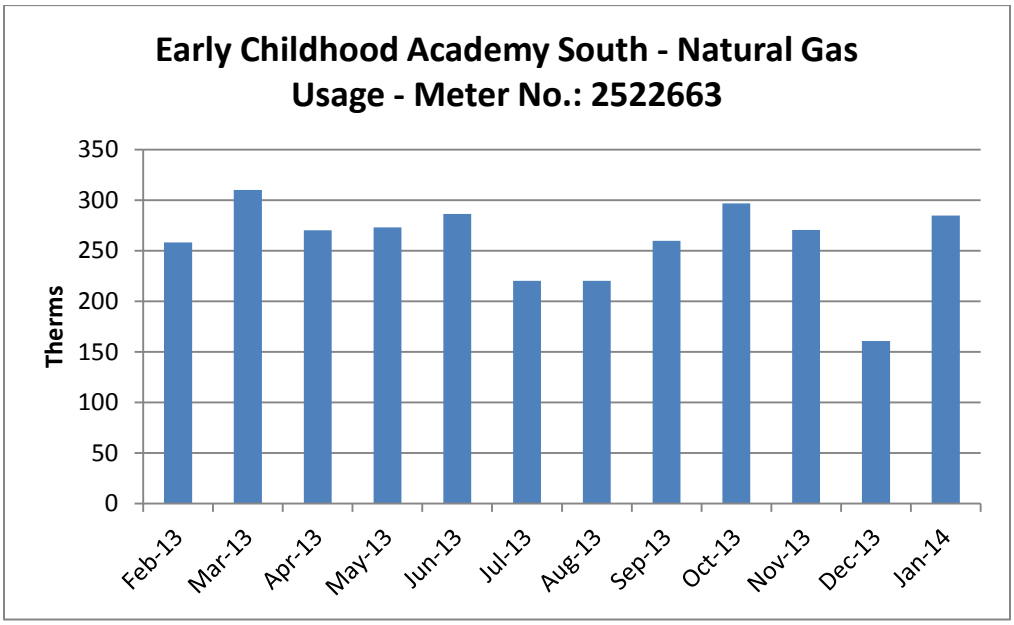
For the 12-month period ending in December 2013, the utilities usages and costs for the building were as follows:

Electric		
Annual Consumption	355,200	kWh
Annual Cost	$55,957	$
Blended Unit Rate	$0.16	$/kWh
Supply Rate	$0.19	$/kWh
Demand Rate	$4.58	$/kW
Peak Demand	102.8	kW
Natural Gas		
Annual Consumption	3,113	Therms
Annual Cost	$3,050	$
Unit Rate	$0.98	$/therm
Fuel Oil		
Annual Consumption	18,035	Gallons
Annual Cost	$58,025	$
Unit Rate	$3.22	$/gal

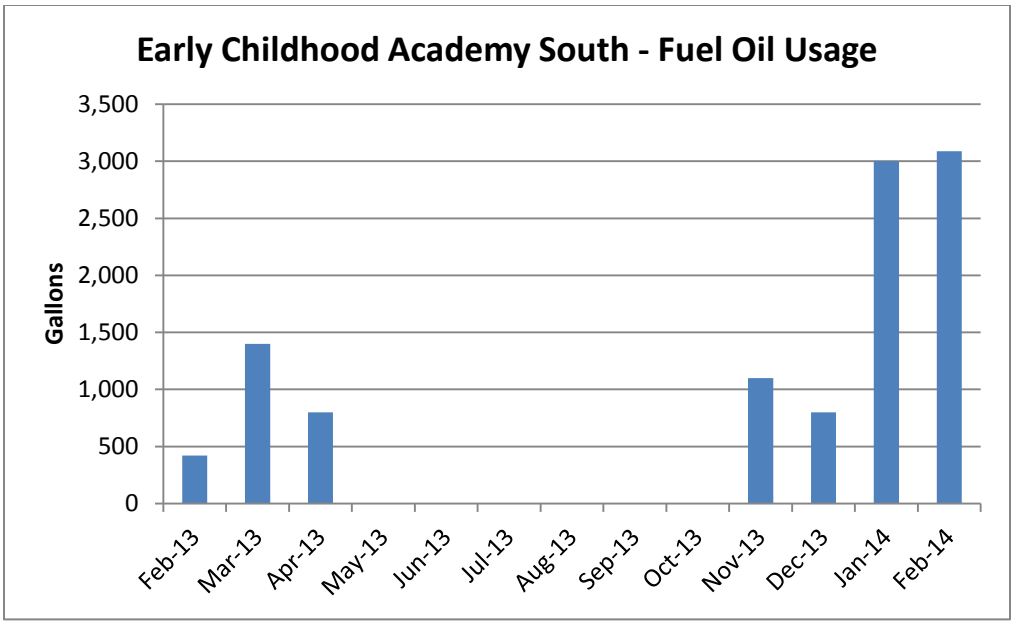
Blended Rate: Average rate charged determined by the annual cost / annual usage
Supply Rate: Actual rate charged for electricity usage in kWh (based on most recent electric bill)
Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)



The electrical consumption profile follows a trend which would be expected for this type of school. The electricity consumption remains fairly constant all year long but drops during the summer time while the school is mostly unoccupied. There is no peak in the summer due to cooling because cooling is minimal in the building.



Natural gas in this building is consumed by the domestic hot water heater. The natural gas usage shows this pretty clearly because the monthly usage is fairly small.



Fuel oil is purchased bi-monthly for space heat. This graph fails to show the exact monthly usage but does show that fuel oil is purchased pretty frequently during the heating months

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	$0.146	$0.128	Y
Natural Gas	$/Therm	$0.98	$0.955	Y
Fuel Oil	$/Gal	$3.22	$3.62	N

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

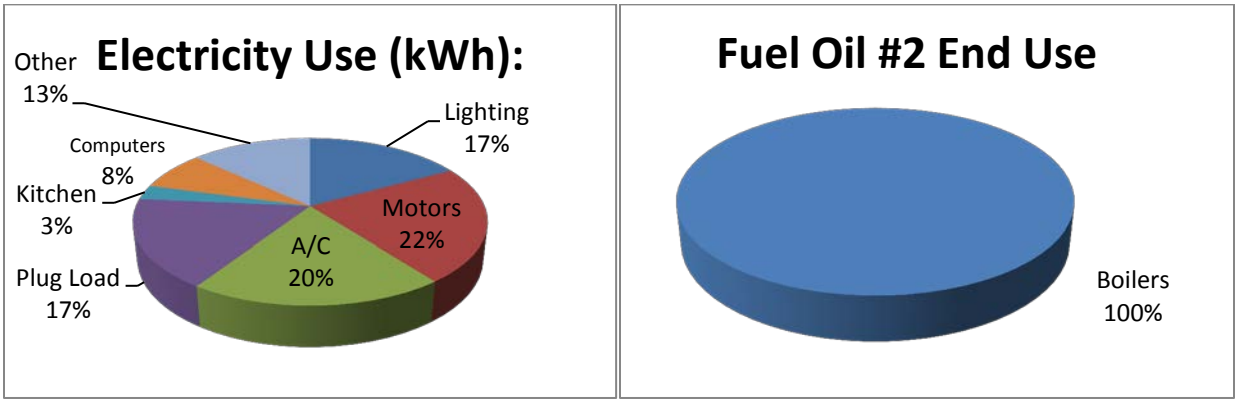
Additional information on selecting a third party energy supplier is available here:

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

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

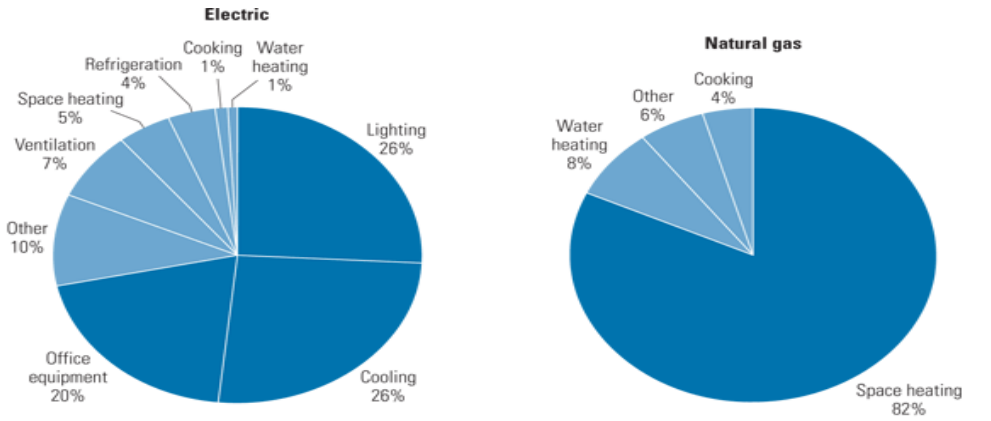
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.

Site End-Use Utility Profile



Most of the electricity consumed by educational facilities is used to for lighting, cooling, and plug loads such as computers and copiers; most of the natural gas is used for space heating. Each school's energy profile is different, and the following charts represent typical utility profiles for K-12 schools per U.S. Department of Energy.

Typical End-Use Utility Profile for Educational Facilities



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

4.0 BENCHMARKING

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)
35.0*	60**

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

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

5.0 ENERGY CONSERVATION MEASURES

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

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

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

Energy savings were quantified in the form of:

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

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

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

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

5.1.1 ECM-1A Heating Fuel Conversion (Fuel Switch)

The existing boilers are steam and have 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.

To implement this ECM, the old burners would be removed and replaced with new burners. Piping and wiring modifications would be needed.

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

ECM-1A 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
40,420	0	0.0	(25,015)	18,035	33,514	19.7	2,000	1.2	1.1

* 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-1B.

5.1.2 ECM-1B Boiler Replacement

The building utilizes (2) two Compak heating hot water (HHW) boilers installed in 1969. These boilers were repaired and are in poor condition. The boilers did not have nameplate data visible but the burner had a maximum MBH input of 4,000 MBH with thermal efficiencies of 80%. These boilers are 45 years old and should be replaced.

This ECM replaces these existing boilers with gas fired condensing boilers of similar capacities. New modulating condensing gas boilers are available that minimally operate at 88%, and can operate as high as 96%. 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-1B Boiler Replacement

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
243,491	0	0.2	(21,742)	18,035	36,732	2.8	4,000	6.6	6.5

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

This measure is recommended only because natural gas is currently available in the school.

5.2 ECM-2 Install Premium Efficiency Motors on HHW Pumps

The HW Pumps currently circulate water at constant flow to terminal units. The motors are 1.5 HP with efficiency of 84.0%. Presently, premium efficiency 1.5 HP motors are offered at 86.5% efficiency ratings.

The savings of this measure are calculated from the motor efficiency improvement for the motors operating at full load.

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

ECM-2 Install Premium Efficiency Motors on HHW Pumps

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
3,348	0.2	555	0	92	(0.6)	0	36.5	36.5

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

This measure is recommended.

5.3 ECM-3 Install VFD & Premium motors on Chilled Water Pumps

The CHW in the CHW system is currently circulated by pumps that run at constant speed. Installing premium efficiency motors driven by VFDs and two-way valves will save energy when full load operation is not required. As the heating load is reduced and the two-way valves on the HHW coils close, the VFD will slow the motor down to maintain the required system pressure and the energy consumption of the pump motors will be reduced.

The savings of this measure are calculated from the motor efficiency improvement and the motor speed reduction the results when the HHW system is only partially loaded.

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

ECM-3 Install VFD & Premium motors on Chilled Water Pumps

Budgetary Cost	*Annual Utility Savings*				*ROI*	*Potential Incentive**	*Payback (without incentive)*	*Payback (with incentive)*
	Electricity		*Natural Gas*	*Total*				
$	*kW*	*kWh*	*Therms*	*$*		*$*	*Years*	*Years*
5,306	*3.8*	13,619	0	2,195	5.7	488	2.4	2.2

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

This measure is recommended.

5.4.1 ECM-4A Install Basic Controls

A pneumatic system is used in this building to control the thermostats in each room. The compressed air is provided by a Quincy compressor located in the boiler room. The compressor has two 1HP electric motors and the compressed air pressure is set at 15 psig. The boilers are controlled by a Honeywell control system which converts the pneumatic signals to analog signals and controls the operation of the boilers. This control system is not functioning properly. There isn't control on the zone loop or u/v's or the air handling units.

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-4A Install Basic Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Fuel Oil #2	Total				
$	kW	kWh	Gallons	$		$	Years	Years
21,309	0.0	104,972	3,153	26,681	17.8	0	0.8	0.8

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

This measure is recommended.

5.4.2 ECM-4B Install Full 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, temporary daytime setback, economizer (free cooling), demand control ventilation, exhaust fan shut down, and holiday TOD optimization. It also allows for remote access and control of the building's systems. This ECM is recommended only if the building HVAC system is to be fully renovated to include new boilers, pumps and ventilation equipment as it will optimize the energy savings potential of the new systems.

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

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

ECM-4B Install Full DDC Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Fuel Oil #2	Total				
$	kW	kWh	Gallons	$		$	Years	Years
352,774	0.0	108,524	3,838	29,446	0.3	0	12.0	12.0

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

This measure is not recommended in lieu of ECM-4A and due to the high cost of implementation. It is important to note that Full DDC should be considered as a viable option if either ECM-1A or ECM-1B is pursued; but due to interactive effects the estimated cost savings of this measure may decrease.

5.5 ECM-5 Replace DHW Heaters with Condensing Hot Water Heaters

Hot water for the restrooms in the building comes from (2) gas fired hot water heaters. The first is an A.O. Smith hot water heater with an input of 365 MBH, a capacity of 85 gallons and a thermal efficiency of 80%. This unit was installed in 2007. The second is an A.O. Smith hot water heater with an input of 251 MBH, a capacity of 65 gallons and a thermal efficiency of 80%. This unit was installed in 2004.

Implementation of this ECM will entail replacing the existing DHW heater with a high efficiency condensing water heater. The tank size of the existing system will need to be resized to eliminate the extra capacity. The calculation estimates a 50% reduction. The proposed DHW heaters include two (2) high efficiency condensing heater.

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

ECM-5 Replace DHW Heaters with Condensing Hot Water Heaters

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
34,838	0	0.0	777	761	(0.7)	400	45.8	45.3

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

This measure is not recommended due to long payback.

5.6 ECM-6 Install Vending Misers

The building presently has two (2) cold beverage vending machine in the building.

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

The calculation uses electrical consumption and annual electrical cost as the baseline, vs. the reduced electrical consumption and cost for the proposed case. The difference between the two values is the energy savings.
The implementation cost and savings related to this ECM are presented in Appendix C and summarized below:

ECM-6 Install Vending Misers

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
560	0.0	5,906	0	930	23.9	0	0.6	0.6

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

This measure is recommended.

5.7 ECM-7 Install Low Flow Plumbing Fixtures

The plumbing fixtures in this building are older high flow fixtures. The water savings associated from replacing existing high flow fixtures with low-flow fixtures was calculated by taking the difference of the annual water usage for the proposed and base case. The basis of this calculation is the estimate usage of each fixture, gallons per use, and number of fixtures. Replacing the existing fixtures in the restrooms with 1.28 Gals/flush toilets, 1.0 gal/flush urinals, and 0.5 gpm faucets will conserve water which will result in lower annual water and sewer charges. 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
160,788	0	0.0	0	644	4,861	(0.5)	0	33.1	33.1

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

These measures are not recommended due to the long paybacks and due to the fact that the metered type faucets are fairly new.

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. 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
71,141	13.3	30,937	0	5,244	0.2	0	13.6	13.6

* 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
20,790	0.0	18,455	0	3,534	1.1	2,695	5.9	5.1

* 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
91,931	13.3	39,971	0	6,561	0.1	2,695	14.0	13.6

* 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% ROI for the Pay for Performance Program, all ECM's identified in this report have been included in the incentive calculations. The results for the building are shown in Appendix C, with more detailed program information in Appendix D.

6.1.4 Energy Savings Improvement Plan

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

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

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

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

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

6.1.5 Renewable Energy Incentive Program

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

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

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

7.0 ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

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

Available Roof Area (Ft^2)	Potential PV Array Size (kW)
28,105	220.0

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 2013 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 – 220.0 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
$880,000	220.0	274,772	0	$43,414	$42,590	20.3	10.2	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.

