THE NEWARK PUBLIC SCHOOLS

Group 3 Buildings

DR. MARION A. BOLDEN STUDENT CENTER

230 Broadway, Newark, NJ 07104

LOCAL GOVERNMENT ENERGY AUDIT PROGRAM

FOR

NEW JERSEY

BOARD OF PUBLIC UTILITIES

April 2014

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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
Dr. Marion A. Bolden Student Center	230 Broadway, Newark, NJ 07107	25,000	1931

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

Building Name	Electric Savings (kWh)	NG Savings (therms)	Total Savings ($)	Payback (years)
Dr. Marion A. Bolden Student Center	76,341	5,476	16,632	6.2

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 5.0.

Each measure recommended by CHA typically has a simple payback period of 15 years or less to be consistent with the requirements of the Energy Savings Improvement Plan (ESIP) which has a maximum payback period of 15 years. Occasionally, we will recommend an ECM that has a longer payback period, based on the need to replace that piece(s) of equipment due to its age, such as a boiler for example.

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

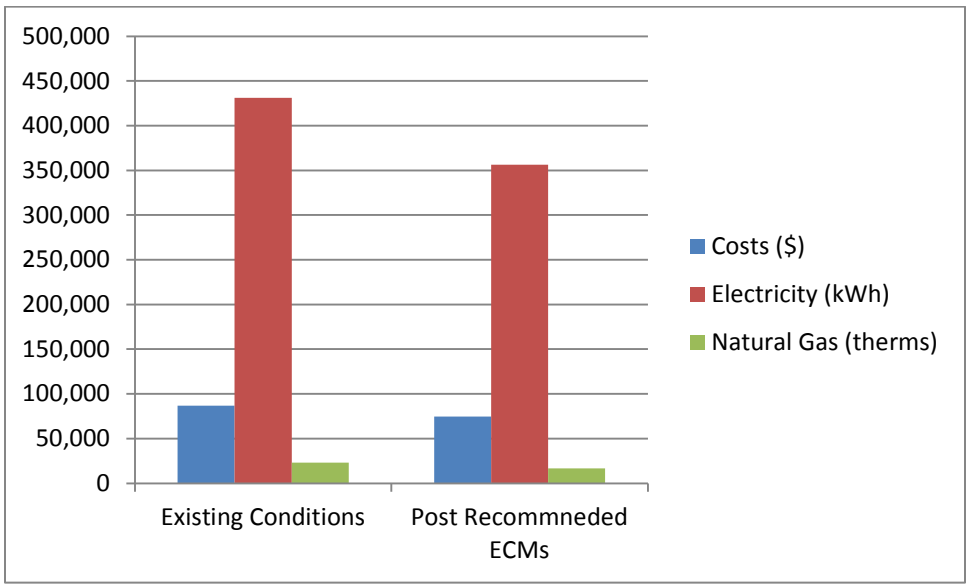
Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
1	Install Door Seals	1,383	219	6.3	0	6.3	Yes
2	Shut Down Chilled Water Pumps in Winter	5,500	3,671	1.5	0	1.5	Yes
3	Install Piping Insulation	1,722	271	6.3	0	6.3	Yes
4	Install Ductwork Insulation	500	618	0.8	0	0.8	Yes
5	Install Variable Speed Drives and Premium Efficiency Motors	12,093	1,678	7.2	600	6.9	Yes
6	Re-Commission Existing Controls	8,665	3,692	2.3	0	2.3	Yes
7	Install Vending Machine Controls	400	659	0.6	0	0.6	Yes
L1**	Lighting Replacements	71,898	5,585	12.9	2,030	12.5	No
L2**	Lighting Controls	898	534	1.7	140	1.4	No
L3	Lighting Replacements w/ Controls	72,795	5,825	12.5	2,170	12.1	Yes
	Total	**$103,059**	**16,632**	**6.2**	**2,770**	**6.0**	
	Total (Recommended)	**$103,059**	**16,632**	**6.2**	**2,770**	**6.0**	

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

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	85,850	69,217	19%
Electricity (kWh)	431,280	354,939	18%
Natural Gas (therms)	23,244	17,768	24%
Site EUI (kbtu/SF/Yr)	151.8	119.5	



2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

The following is a summary of building information related to HVAC, plumbing, building envelope, lighting, kitchen equipment and domestic hot water systems as observed during CHA's site visit. See appendix B for detailed information on mechanical equipment, including capacities, model numbers and age.

Building Name: Dr. Marion A. Bolden Student Center
Address: 230 Broadway, Newark NJ
Gross Floor Area: 25,000 sq.ft.
Number of Floors: 3 + basement
Year Built: 1931
Additions: none

Description of Spaces: Conference rooms, offices, lounges, media center (library), auditorium, recording studio, TV studio, café, storage rooms, toilet rooms and mechanical rooms.
Description of Occupancy: The building serves 145 students from 2nd grade to 8th grade. There are 25 school faculty and staff members.
Number of Computers: The school has approximately 35 desktop and laptop computers.
Building Usage: Hours of operation are 7:00 AM – 11:00 PM Monday through Friday. Students are present from 3:00-7:30 PM during the school year, and 8:00 AM-3:00 PM in the summer.

Construction Materials: Structural steel framing with concrete masonry unit exterior walls, insulation unknown. Interior walls sheetrock. Interior and exterior walls are in good condition.
Façade: Brick and stone veneer
Roof: Rolled asphalt roofing on a flat deck, insulation unknown.
Windows:. Double hung double pane windows with aluminum frames. Windows are in good condition and no ECMs associated with window replacement were evaluated.
Exterior Doors: Doors are steel framed double and quadruple doors with small upper windows. Door sweeps and seals are in poor condition. An ECM to consider door sweeps and seals is included.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating:. Four Laars natural gas fired hot water boilers, each with a heating capacity of 405,000 BTUH and operating at approximately 80% efficiency, provide the heat for this building. The boilers are piped to a common header and the hot water is circulated around the building by two B&G vertical inline pumps which operate in a lead-lag configuration (motor nameplate data not legible). Hot water is pumped to coils in three (3) air handling units, two Greenheck rooftop energy recovery units, one York RTU, fan coils, vertical fan coils, and VAV boxes. The rooftop units service the 3rd flr Library, offices, and TV Studio. Air handling units #1 and #2, equipped with VFDs and located in the Boiler Room, deliver air to the basement areas & the first floor, and to the Gathering room. The third AHU is tasked with providing heating for the back room. The two groups of VAV boxes are supplied by energy recovery rooftop units, capable of varying their fan speed and the amount of outside air that is brought in. Most of the remainder of the building is heated by ceiling mounted fan coil units and by vertical floor mounted fan coils, outfitted with hot water coils. Miscellaneous cabinet heaters, unit heaters, and finned tube radiation also provide heat in selected locations. The hot water system incorporates a percentage of propylene glycol to prevent freeze-ups in coils exposed to the outside air. ECMs were added to examine insulating rooftop ductwork and hot water piping.

Cooling: With the exception of basement areas and the mechanical rooms and storage rooms, this building is 100% air-conditioned**.** Two (2) York air cooled 70 ton chillers, approximately ten years old and installed on a concrete pad adjacent to the northern back corner of the building, provide the chilled water for the building. Two B&G vertical inline chilled water pumps, located up high in the Boiler Room and operating in a lead-lag configuration, pump the chilled water to the air handling units, RTUs, and various types of fan coils in the building. It was observed during the site visit that the chilled water pumps were running, even though the outside air temperature was approximately 18°F. Maintenance personnel indicated that the chilled water pumps were kept running throughout the winter to prevent coil freeze-ups in the rooftop units. An ECM was included to examine turning these pumps off during the winter months. ECMs for variable speed drives and premium efficiency motors are also included.

Ventilation: Two (2) Greenheck rooftop energy recovery rooftop units, one (1) York RTU, and three (3) York air handling units provide dedicated outdoor ventilation air to the spaces they serve. Each ERU is equipped with a heat recovery wheel, which provides for the transfer of both humidity and thermal energy between the incoming and exiting airstreams, depending upon outdoor climate conditions. All of these units have economizer and DCV capability. In general, windows in the building are not opened to provide ventilation.

Exhaust: General building pressure relief is provided primarily by the two (2) rooftop ERUs, which take exhaust air and pass it through energy recovery wheels before exiting the building. It is also secondarily provided by the relief air grilles on the air handling units, and by toilet room exhaust. Toilet rooms are exhausted by roof mounted centrifugal fans.

Controls Systems

Some of the building HVAC systems are controlled by a Metasys DDC control system which can be accessed by a computer in an office down the hall from the primary mechanical room. The system allows for space temperature set points, outside air damper positions, unoccupied setback and scheduling of all major air handling units throughout the building. The temperature setpoint is 80°F with +/- 2 degree swing, and this temperature is maintained during unoccupied times such as weekends and nighttime. The controls system allows for adjustments of these temperatures to account for local heating & cooling issues. The existing DDC system has a user-friendly graphical display which shows individual units and their temperature set-points,

damper positions, and fan operation. The controls system is not complete, however, in that not all of the equipment points have been tied in to the primary head end. An ECM for re-commissioning controls was also included.