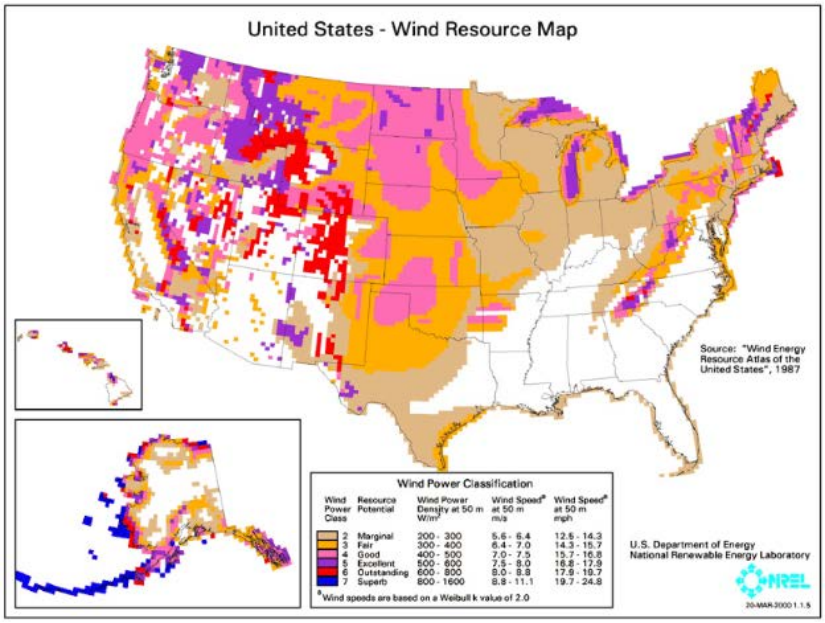
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping).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

7.3 Combined Heat and Power Plant

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

Any proposed CHP project will need to consider many factors, such as existing system load, use of thermal energy produced, system size, natural gas fuel availability, and proposed plant location. The building has sufficient need for electrical generation and the ability to use most of the thermal byproduct during the winter; however thermal usage during the summer months does not exist. Thermal energy produced by the CHP

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

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

7.4 Demand Response Curtailment

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

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

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

Building Electric Load Profile

Peak Demand kW	Min Demand kW	Avg Demand kW	Onsite Generation Y/N	Eligible? Y/N
102.8	62.4	82.7	N	N

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

8.0 CONCLUSIONS & RECOMMENDATIONS

The LGEA energy audit conducted by CHA for the building identified potential annual savings of $73,191/yr with an overall payback of 5.0 years, if the recommended ECMs are implemented.

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

Electric Savings (kWh)	Natural Gas Savings (therms)	Fuel Oil #2 Savings (Gallons)	Total Savings ($)	Payback (years)
165,022	0	3,153	73,191	5.0

The following projects should be considered for implementation:

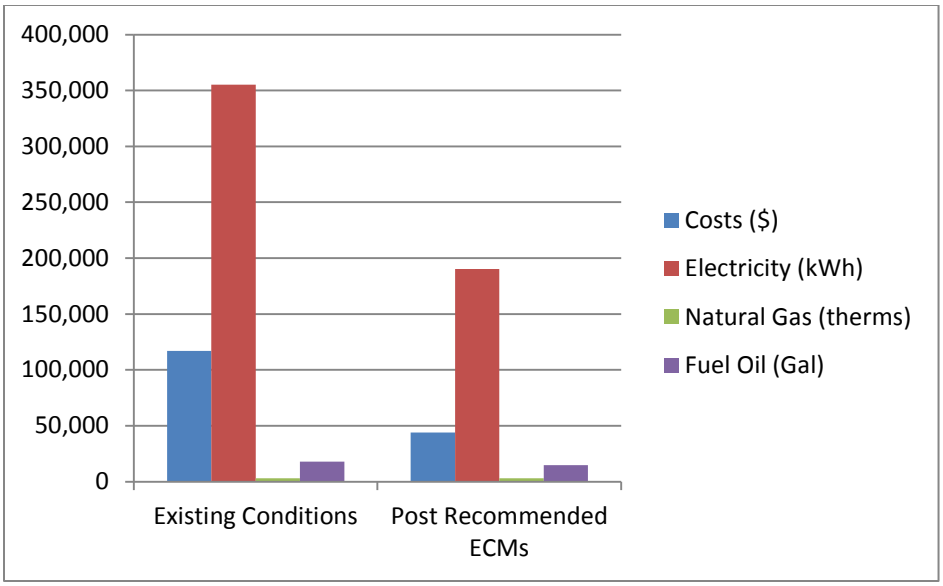
- Boiler Replacement
- Install Premium Efficiency Motors on HW Pumps
- Install VFD & Premium motors on Chilled Water Pumps
- Install Basic DDC Controls
- Install Vending Machine Controls
- Lighting Replacements with Controls (Occupancy Sensors)

The following alternative energy measures are recommended for further study:

- Photovoltaic (PV) Rooftop Solar Power Generation – 220.0 kW System

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	117,032	43,841	63%
Electricity (kWh)	355,200	190,178	46%
Natural Gas (therms)	3,113	3,113	0%
Fuel Oil (Gal)	18,035	14,882	17%
Site EUI (kbtu/SF/Yr)	93.0	69.9	



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

Early Childhood Academy South - Electric Usage

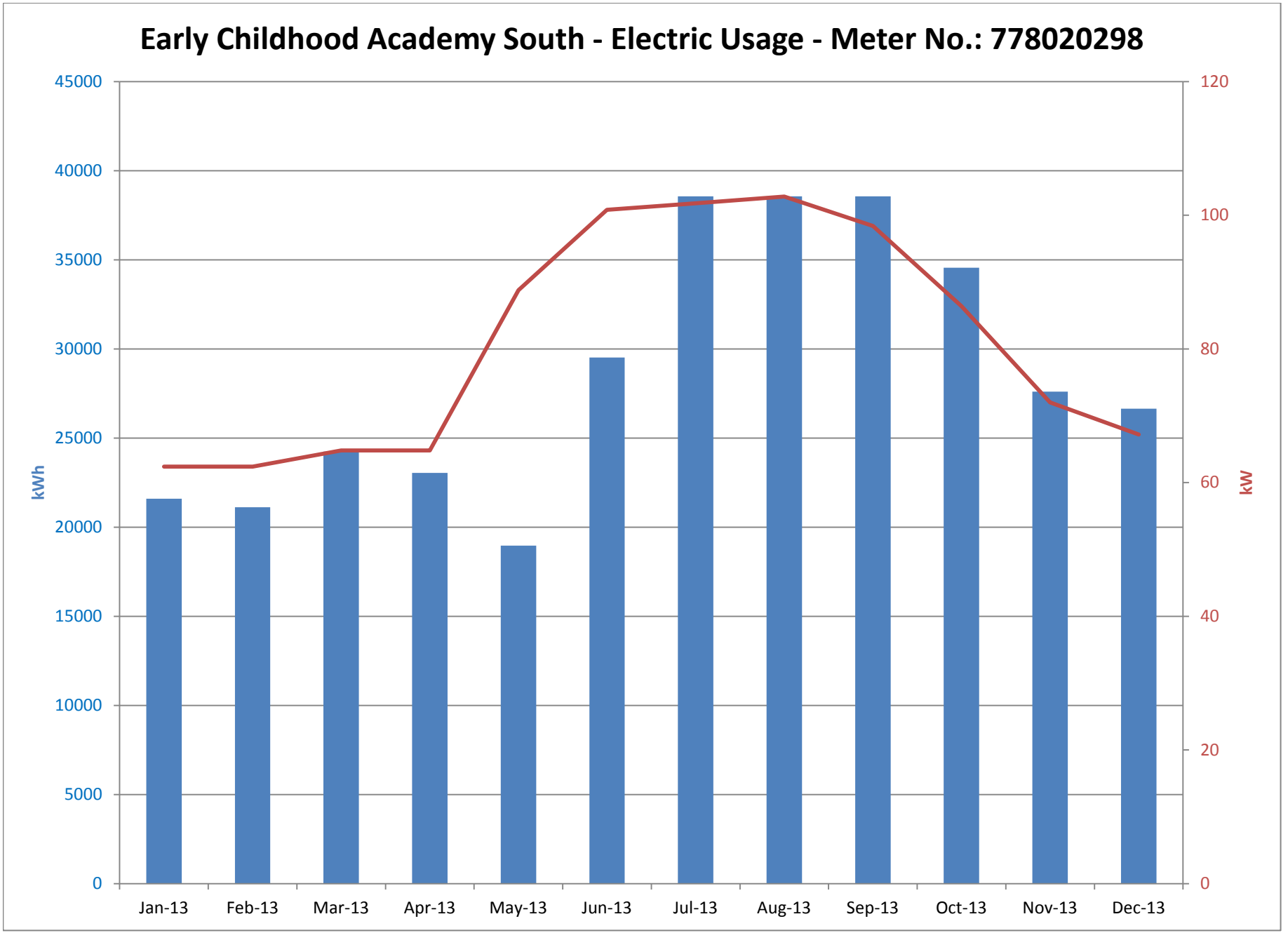
Start Date	End Date	kWh	Demand Usage (KW)	Total Charge	Supply Charge	Delivery Charge	Demand Charge	Consumption ($)	Blended Rate ($/kWh)	Consumption Rate ($/kWh)	Demand Rate ($/kW)
1/5/2012	2/2/2012	20640	60	3,510.00	0	666.14	254.19	3,255.81	0.17	0.16	4.24
2/3/2012	4/3/2012	42480	62.4	7,220.00	0	1,370.75	528.72	6691.28	0.17	0.16	8.47
4/4/2012	5/3/2012	22080	57.6	3,755.00	0	712.31	244.02	3510.98	0.17	0.16	4.24
5/4/2012	6/4/2012	26880	108	4,570.00	0	1,888.84	457.54	4112.46	0.17	0.15	4.24
6/5/2012	8/1/2012	71280	115.2	12,148.23	6,499.67	4,672.47	976.09	11172.14	0.17	0.16	8.47
8/2/2012	8/30/2012	36000	108	5,985.88	3,230.66	2,297.68	457.54	5528.34	0.17	0.15	4.24
8/31/2012	12/3/2012	82320	88.8	11,497.30	7,700.52	2,769.85	1,026.93	10470.37	0.14	0.13	11.56
12/4/2012	1/3/2013	21600	57.6	3,110.47	2,141.44	724.76	244.27	2866.2	0.14	0.13	4.24
1/4/2013	2/1/2013	21120	62.4	3,164.22	2,177.29	719.83	267.1	2897.12	0.15	0.14	4.28
2/2/2013	3/5/2013	24240	62.4	3,555.18	2,507.62	780.46	267.1	3288.08	0.15	0.14	4.28
3/6/2013	4/4/2013	23040	64.8	3,450.58	2,431.16	742.04	277.38	3173.2	0.15	0.14	4.28
4/5/2013	5/3/2013	18960	64.8	3,063.51	2,174.74	611.39	277.38	2786.13	0.16	0.15	4.28
5/4/2013	6/5/2013	29520	88.8	5,249.78	3,012.58	1,857.09	380.11	4869.67	0.18	0.16	4.28
6/6/2013	7/8/2013	38560	100.8	6,521.65	3,721.44	2,368.74	431.48	6090.18	0.17	0.16	4.28
7/9/2013	8/10/2013	38560	101.8	6,521.65	3,721.44	2,368.74	431.48	6090.18	0.17	0.16	4.24
8/11/2013	9/12/2013	38560	102.8	6,521.65	3,721.44	2,368.74	431.48	6090.18	0.17	0.16	4.20
9/4/2013	10/2/2013	34560	98.4	4,979.21	3,377.30	1,180.71	421.2	4558.01	0.14	0.13	4.28
10/3/2013	11/1/2013	27600	86.4	4,120.33	2,804.06	946.43	369.84	3750.49	0.15	0.14	4.28
11/1/2013	12/3/2013	26640	72	3,964.97	2,743.11	913.66	308.2	3656.77	0.15	0.14	4.28
12/3/2013	2/4/2014	54960	67.2	8,008.16	5,602.27	1,830.59	575.3	7432.86	0.15	0.14	8.56

Early Childhood Academy South (Clinton A		Start Date	End Date	Months
534 Clinton Ave. , 07108		1/5/2012	2/4/2014	24
Account Number	2147483647			
Meter Number	778020298			

ELECTRIC USAGE - MOST RECENT 12 MONTHS, PERIOD ENDING: 2/4/2014

Total Usage	355,200	**kwh**
Total Charges	$55,957	
Blended Rate	$0.16	**$/kWh**
Consumption Rate	$0.19	**$/kWh**
Demand Rate	$4.58	**$/kW**
Max Demand	102.8	**kW**
Min Demand	62.4	**kW**
Avg Demand	82.7	**kW**

Estimated Values - Billed for 3 months in one month


Early Childhood Academy South - Electric Usage - Meter No.: 778020298
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
kWh
120
100
80
60
40
20
0
kW
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

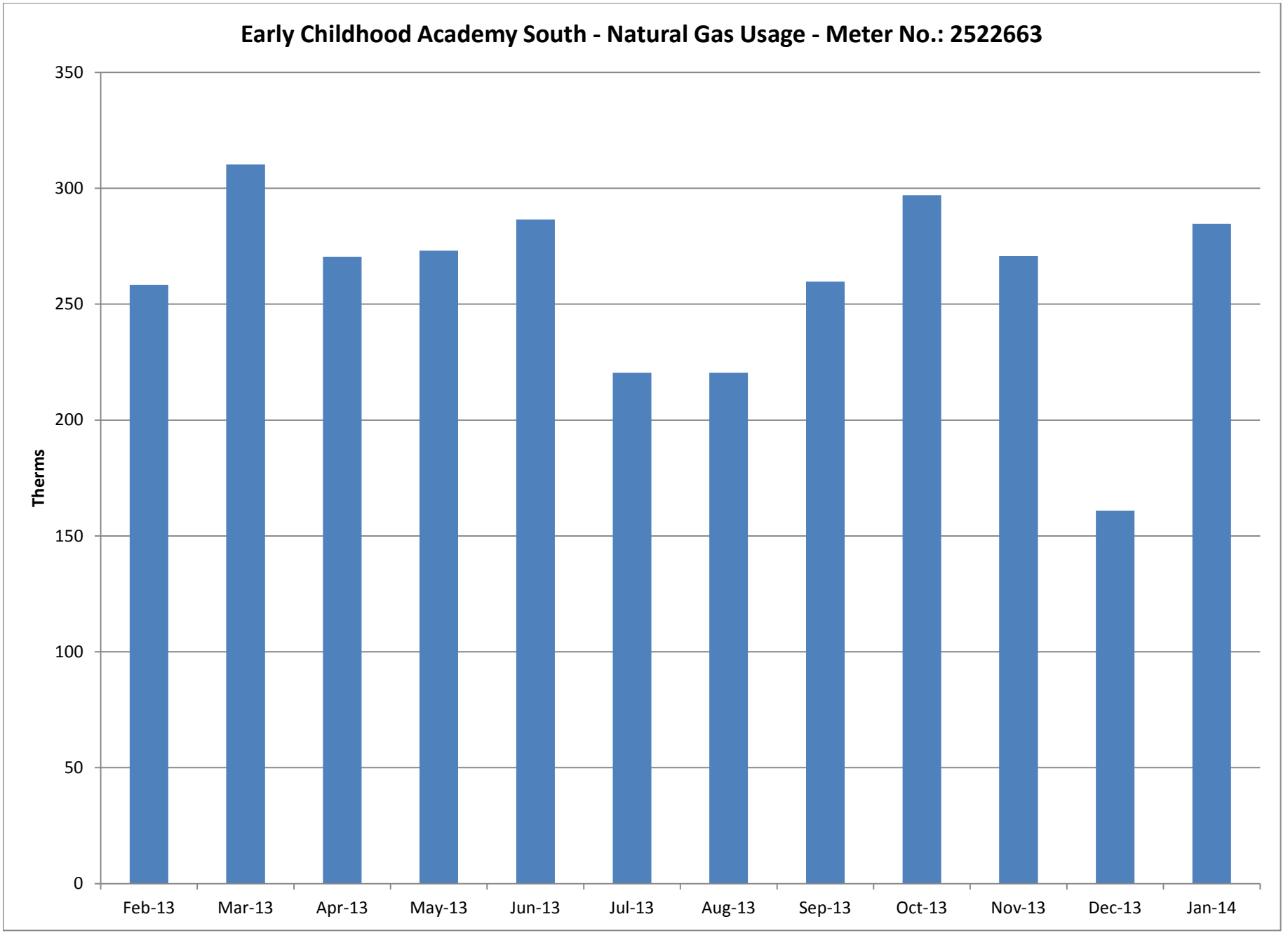
Early Childhood Academy South - Natural Gas Usage