Domestic Hot Water Systems

Domestic hot water is generated by an indirect heated Cemline Stonesteel water heater/ storage tank of unknown vintage. Hot water off the primary boiler heating loop supplies a coil within the Cemline tank to provide the hot water. This tank has a capacity of 120 gallons. A fractional horsepower B&G pump drives the circulation of the domestic hot water around the school.

Kitchen Equipment

The kitchen is residential in size and scope. It contains one (1) under-counter electric dishwasher and a residential size gas range, above which there is no exhaust of any kind. There is one (1) triple-door reach-in cooler by Market Forge; which at the time of the site visit, was chain-locked. There is also a single bay stainless steel sink and faucet.

Plumbing Systems

This building contains primarily low flow water closets (1.6 GPF or less), and low flow lavatories (2.2 GPM or less). Most urinals operate on the lower flush volumes. One waterless urinal was noted in a basement toilet room near the main Boiler Rm. Water usage is primarily toilet rooms, the kitchen, and lavatories. All fixtures appear to be in good condition.

Plug Load

This building has computers, copiers, smart boards, residential appliances (microwave, refrigerator), printers and portable electric heaters (personal) which contribute to the plug load in the building. An ECM for a vending machine controller is included.

Lighting Systems

The lighting within the Student Center is primarily 4' T8 linear fluorescent fixtures with electronic ballasts, with the number of lamps varying per fixture from one, two, three and four. 26 watt recessed CFL lights illuminate some corridors. Exterior lighting consisted of 150W metal halide lamps. Toilet rooms, lounges and office spaces are controlled by occupancy sensors, but the media center and various studios are operated by manual switches.

3.0 UTILITIES

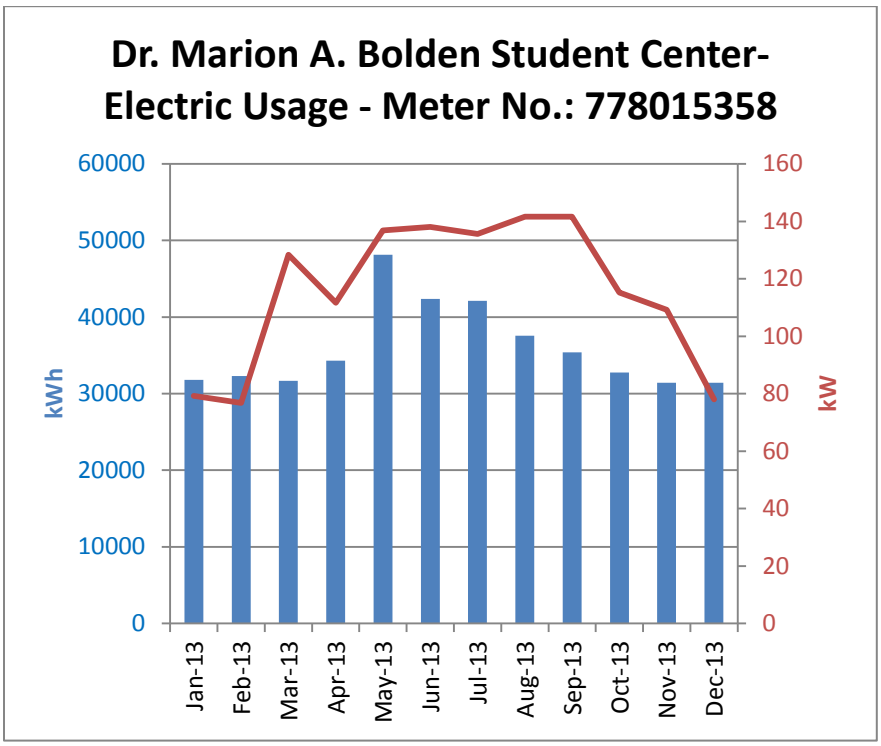
Utilities used by the building are delivered and supplied by the following utility companies:

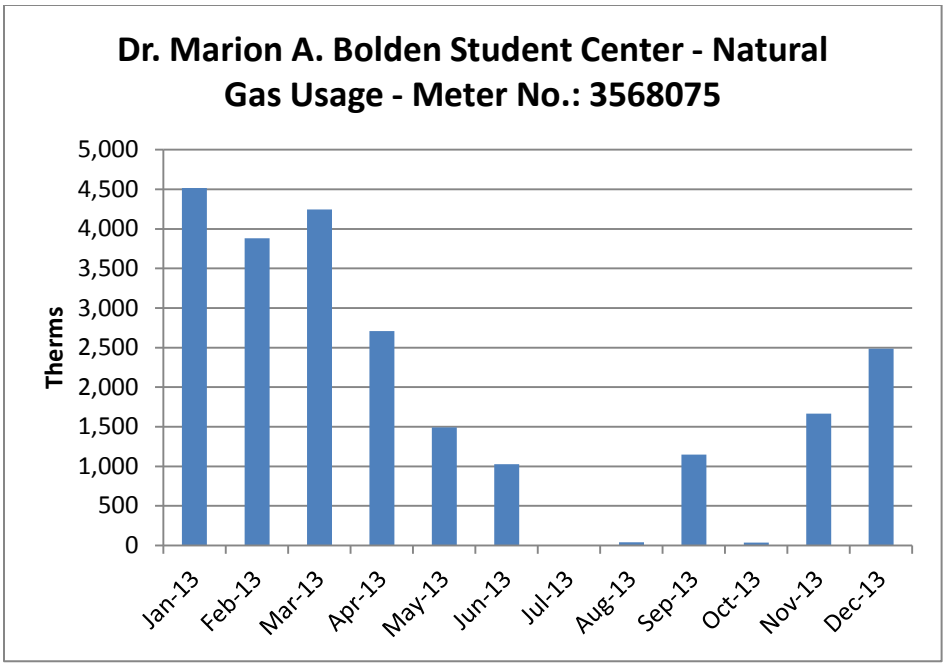
	Electric	Natural Gas
Deliverer	PSEG	PSEG
Supplier	Nextera Energy Services	PSEG

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

Electric		
Annual Consumption	431,280	kWh
Annual Cost	$64,696	$
Blended Unit Rate	$0.15	$/kWh
Supply Rate	$0.13	$/kWh
Demand Rate	$5.83	$/kW
Peak Demand	142.0	kW
Natural Gas		
Annual Consumption	23,244	Therms
Annual Cost	$21,154	$
Unit Rate	$0.91	$/therm

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





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

This building has a fairly typical electric consumption profile with spike in use during May 2013. CHA does not known why this spike occurred, though possible explanations include an incorrect meter reading, atypical activities that may have been scheduled during that time, or typos involved with NPS transferring meter data to spreadsheets. Natural gas consumption is mainly for heating and also follows a typical consumption profile.

See Appendix A for a detailed 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*			
Utility	Units	Building Average Rate	NJ Average Rate
Electricity	$/kWh	$0.15	$0.12
Natural Gas	$/Therm	$0.91	$0.95

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

This building on average has a higher rate for their electricity than the average commercial building in New Jersey. It is recommended that this school shop for a third party utility supplier for electricity.

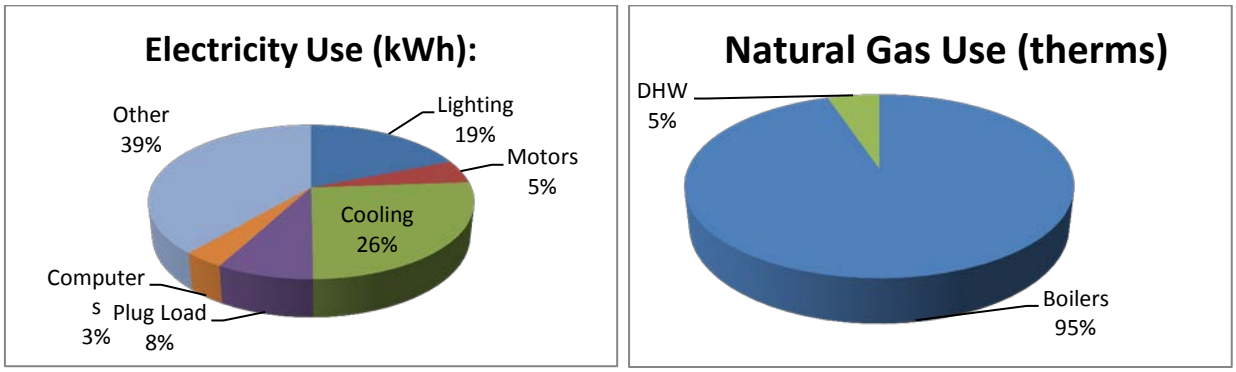
Additional information on selecting a third party energy supplier is available here:

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.