Index No	Current Name	Acct	Meter	Start Date	End Date	Therms	Total Charge	$/therm
25	Early Childhood Academy South	6514079806	2522663	1/5/2012	2/2/2012	474.97	465.67	0.98
25	Early Childhood Academy South	6514079806	2522663	2/3/2012	4/3/2012	854.52	733.99	0.86
25	Early Childhood Academy South	6514079806	2522663	4/4/2012	5/3/2012	460.57	378.33	0.82
25	Early Childhood Academy South	6514079806	2522663	5/4/2012	6/4/2012	261.35	216.58	0.83
25	Early Childhood Academy South	6514079806	2522663	6/5/2012	7/3/2012	223.5	196.3	0.88
25	Early Childhood Academy South	6514079806	2522663	7/4/2012	8/1/2012	248.96	226.26	0.91
25	Early Childhood Academy South	6514079806	2522663	8/2/2012	8/30/2012	227.73	213.63	0.94
25	Early Childhood Academy South	6514079806	2522663	8/31/2012	12/3/2012	817.7	774.2	0.95
25	Early Childhood Academy South	6514079806	2522663	12/4/2012	1/3/2013	273.64	272.09	0.99
25	Early Childhood Academy South	6514079806	2522663	1/4/2013	2/1/2013	258.35	248.44	0.96
25	Early Childhood Academy South	6514079806	2522663	2/2/2013	3/5/2013	310.32	301.62	0.97
25	Early Childhood Academy South	6514079806	2522663	3/6/2013	4/4/2013	270.49	262.87	0.97
25	Early Childhood Academy South	6514079806	2522663	4/5/2013	5/3/2013	273.12	275.8	1.01
25	Early Childhood Academy South	6514079806	2522663	5/4/2013	6/5/2013	286.55	293.97	1.03
25	Early Childhood Academy South	6514079806	2522663	6/6/2013	7/8/2013	220.41	222.76	1.01
25	Early Childhood Academy South	6514079806	2522663	7/9/2013	8/2/2013	220.41	222.76	1.01
25	Early Childhood Academy South	6514079806	2522663	8/3/2013	9/3/2013	259.77	245.68	0.95
25	Early Childhood Academy South	6514079806	2522663	9/4/2013	10/2/2013	297.03	282.26	0.95
25	Early Childhood Academy South	6514079806	2522663	10/3/2013	11/1/2013	270.75	258.22	0.95
25	Early Childhood Academy South	6514079806	2522663	11/2/2013	12/3/2013	160.9	154.87	0.96
25	Early Childhood Academy South	6514079806	2522663	12/4/2013	1/3/2014	284.75	280.92	0.99

Early Childhood Academy South (Clinton Aver		Start Date	End Date	# Months
Account Number	6514079806	1/5/2012	1/3/2014	23
Meter Number	2522663			

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

Annual Usage	3,113	**Therms**	
Annual Cost	$3,050		
Rate	$0.98	**$/Therm**	Bill missing. Two month average used


Early Childhood Academy South - Natural Gas Usage - Meter No.: 2522663
Therms
350
300
250
200
150
100
50
0
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14

Newark Public Schools LGEA
CHA Project# 27999

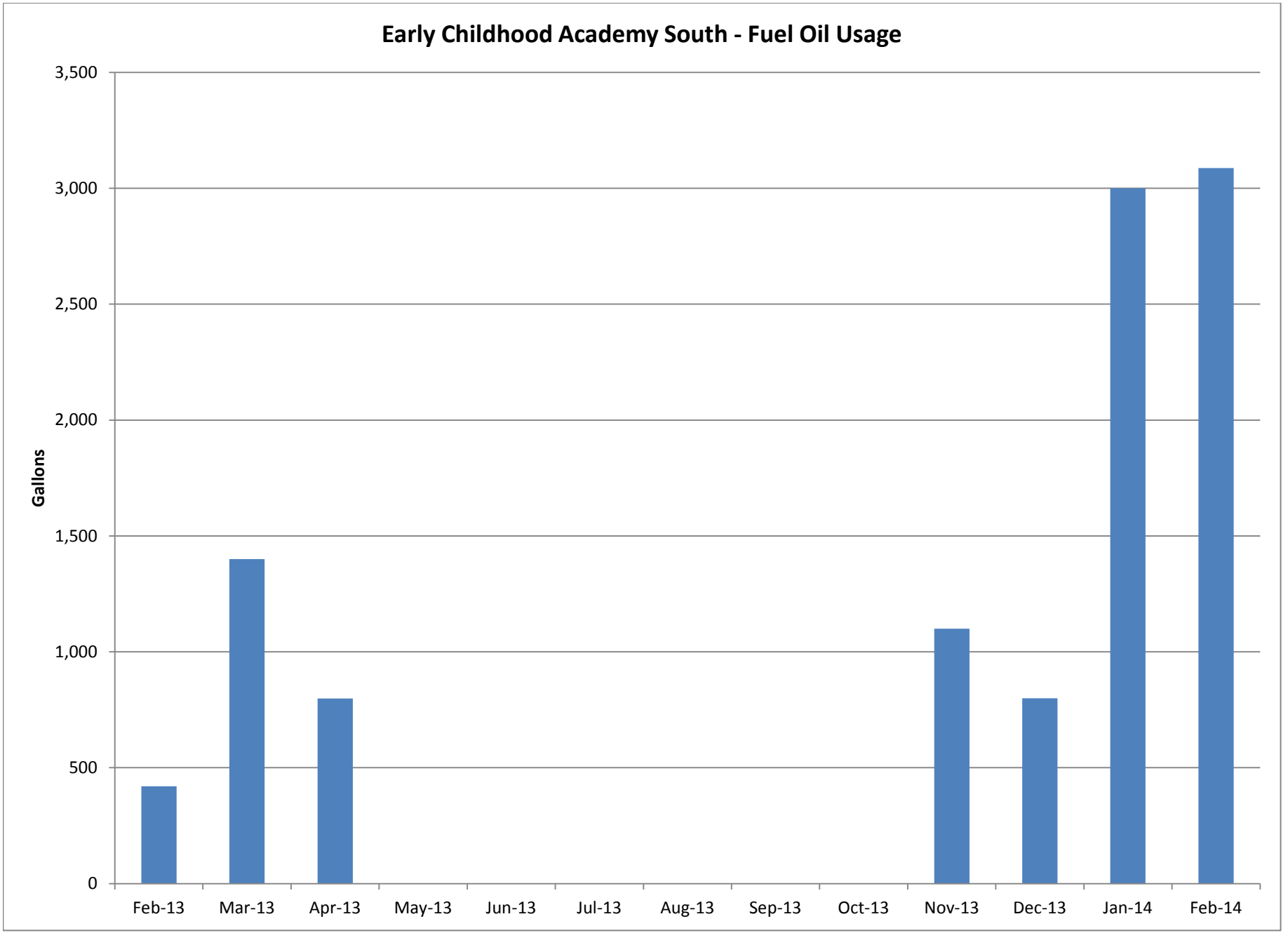
Early Childhood Academy South - Fuel Oil Usage

Index No	Current Name	Address NJIT PSS	Ticket Number	Delivery Date	Gallons	Delivery $	$/Gallon
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74759603	11/4/2011	1,000.00	3,159.00	3.16
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74761264	11/22/2011	525	1,626.00	3.10
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74762093	12/2/2011	927	2,847.00	3.07
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74762749	12/9/2011	244	740	3.03
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74764075	12/23/2011	457	1,374.00	3.01
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74765169	1/6/2012	813	2,606.00	3.21
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74766803	1/23/2012	325	1,029.00	3.17
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74768435	1/30/2012	350	1,131.00	3.23
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74769040	2/3/2012	942	3,020.00	3.21
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74771252	2/21/2012	1,214.00	4,047.00	3.33
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74772143	2/28/2012	216	740	3.43
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74772775	3/6/2012	300	1,009.00	3.36
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74775957	4/17/2012	400	1,293.00	3.23
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74776633	10/16/2012	1,004.00	3,441.00	3.43
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74788534	11/7/2012	601	1,952.00	3.25
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74790091	11/20/2012	829	2,884.00	3.48
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74790794	11/28/2012	494	1,694.00	3.43
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74792869	12/18/2012	600	1,911.00	3.19
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74794440	1/2/2013	700	2,217.00	3.17
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74796018	1/15/2013	800	2,696.00	3.37
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74798048	1/29/2013	1,100.00	3,707.00	3.37
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74799034	2/5/2013	600	2,091.00	3.49
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74800055	2/12/2013	600	2,122.00	3.54
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74800904	2/19/2013	601	2,105.00	3.50
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74801876	2/26/2013	420	1,425.00	3.39
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74802607	3/12/2013	900	2,949.00	3.28
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74805200	3/26/2013	1,400.00	4,410.00	3.15
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74805997	4/3/2013	799	2,601.00	3.26
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74807502	4/23/2013	403	1,183.00	2.94
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74821059	11/19/2013	801	2,427.00	3.03
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74821828	11/26/2013	1,100.00	3,465.00	3.15
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74823282	12/10/2013	800	2,525.00	3.16
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74825674	1/7/2014	3,000.00	9,320.00	3.11
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74827683	1/15/2014	1,000.00	3,108.00	3.11
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74828585	1/25/2014	1,025.00	3,375.00	3.29
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74830813	2/5/2014	3,087.00	10,362.00	3.36
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74832314	2/11/2014	1,000.00	3,272.00	3.27
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74833753	2/20/2014	1,500.00	4,987.00	3.32
25	Early Childhood Academy South (Clinton Avenue)	534 Clinton Ave. , 07108	74834101	2/25/2014	800	2,616.00	3.27

Early Childhood Academy South (Clinton Avenue)		Start Date	End Date	# Months
Address	534 Clinton Ave. , 07108	11/4/2011	2/25/2014	27

FUEL OIL USAGE - MOST RECENT 12 MONTHS, PERIOD ENDING: 2/25/2014

Annual Usage	18,035	**Gallons**
Annual Cost	$58,025	
Rate	$3.22	**$/Gallon**


Early Childhood Academy South - Fuel Oil Usage
Gallons
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13
Jan-14
Feb-14

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**

Back to the main supplier page

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**

Back to main supplier information page

APPENDIX B

Equipment Inventory

Newark Regional School District
CHA Project# 27998
Early Childhood Academy South School

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Location	Areas/Equipment Served	Actual *Estimated* Date Installed	Remaining Useful Life (years)	Other Info.
Air Compressor	1	Quincy	Q001506D00132	2.00301E+12	Compressed Air / Electric	Dual Motor 1 HP each	MER	School	*2003*	14	
B-1	1	Compak	FDL7-62	H14358	Heating / Natural Gas	4,000 MBH input, 80%	MER	School	*1969*	-20	
B-2	1	Compak	FDL7-62	H14359	Heating / Natural Gas	4,000 MBH input, 80%	MER	School	*1969*	-20	
HWP-5	1	-	-	-	Heating / Electric	1-1/2 HP	MER	HVAC 1 & 2	*2000*	4	
HWP-6	1	-	-	-	Heating / Electric	1-1/2 HP	MER	UV's Zone 1	*2000*	4	
HWP-7	1	-	-	-	Heating / Electric	1-1/2 HP	MER	UV's Zone 2	*2000*	4	
HWP-3	1	-	-	-	Heating / Electric	1-1/2 HP	MER	HVAC 3	*2000*	4	
HWP-4	1	-	-	-	Heating / Electric	1-1/2 HP	MER	HVAC 4	*2000*	4	
P-8	1	-	-	-	Heating / Electric	1-1/2 HP	MER	UV's Zone 3	*2000*	4	
P-9	1	-	-	-	Heating / Electric	1-1/2 HP	MER	UV's Zone 4	*2000*	4	
P-12	1	-	-	-	Cooling / Electric	7-1/2 HP	MER	School	*2000*	4	Chilled water pump
DHW-1	1	A.O. Smith	BTR 365A 118	C07M007284	Hot Water / Natural Gas	365,000 BTUH input, 80% efficiency, 85 gallons	MER	School	*2007*	5	
DHW-2	1	A.O. Smith	BTR 251 110	C07M007284	Hot Water / Natural Gas	251,000 BTUH input, 80% efficiency, 65 gallons	MER	School	*2004*	2	
RTU-1	1	Trane	GRC070CJC22G1	A93G07014	Cooling / Electric	700,000 BTU input, 539,000 Btu output, 6,885 cfm	Roof	School	*1993*	4	
HVAC-1	1	Nesbitt	-	-	Heating / Hot water		2nd Floor Utility Room	Cafeteria	*2005*	16	Chilled water cooling
HVAC-2	1	Nesbitt	-	-	Heating / Hot water		2nd Floor Utility Room	Cafeteria	*2005*	16	Chilled water cooling
HVAC-3	1	Nesbitt	-	-	Heating / Hot water		Utility Room	Zone 2	*2005*	16	Chilled water cooling
HVAC-4	3	Nesbitt	-	-	Cooling / Electric	Various	Classroom Windows	Admin Zone 4	*2005*	16	Chilled water cooling
CH-1	1	McQuay	AG7085B512-ER10	S1NU030200076	Chilled Water / Electric		Roof	School	*2000*	9	

Energy Audit of Early Childhood Academy South
CHA Project No. 27998
Existing Lighting & Audit Input

Cost of Electricity: **$0.191** **$/kWh**
$4.58 **$/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
40LED	Office	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	C-OCC	
40LED	VP Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
40LED	Main Office	Offices	10	T 32 R F 2 (ELE)	F42LL	60	0.60	SW	2400	1,440	C-OCC	
20LED	Conference Room C	Conference	36	S 32 C F 1 (ELE)	F41LL	32	1.15	SW	1200	1,382	C-OCC	
20LED	Vest	Hallways	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	6240	200	C-OCC	
20LED	114 Classroom	Classrooms	33	S 32 C F 1 (ELE)	F41LL	32	1.06	SW	2400	2,534	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	Janitor Closet	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	32	C-OCC	
20LED	Storage (UN-38)	Storage Areas	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	1000	32	C-OCC	
20LED	Boys TR	Restroom	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	4300	688	C-OCC	
20LED	116 Classroom	Classrooms	17	S 32 C F 1 (ELE)	F41LL	32	0.54	SW	2400	1,306	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	118 Classroom	Classrooms	17	S 32 C F 1 (ELE)	F41LL	32	0.54	SW	2400	1,306	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	117 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
40LED	115 Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	C-OCC	
20LED	119 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	120 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	121 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	123 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	Storage (UN-38)	Storage Areas	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	1000	192	C-OCC	
20LED	122 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	125 Office	Offices	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	124 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	127 Art Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	126 Staff Lounge	Break/Lunch Rooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	128A Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	128B Conference	Conference	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	1200	691	C-OCC	
20LED	Corridor	Hallways	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	6240	799	NONE	
20LED	Parent Resource	Classrooms	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	307	C-OCC	
40LED	130 Office	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	C-OCC	
40LED	132 Office	Offices	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	2400	288	C-OCC	
20LED	Womens TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	Mens TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	Storage (UN-38)	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	64	C-OCC	
40LED	UN-06 Nurse Vest	Hallways	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	6240	749	C-OCC	
40LED	Nurse	Offices	8	T 32 R F 2 (ELE)	F42LL	60	0.48	SW	2400	1,152	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	Kitchen	Cafeteria	25	S 32 C F 1 (ELE)	F41LL	32	0.80	SW	2000	1,600	NONE	
20LED	Storage 1	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	64	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	Storage 2	Storage Areas	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	1000	96	C-OCC	
20LED	Storage 3	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	64	C-OCC	
20LED	UN-32 Storage	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	64	C-OCC	
20LED	112 Classroom	Classrooms	33	S 32 C F 1 (ELE)	F41LL	32	1.06	SW	2400	2,534	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	Janitors Closet	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	64	C-OCC	
20LED	Girls TR	Restroom	5	S 32 C F 1 (ELE)	F41LL	32	0.16	SW	4300	688	C-OCC	
40LED	113 Office	Offices	3	T 32 R F 2 (ELE)	F42LL	60	0.18	SW	2400	432	C-OCC	
20LED	110A Classroom	Classrooms	16	S 32 C F 1 (ELE)	F41LL	32	0.51	SW	2400	1,229	C-OCC	
20LED	110B Classroom	Classrooms	16	S 32 C F 1 (ELE)	F41LL	32	0.51	SW	2400	1,229	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
20LED	Room 111 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	109 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	108 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	107 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	105 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	106 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	103 Classroom	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	104 Resource Room	Classrooms	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	101 Office	Offices	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	102 Office	Offices	18	S 32 C F 1 (ELE)	F41LL	32	0.58	SW	2400	1,382	C-OCC	
20LED	100 Media Center	Classrooms	36	S 32 C F 1 (ELE)	F41LL	32	1.15	SW	2400	2,765	C-OCC	
20LED	Storage	Storage Areas	2	S 32 C F 1 (ELE)	F41LL	32	0.06	SW	1000	64	C-OCC	
20LED	Boys TR	Restroom	3	S 32 C F 1 (ELE)	F41LL	32	0.10	SW	4300	413	C-OCC	
20LED	Girls TR	Restroom	6	S 32 C F 1 (ELE)	F41LL	32	0.19	SW	4300	826	C-OCC	
40LED	Stair (Boiler Room)	Boiler Room	1	T 32 R F 2 (ELE)	F42LL	60	0.06	SW	2000	120	NONE	

Energy Audit of Early Childhood Academy South
CHA Project No. 27998
Existing Lighting & Audit Input

Cost of Electricity: **$0.191** **$/kWh**
$4.58 **$/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
20LED	Cust Office	Offices	4	S 32 C F 1 (ELE)	F41LL	32	0.13	SW	2400	307	C-OCC	
20LED	TR	Restroom	1	S 32 C F 1 (ELE)	F41LL	32	0.03	SW	4300	138	C-OCC	
65	Storage	Storage Areas	1	I 100	I100/1	100	0.10	SW	1000	100	C-OCC	
40LED	Storage	Storage Areas	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	1000	360	C-OCC	
40LED	Storage 1	Storage Areas	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	C-OCC	
40LED	Storage 2	Storage Areas	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	C-OCC	
40LED	Storage 3	Storage Areas	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	C-OCC	
40LED	Storage 4	Storage Areas	2	T 32 R F 2 (ELE)	F42LL	60	0.12	SW	1000	120	C-OCC	
77	Oil Tank Room	Storage Areas	1	I 150	I150/1	150	0.15	SW	1000	150	C-OCC	
40LED	MER (Boiler Room)	Boiler Room	11	T 32 R F 2 (ELE)	F42LL	60	0.66	SW	2000	1,320	NONE	
	Total		**757**				**26.12**			**60,527**		

APPENDIX C

ECM Calculations

Newark Board of Education - NJBPU
CHA Project Number: 27998

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
$ 0.158	$/kWh blended		0.000420205	43,531	$ 55,957	$ 3,050	$ 58,025
$ 0.146	$/kWh supply	355,200	0.000420205				
$ 4.58	$/kW	102.8	0				
$ 0.98	$/Therm	3,113	0.00533471				
$ 7.55	$/kgals		0				
$ 3.22	$/Gal	18,035					

Early Childhood Academy South

Recommend? Y or N		Item	Savings kW	kWh	therms	No. 2 Oil gal	Water kgal	$	Cost	Simple Payback	Life Expectancy	Equivalent CO_2 (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Projected kW	kWh	therms	Oil	kgal/yr	$	ROI	NPV	IRR
N	ECM-1A	Heating Fuel Conversion (Fuel Switch)	0.0	0	(25,015)	18,035	0	33,514	$ 40,420	1.2	25	-133.4	$ 2,000	N	1.1	0.0	0	(625,364)	450,875	0	$ 837,856	19.7	$545,169	87.2%
Y	ECM-1B	Boiler Replacement	0.2	0	(21,742)	18,035	0	36,732	$ 243,491	6.6	25	-116.0	$ 4,000	N	6.5	5.0	0	(543,555)	450,875	0	$ 918,291	2.8	$400,122	14.9%
Y	ECM-2	Install Premium Efficiency Motors on HW Pumps	0.2	555	0	0	0	92	$ 3,348	36.5	15	0.2	$ -	N	36.5	3.0	8,322	0	0	0	$ 1,475	(0.6)	($2,252)	-9.5%
Y	ECM-3	Install VFD & Premium motors on Chilled Water Pumps	3.8	13,619	0	0	0	2,195	$ 5,306	2.4	15.0	5.7	$ 488	N	2.2	57.2	204,283	0	0	0	$ 35,328	5.7	$21,389	45.4%
Y	ECM-4A	Install Basic Controls	0.0	104,972	0	3,153	0	26,681	$ 21,309	0.8	15.0	44.1	$ -	N	0.8	0.0	1,574,580	0	47,294	0	$ 400,216	17.8	$297,207	125.2%
N	ECM-4B	Install Full DDC Controls	0.0	108,524	0	3,838	0	29,446	$ 352,774	12.0	15.0	45.6	$ -	N	12.0	0.0	1,627,860	0	57,574	0	$ 441,683	0.3	($1,255)	3.0%
N	ECM-5	Replace DHW Heaters with Condensing Hot Water Heaters	0.0	0	777	0	0	761	$ 34,838	45.8	15.0	4.1	$ 400	N	45.3	0.0	0	11,650	0	0	$ 11,416	(0.7)	($25,353)	-11.4%
Y	ECM-6	Install Vending Machine Controls	0.0	5,906	0	0	0	930	$ 560	0.6	15.0	2.5	$ -	N	0.6	0.0	88,583	0	0	0	$ 13,955	23.9	$10,546	166.1%
N	ECM-7	Install Low Flow Plumbing Fixtures	0.0	0	0	0	644	4,861	$ 160,788	33.1	15.0	0.0	$ -	N	33.1	0.0	0	0	0	9,658	$ 72,917	(0.5)	($102,756)	-8.6%
N	ECM-L1	Lighting Replacements / Upgrades	13.3	30,937	0	0	0	5,244	$ 71,141	13.6	15.0	13.0	$ -	N	13.6	200.0	464,062	0	0	0	$ 84,106	0.2	($8,541)	1.3%
N	ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	18,455	0	0	0	3,534	$ 20,790	5.9	15.0	7.8	$ 2,695	N	5.1	0.0	276,831	0	0	0	$ 43,611	1.1	$24,095	17.9%
Y	ECM-L3	Lighting Replacements with Controls (Occupancy Sensors)	13.3	39,971	0	0	0	6,561	$ 91,931	14.0	15.0	16.8	$ 2,695	N	13.6	200.0	599,559	0	0	0	$ 105,452	0.1	($10,914)	1.2%
		Total (Does Not Include ECM-1A, 4B, L1 & L2)	**17.5**	**165,022**	**777**	**3,153**	**644**	**$ 78,813**	**$ 561,572**	**7.1**	**16.3**	**(43)**	**$ 7,583**		**7.0**	**265**	**2,475,327**	**(531,905)**	**498,169**	**9,658**	**$ 1,559,050**	**1.8**	**$435,990**	**11.9%**
		Recommended Measures (highlighted green above)	**17.5**	**165,022**	**0**	**3,153**	**0**	**$ 73,191**	**$ 365,946**	**5.0**	**16.7**	**(47)**	**$ 7,183**	**0**	**4.9**	**265**	**2,475,327**	**(543,555)**	**498,169**	**-**	**$ 1,474,717**	**3.0**	**$560,595**	**19.2%**
		% of Existing	**17%**	**46%**	**0%**	**17%**																		

Note: Due to Fuel Conversion the recommended ECMs can add up to be greater than the current fuel oil usage. To account for this the fuel oil and natural gas savings of performing fuel conversion is not shown in the total or total recommended rows. Only cost savings is included

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

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

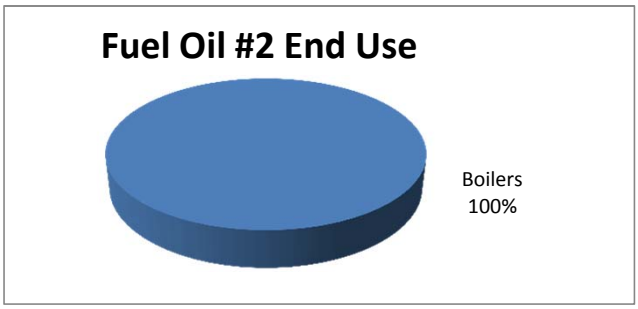
Heating System Efficiency	80%
Cooling Eff (kW/ton)	1.2

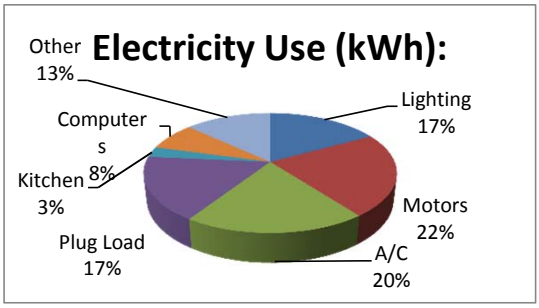
Heating		
Hours	4,427	Hrs
Weighted Avg	40	F
Avg	28	F

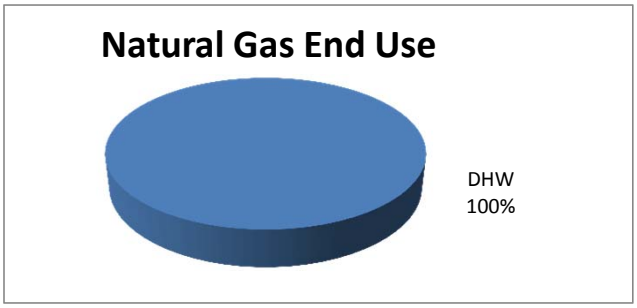
Cooling		
Hours	4,333	Hrs
Weighted Avg	68	F
Avg	78	F

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
355,200	Total	Based on utility analysis	
60,527	Lighting	From Lighting Calculations	0.170402027
80,000	Motors	Estimated	0.225225225
70,000	A/C	See Window AC Calculation	0.197072072
60,943	Plug Load	Estimated	0.171574887
10,000	Kitchen	Estimated	0.028153153
27,000	Computers	Estimated	0.076013514
46,730	Other	Remaining	0.131559122
Fuel Oil #2 Gas Use (Oil):		**Notes/Comments:**	
18,035	Total	Based on utility analysis	
18,035	Boilers	Gallons/SF x Square Feet Served	
Natural Gas Use (Therms):		**Notes/Comments:**	
3,113	Total	Based on utility analysis	
3,113	DHW	Therms/SF x Square Feet Served	1







Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-1A: Heating Fuel Conversion (Fuel Switch)

Existing Fuel #2 Oil
Proposed Fuel Nat.Gas

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 3.22	/ Gal #2	Based on Utility Analysis
Proposed Fuel Cost	$ 0.98	/ Therm	Based on Utility Analysis
Baseline Fuel Use	18,035	Gals #2	Based on historical utility data
Existing Boiler Plant Efficiency	80%		Estimated or Measured
Baseline Boiler Load	2,001,164	Mbtu/yr	Baseline Fuel Use x Existing Efficiency x 138.7 Mbtu/Gals #2
Baseline Fuel Cost	$ 58,025		
Proposed Boiler Plant Efficiency	80%		New Burner Efficiency
Proposed Fuel Use	25,015	Therms	Baseline Boiler Load / Proposed Efficiency / 100 Mbtu/Therms
Proposed Fuel Cost	$ 24,511		
Calculated Gas Penalty	(25,015)	Therms	
Estimated Annual Savings	18,035	Gals #2	

*Note to engineer: Link savings back to summary sheet in appropriate column.

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-1A: Heating Fuel Conversion (Fuel Switch) - 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.		
2,000 MBH Replacement NG Burner	2	EA	$ 5,000	$ 2,500		$ 10,270	$ 6,230	$ -	$ 16,500	RS Means 2012
Boiler Controllers	1	EA	$ 5,500	$ 1,000		$ 5,649	$ 1,246	$ -	$ 6,895	RS Means 2012
Miscellaneous Electrical	1	LS	$ 500	$ 1,500		$ 514	$ 1,869	$ -	$ 2,383	RS Means 2012
Natural Gas Piping	150	LF	$ 32.5	$ 6.5	$ 2.0	$ 5,007	$ 1,215	$ 337	$ 6,559	RS Means 2012
						$ -	$ -	$ -	$ -	

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

$ 32,336	Subtotal
$ 8,084	25% Contingency
$ 40,420	**Total**

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-1B: Boiler Replacement

Description: This ECM evaluates the replacement of an existing fuel oil #2 boiler system with high efficiency condensing gas boiler and hydronic heating system. The existing boiler efficiency is 80% (per NJBPU protocals) and the proposed boiler efficiency is 90% (average seasonal efficiency). This ECM is contingent on completing ECM-1A.

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 0.98	/ Therm	Natural Gas
Baseline Fuel Cost	$ 3.22	/ Gal	No. 2 Oil
FORMULA CONSTANTS			
Oversize Factor	0.8		
Hours per Day	24		
Infrared Conversion Factor	1.0		1.0 if Boiler, 0.8 if Infrared Heater
EXISTING			
Capacity	3,543,978	btu/hr	
Heating Combustion Efficiency	80%		
Heating Degree-Day	2,783	Degree-day	
Design Temperature Difference	75	F	
Fuel Conversion	100,000	btu/therm	
PROPOSED			
Capacity	3,543,978	btu/hr	
Efficiency	90%		
SAVINGS			
Fuel Savings	3,507	therms	NJ Protocols Calculation
Fuel Savings	18,035	Gal	
New Fuel Usage	(21,742)	therms	
Fuel Cost Savings	$ 36,721		

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

Algorithms

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

Definition of Variables

OF = Oversize factor of standard boiler or furnace (OF=0.8)

$CAPY_{Bi}$ = Total input capacity of the baseline furnace, boiler or heater in Btu/hour

$CAPY_{Qi}$ = Total input capacity of the qualifying furnace, boiler or heater in Btu/hour

HDD_{mod} = HDD by zone and building type

24 = Hours/Day

ΔT = design temperature difference

HC_{fuel} = Conversion from Btu to therms of gas or gallons of oil or propane (100,000 btu/therm; 138,700 btu/gal of #2 oil; 92,000 btu/gal of propane)

EFF_Q = Efficiency of qualifying heater(s) (AFUE %)

EFF_B = Efficiency of baseline heaters (AFUE %)

ICF = Infrared Compensation Factor (ICF = 0.8 for IR Heaters, 1.0 for furnaces/boilers)[2]

Furnaces and Boilers

Component	Type	Value	Source
$AFUE_q$	Variable		Application
$AFUE_b$	Fixed	Furnaces: 78% Boilers: 80% Infrared: 78%	EPACT Standard for furnaces and boilers
$CAPY_{in}$	Variable		Application
ΔT	Variable	See Table Below	1
HDD_{mod}	Fixed	See Table Below	1

Sources:

1. KEMA, *Smartstart Program Protocol Review*. 2009.
2. http://www.spaceray.com/1_space-ray_faqs.php

Adjusted Heating Degree Days by Building Type

Building Type	Heating Energy Density (kBtu/sf)	Degree Day Adjustment Factor	Atlantic City (HDD)	Newark (HDD)	Philadelphia (HDD)	Monticello (HDD)
Education	29.5	0.55	2792	2783	2655	3886
Food Sales	35.6	0.66	3369	3359	3204	4689
Food Service	39.0	0.73	3691	3680	3510	5137
Health Care	53.6	1.00	5073	5057	4824	7060
Lodging	15.0	0.28	1420	1415	1350	1976
Retail	29.3	0.55	2773	2764	2637	3859
Office	28.1	0.52	2660	2651	2529	3701
Public Assembly	33.8	0.63	3199	3189	3042	4452
Public Order/Safety	24.1	0.45	2281	2274	2169	3174
Religious Worship	29.1	0.54	2754	2745	2619	3833
Service	47.8	0.89	4524	4510	4302	6296
Warehouse/Storage	20.2	0.38	1912	1906	1818	2661

Heating Degree Days and Outdoor Design Temperature by Zone

Weather Station	HDD	Outdoor Design Temperature (F)
Atlantic City	5073	13
Newark	5057	14
Philadelphia, PA	4824	15
Monticello, NY	7060	8

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-1B: Boiler Replacement - Cost