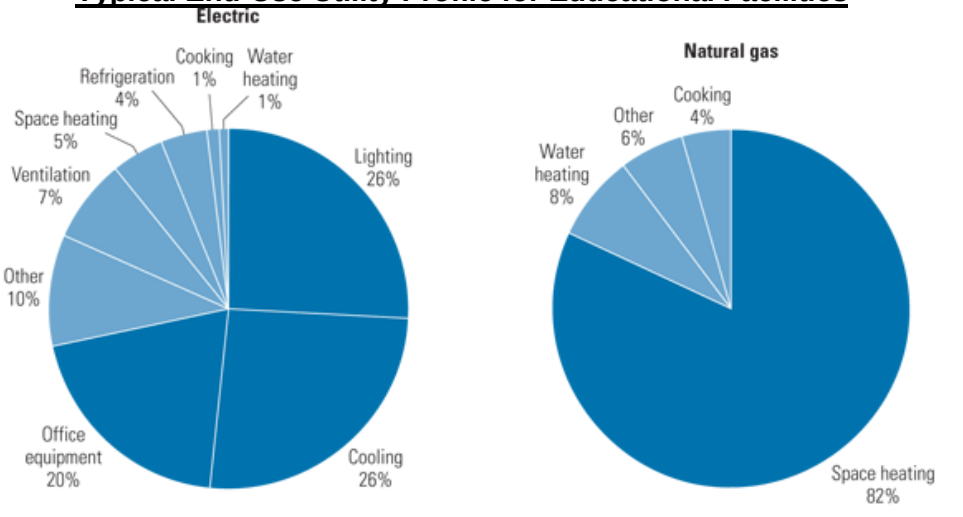
The charts below represent estimated utility end-use utility profiles for the building. The values used within the charts were estimated from a review of the utility analysis and the energy savings calculations.

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. The energy profile for each building 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

This building has not been previously benchmarked. The site EUI below was calculated based on utility data provided from Newark Public Schools.

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)
151.8*	5**

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

The Site EUI was obtained, but the Energy Star Rating Score was not calculated for this 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.

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

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

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

5.1 ECM-1 Replace Door Sweeps and Seals

It was noted during the site visit that the seals and sweeps were showing wear on the nearly all of the exterior doors, and daylight was visible between some of the doors and frames.

The seals around exterior doors fail over time. This leads to infiltration of unconditioned outside air or exfiltration of conditioned air resulting in increased heating energy usage. This measure calls for the replacement of all exterior door seals. Replacement of these seals will result in a reduction of the buildings heating and cooling loads, therefore providing natural gas and electricity savings. The linear footage of gap and wind speed

is used to estimate the infiltration rate, which is then multiplied by the BIN weather data and the equipment efficiencies to determine the annual energy savings.

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

ECM-1 Replace Door Sweeps and Seals

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
1,383	0	23	236	219	0.6	0	6.3	6.3

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

This measure is recommended.

5.2 ECM-2 Turn off Chilled Water Pumps in Winter-time

It was observed during the site visit that the chilled water pumps were running, even though the outside air temperature was approximately 18°F. Maintenance personnel indicated that the chilled water pumps were kept running throughout the winter to prevent coil freeze-ups in the rooftop units.

Operating pumps unnecessarily is wasteful of electricity. It is recommended that the Student Center maintenance staff either 1) drains the chilled water out of the system in the winter; or 2) replenishes the existing propylene glycol injection system in the Boiler Rm. If either of these two options is implemented, the chilled water pumps can be turned off during the winter heating season, which will result in an energy savings.

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

ECM-2 Turn off Chilled Water Pumps in Winter-time

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
5,500	2.2	9,322	2,525	3,671	10.9	0	1.5	1.5

* 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 Insulation on Piping

It was observed during the site visit that pipe insulation was missing from domestic hot water piping in the Boiler Rm. A certain percentage of energy used to heat the water is lost via conduction through exposed piping surfaces. It is recommended that this piping be externally insulated to reduce the loss of this energy.

Implementation of this ECM will entail wrapping the existing bare metal pipe with an approved high performance fiberglass insulation jacketing material.

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

ECM-3 Install Insulation on Piping

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
1,722	0	0	298	271	0.6	0	6.3	6.3

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

This measure is recommended.

5.4 ECM-4 Install Insulation on Exterior Ductwork

HVAC rooftop units provide conditioned air to spaces within the building below, and one of these RTUs is connected to un-insulated supply and return ductwork with lengthy runs exposed to the outdoor air. A certain percentage of energy used to heat or cool the air is lost via conduction through exposed ductwork surfaces. It is recommended that this ductwork be externally insulated to reduce the loss of this energy.

Implementation of this ECM will entail wrapping the existing bare metal HVAC ductwork with an approved exterior grade fiberglass insulation material.

ECM-4 Install Insulation on Exterior Ductwork

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
500	0	2,849	209	618	11.4	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.

5.5 ECM-5 Install VFDs & Premium Efficiency Motors

The existing York supply and return air fans on AHU-3 serving the back area are not controlled by variable frequency drives (VFDs). Typically fans within air handling units are perfectly selected to match the ventilation needs of a space functioning at maximum capacity. Often enough there are times during the day when the space is at less than full occupancy. VFDs allow fans to run at slower RPMs to better meet the needs of the system and in the process, energy is saved.

Ideally fans or pump motors are perfectly selected to match the needs of a system operating a maximum capacity. Typically units are over-sized somewhat for safety and the system is operating at less than full heating capacity. VFDs allow motors to run at

slower RPMs to better meet the needs of the system and in the process, energy is saved.

To implement this ECM, the existing motors can be removed and new inverter duty motors and VFDs installed in their place. Piping and wiring modifications may also be needed.

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

ECM-5 Install VFDs & Premium Motors

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
12,093	4.1	10,617	0	1,678	1.3	600	7.2	6.9

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

This measure is recommended.

5.6 ECM-6 Re-Commission DDC Controls

The existing Metasys DDC control system has a user-friendly graphical display which shows unit temperature set-points, damper positions, scheduling, and fan operation. The controls system is not complete, however, in that not all of the equipment points have been tied in to the primary head end.

Retro-commissioning is a verification process that involves observing and/or measuring the actual operations of building HVAC equipment and comparing it to the control setpoint value on the building's automation system. This process confirms that valves, damper actuators and other control devices are correctly enabled to provide the desired heating/cooling performance to the space. When system deficiencies are discovered, they can be corrected by replacing non-operative controls or by re-programming the control setpoints and ranges.

Retro-commissioning has been proven to provide substantial electrical and natural gas energy savings in buildings that currently have a building automation system.

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

ECM-6 Re-Commission DDC Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
8,665	0	11,213	2,208	3,692	5.4	0	2.3	2.3

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

This measure is recommended.

5.7 ECM-7 Install Vending Misers

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

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

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

ECM-7 Install Vending Misers

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
400	0	4,390	0	659	23.7	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.

5.8 ECM-L1 Lighting Replacements / Upgrades

The lighting within the Student Center is primarily 4' T8 linear fluorescent fixtures with electronic ballasts, and 26 watt recessed CFL lights in corridors.

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 Replacements / Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
71,898	12	36,100	0	5,585	(0.1)	2,030	12.9	12.5

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

This measure is not recommended in lieu of ECM L3.

5.9 ECM-L2 Install Lighting Controls (Occupancy Sensors)

Occupancy sensors in this building are found only in the toilet rooms, classrooms and lounges. Other areas in the building with intermittent use, such as the media center, offices, and studios, could benefit from the installation of occupancy sensors to turn off lights when these areas are unoccupied.

This measure recommends installing occupancy sensors for the current lighting system. Using a process similar to that utilized in Section 5.7.1, the energy savings for this measure was calculated by applying the known fixture wattages in the space to the estimated existing and proposed times of operation for each fixture.

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

ECM-L2 Install Lighting Controls (Occupancy Sensors)

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$	%	$	Years	Years
898	0	3,563	0	534	5.0	140	1.7	1.4

* 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.

5.10 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
72,795	12.1	37,927	0	5,825	(0.1)	2,170	12.5	12.1

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

This measure is recommended.

5.11 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:

- Set computers monitors to turn off and computers to sleep mode when not in use
- Look for the ENERGY STAR® label when purchasing Window AC units or Kitchen Appliances
- Disconnect unnecessary or unused small appliances and electronics when not in use to reduce phantom loads
- Train custodians to turn off lights and set HVAC temperatures to minimum levels when rooms are unoccupied
- Develop an Energy Master Plan to measure and track energy performance
- Educate students and staff about how their behavior affects energy use. Create student energy patrols to monitor and inform administration when energy is being wasted.
- During the winter, Custodians should ensure all windows are closed as part of cleaning routine

6.0 PROJECT INCENTIVES

6.1 Incentives Overview

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

6.1.1 New Jersey Smart Start Program

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

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

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

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

6.1.2 Direct Install Program

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

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

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

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

The building does not qualify for this program because its electrical demand is greater 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 D, along with more detailed program information.