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
2,000 MBH NG Condensing Boiler	2	EA	$ 32,000	$ 8,000		$ 65,728	$ 19,936	$ -	$ 85,664	Vendor Estimate
Flue Installation	100	LF	$ 150.0	$ 50.00		$ 15,405	$ 6,230	$ -	$ 21,635	Engineering Estimate
Miscellaneous Electrical	2	EA	$ 2,500	$ 5,000		$ 5,135	$ 12,460	$ -	$ 17,595	RS Means 2012
Miscellaneous HW Piping	2	EA	$ 10,000	$ 5,000		$ 20,540	$ 12,460	$ -	$ 33,000	RS Means 2012
Natural Gas Piping	1	EA	$ 2,500	$ 500		$ 2,568	$ 623	$ -	$ 3,191	Engineering Estimate
Installation of Primary Pumps	2	EA	$ 2,500	$ 1,500		$ 5,135	$ 3,738	$ -	$ 8,873	RS Means 2012
Installation of Secondary Pumps	2	EA	$ 3,500	$ 1,500		$ 7,189	$ 3,738	$ -	$ 10,927	RS Means 2012
Boiler controls	1	LS	$ 2,500	$ 2,500		$ 2,568	$ 3,115	$ -	$ 5,683	Engineering Estimate
VFD	2	ea	$ 2,021	$ 509		$ 4,151	$ 1,268	$ -	$ 5,420	RS Means 2012
Motor	2	ea	$ 536	$ 84		$ 1,101	$ 209	$ -	$ 1,310	RS Means 2012
Pipe pressure sensor/transmitter	1	ea	$ 850	$ 500		$ 873	$ 623	$ -	$ 1,496	RS Means 2012

$	194,793	Subtotal
$	48,698	25% Contingency
$	**243,491**	**Total**

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

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

Demand Cost $/kW-month	Energy Cost $/kWh
$ 4.58	$ 0.15

Multipliers		
Material	Labor	Equipment
1.03	1.25	1.12

ECM-2: Install Premium Efficiency Motors

Description: This ECM evaluates the electrical savings associated with replacing less efficient electric motors with NEMA standard MG-1 rated motors

Savings Analysis

Cost Estimates

#	Description	Location	Existing HP	Load Factor	Coincidence Factor	IF_{VFD} Y/N	IF_{VFD} Factor	Existing Efficiency[a]	New Efficiency[a]	ΔkW kW	Demand Savings	Demand Savings $	Annual Hours	kWh Savings	$ kWh Savings	Total $ Savings	Estimated Cost	Payback Years	Unit Costs Materials	Unit Costs Labor	Unit Costs Equipment	Subtotal Costs Materials	Subtotal Costs Labor	Subtotal Costs Equipment	Total Cost	Remarks
1	HWP-5	MER	1.5	0.75	0.74	N	1.0	0.840	0.865	0.0	0.028	$ 2	2,745	79	$ 12	$ 13	$ 478	36.5	$ 284	$ 150	$ -	$ 291	$ 187	$ -	$ 478	
2	HWP-6	MER	1.5	0.75	0.74	N	1.0	0.840	0.865	0.0	0.028	$ 2	2,745	79	$ 12	$ 13	$ 478	36.5	$ 284	$ 150	$ -	$ 291	$ 187	$ -	$ 478	
3	HWP-7	MER	1.5	0.75	0.74	N	1.0	0.840	0.865	0.0	0.028	$ 2	2,745	79	$ 12	$ 13	$ 478	36.5	$ 284	$ 150	$ -	$ 291	$ 187	$ -	$ 478	
4	HWP-3	MER	1.5	0.75	0.74	N	1.0	0.840	0.865	0.0	0.028	$ 2	2,745	79	$ 12	$ 13	$ 478	36.5	$ 284	$ 150	$ -	$ 291	$ 187	$ -	$ 478	
5	HWP-4	MER	1.5	0.75	0.74	N	1.0	0.840	0.865	0.0	0.028	$ 2	2,745	79	$ 12	$ 13	$ 478	36.5	$ 284	$ 150	$ -	$ 291	$ 187	$ -	$ 478	
6	P-8	MER	1.5	0.75	0.74	N	1.0	0.840	0.865	0.0	0.028	$ 2	2,745	79	$ 12	$ 13	$ 478	36.5	$ 284	$ 150	$ -	$ 291	$ 187	$ -	$ 478	
7	P-9	MER	1.5	0.75	0.74	N	1.0	0.840	0.865	0.0	0.028	$ 2	2,745	79	$ 12	$ 13	$ 478	36.5	$ 284	$ 150	$ -	$ 291	$ 187	$ -	$ 478	
		Total	**10.5**							**0.3**	**0.20**	**$ 11**		**555**	**$ 81**	**$ 92**	**$ 3,348**									

Notes

a Existing and new efficiencies should be entered if known. If not known, use provided curve fit based on "DOE Survey Installed Average" and NEMA Premium values, respectively.

b Same as existing HP unless resized to better match load

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-3: Install VFD & Premium motors on Chilled Water Pumps

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

Variable Inputs

Electric Rate	$0.15	**$/kWh**
Demand Rate	$4.58	**$/kW**

MOTOR SCHEDULE										Savings Factor		Existing Motor Energy		Proposed Motor Energy		Energy Savings	
Motor ID	Motor Type	Qty	HP	Total HP	Upgrade Motor	Load Factor	Existing Motor Eff.	New Motor Eff.	Annual Hours	Demand Savings Factor	Energy Savings Factor	Demand Savings (kW)	Energy Savings (kWh)	Demand Savings (kW)	Energy Savings (kWh)	Peak Demand Savings (kW)	Annual Energy Savings (kWh)
P-12	CHW/HW	1	7.5	7.5	Y	0.75	88.5%	91.0%	4,333	0.201	0.580	4.7	20,542	0.9	6,923	3.8	13,619
														Total:		3.8	13,618.9
																$ 210	$ 1,986
																	$ 2,195

Savings calculation formulas are taken from NJ Protocols document for VFDs

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-3: Install VFD & Premium motors on Chilled Water Pumps - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
7.5 HP VFD	1	ea	$ 2,021	$ 509		$ 2,076	$ 635	$ -	$ 2,710	RS Means 2012
7.5 HP Motor	1	ea	$ 536	$ 84		$ 550	$ 105	$ -	$ 655	RS Means 2012
Electrical - misc.	1	ls	$ 250	$ 500		$ 257	$ 623	$ -	$ 880	RS Means 2012
			$ -			$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 4,245	Subtotal
$ 1,061	25% Contingency
$ 5,306	**Total**

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

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-4A: Basic Controls

Description: This ECM evaluates adding automatic temperature controls that will turn the boilers on/off based on outdoor air and indoor air temperatures.

Day Setback

EXISTING CONDITIONS			
Heating			
Heating Season Facility Temp	80	F	Th
Weekly Occupied Hours	70	hrs	H
Heating Season Setback Temp	75	F	Sh
Heating Season % Savings per	3%		Ph
Annual Boiler Capacity		Mbtu/yr	
Capacity	1,771,989	Btu/hr	Caph
Equivalent Full Load Heating	900	hrs	EFLHh
Heating Equipment Efficiency	80%		AFUEh
Cooling			
Cooling Season Facility Temp	74	F	Tc
Weekly Occupied Hours	70	hrs	H
Cooling Season Setback Temp	79	F	Sc
Cooling Season % Savings per	3%		Pc
Connected Cooling Load	85	Tons	Capc
Equivalent Full Load Cooling	381	hrs	EFLHc
Cooling Equipment EER	14.0		AFUEc
SAVINGS			
Fuel Oil #2 Savings	1,182	Gallons^3	
Cooling Electricity Savings	52,717	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	1,771,989	Btu/hr
Equivalent Full Load Heating Hours	500	hrs
Heating Equipment Efficiency	80%	
Cooling		
Cooling Season Facility Temp	74	F
Weekly Occupied Hours	70	hrs
Cooling Season Setback Temp	80	F
Cooling Season % Savings per	3%	
Connected Cooling Load Capacity	85	Tons
Equivalent Full Load Cooling Hours	381	hrs
Cooling Equipment EER	14.0	
SAVINGS		
Fuel Oil #2 Savings	1,971	Gallons^3
Cooling Electricity Savings	52,256	kWh

$0.16	$/kWh Blended
$3.22	$/Gallons

COMBINED SAVINGS		
Fuel Oil #2 Savings	3,153	Gallons
Cooling Electricity Savings	104,972	kWh
Total Cost Savings	$ 26,681	
Estimated Total Project Cost	$ 21,309	
Simple Payback	0.8	Yrs

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

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 Number: 27998
Early Childhood Academy South

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-4A: Basic Controls - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Boiler Controller	1	ea	$ 7,500	$ 7,500		$ 7,703	$ 9,345	$ -	$ 17,048	RS Means 2012
						$ -	$ -	$ -	$ -	

**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 Number: 27998
Early Childhood Academy South

ECM-4B: Install Full DDC Controls

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

Building Information:

43,531	Sq Footage	$0.16	$/kWh Blended
Y	Cooling	$3.22	$/Gallons
Y	Heating		

FULL DDC - TEMPERATURE SETBACK SAVINGS CALCULATION

EXISTING CONDITIONS		
Heating		
Heating Season Facility Temp	80	F
Weekly Occupied Hours	70	hrs
Heating Season Setback Temp	75	F
Heating Season % Savings per Degree Setback	3%	
Annual Boiler Capacity	-	Mbtu/yr
Connected Heating Load Capacity	1,771,989	Btu/hr
Equivalent Full Load Heating Hours	900	hrs
Heating System Efficiency	80%	
Cooling		
Cooling Season Facility Temp	74	F
Weekly Occupied Hours	70	hrs
Cooling Season Setback Temp	79	F
Cooling Season % Savings per Degree Setback	3%	
Connected Cooling Load Capacity	85	Tons
Equivalent Full Load Cooling Hours	381	hrs
Cooling Equipment EER	14.0	
SAVINGS		
Fuel Oil #2 Savings	1,182	Gallons
Cooling Electricity Savings	52,717	kWh

FULL DDC - ADDITIONAL CONTROLS SAVINGS CALCULATION

EXISTING CONDITIONS		
Existing Facility Total Electric usage	355,200	kWh
Existing Facility Total Oil usage	18,035	Gallons
Existing Facility Cooling Electric usage	88,800.0	kWh[1]
Existing Facility Heating Natural Gas usage	17,133	Gallons[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	3,552	kWh
Proposed Facility Fuel Oil #2 Savings	685	Gallons
SAVINGS		
Electric Savings	3,552	**kWh**
Fuel Oil Savings	685	**Gallons**

Assumptions

1	25%	of facility total electricity dedicated to Cooling; based on utility information
2	95%	of facility total natural gas dedicated to Heating; based on utility information
3	4%	Typical Savings associated with installation of DDC controls

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 Degree Setback	3%	
Annual Boiler Capacity		Mbtu/yr
Connected Heating Load Capacity	1,771,989	Btu/hr
Equivalent Full Load Heating Hours	500	hrs
Heating Equipment Efficiency	80%	
Cooling		
Cooling Season Facility Temp	74	F
Weekly Occupied Hours	70	hrs
Cooling Season Setback Temp	80	F
Cooling Season % Savings per Degree Setback	3%	
Connected Cooling Load Capacity	85	Tons
Equivalent Full Load Cooling Hours	381	hrs
Cooling Equipment EER	14.0	
SAVINGS		
Natural Gas Savings	1,971	Gallons[3]
Cooling Electricity Savings	52,256	kWh

COMBINED SAVINGS		
Natural Gas Savings	3,838	Gallons
Cooling Electricity Savings	108,524	kWh
Total Cost Savings	$ 29,446	
Estimated Total Project Cost	$ 352,774	
Simple Payback	12.0	Yrs

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

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

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.00

ECM-4B: Install Full DDC Controls - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
Unit Ventilator Controls	36	ea		$ 4,000		$ -	$ 179,424	$ -	$ 179,424	Vendor Quote
AHU Control	4	ea		$ 4,000		$ -	$ 19,936		$ 19,936	Vendor Quote
Radiator Control (Group of 4)	4	ea		$ 4,500		$ -	$ 22,428	$ -	$ 22,428	Vendor Quote
Exhaust Fan Control (Group of 4)	5	ea		$ 3,300		$ -	$ 20,559	$ -	$ 20,559	Vendor Quote
Head End Controller & Programming	1	ls		$ 32,000		$ -	$ 39,872	$ -	$ 39,872	Vendor Quote
New Unit Ventilator	0	ea	$ 5,000	$ 4,000		$ -	$ -	$ -	$ -	Engineering Estimate
New Exhaust Fan	0	ea	$ 1,525	$ 239		$ -	$ -	$ -	$ -	RS Means 2012
New Radiator	0	lf	$ 43	$ 21		$ -	$ -	$ -	$ -	RS Means 2012
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

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

$ 282,219	Subtotal
$ 70,555	25% Contingency
$ 352,774	**Total**

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-5: Replace Gas-Fired DHW Heater w/ Condensing Gas-Fired DHW Heater

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

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	**331**	Therms/month	Average Calculated from utility bill
Total Annual Utility Demand by Water Heater	397,200	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	78%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	309,816	MBTU/yr	
Existing Tank Size	85	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	Per building personnel
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.9	MBH	
Annual Standby Hot Water Load	7,884	MBTU/yr	
New Tank Size	50	Gallons	Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	120	˚F	
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.6	MBH	
Annual Standby Hot Water Load	4,818	MBTU/yr	
Total Annual Hot Water Demand	306,750	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Proposed Fuel Use	3,195	Therns	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$0.98	$/Therm	
Existing Operating Cost of DHW	$3,892	$/yr	
Proposed Operating Cost of DHW	$3,131	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	777	$761

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

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	2	LS		$ 50		$ -	$ 125	$ -	$ 125	RS Means 2012
High Efficiency Gas-Fired DHW Heater	2	EA	$ 5,150	$ 4,500		$ 10,578	$ 11,214	$ -	$ 21,792	Vendor Quote
Miscellaneous Electrical	2	LS	$ 500	$ 500		$ 1,027	$ 1,246	$ -	$ 2,273	RS Means 2012
Venting Kit	2	EA	$ 450	$ 650		$ 924	$ 1,620	$ -	$ 2,544	RS Means 2012
Miscellaneous Piping and Valves	1	LS	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	RS Means 2012

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

$ 27,870	Subtotal
$ 6,968	25% Contingency
$ 34,838	**Total**

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-6: Install Vending Machine Controls

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

Unit Cost: $0.158 $/kWh blended

Energy Savings Calculations:

Existing		
Cold Beverage Vending Machine Electric usage	7,008	kWh[1,4,7]
Snack Vending Machine Electric usage	-	kWh[2,5,7]
Dual Vending Machine Electric Usage	-	kWh[3,6,7]
Total Vending Machine Electric Usage	7,008	kWh
Proposed		
Cold Beverage Vending Machine Electric usage	1,103	kWh[8]
Snack Vending Machine Electric usage	0	kWh
Dual Vending Machine Electric Usage	0	kWh
Total Vending Machine Electric Usage	1,103	kWh
Vending Machine Controls Usage Savings	**5,906**	**kWh**
Total cost savings	**$ 930**	
Estimated Total Project Cost	**$ 560**	[9]
Simple Payback	**1**	**years**

Assumptions

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

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

ECM-6: Install Vending Machine Controls - 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.		
									$ -	
Vending Miser	2	EA	$ 200	$ 15	$ -	$ 411	$ 37	$ -	$ 448	Vendor Estimation
						$ -	$ -	$ -	$ -	

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

$ 448	Subtotal
$ 112	25% Contingency
$ 560	**Total**

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

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	14	Based on # of occupants
Average Flushes / Urinal (per Day)	18	
Average Gallons / Flush	2.5	Gal

PROPOSED CONDITIONS		
Proposed Urinals to be Replaced	14	
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	229.95	kGal / year
Proposed Urinal Water Use	11.50	kGal / year
Water Savings	218.45	kGal / year
Cost Savings	$1,649	/ year

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

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

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	35	Based on # of occupants
Average Flushes / Toilet (per Day)	15	
Average Gallons / Flush	3.5	Gal

PROPOSED CONDITIONS		
Proposed Toilets to be Replaced	35	
Proposed Gallons / Flush	1.28	Gal

SAVINGS		
Current Toilet Water Use	670.69	kGal / year
Proposed Toilet Water Use	245.28	kGal / year
Water Savings	425.41	kGal / year
Cost Savings	$3,212	/ year

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

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	14	EA	$ 1,200	$ 1,000	$ -	$ 17,254	$ 17,444	$ -	$ 34,698	Vendor Estimate
Low-Flow Toilet	35	EA	$ 1,400	$ 1,000	$ -	$ 50,323	$ 43,610	$ -	$ 93,933	Vendor Estimate
						$ -	$ -	$ -	$ -	

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

$ 128,631	Subtotal
$ 32,158	25% Contingency
$ 160,788	**Total**

Newark Board of Education - NJBPU
CHA Project Number: 27998
Early Childhood Academy South

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.
Values used in this calculation are for ALL identified measures except for alternate ECMs, regardless of payback or IRR. P4P estimated incentives represent a best case scenario, and will likely be lower depending on which measures are included. The savings displayed here are not guaranteed to qualify for P4P incentives if IRR or payback requirements are not met.

Total Building Area (Square Feet)	43,531
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

Incentive #1		
Audit is funded by NJ BPU	$0.10	$/sqft

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$55,957	$3,050
Existing Usage (from utility)	355,200	3,113
Proposed Savings	165,022	0
Existing Total MMBtus	1,524	
Proposed Savings MMBtus	563	
% Energy Reduction	**37.0%**	
Proposed Annual Savings	$73,191	

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

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$5,000
Incentive #2	$18,152	$0	$18,152
Incentive #3	$18,152	$0	$18,152
Total All Incentives	**$36,305**	**$0**	**$41,305**

Total Project Cost	$561,572

		Allowable Incentive
% Incentives #1 of Utility Cost*	8.5%	$5,000
% Incentives #2 of Project Cost**	3.2%	$18,152
% Incentives #3 of Project Cost**	3.2%	$18,152
Total Eligible Incentives***	**$41,305**	
Project Cost w/ Incentives	$520,267	

Project Payback (years)	
w/o Incentives	w/ Incentives
7.7	7.1

* 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 Early Childhood Academy South
CHA Project No. 27998
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) * (kWh Saved)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
40LED	Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	106	0.0	$ 22.64	$ 472.50	$0	20.9	20.9
40LED	VP Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 59 R LED	RTLED38	38	0.1	SW	2,400	274	158	0.1	$ 33.96	$ 708.75	$0	20.9	20.9
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
40LED	Main Office	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440	10	T 59 R LED	RTLED38	38	0.4	SW	2,400	912	528	0.2	$ 113.21	$ 2,362.50	$0	20.9	20.9
20LED	Conference Room C	36	S 32 C F 1 (ELE)	F41LL	32	1.2	SW	1200	1,382	36	4 ft LED Tube	200732x1	15	0.5	SW	1,200	648	734	0.6	$ 174.29	$ 2,940.30	$0	16.9	16.9
20LED	Vest	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	6240	200	1	4 ft LED Tube	200732x1	15	0.0	SW	6,240	94	106	0.0	$ 21.25	$ 81.68	$0	3.8	3.8
20LED	114 Classroom	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	4 ft LED Tube	200732x1	15	0.5	SW	2,400	1,188	1,346	0.6	$ 288.68	$ 2,695.28	$0	9.3	9.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	Janitor Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	4 ft LED Tube	200732x1	15	0.0	SW	1,000	15	17	0.0	$ 4.19	$ 81.68	$0	19.5	19.5
20LED	Storage (UN-38)	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	4 ft LED Tube	200732x1	15	0.0	SW	1,000	15	17	0.0	$ 4.19	$ 81.68	$0	19.5	19.5
20LED	Boys TR	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	688	5	4 ft LED Tube	200732x1	15	0.1	SW	4,300	323	366	0.1	$ 74.67	$ 408.38	$0	5.5	5.5
20LED	116 Classroom	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,306	17	4 ft LED Tube	200732x1	15	0.3	SW	2,400	612	694	0.3	$ 148.71	$ 1,388.48	$0	9.3	9.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	118 Classroom	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,306	17	4 ft LED Tube	200732x1	15	0.3	SW	2,400	612	694	0.3	$ 148.71	$ 1,388.48	$0	9.3	9.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	117 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
40LED	115 Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 59 R LED	RTLED38	38	0.1	SW	2,400	274	158	0.1	$ 33.96	$ 708.75	$0	20.9	20.9
20LED	119 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	120 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	121 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	123 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	Storage (UN-38)	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	4 ft LED Tube	200732x1	15	0.1	SW	1,000	90	102	0.1	$ 25.14	$ 490.05	$0	19.5	19.5
20LED	122 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	125 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	124 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	127 Art Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	126 Staff Lourge	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	128A Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	128B Conference	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1200	691	18	4 ft LED Tube	200732x1	15	0.3	SW	1,200	324	367	0.3	$ 87.14	$ 1,470.15	$0	16.9	16.9
20LED	Corridor	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	6240	799	4	4 ft LED Tube	200732x1	15	0.1	SW	6,240	374	424	0.1	$ 84.99	$ 326.70	$0	3.8	3.8
20LED	Parent Resource	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	4 ft LED Tube	200732x1	15	0.1	SW	2,400	144	163	0.1	$ 34.99	$ 326.70	$0	9.3	9.3
40LED	130 Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	106	0.0	$ 22.64	$ 472.50	$0	20.9	20.9
40LED	132 Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 59 R LED	RTLED38	38	0.1	SW	2,400	182	106	0.0	$ 22.64	$ 472.50	$0	20.9	20.9
20LED	Womens TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	Mens TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	Storage (UN-38)	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	SW	1,000	30	34	0.0	$ 8.38	$ 163.35	$0	19.5	19.5
40LED	UN-06 Nurse Vest	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6240	749	2	T 59 R LED	RTLED38	38	0.1	SW	6,240	474	275	0.0	$ 55.00	$ 472.50	$0	8.6	8.6
40LED	Nurse	8	T 32 R F 2 (ELE)	F42LL	60	0.5	SW	2400	1,152	8	T 59 R LED	RTLED38	38	0.3	SW	2,400	730	422	0.2	$ 90.57	$ 1,890.00	$0	20.9	20.9
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	Kitchen	25	S 32 C F 1 (ELE)	F41LL	32	0.8	SW	2000	1,600	25	4 ft LED Tube	200732x1	15	0.4	SW	2,000	750	850	0.4	$ 186.14	$ 2,041.88	$0	11.0	11.0
20LED	Storage 1	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	SW	1,000	30	34	0.0	$ 8.38	$ 163.35	$0	19.5	19.5
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	Storage 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	4 ft LED Tube	200732x1	15	0.0	SW	1,000	45	51	0.1	$ 12.57	$ 245.03	$0	19.5	19.5
20LED	Storage 3	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	SW	1,000	30	34	0.0	$ 8.38	$ 163.35	$0	19.5	19.5
20LED	UN-32 Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	SW	1,000	30	34	0.0	$ 8.38	$ 163.35	$0	19.5	19.5
20LED	112 Classroom	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	4 ft LED Tube	200732x1	15	0.5	SW	2,400	1,188	1,346	0.6	$ 288.68	$ 2,695.28	$0	9.3	9.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	Janitors Closet	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	SW	1,000	30	34	0.0	$ 8.38	$ 163.35	$0	19.5	19.5
20LED	Girls TR	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	688	5	4 ft LED Tube	200732x1	15	0.1	SW	4,300	323	366	0.1	$ 74.67	$ 408.38	$0	5.5	5.5
40LED	113 Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 59 R LED	RTLED38	38	0.1	SW	2,400	274	158	0.1	$ 33.96	$ 708.75	$0	20.9	20.9
20LED	110A Classroom	16	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,229	16	4 ft LED Tube	200732x1	15	0.2	SW	2,400	576	653	0.3	$ 139.97	$ 1,306.80	$0	9.3	9.3
20LED	110B Classroom	16	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,229	16	4 ft LED Tube	200732x1	15	0.2	SW	2,400	576	653	0.3	$ 139.97	$ 1,306.80	$0	9.3	9.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
20LED	Room 111 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	109 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	108 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	107 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	105 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	106 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	103 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	104 Resource Room	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	101 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	102 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	SW	2,400	648	734	0.3	$ 157.46	$ 1,470.15	$0	9.3	9.3
20LED	100 Media Center	36	S 32 C F 1 (ELE)	F41LL	32	1.2	SW	2400	2,765	36	4 ft LED Tube	200732x1	15	0.5	SW	2,400	1,296	1,469	0.6	$ 314.92	$ 2,940.30	$0	9.3	9.3
20LED	Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	SW	1,000	30	34	0.0	$ 8.38	$ 163.35	$0	19.5	19.5
20LED	Boys TR	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	4300	413	3	4 ft LED Tube	200732x1	15	0.0	SW	4,300	194	219	0.1	$ 44.80	$ 245.03	$0	5.5	5.5
20LED	Girls TR	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	826	6	4 ft LED Tube	200732x1	15	0.1	SW	4,300	387	439	0.1	$ 89.60	$ 490.05	$0	5.5	5.5
40LED	Stair (Boiler Room)	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	T 59 R LED	RTLED38	38	0.0	SW	2,000	76	44	0.0	$ 9.64	$ 236.25	$0	24.5	24.5
20LED	Cust Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	4 ft LED Tube	200732x1	15	0.1	SW	2,400	144	163	0.1	$ 34.99	$ 326.70	$0	9.3	9.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	SW	4,300	65	73	0.0	$ 14.93	$ 81.68	$0	5.5	5.5
65	Storage	1	I 100	I100/1	100	0.1	SW	1000	100	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	73	0.1	$ 17.99	$ 40.50	$0	2.3	2.3
40LED	Storage	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1000	360	6	T 59 R LED	RTLED38	38	0.2	SW	1,000	228	132	0.1	$ 32.54	$ 1,417.50	$0	43.6	43.6
40LED	Storage 1	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	44	0.0	$ 10.85	$ 472.50	$0	43.6	43.6
40LED	Storage 2	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	44	0.0	$ 10.85	$ 472.50	$0	43.6	43.6
40LED	Storage 3	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	44	0.0	$ 10.85	$ 472.50	$0	43.6	43.6
40LED	Storage 4	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	44	0.0	$ 10.85	$ 472.50	$0	43.6	43.6
77	Oil Tank Room	1	I 150	I150/1	150	0.2	SW	1000	150	1	CF 26	CFQ26/1-L	27	0.0	SW	1,000	27	123	0.1	$ 30.32	$ 6.75	$0	0.2	0.2
40LED	MER (Boiler Room)	11	T 32 R F 2 (ELE)	F42LL	60	0.7	SW	2000	1,320	11	T 59 R LED	RTLED38	38	0.4	SW	2,000	836	484	0.2	$ 105.99	$ 2,598.75	$0	24.5	24.5
	Total	**757**				**26.1**			**60,527**	**757**			**1,607**	**12.8**				**29,589**	**30,937**	**13.3**	**$6,658**	**$71,141**	**$0**		
																		Demand Savings			**13.3**	**$733**			
																		kWh Savings			**30,937**	**$5,924**			
																		Total savings				**$6,658**		**10.7**	**10.7**

Energy Audit of Early Childhood Academy South
CHA Project No. 27998
ECM-L2 Install Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kW Saved) * ($/kWh)	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
40LED	Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	1400	168.0	120.0	0.0	$22.98	$270.00	$35.00	11.7	10.2
40LED	VP Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	C-OCC	1400	252.0	180.0	0.0	$34.47	$270.00	$35.00	7.8	6.8
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
40LED	Main Office	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440.0	10	T 32 R F 2 (ELE)	F42LL	60	0.6	C-OCC	1400	840.0	600.0	0.0	$114.90	$270.00	$35.00	2.3	2.0
20LED	Conference Room C	36	S 32 C F 1 (ELE)	F41LL	32	1.2	SW	1200	1,382.4	36	S 32 C F 1 (ELE)	F41LL	32	1.2	C-OCC	1000	1,152.0	230.4	0.0	$44.12	$270.00	$35.00	6.1	5.3
20LED	Vest	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	6240	199.7	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	6240	199.7	0.0	0.0	$0.00	$270.00	$35.00		#DIV/0!
20LED	114 Classroom	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534.4	33	S 32 C F 1 (ELE)	F41LL	32	1.1	C-OCC	1680	1,774.1	760.3	0.0	$145.60	$270.00	$35.00	1.9	1.6
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	Janitor Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	250	8.0	24.0	0.0	$4.60	$270.00	$35.00	58.7	51.1
20LED	Storage (UN-38)	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	250	8.0	24.0	0.0	$4.60	$270.00	$35.00	58.7	51.1
20LED	Boys TR	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	688.0	5	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	3000	480.0	208.0	0.0	$39.83	$270.00	$35.00	6.8	5.9
20LED	116 Classroom	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,305.6	17	S 32 C F 1 (ELE)	F41LL	32	0.5	C-OCC	1680	913.9	391.7	0.0	$75.01	$270.00	$35.00	3.6	3.1
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	118 Classroom	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,305.6	17	S 32 C F 1 (ELE)	F41LL	32	0.5	C-OCC	1680	913.9	391.7	0.0	$75.01	$270.00	$35.00	3.6	3.1
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	117 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
40LED	115 Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	C-OCC	1400	252.0	180.0	0.0	$34.47	$270.00	$35.00	7.8	6.8
20LED	119 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	120 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	121 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	123 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	Storage (UN-38)	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192.0	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	250	48.0	144.0	0.0	$27.58	$270.00	$35.00	9.8	8.5
20LED	122 Classroom	18	S 32 C F 1 (ELE)	F42LL	60	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F42LL	60	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	125 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1400	806.4	576.0	0.0	$110.30	$270.00	$35.00	2.4	2.1
20LED	124 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	127 Art Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	126 Staff Lounge	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1500	864.0	518.4	0.0	$99.27	$270.00	$35.00	2.7	2.4
20LED	128A Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	128B Conference	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1200	691.2	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1000	576.0	115.2	0.0	$22.06	$270.00	$35.00	12.2	10.7
20LED	Corridor	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	6240	798.7	4	S 32 C F 1 (ELE)	F41LL	32	0.1	NONE	6240	798.7	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Parent Resource	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307.2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1680	215.0	92.2	0.0	$17.65	$270.00	$35.00	15.3	13.3
40LED	130 Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	1400	168.0	120.0	0.0	$22.98	$270.00	$35.00	11.7	10.2
40LED	132 Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	1400	168.0	120.0	0.0	$22.98	$270.00	$35.00	11.7	10.2
20LED	Womens TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	Mens TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	Storage (UN-38)	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	250	16.0	48.0	0.0	$9.19	$270.00	$35.00	29.4	25.6
40LED	UN-06 Nurse Vest	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6240	748.8	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	6240	748.8	0.0	0.0	$0.00	$270.00	$35.00		#DIV/0!
40LED	Nurse	8	T 32 R F 2 (ELE)	F42LL	60	0.5	SW	2400	1,152.0	8	T 32 R F 2 (ELE)	F42LL	60	0.5	C-OCC	1400	672.0	480.0	0.0	$91.92	$270.00	$35.00	2.9	2.6
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	Kitchen	25	S 32 C F 1 (ELE)	F41LL	32	0.8	SW	2000	1,600.0	25	S 32 C F 1 (ELE)	F41LL	32	0.8	NONE	2000	1,600.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Storage 1	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	250	16.0	48.0	0.0	$9.19	$270.00	$35.00	29.4	25.6
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	Storage 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96.0	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	250	24.0	72.0	0.0	$13.79	$270.00	$35.00	19.6	17.0
20LED	Storage 3	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	250	16.0	48.0	0.0	$9.19	$270.00	$35.00	29.4	25.6
20LED	UN-32 Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	250	16.0	48.0	0.0	$9.19	$270.00	$35.00	29.4	25.6
20LED	112 Classroom	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534.4	33	S 32 C F 1 (ELE)	F41LL	32	1.1	C-OCC	1680	1,774.1	760.3	0.0	$145.60	$270.00	$35.00	1.9	1.6
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	Janitors Closet	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	250	16.0	48.0	0.0	$9.19	$270.00	$35.00	29.4	25.6
20LED	Girls TR	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	688.0	5	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	3000	480.0	208.0	0.0	$39.83	$270.00	$35.00	6.8	5.9
40LED	113 Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432.0	3	T 32 R F 2 (ELE)	F42LL	60	0.2	C-OCC	1400	252.0	180.0	0.0	$34.47	$270.00	$35.00	7.8	6.8
20LED	110A Classroom	16	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,228.8	16	S 32 C F 1 (ELE)	F41LL	32	0.5	C-OCC	1680	860.2	368.6	0.0	$70.59	$270.00	$35.00	3.8	3.3
20LED	110B Classroom	16	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,228.8	16	S 32 C F 1 (ELE)	F41LL	32	0.5	C-OCC	1680	860.2	368.6	0.0	$70.59	$270.00	$35.00	3.8	3.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
20LED	Room 111 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	109 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	108 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	107 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	105 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	106 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	103 Classroom	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	104 Resource Room	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1680	967.7	414.7	0.0	$79.42	$270.00	$35.00	3.4	3.0
20LED	101 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1400	806.4	576.0	0.0	$110.30	$270.00	$35.00	2.4	2.1
20LED	102 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382.4	18	S 32 C F 1 (ELE)	F41LL	32	0.6	C-OCC	1400	806.4	576.0	0.0	$110.30	$270.00	$35.00	2.4	2.1
20LED	100 Media Center	36	S 32 C F 1 (ELE)	F41LL	32	1.2	SW	2400	2,764.8	36	S 32 C F 1 (ELE)	F41LL	32	1.2	C-OCC	1680	1,935.4	829.4	0.0	$158.83	$270.00	$35.00	1.7	1.5
20LED	Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64.0	2	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	250	16.0	48.0	0.0	$9.19	$270.00	$35.00	29.4	25.6
20LED	Boys TR	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	4300	412.8	3	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	3000	288.0	124.8	0.0	$23.90	$270.00	$35.00	11.3	9.8
20LED	Girls TR	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	825.6	6	S 32 C F 1 (ELE)	F41LL	32	0.2	C-OCC	3000	576.0	249.6	0.0	$47.80	$270.00	$35.00	5.6	4.9
40LED	Stair (Boiler Room)	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2000	120.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	NONE	2000	120.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Cust Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307.2	4	S 32 C F 1 (ELE)	F41LL	32	0.1	C-OCC	1400	179.2	128.0	0.0	$24.51	$270.00	$35.00	11.0	9.6
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	137.6	1	S 32 C F 1 (ELE)	F41LL	32	0.0	C-OCC	3000	96.0	41.6	0.0	$7.97	$270.00	$35.00	33.9	29.5
65	Storage	1	I 100	I100/1	100	0.1	SW	1000	100.0	1	I 100	I100/1	100	0.1	C-OCC	250	25.0	75.0	0.0	$14.36	$270.00	$35.00	18.8	16.4
40LED	Storage	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1000	360.0	6	T 32 R F 2 (ELE)	F42LL	60	0.4	C-OCC	250	90.0	270.0	0.0	$51.70	$270.00	$35.00	5.2	4.5
40LED	Storage 1	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	250	30.0	90.0	0.0	$17.23	$270.00	$35.00	15.7	13.6
40LED	Storage 2	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	250	30.0	90.0	0.0	$17.23	$270.00	$35.00	15.7	13.6
40LED	Storage 3	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	250	30.0	90.0	0.0	$17.23	$270.00	$35.00	15.7	13.6
40LED	Storage 4	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	C-OCC	250	30.0	90.0	0.0	$17.23	$270.00	$35.00	15.7	13.6
77	Oil Tank Room	1	I 150	I150/1	150	0.2	SW	1000	150.0	1	I 150	I150/1	150	0.2	C-OCC	250	37.5	112.5	0.0	$21.54	$270.00	$35.00	12.5	10.9
40LED	MER (Boiler Room)	11	T 32 R F 2 (ELE)	F42LL	60	0.7	SW	2000	1,320.0	11	T 32 R F 2 (ELE)	F42LL	60	0.7	NONE	2000	1,320.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
	Total	**757**				**26.1**			**60526.8**	**757.0**				**26.1**		0	#N/A	#VALUE!	#VALUE!	#VALUE!			#VALUE!	#VALUE!