6.1.4 Energy Savings Improvement Plan

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

ESIP allows local units to use "energy savings obligations" (ESO) to pay for the capital costs of energy improvements to their facilities. This can be done over a maximum term of 15 years. 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)
1,851	0

There is not adequate available roof space for PV solar power generation, and therefore this measure was not evaluated further.

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.

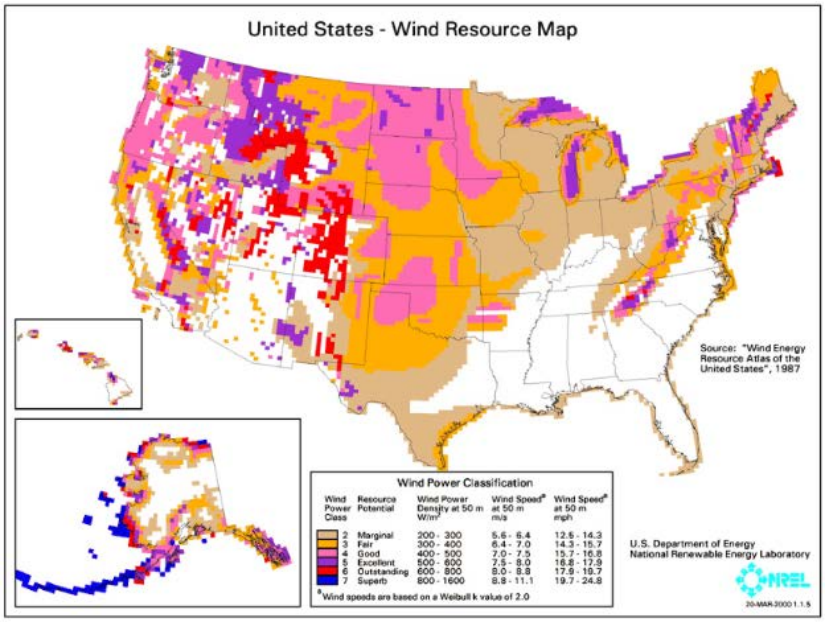
A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually 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.

7.2 Wind Powered Turbines

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



This measure is not recommended because Newark, NJ is a class 1 area.

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 is low. 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 not enough space on-site for installation. The costs involved with purchasing this system and performing modifications to the existing HVAC and electrical systems would outweigh the energy savings over the life of the equipment.

This measure is not recommended because of the limited summer thermal demand.

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
142	76.8	116	N	N

This building is not eligible for demand response curtailment because it does not meet the minimum required demand reduction.

8.0 CONCLUSIONS & RECOMMENDATIONS

The LGEA energy audit conducted by CHA for the building identified potential annual savings of $13,804/yr with an overall payback of 7.4 years, if the recommended ECMs are implemented.

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

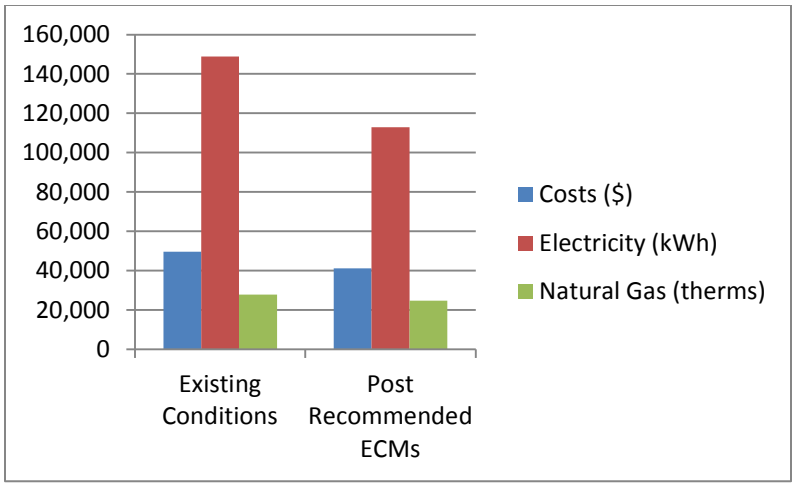
Electric Savings (kWh)	Natural Gas Savings (therms)	Total Savings ($)	Payback (years)
76,341	5,476	16,632	6.2

The following projects should be considered for implementation:

- Replace Door Sweeps and Seals
- Shut Down Chilled Water Pumps in Winter
- Install VFDs & Premium Motors
- Install Insulation on Exterior Ductwork
- Install Insulation on Piping
- Retro-Commission HVAC Controls
- Install Vending Misers
- Lighting Replacements with Controls (Occupancy Sensors)

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	85,850	69,217	19%
Electricity (kWh)	431,280	354,939	18%
Natural Gas (therms)	23,244	17,768	24%
Site EUI (kbtu/SF/Yr)	151.8	119.5	



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

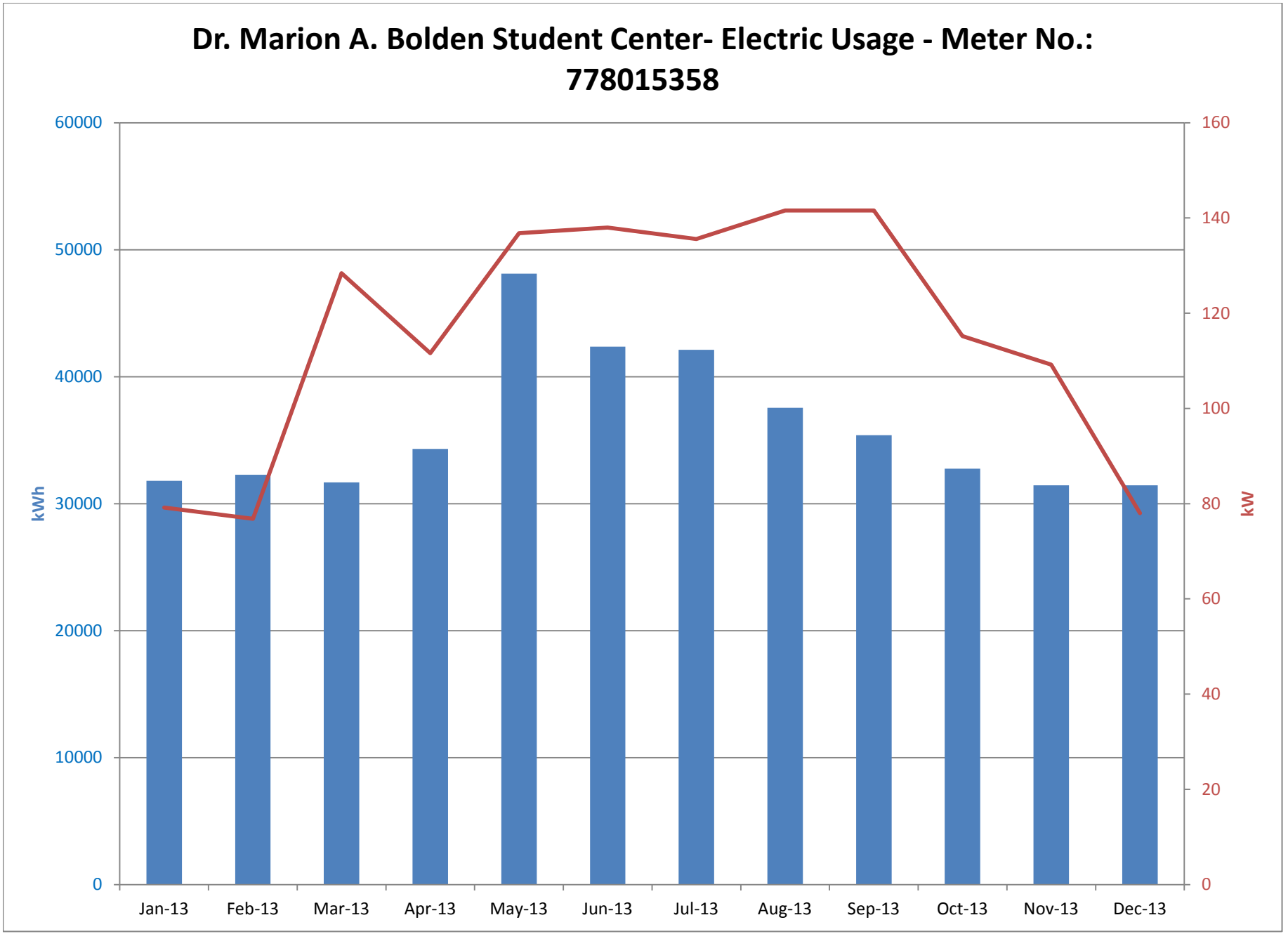
Dr. Marion A. Bolden Student Center - Electric Usage