Demand Savings	**42071.4**	**18455.4**	**0.0**	**3534.1**	**20790.0**	**2695.0**
kWh Savings				**18,455**	**$3,534**	
Total Savings					**$3,534**	

Energy Audit of Early Childhood Academy South

CHA Project No. 27998

ECM-L3 Lighting Replacements with Occupancy Sensors

		EXISTING CONDITIONS							RETROFIT CONDITIONS								COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
40LED	Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 59 R LED	RTLED38	38	0.1	C-OCC	1,400	106	182	0.0	$ 37.20	$ 742.50	$ 35	20.0	19.0
40LED	VP Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 59 R LED	RTLED38	38	0.1	C-OCC	1,400	160	272	0.1	$ 55.79	$ 978.75	$ 35	17.5	16.9
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
40LED	Main Office	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440	10	T 59 R LED	RTLED38	38	0.4	C-OCC	1,400	532	908	0.2	$ 185.98	$ 2,632.50	$ 35	14.2	14.0
20LED	Conference Room C	36	S 32 C F 1 (ELE)	F41LL	32	1.2	SW	1200	1,382	36	4 ft LED Tube	200732x1	15	0.5	C-OCC	1,000	540	842	0.6	$ 194.97	$ 3,210.30	$ 35	16.5	16.3
20LED	Vest	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	6240	200	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	6,240	94	106	0.0	$ 21.25	$ 351.68	$ 35	16.6	14.9
20LED	114 Classroom	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	4 ft LED Tube	200732x1	15	0.5	C-OCC	1,680	832	1,703	0.6	$ 356.93	$ 2,965.28	$ 35	8.3	8.2
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	Janitor Closet	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	4	28	0.0	$ 6.34	$ 351.68	$ 35	55.4	49.9
20LED	Storage (UN-38)	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	1000	32	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	4	28	0.0	$ 6.34	$ 351.68	$ 35	55.4	49.9
20LED	Boys TR	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	688	5	4 ft LED Tube	200732x1	15	0.1	C-OCC	3,000	225	463	0.1	$ 93.34	$ 678.38	$ 35	7.3	6.9
20LED	116 Classroom	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,306	17	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	428	877	0.3	$ 183.87	$ 1,658.48	$ 35	9.0	8.8
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	118 Classroom	17	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,306	17	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,680	428	877	0.3	$ 183.87	$ 1,658.48	$ 35	9.0	8.8
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	117 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
40LED	115 Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 59 R LED	RTLED38	38	0.1	C-OCC	1,400	160	272	0.1	$ 55.79	$ 978.75	$ 35	17.5	16.9
20LED	119 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	120 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	121 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	123 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	Storage (UN-38)	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	1000	192	6	4 ft LED Tube	200732x1	15	0.1	C-OCC	250	23	170	0.1	$ 38.07	$ 760.05	$ 35	20.0	19.0
20LED	122 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	125 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,400	378	1,004	0.3	$ 209.17	$ 1,740.15	$ 35	8.3	8.2
20LED	124 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	127 Art Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	126 Staff Lounge	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,500	405	977	0.3	$ 204.00	$ 1,740.15	$ 35	8.5	8.4
20LED	128A Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	128B Conference	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	1200	691	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,000	270	421	0.3	$ 97.48	$ 1,740.15	$ 35	17.9	17.5
20LED	Corridor	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	6240	799	4	4 ft LED Tube	200732x1	15	0.1	NONE	6,240	374	424	0.1	$ 84.99	$ 326.70	$ -	3.8	3.8
20LED	Parent Resource	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	4 ft LED Tube	200732x1	15	0.1	C-OCC	1,680	101	206	0.1	$ 43.26	$ 596.70	$ 35	13.8	13.0
40LED	130 Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 59 R LED	RTLED38	38	0.1	C-OCC	1,400	106	182	0.0	$ 37.20	$ 742.50	$ 35	20.0	19.0
40LED	132 Office	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2400	288	2	T 59 R LED	RTLED38	38	0.1	C-OCC	1,400	106	182	0.0	$ 37.20	$ 742.50	$ 35	20.0	19.0
20LED	Womens TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	Mens TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	Storage (UN-38)	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	8	57	0.0	$ 12.69	$ 433.35	$ 35	34.2	31.4
40LED	UN-06 Nurse Vest	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	6240	749	2	T 59 R LED	RTLED38	38	0.1	C-OCC	6,240	474	275	0.0	$ 55.00	$ 742.50	$ 35	13.5	12.9
40LED	Nurse	8	T 32 R F 2 (ELE)	F42LL	60	0.5	SW	2400	1,152	8	T 59 R LED	RTLED38	38	0.3	C-OCC	1,400	426	726	0.2	$ 148.78	$ 2,160.00	$ 35	14.5	14.3
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	Kitchen	25	S 32 C F 1 (ELE)	F41LL	32	0.8	SW	2000	1,600	25	4 ft LED Tube	200732x1	15	0.4	NONE	2,000	750	850	0.4	$ 186.14	$ 2,041.88	$ -	11.0	11.0
20LED	Storage 1	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	8	57	0.0	$ 12.69	$ 433.35	$ 35	34.2	31.4
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	Storage 2	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	96	3	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	11	85	0.1	$ 19.03	$ 515.03	$ 35	27.1	25.2
20LED	Storage 3	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	8	57	0.0	$ 12.69	$ 433.35	$ 35	34.2	31.4
20LED	UN-32 Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	8	57	0.0	$ 12.69	$ 433.35	$ 35	34.2	31.4
20LED	112 Classroom	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	4 ft LED Tube	200732x1	15	0.5	C-OCC	1,680	832	1,703	0.6	$ 356.93	$ 2,965.28	$ 35	8.3	8.2
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	Janitors Closet	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	8	57	0.0	$ 12.69	$ 433.35	$ 35	34.2	31.4
20LED	Girls TR	5	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	688	5	4 ft LED Tube	200732x1	15	0.1	C-OCC	3,000	225	463	0.1	$ 93.34	$ 678.38	$ 35	7.3	6.9
40LED	113 Office	3	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	432	3	T 59 R LED	RTLED38	38	0.1	C-OCC	1,400	160	272	0.1	$ 55.79	$ 978.75	$ 35	17.5	16.9
20LED	110A Classroom	16	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,229	16	4 ft LED Tube	200732x1	15	0.2	C-OCC	1,680	403	826	0.3	$ 173.06	$ 1,576.80	$ 35	9.1	8.9
20LED	110B Classroom	16	S 32 C F 1 (ELE)	F41LL	32	0.5	SW	2400	1,229	16	4 ft LED Tube	200732x1	15	0.2	C-OCC	1,680	403	826	0.3	$ 173.06	$ 1,576.80	$ 35	9.1	8.9
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
20LED	Room 111 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	109 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	108 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	107 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	105 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	106 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	103 Classroom	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	104 Resource Room	18	S 32 C F 1 (ELE)	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	$ 194.69	$ 1,740.15	$ 35	8.9	8.8
20LED	101 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,400	378	1,004	0.3	$ 209.17	$ 1,740.15	$ 35	8.3	8.2
20LED	102 Office	18	S 32 C F 1 (ELE)	F41LL	32	0.6	SW	2400	1,382	18	4 ft LED Tube	200732x1	15	0.3	C-OCC	1,400	378	1,004	0.3	$ 209.17	$ 1,740.15	$ 35	8.3	8.2
20LED	100 Media Center	36	S 32 C F 1 (ELE)	F41LL	32	1.2	SW	2400	2,765	36	4 ft LED Tube	200732x1	15	0.5	C-OCC	1,680	907	1,858	0.6	$ 389.38	$ 3,210.30	$ 35	8.2	8.2
20LED	Storage	2	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	1000	64	2	4 ft LED Tube	200732x1	15	0.0	C-OCC	250	8	57	0.0	$ 12.69	$ 433.35	$ 35	34.2	31.4
20LED	Boys TR	3	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	4300	413	3	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	135	278	0.1	$ 56.00	$ 515.03	$ 35	9.2	8.6
20LED	Girls TR	6	S 32 C F 1 (ELE)	F41LL	32	0.2	SW	4300	826	6	4 ft LED Tube	200732x1	15	0.1	C-OCC	3,000	270	556	0.1	$ 112.00	$ 760.05	$ 35	6.8	6.5
40LED	Stair (Boiler Room)	1	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	2000	120	1	T 59 R LED	RTLED38	38	0.0	NONE	2,000	76	44	0.0	$ 9.64	$ 236.25	$ -	24.5	24.5
20LED	Cust Office	4	S 32 C F 1 (ELE)	F41LL	32	0.1	SW	2400	307	4	4 ft LED Tube	200732x1	15	0.1	C-OCC	1,400	84	223	0.1	$ 46.48	$ 596.70	$ 35	12.8	12.1
20LED	TR	1	S 32 C F 1 (ELE)	F41LL	32	0.0	SW	4300	138	1	4 ft LED Tube	200732x1	15	0.0	C-OCC	3,000	45	93	0.0	$ 18.67	$ 351.68	$ 35	18.8	17.0
65	Storage	1	I 100/1	I100/1	100	0.1	SW	1000	100	1	CF 26	CFQ26/1-L	27	0.0	C-OCC	250	7	93	0.1	$ 21.87	$ 310.50	$ 35	14.2	12.6
40LED	Storage	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1000	360	6	T 59 R LED	RTLED38	38	0.2	C-OCC	250	57	303	0.1	$ 65.28	$ 1,687.50	$ 35	25.8	25.3
40LED	Storage 1	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	C-OCC	250	19	101	0.0	$ 21.76	$ 742.50	$ 35	34.1	32.5
40LED	Storage 2	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	C-OCC	250	19	101	0.0	$ 21.76	$ 742.50	$ 35	34.1	32.5
40LED	Storage 3	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	C-OCC	250	19	101	0.0	$ 21.76	$ 742.50	$ 35	34.1	32.5
40LED	Storage 4	2	T 32 R F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	T 59 R LED	RTLED38	38	0.1	C-OCC	250	19	101	0.0	$ 21.76	$ 742.50	$ 35	34.1	32.5
77	Oil Tank Room	1	I 150	I150/1	150	0.2	SW	1000	150	1	CF 26	CFQ26/1-L	27	0.0	C-OCC	250	7	143	0.1	$ 34.20	$ 276.75	$ 35	8.1	7.1
40LED	MER (Boiler Room)	11	T 32 R F 2 (ELE)	F42LL	60	0.7	SW	2000	1,320	11	T 59 R LED	RTLED38	38	0.4	NONE	2,000	836	484	0.2	$ 105.99	$ 2,598.75	$ -	24.5	24.5
															0	#N/A								#VALUE!
S	Total	757				26.1			60,527	757				12.8				20,556		13.3	8,388	91,931	$2,695		
S																		Demand Savings			13.3	$733			
S																		kWh Savings			39,971	$7,654			
S																		Total Savings				$8,388		11.0	10.6

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

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PILOT

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

T-12 SCHOOLS LIGHTING INITIATIVE

TEACH

ARRA

TECHNOLOGIES

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Home » Commercial & Industrial » Programs

NJ SmartStart Buildings

Program Overview

New Jersey SmartStart BUILDINGS®

With New Jersey SmartStart Buildings ...

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

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

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

Getting Started

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

Smart-Growth Eligibility: *Check to make sure your project is eligible for incentives.*

Incentives for new construction are available only for projects in areas designated for growth in the NJ State Development and Redevelopment Plan. Public school (K-12) new construction projects are exempted from this restriction and are eligible for incentives throughout the State.

Customers, or their trade allies, can determine if a location is in a designated growth area by referring to the Smart Growth Site Evaluator Tool available from the HMFA website. Contact a program representative if you are uncertain about project eligibility. The Smart Growth policies will be implemented consistent with Board Orders as described more fully in the C&I Operational Procedure Manual.

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

Support for Custom Energy-Efficiency Measures

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

Incentives for Qualifying Equipment and Projects

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

Find out more about equipment incentives!

For specific details on equipment requirements and financial incentives, including incentives for equipment not listed here, contact a program representative. Annual financial incentives may be

Program Updates

Notice of 2013 Changes to C&I Programs

Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years

Large Combined Heat & Power/Fuel Cell Program Update

Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

- PROGRAMS
  - NJ SMARTSTART BUILDINGS
    - EQUIPMENT INCENTIVES
    - APPLICATION FORMS
    - TOOLS AND RESOURCES
  - PAY FOR PERFORMANCE
  - COMBINED HEAT & POWER AND FUEL CELLS
  - LOCAL GOVERNMENT ENERGY AUDIT
  - LARGE ENERGY USERS PILOT
  - ENERGY SAVINGS IMPROVEMENT PROGRAM
  - DIRECT INSTALL
  - ENERGY BENCHMARKING
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

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 or 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 specifications needed for your project) and a current utility bill(s).