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)
1/18/2012	2/15/2012	33480	79.2	5,655.00	0	849.72	335.53	5319.47	$ 0.17	$ 0.16	$ 4.24
2/16/2012	3/16/2012	33360	108	5,625.00	0	762.93	457.55	5167.45	$ 0.17	$ 0.15	$ 4.24
3/17/2012	4/17/2012	33240	115.2	5,590.00	0	738.34	488.04	5101.96	$ 0.17	$ 0.15	$ 4.24
4/18/2012	5/16/2012	36840	128.4	6,105.00	0	815.76	543.97	5561.03	$ 0.17	$ 0.15	$ 4.24
5/17/2012	6/15/2012	46080	147.6	6,997.52	3,836.02	2,536.20	625.3	6372.22	$ 0.15	$ 0.14	$ 4.24
6/16/2012	7/17/2012	43560	138	6,253.83	3,232.49	2,436.70	584.64	5669.19	$ 0.14	$ 0.13	$ 4.24
7/18/2012	8/15/2012	49320	148.8	7,017.27	3,664.06	2,722.82	630.39	6386.88	$ 0.14	$ 0.13	$ 4.24
8/16/2012	9/14/2012	43920	134.4	6,107.17	3,186.78	2,351.00	569.39	5537.78	$ 0.14	$ 0.13	$ 4.24
9/15/2012	12/14/2012	95160	132	10,431.59	6,759.80	2,172.06	1,499.73	8931.86	$ 0.11	$ 0.09	$ 11.36
12/15/2012	1/16/2013	32040	81.6	3,620.96	2,426.93	846.59	347.44	3273.52	$ 0.11	$ 0.10	$ 4.26
1/17/2013	2/14/2013	31800	79.2	3,818.61	2,653.22	826.38	339.01	3479.6	$ 0.12	$ 0.11	$ 4.28
2/15/2013	3/18/2013	32280	76.8	3,910.86	2,765.39	816.73	328.74	3582.12	$ 0.12	$ 0.11	$ 4.28
3/19/2013	4/17/2013	31680	128.4	3,956.22	2,757.69	648.91	549.62	3406.6	$ 0.12	$ 0.11	$ 4.28
4/18/2013	5/16/2013	34320	111.6	4,267.00	3,007.47	781.83	477.7	3789.3	$ 0.12	$ 0.11	$ 4.28
5/16/2013	6/19/2013	48120	136.8	7,640.74	4,477.83	1,519.21	1,643.70	5997.04	$ 0.16	$ 0.12	$ 12.02
6/19/2013	7/17/2013	42360	138	7,367.26	4,355.63	1,324.66	1,686.97	5680.29	$ 0.17	$ 0.13	$ 12.22
7/18/2013	8/16/2013	42120	135.6	7,217.66	4,238.19	2,399.03	580.44	6637.22	$ 0.17	$ 0.16	$ 4.28
8/17/2013	9/16/2013	37560	141.6	6,933.18	3,878.66	2,448.40	606.12	6327.06	$ 0.18	$ 0.17	$ 4.28
9/17/2013	10/15/2013	35400	141.6	5,294.17	3,681.00	1,007.05	606.12	4688.05	$ 0.15	$ 0.13	$ 4.28
10/15/2013	11/14/2013	32760	115.2	4,897.45	3,447.66	956.68	493.11	4404.34	$ 0.15	$ 0.13	$ 4.28
11/14/2013	12/16/2013	31440	109.2	4,752.78	3,365.09	920.26	467.43	4285.35	$ 0.15	$ 0.14	$ 4.28
12/16/2013	1/15/2014	31440	78	4,640.07	3,368.66	937.53	333.88	4306.19	$ 0.15	$ 0.14	$ 4.28

Dr. Marion A. Bolden Student Center		Start Date	End Date	Months
230 Broadway, 07104		1/18/2012	1/15/2014	23
Account Number	2147483647			
Meter Number	778015358			

ELECTRIC USAGE - MOST RECENT 12 MONTHS, PERIOD ENDING: 1/15/2014

Total Usage	431,280	**kwh**
Total Charges	$64,696	
Blended Rate	$0.15	**$/kWh**
Consumption Rate	$0.13	**$/kWh**
Demand Rate	$5.83	**$/kW**
Max Demand	142	**kW**
Min Demand	76.8	**kW**
Avg Demand	116	**kW**


Dr. Marion A. Bolden Student Center- Electric Usage - Meter No.: 778015358
kWh
kW
60000
50000
40000
30000
20000
10000
0
160
140
120
100
80
60
40
20
0
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13

Newark Public Schools LGEA
CHA Project# 27999

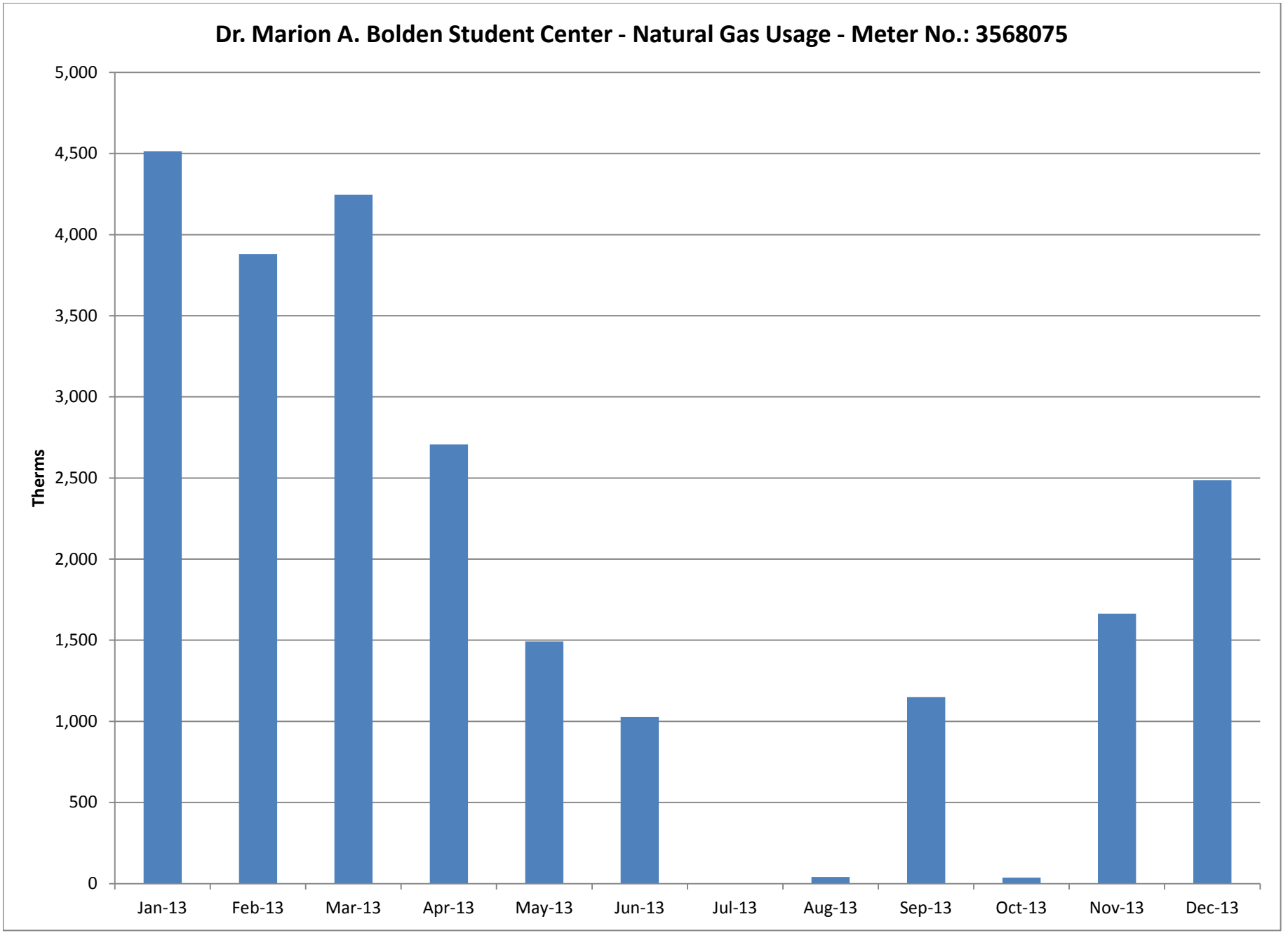
Dr. Marion A. Bolden Student Center - Natural Gas Usage

Index No	Current Name	Acct	Meter	Start Date	End Date	Therms	Total Charge	$/therm
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	1/18/2012	2/15/2012	3,699.91	3,179.14	0.86
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	2/16/2012	3/16/2012	1,596.36	1,508.65	0.95
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	3/17/2012	4/17/2012	2,363.44	1,515.63	0.64
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	4/18/2012	5/16/2012	1,694.59	1,090.96	0.64
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	5/17/2012	6/15/2012	1,269.97	871.62	0.69
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	6/16/2012	7/17/2012	0	99.5	#DIV/0!
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	7/18/2012	8/15/2012	796.53	650.59	0.82
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	8/16/2012	9/14/2012	552.01	477.5	0.87
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	9/15/2012	10/15/2012	627.28	528.2	0.84
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	10/16/2012	11/14/2012	1,727.42	1,785.22	1.03
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	11/15/2012	12/14/2012	1,800.99	1,898.53	1.05
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	12/15/2012	1/16/2013	4,514.44	4,096.61	0.91
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	1/17/2013	2/15/2013	3,880.08	3,512.37	0.91
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	2/16/2013	3/18/2013	4,245.57	3,859.81	0.91
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	3/19/2013	4/17/2013	2,707.53	2,077.82	0.77
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	4/18/2013	5/16/2013	1,492.42	1,250.63	0.84
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	5/17/2013	6/19/2013	1,028.14	915.19	0.89
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	7/18/2013	8/16/2013	40.42	133.36	3.30
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	8/16/2013	9/16/2013	1,148.76	914.14	0.80
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	9/17/2013	10/15/2013	36.13	234.09	6.48
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	10/16/2013	11/14/2013	1,663.49	1,745.99	1.05
82	Dr. Marion A. Bolden Student Center	6616189309	3568075	11/15/2013	12/16/2013	2,486.54	2,413.56	0.97

Dr. Marion A. Bolden Student Center		Start Date	End Date	# Months
Account Number	6616189309	1/18/2012	12/16/2013	22
Meter Number	3568075			

NATURAL GAS USAGE - MOST RECENT 12 MONTHS, PERIOD ENDING: 12/16/2013

Annual Usage	23,244	**Therms**
Annual Cost	$21,154	
Rate	$0.91	**$/Therm**


Dr. Marion A. Bolden Student Center - Natural Gas Usage - Meter No.: 3568075
Therms
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-13
Feb-13
Mar-13
Apr-13
May-13
Jun-13
Jul-13
Aug-13
Sep-13
Oct-13
Nov-13
Dec-13

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 Public Schools
CHA Project# 27999
Dr. Marion A. Bolden Student Center

Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size /Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)
AHU-2	1	York	04-106456-0203	CLNM24742D	Air Handling Unit	~5,000 cfm	Basement Mechancial Room	Offices	1995	6
AHU-1	1	York	04-106456-0201	CLNM2473D	Air Handling Unit	~5,000 cfm	Basement Mechancial Room	Gathering Room	1995	6
DHW-1	1	Cemline	V120JST	55817	Domestic Hot Water Heater	120 Gal.	Basement Mechancial Room	Building	2009	-5
B-1	1	Laars	137756	C03106971	Gas Fired Boiler	405,000 btu input / 500,000 btu output / 81% eff	Basement Mechancial Room	Building	2003	24
B-2	1	Laars	137756	C03106972	Gas Fired Boiler	405,000 btu input / 500,000 btu output / 81% eff	Basement Mechancial Room	Building	2003	24
HWP-1	2	Baldor	MM12443	Unknown	Hot Water Pump	5 hp	Basement Mechancial Room	Building	2009	5
AHU-3	1	York	04-106456-0205	CLNM24746D	Air Handling Unit	~10,000 CFM	Break Room Mechanical Closet	Back Room	N/A	
RTU-1	1	York	XTO-036NC0-HDJG017A	CDSMX10107	Packaged Rooftop Unit	200,300 btu output / 7.5 hp	Roof	Building	N/A	
ERU-1	1	Greenheck	ERCH-45H-15-30-ES	10801875	Air Handling Unit	3 HP Fan	Roof	Building	N/A	
RTU-3	1	York	XTO-030N042-DAGN017A	CDSM-40109	Air Handling Unit	25 HP Supply Fan	Roof	Building	N/A	
CHWP-1	2	Marathon Electric	BVF-213TTDW7048AB	2131MV	Chilled Water Pump	7.5 HP	Basement Mechancial Room	Building	2009	5
AHU-3	1	York	410645602050020000	CLNM24746D	Air Handling Unit	1 HP	Teacher's Lounge Mechanical Room	TV Studio	1995	-9
CH-1	2	York	YCAL007DEC17XCABXTXXRLXXX44XXXXXXXXXXXSAXXXXX3XXXXXNBXXXXX	RHNM009313	Air Cooled Chiller	15 ton	Parking Lot	Building	2004	13
RTU-2	1	York	N10033NO54DD1H07A	CDSMN010108	Packaged Rooftop Unit	3 ton	Roof	3rd Floor Office	2004	-10

Energy Audit of Newark Public Schools - Dr. Marion A. Bolden Student Center
CHA Project No. 27999
Existing Lighting & Audit Input

Cost of Electricity: **$0.131** **$/kWh**
$5.83 **$/kW**

			EXISTING CONDITIONS									Retrofit Control	
	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	Describe Usage Type using Operating Hours	No. of fixtures before the retrofit	Lighting Fixture Code	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	Retrofit control device	Notes
262	Sign In Area	Hallways	6	B CF 36 W	CFT36/1	51	0.31	SW	4420	1,353	None	
262	Cafeteria	Cafeteria	41	B CF 36 W	CFT36/1	51	2.09	SW	2000	4,182	None	
117	Stairs	Hallways	5	CF 23	CFS23/1	23	0.12	SW	4420	508	None	
40LED	Boiler Room	Boiler Room	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2800	672	None	
35LED	Bathroom	Restroom w/ OCC	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	OCC	1000	90	None	
35LED	Elevator MER	Mechanical Room	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	1000	90	None	
262	B-06 Offices	Offices	14	B CF 36 W	CFT36/1	51	0.71	SW	2000	1,428	None	
35LED	B-06 Offices	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2000	360	None	
262	B-05 Offices	Offices	22	B CF 36 W	CFT36/1	51	1.12	OCC	2000	2,244	None	
35LED	B-05 Offices	Offices	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.81	SW	2000	1,620	None	
7LED	Basement Hallway	Hallways	7	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.42	SW	4420	1,856	None	
24	B-14 Mechanical Room	Mechanical Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.12	SW	1000	120	None	
50LED	B-13 Break Room	Staff Lounge	3	W 32 W P 2 (ELE)	F42LL	60	0.18	OCC	8760	1,577	None	
262	B-15 Office	Offices	14	B CF 36 W	CFT36/1	51	0.71	SW	2000	1,428	None	
35LED	B-15 Office	Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2000	360	OCC	
262	B-15B Office	Offices	2	B CF 36 W	CFT36/1	51	0.10	SW	2000	204	OCC	
262	B-08 Closet	Linen/Utility/Wet/Janitor/Electrical	1	B CF 36 W	CFT36/1	51	0.05	SW	1000	51	None	
35LED	Maintenance Storage	Storage Areas	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	OCC	1300	234	None	
117	Maintenance Storage	Storage Areas	2	CF 23	CFS23/1	23	0.05	OCC	1300	60	None	
50LED	Men's Bathroom	Restrooms	1	W 32 W P 2 (ELE)	F42LL	60	0.06	OCC	1000	60	None	
50LED	Women's Bathroom	Restrooms	1	W 32 W P 2 (ELE)	F42LL	60	0.06	OCC	1000	60	None	
262	B-04 Office	Offices	10	B CF 36 W	CFT36/1	51	0.51	OCC	2000	1,020	None	
50LED	B-10 Shower	Restrooms	1	W 32 W P 2 (ELE)	F42LL	60	0.06	OCC	1000	60	None	
50LED	B-11 Shower	Restrooms	1	W 32 W P 2 (ELE)	F42LL	60	0.06	OCC	1000	60	None	
71	Lobby Chandelier	Hallways	8	I 60	I60/1	60	0.48	Breaker	4420	2,122	None	
261LED	Lobby	Hallways	28	PAR 38 SP	H100/1	100	2.80	OCC	4420	12,376	None	
262	Lounge A	Lounge	16	B CF 36 W	CFT36/1	51	0.82	OCC	2400	1,958	None	
71	Lounge A	Lounge	8	I 60	I60/1	60	0.48	OCC	2400	1,152	None	
262	Lounge B	Lounge	16	B CF 36 W	CFT36/1	51	0.82	OCC	2400	1,958	None	
71	Lounge B	Lounge	8	I 60	I60/1	60	0.48	OCC	2400	1,152	None	
40LED	105-Theater	Classrooms	10	T 32 R F 2 (ELE)	F42LL	60	0.60	SW	2400	1,440	None	
198LED	106-Storage	Storage Areas	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.06	SW	1300	81	None	
198LED	116-Storage	Storage Areas	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.06	SW	1300	81	None	
35LED	111-Café	Lounge	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	OCC	2400	432	None	
40LED	Men's Bathroom	Restrooms	2	T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	1000	120	None	
40LED	Women's Bathroom	Restrooms	2	T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	1000	120	None	
40LED	Student Lounge	Lounge	4	T 32 R F 2 (ELE)	F42LL	60	0.24	SW	2400	576	None	
262	Closet	Linen/Utility/Wet/Janitor/Electrical	1	B CF 36 W	CFT36/1	51	0.05	SW	1000	51	None	
117	Stairs	Hallways	9	CF 23	CFS23/1	23	0.21	SW	4420	915	None	
35LED	2nd Floor Hallways	Hallways	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.63	SW	4420	2,785	None	
20LED	Dance Studio	Classrooms	33	S 32 C F 1 (ELE)	F41LL	32	1.06	SW	2400	2,534	None	
35LED	203-Green Room	Classrooms	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	2400	2,160	None	
7LED	203-Green Room	Classrooms	18	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	1.08	SW	2400	2,592	None	
40LED	201-Club Room	Classrooms	39	T 32 R F 2 (ELE)	F42LL	60	2.34	SW	2400	5,616	None	
7LED	Hallway	Hallways	5	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.30	SW	4420	1,326	None	
40LED	211-Storage	Storage Areas	6	T 32 R F 2 (ELE)	F42LL	60	0.36	SW	1300	468	None	
50LED	Men's Bathroom	Restrooms	3	W 32 W P 2 (ELE)	F42LL	60	0.18	OCC	1000	180	None	
20LED	Men's Bathroom	Restrooms	1	S 32 C F 1 (ELE)	F41LL	32	0.03	OCC	1000	32	None	
50LED	Women's Bathroom	Restrooms	3	W 32 W P 2 (ELE)	F42LL	60	0.18	OCC	1000	180	None	
20LED	Women's Bathroom	Restrooms	1	S 32 C F 1 (ELE)	F41LL	32	0.03	OCC	1000	32	None	
35LED	Hallway	Hallways	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.09	SW	4420	398	None	
117	Stairs	Hallways	8	CF 23	CFS23/1	23	0.18	SW	4420	813	None	
35LED	3rd Floor Hallway	Hallways	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.90	SW	4420	3,978	None	
35LED	Men's Bathroom	Restrooms	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	180	None	
35LED	Women's Bathroom	Restrooms	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	1000	180	None	
50LED	Student Publication	Classrooms	23	W 32 W P 2 (ELE)	F42LL	60	1.38	SW	2400	3,312	OCC	
35LED	306-Offices	Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.27	SW	2000	540	None	
35LED	Server Room	Offices	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	2000	1,080	OCC	
7LED	Server Room	Offices	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.06	SW	2000	120	OCC	
50LEd	Media Center	Classrooms	49	W 32 W P 2 (ELE)	F42LL	60	2.94	SW	2400	7,056	OCC	
117	Media Center	Classrooms	6	CF 23	CFS23/1	23	0.14	SW	2400	331	OCC	
40LED	Men's Bathroom	Restrooms	1	T 32 R F 2 (ELE)	F42LL	60	0.06	OCC	1000	60	None	
40LED	Women's Bathroom	Restrooms	1	T 32 R F 2 (ELE)	F42LL	60	0.06	OCC	1000	60	None	
117	Roof Stairs	Linen/Utility/Wet/Janitor/Electrical	1	CF 23	CFS23/1	23	0.02	SW	1000	23	None	
238	Exterior	Outdoor Lighting	3	WP 400 Po HPS	hps400/1	465	1.40	PHC	4368	6,093	None	
117	Exterior	Outdoor Lighting	2	CF 23	CFS23/1	23	0.05	PHC	4368	201	None	
64LED	Exterior	Outdoor Lighting	6	175 MH POLE	MH175/1	215	1.29	PHC	4368	5,635	None	
	Total		**523**				**32.84**			**92,196**		