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

Electric Chillers

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

Gas Cooling

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

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)

Ground Source Heat Pumps

- Closed Loop ($450-750 per ton)

Gas Heating

- Gas-fired boilers < 300 MBH ($300 per unit)
- Gas-fired boilers ≥ 300 MBH - 1500 MBH ($1.75 per MBH)
- Gas-fired boilers ≥ 1500 MBH - ≤ 4000 MBH ($1.00 per MBH)
- Gas-fired boilers > 4000 MBH (Calculated through Custom Measure Path)
- Gas furnaces ($300-$400 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

Program Updates

- Notice of 2013 Changes to C&I Programs
- Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years
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- Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.

Featured Success Story

Mannington Mills:

NJ SmartStart Buildings custom measures case study presented at Globalcon Conference

Applications and Brochures

Download the latest program materials.

e-Newsletter SIGN UP TODAY!

Follow Us:

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

- PROGRAMS
  - NJ SMARTSTART BUILDINGS
  - PAY FOR PERFORMANCE
  - COMBINED HEAT & POWER AND FUEL CELLS
  - LOCAL GOVERNMENT ENERGY AUDIT
  - LARGE ENERGY USERS PILOT
  - ENERGY SAVINGS IMPROVEMENT PROGRAM
  - DIRECT INSTALL
    - PARTICIPATION STEPS
    - PARTICIPATING CONTRACTORS
    - SUSTAINABLE JERSEY
  - ENERGY BENCHMARKING
  - OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS
  - EDA PROGRAMS
  - T-12 SCHOOLS LIGHTING INITIATIVE
  - TEACH
  - ARRA
- TECHNOLOGIES
- TOOLS AND RESOURCES
- PROGRAM UPDATES
- CONTACT US

Home » Commercial & Industrial » Programs » Direct Install

Direct Install - Steps to Participation

New Jersey SmartStart BUILDINGS

NEW JERSEY'S CLEAN ENERGY PROGRAM DIRECT Install

SIX SIMPLE STEPS TO PARTICIPATION

CONTACT THE PARTICIPATING CONTRACTOR IN YOUR AREA

Identify the contractor assigned and trained to provide Direct Install services in the county where your project is located. Using the contact information provided, call or send an e-mail to the participating contractor to discuss your project. The contractor will schedule an energy assessment and work with you to complete the program application and participation agreement.

If you're unable to contact the participating contractor or have questions, you may contact us at 866-NJSMART or send an e-mail to DirectInstall@NJCleanEnergy.com..

REVIEW RESULTS

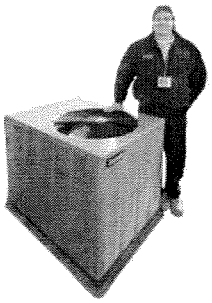
After the energy assessment, the contractor will review the results with you, including what measures qualify and your share of the project cost.

MOVE FORWARD

You will sign a scope of work document to proceed with implementation of qualifying measures.

ARRANGE INSTALLATION

You and the participating contractor will set a convenient start date for the installation.



CONFIRM INSTALLATION

Once the participating contractor completes the installation, you accept the work by signing a project completion form.

COMPLETE TRANSACTION

You pay the participating contractor your share of the project cost and New Jersey's Clean Energy Program pays the rest.

Program Updates

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- Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years
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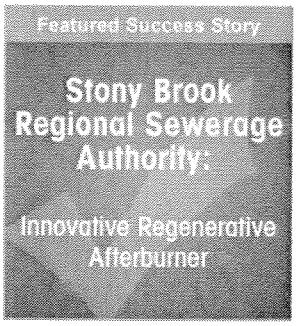
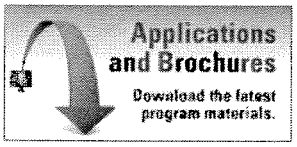
Other updates posted.





Follow Us:

III. PAY FOR PERFORMANCE (P4P)

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

New Jersey SmartStart BUILDINGS®

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

Incentive Amount: ..... **$0.10 per sq ft**
Minimum Incentive: **$5,000**
Maximum Incentive:: ..... **$50,000 or 50% of facility annual energy cost (whichever is less)**

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: **15%**

Electric Incentives

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 per projected kWh saved**

Gas Incentives

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**

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: **15%**

Electric Incentives

Base Incentive based on 15% savings: ..... **$0.09 per actual kWh saved**
For each % over 15% add: ..... **$0.005 per actual kWh saved**
Maximum Incentive: ..... **$0.11 per actual kWh saved**

Gas Incentives

Base Incentive based on 15% savings: ..... **$0.90 per actual Therm saved**
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Maximum Incentive: ..... **$1.25 per actual Therm saved**

Incentive Cap: ..... **25% of total project cost**

This incentive will be released upon submittal of a Post-Construction Benchmarking Report that verifies that the level of savings actually achieved by the installed measures meets or exceeds the minimum performance threshold. To validate the savings and achievement of the Energy Target, the EPA Portfolio Manager shall be used. Savings should be rounded to the nearest percent. Total value of Incentive #2 and Incentive #3 may not exceed 50% of the total project cost. Incentives will be limited to $1 million per gas and electric account per building; maximum of $2 million per project. See Participation Agreement for details.

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

PROGRAMS

- NJ SMARTSTART BUILDINGS
- PAY FOR PERFORMANCE
- COMBINED HEAT & POWER AND FUEL CELLS
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- T-12 SCHOOLS LIGHTING INITIATIVE
- TEACH
- ARRA

TECHNOLOGIES

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

Home » Commercial & Industrial » Programs

Energy Savings Improvement Program

A new State law allows government agencies to make energy related improvements to 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 "Energy Savings Improvement Program" (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

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

Local Government
School Districts (K-12)

The Board also adopted protocols to measure energy savings.

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

FIRST STEP – ENERGY AUDIT

For local governments interested in pursuing an ESIP, the first step is to perform an energy audit. As explained in the Local Finance Notice, this may be done internally if an agency has qualified staff to conduct the audit. If not, the audit must be implemented by an independent contractor and not by the energy savings company producing the Energy Reduction Plan.

Pursuing a Local Government Energy Audit through New Jersey's Clean Energy Program is a valuable first step to the ESIP approach - and it's free. **Incentives provide 100% of the cost of the audit.**

ENERGY REDUCTION PLANS

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

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

Program Updates

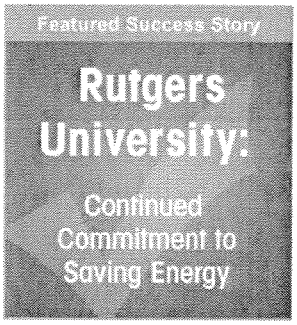
Notice of 2013 Changes to C&I Programs

Warranty and Lease Terms for CHP/Fuel Cells Increased to 10 Years

Large Combined Heat & Power/Fuel Cell Program Update

Board Order - Standby Charges for Distributed Generation Customers

Other updates posted.



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new jersey department of community affairs
people places progress
division of local government services

LFN 2011-17

June 16, 2011

Local Finance Notice

Chris Christie, *Governor* | Kim Guadagno, *Lt. Governor* | Lori Grifa, *Commissioner* | Thomas H. Neff, *Director*

Update on Implementing Energy Savings Improvement Programs

This Local Finance Notice provides guidance concerning Energy Savings Improvement Program (ESIP) matters that affect local units covered under the Local Public Contracts Law (LPCL, N.J.S.A. 40A:11) and the Public School Contracts Law (PSCL, N.J.S.A. 18A:18A).

The Notice covers a model ESCO (Energy Services Company) Request for Proposal document and provides information on using the "Do-It-Yourself" process for implementing an ESIP. This Notice supplements Local Finance Notice 2009-11 concerning ESIPs.

Model ESCO Request for Proposal Document

General Issues

The Division of Local Government Services and the Board of Public Utilities have completed development of a model ESCO Request for Proposal Document. It is designed to assist all organizations (contracting units) covered by the LPCL and PSCL hire an energy services company (ESCO) to develop and implement an Energy Savings Plan (ESP) as part of an Energy Savings Improvement Program as authorized under N.J.S.A. 40A:11-4.6 and 18A:18A-4.6.

Specifically, the document serves as the starting point for these government agencies to select an ESCO through the competitive contracting procedure (N.J.S.A. 40A:11-4.1 et seq. and 18A:18A-4.1 et seq.).

Notwithstanding the efforts of the State agencies to ensure that the RFP is consistent with all relevant procurement procedures, laws, and regulations, there are several issues contracting unit personnel should keep in mind:

1) Local legal advisors should review the document to ensure it is consistent with any allowable local practices and legal considerations.
2) The individual responsible for managing the project should review the entire RFP in order to be able to answer questions and ensure the document meets local needs.
3) Forms have been carefully designed to meet the need of this specific process. Care should be taken if proposed forms are removed and replaced with ones normally used by the contracting unit.

Contact Information

Director's Office
V. 609.292.6613
F. 609.292.9073

Local Government Research
V. 609.292.6110
F. 609.292.9073

Financial Regulation and Assistance
V. 609.292.4806
F. 609.984.7388

Local Finance Board
V. 609.292.0479
F. 609.633.6243

Local Management Services
V. 609.292.7842
F. 609.633.6243

Authority Regulation
V. 609.984.0132
F. 609.984.7388

Mail and Delivery
101 South Broad St.
PO Box 803
Trenton, New Jersey
08625-0803
Web: www.nj.gov/dca/lgs
E-mail: dlgs@dca.state.nj.us

Distribution
Municipal and Freeholder Clerks
Municipal and County Chief Financial Officers
Local Authority and Fire District Officials
School Business Administrators
Local Procurement Officials

The RFP also uses a formal process for potential proposers to submit questions and requests for clarifications. Appendix B is a form for the submission of these requests and is referred to throughout the text.

Contracting units are also reminded the Competitive Contracting process does not allow for negotiating proposals. While legal elements of the contract (project development agreement) may require legal determinations and modifications, the process does not allow for negotiation of price or related substantive elements and any element that would have provided less than a level playing field for proposers.

Contracting units are also cautioned that setting qualification standards that arbitrarily limit competition is inconsistent with public bidding requirements.

Office of State Comptroller Filing: Contracting units are also reminded of their obligations to meet State Comptroller requirements for public contracts. In accordance with N.J.S.A 52:15C-10, contracting units must notify OSC as early as practicable, but no later than 30 days before advertisement, of any negotiation or solicitation of a contract that may exceed $10 million. Contracting units must also provide post-award notification for any contract for an amount exceeding $2 million. Notification must be given within 20 days of the award.

Substantive Edits:

Several sections are highlighted in green. These sections should be carefully edited to meet contracting unit needs. This has important application to evaluation criteria in Section D. Once finalized, the green highlight should be removed.

Section B-16; Insurance should be reviewed by the contracting unit's Risk Management professionals to be sure the standards are appropriate to the contracting unit and the work to be done.

The following Sections also require local decisions and editing:

- A-3: # of copies of proposal and # of CDs to be submitted
- A-4: Web posting address, if desired
- A-5: If extra credit is to be provided on evaluation scoring for attending site walk through
- B-11: Delete LPCL or PSCL section as appropriate
- B-34: Use only if PSCL
- C-1: Explanation of type of audit information
- C-3(k): Include if ESCO is to provide financing option
- Use of Appendix F and Proposal Requirements #8: These forms are related to submission of Political Contribution Disclosure forms. Only PSCL agencies are required to use these forms as pursuant to Public School Fiscal Accountability Procedures (N.J.A.C. 6A23A-6.3). The forms and references to it should be removed for all LPCL users.

Under the ESIP DIY approach, there would be no conflict in a properly procured single organization conducting the audit, developing the ESP, then preparing plans and specifications. This does not apply when using the ESCO approach, where the auditor and ESCO must be independent.

Once construction plans and specifications are complete, the contracting unit would then conduct the bidding process as it would any public works construction project: manage the project as it sees fit (the firm that did the plans could also serve as construction manager), and then contract as necessary for commissioning and final third party verification. The two verification steps (the ESP and verifying implementation) must be performed by an organization independent of the ones preparing the ESP, overseeing construction and commissioning.

By following this process, the contracting unit can then apply to the Local Finance Board for the issuance of ESIP-based energy saving obligations or enter into appropriate lease financing.

The ESIP approach to energy improvement provides a range of options for contracting units to accrue energy savings while improving the environment, taking advantage of low-cost financing and state and federal incentives. DLGS and the BPU encourage comments and questions (through the ESIP web page) on this new opportunity so we can improve it as time goes on.

Approved: Thomas H. Neff, Director, Division of Local Government Services

Table of Web Links

Page	Shortcut text	Internet Address
1, 4	Local Finance Notice 2009-11	http://www.nj.gov/dca/lgs/lfns/09lfns/2009-11.doc
2	ESIP webpage	http://www.nj.gov/dca/lgs/lpcl/esip.htm
2	email comments	mailto:lpcl@dca.state.nj.us
2	to register (via email	mailto:lpcl@dca.state.nj.us
2	GovConnect Local Procurement	http://www.nj.gov/dca/surveys/ppsurvey.htm
3	State Comptroller requirements.	http://www.nj.gov/comptroller/compliance/index.html

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

New Jersey SmartStart BUILDINGS

BPU

2012 PAY FOR PERFORMANCE PROGRAM
Existing Buildings Incentive Structure

Incentive #1: Energy Reduction Plan

Incentive Amount: ..... **$0.10 per sq ft**
Minimum Incentive: **$5,000**
Maximum Incentive:: ..... **$50,000 or 50% of facility annual energy cost (whichever is less)**

This incentive is designed to offset the cost of services associated with the development of the Energy Reduction Plan (ERP) and is paid upon ERP approval. Incentive is contingent on implementation of recommended measures outlined in the ERP.

Incentive #2: Installation of Recommended Measures

Minimum Performance Target: **15%**

Electric Incentives

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 per projected kWh saved**

Gas Incentives

Base Incentive based on 15% savings: ..... **$0.90 per projected Therm saved**
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Incentive Cap: ..... **25% of total project cost**

This incentive is based on projected energy savings outlined in the ERP. Incentive is paid upon successful installation of recommended measures.

Incentive #3: Post-Construction Benchmarking Report

Minimum Performance Target: **15%**

Electric Incentives

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APPENDIX E

Photovoltaic Analysis

NEWARK PUBLIC SCHOOL DISTRICT
EARLY CHILDHOOD ACADEMY SOUTH

Cost of Electricity	$0.158	/kWh
Electricity Usage	355,200	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
$880,000	**220.0**	**274,772**	**0**	**$43,414**	**0**	**$43,414**	**$0**	**$42,590**	**20.3**	**10.2**

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

Area Output*
3,453 m2
37,167 ft2

Perimeter Output*
250 m
821 ft

Available Roof Space for PV:
(Area Output - 5 ft x Perimeter) x 85%
28,105 ft2

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

8 watt/ft2
224,837 DC watts
220 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	07108	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
274,772 annual kWh calculated in PV Watts program

% Offset Calc

Usage	355,200	(from utilities)
PV Generation	274,772	(generated using PV Watts)
% offset	77%	

* 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

Early Childhood Academy South

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	220.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	182.6 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	15.8 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	2.78	16070	2539.06
2	3.54	18515	2925.37
3	4.35	24513	3873.05
4	4.95	25983	4105.31
5	5.69	30167	4766.39
6	5.86	29180	4610.44
7	5.73	29133	4603.01
8	5.47	27522	4348.48
9	4.91	24656	3895.65
10	3.99	21386	3378.99
11	2.68	14355	2268.09
12	2.35	13293	2100.29
Year	4.36	274772	43413.98

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

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

APPENDIX F

Photos

1: Existing HW Pumps

2: Existing HHW boiler

3: Existing Air Cooled Chiller

4: Existing Hot Water Heater

5: Existing Vending Machine

6: Existing RTU

APPENDIX G

EPA Benchmarking Report

ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Early Childhood Academy South (Clinton Avenue)

Primary Property Function:
Gross Floor Area (ft): 0
Built: 1969

For Year Ending: March 31, 2013
Date Generated: April 30, 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
Early Childhood Academy South (Clinton Avenue) 534 Clinton Avenue Newark, New Jersey 07108	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: 3606982

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
N/A

Source EUI
N/A

Annual Energy by Fuel	
Natural Gas (kBtu)	335,262 (11%)
Electric - Grid (kBtu)	1,121,047 (38%)
Fuel Oil (No. 2) (kBtu)	1,524,762 (51%)

National Median Comparison	
National Median Site EUI ()	N/A
National Median Source EUI ()	N/A
% Diff from National Median Source EUI	N/A%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	273

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)