APPENDIX C

ECM Calculations

Newark Board of Education - NJBPU
CHA Project #27999

Rate of Discount (used for NPV) 3.0%

Utility Costs		Yearly Usage	Metric Ton Carbon Dioxide Equivalent	Building Area	Annual Utility Cost		
					Electric	Natural Gas	Fuel Oil
$ 0.150	$/kWh blended		0.000420205	25,000	$ 64,696	$ 21,154	
$ 0.131	$/kWh supply	431,280	0.000420205				
$ 5.83	$/kW	141.6	0				
$ 0.91	$/Therm	23,244	0.00533471				
$ 7.55	$/kgals	261	0				

Dr. Marion A. Bolden Student Center

	Item	Savings					Cost	Simple Payback	Life Expectancy	Equivalent CO_2 (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings					ROI	NPV	IRR
		kW	kWh	therms	Water kgal	$								kW	kWh	therms	kgal/yr	$			
ECM-1	Install Door Seals	0.0	23	236	0	219	$ 1,383	6.3	10	1.3		N	6.3	0.0	235	2,362	0	$ 2,185	0.6	$481	9.3%
ECM-2	Shut Down Chilled Water Pumps in Winter	2.2	9,322	2,525	0	3,671	$ 5,500	1.5	17	17.4		N	1.5	36.7	158,468	42,917	0	$ 65,395	10.9	$42,838	66.7%
ECM-3	Install Piping Insulation	0.0	0	298	0	271	$ 1,722	6.3	10	1.6		N	6.3	0.0	0	2,980	0	$ 2,712	0.6	$591	9.2%
ECM-4	Install Ductwork Insulation	0.0	2,849	209	0	618	$ 500	0.8	10	2.3		N	0.8	0.0	28,493	2,094	0	$ 6,180	11.4	$4,772	123.6%
ECM-5	Install Variable Speed Drives and Premium Efficiency Motors	4.1	10,617	0	0	1,678	$ 12,093	7.2	15	4.5	$ 600	N	6.9	61.1	159,253	0	0	$ 28,162	1.3	$8,536	11.9%
ECM-6	Re-Commission Existing Controls	0.0	11,213	2,208	0	3,692	$ 8,665	2.3	15	16.5		N	2.3	0.0	168,199	33,122	0	$ 55,375	5.4	$35,406	42.4%
ECM-7	Install Vending Machine Controls	0.0	4,390	0	0	659	$ 400	0.6	15	1.8		N	0.6	0.0	65,846	0	0	$ 9,878	23.7	$7,461	164.6%
ECM-L1	Lighting Replacements / Upgrades	12.1	36,100	0	0	5,585	$ 71,898	12.9	10	15.2	$ 2,030	N	12.5	121.4	361,002	0	0	$ 62,645	(0.1)	($22,222)	-3.9%
ECM-L2	Install Lighting Controls (Add Occupancy Sensors)	0.0	3,563	0	0	534	$ 898	1.7	10	1.5	$ 140	N	1.4	0.0	35,626	0	0	$ 5,344	5.0	$3,801	70.2%
ECM-L3	Lighting Replacements with Controls (Occupany Sensors)	12.1	37,927	0	0	5,825	$ 72,795	12.5	10	15.9	$ 2,170	N	12.1	121.4	379,271	0	0	$ 65,386	(0.1)	($20,936)	-3.4%
Total (Does Not Include ECM-L1 & ECM-L2)		**18.4**	**76,341**	**5,476**	**0**	**$ 16,632**	**$ 103,059**	**6.2**	**$ 13**	**61**	**$ 2,770**		**6.0**	**219**	**959,765**	**83,475**	**-**	########	**1.3**	**65268.18**	**12.6%**
Total Measures with Payback <15		**18.4**	**76,341**	**5,476**	**0**	**$ 16,632**	**$ 103,059**	**6.2**	**13.0**	**61**	**$ 2,770**		**6.0**	**219.2**	**959,765**	**83,475**	**0**	########	**1.3**	**$76,594**	**13.3%**
% of Existing		**13%**	**18%**	**24%**	**0%**																

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

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

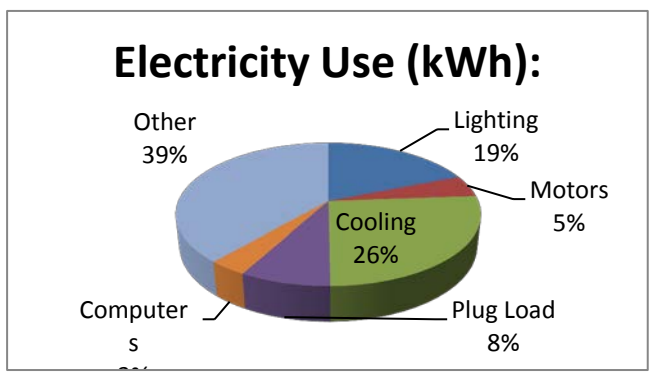
Heating System Efficiency	80%
Cooling Eff (kW/ton)	1.2

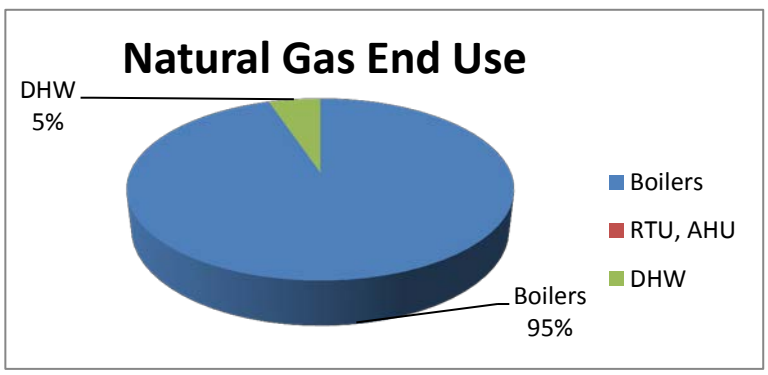
Heating		
Hours	4,427	Hrs
Weighted Avg	40	F
Avg	28	F

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

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
431,280	Total	Based on utility analysis	
81,558	Lighting	From Lighting Calculations	0.189106845
21,242	Motors	Estimated	0.049253385
112,132	Cooling	See Window AC Calculation	0.259998145
35,000	Plug Load	Estimated	0.081153775
	Kitchen	Estimated	0
15,000	Computers	Estimated	0.034780189
166,348	Other	Remaining	0.385707661
Natural Gas Use (Therms):		**Notes/Comments:**	
23,244	Total	Based on utility analysis	
22,044	Boilers	Therms/SF x Square Feet Served	0.948372708
	RTU, AHU	Based on utility analysis	0
1,200	DHW	Based on utility analysis	0.051627292





Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-1: Install Door Seals

Existing: Lack of door seals result in excessive heat loss and infiltration
Proposed: Install door seals and/or weather-stripping to reduce air infiltration

Heating System Efficiency	80%		Ex Occupied Clng Temp.	80	*F	Ex Occupied Htg Temp.	80	*F
Cooling System Efficiency	1.20	kW/ton	Ex Unoccupied Clng Temp.	85	*F	Ex Unoccupied Htg Temp.	80	*F
Linear Feet of Door Edge	72	LF	Cooling Occ Enthalpy Setpoint	31.4	Btu/lb	Electricity	$ 0.15	$/kWh
Existing Infiltration Factor*	1.5	cfm/LF	Cooling Unocc Enthalpy Setpoint	34.8	Btu/lb	Natural Gas	$ 0.91	$/therm
Proposed Infiltration Factor*	0.45	cfm/LF						

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

					EXISTING LOADS		PROPOSED LOADS		COOLING ENERGY		HEATING ENERGY	
					Occupied	Unoccupied	Occupied	Unoccupied				
Avg Outdoor Air Temp. Bins °F	Avg Outdoor Air Enthalpy	Existing Equipment Bin Hours	Occupied Equipment Bin Hours	Unoccupied Equipment Bin Hours	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Door Infiltration Load BTUH	Existing Cooling Energy kWh	Proposed Cooling Energy kWh	Existing Heating Energy therms	Proposed Heating Energy therms
A		B	C	D	E	F	G	H	I	J	K	L
102.5	0.0	0	0	0	15,260	16,913	4,578	5,074	0	0	0	0
97.5	35.4	6	3	4	-1,948	-295	-584	-89	1	0	0	0
92.5	37.4	31	13	18	-2,917	-1,265	-875	-379	6	2	0	0
87.5	35.0	131	55	76	-1,742	-90	-523	-27	10	3	0	0
82.5	33.0	500	208	292	-800	0	-240	0	17	5	0	0
77.5	31.5	620	258	362	292	292	87	87	0	0	2	1
72.5	29.9	664	277	387	875	875	262	262	0	0	7	2
67.5	27.2	854	356	498	1,458	1,458	437	437	0	0	16	5
62.5	24.0	927	386	541	2,041	2,041	612	612	0	0	24	7
57.5	20.3	600	250	350	2,624	2,624	787	787	0	0	20	6
52.5	18.2	730	304	426	3,208	3,208	962	962	0	0	29	9
47.5	16.0	491	205	286	3,791	3,791	1,137	1,137	0	0	23	7
42.5	14.5	656	273	383	4,374	4,374	1,312	1,312	0	0	36	11
37.5	12.5	1,023	426	597	4,957	4,957	1,487	1,487	0	0	63	19
32.5	10.5	734	306	428	5,540	5,540	1,662	1,662	0	0	51	15
27.5	8.7	334	139	195	6,124	6,124	1,837	1,837	0	0	26	8
22.5	7.0	252	105	147	6,707	6,707	2,012	2,012	0	0	21	6
17.5	5.4	125	52	73	7,290	7,290	2,187	2,187	0	0	11	3
12.5	3.7	47	20	27	7,873	7,873	2,362	2,362	0	0	5	1
7.5	2.1	34	14	20	8,456	8,456	2,537	2,537	0	0	4	1
2.5	1.3	1	0	1	9,040	9,040	2,712	2,712	0	0	0	0
-2.5	0.0	0	0	0	9,623	9,623	2,887	2,887	0	0	0	0
-7.5	0.0	0	0	0	10,206	10,206	3,062	3,062	0	0	0	0
TOTALS		**8,760**	**3,650**	**5,110**					**34**	**10**	**337**	**101**

Existing Door Infiltration	**108**	**cfm**	**Savings**	**236**	**therms**
Existing Unoccupied Door Infiltration	**108**	**cfm**		**23**	**kWh**
Proposed Door Infiltration	**32**	**cfm**			
Proposed Unoccupied Door Infiltration	**32**	**cfm**			

								$ 215
								$ 4
								$ 219

Door	Width (ft)	Height (ft)	Linear Feet (LF)	gap (in)	gap location	LF of gap	% door w/ gap	Average gap for door (in)
1a	3	7	20	0.25	bottom/seam	10	50%	0.125
1b	3	7	20	0.25	bottom/seam	10	50%	0.125
2	3	7	20	0.25	all sides	13	65%	0.1625
3	3	7	20	0.25	all sides	13	65%	0.1625
4	3	7	20	0.125	all sides	13	65%	0.08125
5	3	7	20	0.125	all sides	13	65%	0.08125
Total	**18**	**42**	**120**	**0.208**		**72**	**60%**	**0.123**

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

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-1: Install Door Seals - 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.		
									$ -	
Door Weatherization Seals & Sweeps	6	EA	$ 40	$ 115	$ -	$ 246	$ 860	$ -	$ 1,106	
						$ -	$ -	$ -	$ -	

$ 1,106	Subtotal
$ 277	25% Contingency
$ 1,383	**Total**

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

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-2: Shut Down Chilled Water Pumps in Winter

Currently the school operates one CHW pump in the winter @ 45% capacity for freeze protection because there is not enough glycol in the CHW loop. This ECM evaluates the pump electrical savings and residual coil thermal savings associated with adding a higher concentration of glycol to the loop and turning the pumps "off"

Equipment Tag	Equipment Description	Motor Horsepower	Efficiency	VFD?	GPM	Eq. GPM	Eq. Motor HP	Motor Running?
		7.5	91%	45%	44	19.8	3.4	Y
		7.5	91%	0%	44	-	-	N
						-	-	
						-	-	
						-	-	

Total Capacity 3.4
Average kW/ton 91%
Total GPM 19.8

UTILITY COSTS		
Electricity Rate	$ 0.13	/ kWh
Demand Rate	$ 5.83	/ kW
Natural Gas Rate	$ 0.91	/Therm
CONSTANTS		
Convserion HP to kW	0.746	kW/HP
Load Factor	0.78	
EXISTING CONDITIONS and PARAMETERS		
Duration of Motor Operation	6	Months
Approx. Hours of operation	4,320	hrs
Approx. Heating Hours (below 40F)	2,550	hrs
Total Horsepower of Motors	3.4	HP
Average Efficiency of Motors	91%	
Estimated Flow Rate of Pumps	20	GPM
ΔT between AHU Hot and CHW Coil	10	°F
S A V I N G S		
Motor Demand Savings	2.2	kW
Motor Savings	9,322	kWh
Thermal Savings	2,525	Therms
Total Cost Savings	$ 3,533	
Estimated Total Project Cost	$ 5,500	
Simple Payback	1.6	**years**

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-2: Shut Down Chilled Water Pumps in Winter - 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.		
						$ -	$ -	$ -	$ -	
55 Gallon Drum of Glycol*	5	EA	$ 850			$ 4,365	$ -	$ -	$ 4,365	
						$ -	$ -	$ -	$ -	

Total Glycol 275 Gallons

*Assumed that 275 gallons needed to prevent freezing in the CHW system.
This also assumes that there is already an undetermined amount of glycol in the system

$ 4,365	Subtotal
$ 1,091	25% Contingency
$ 5,500	**Total**

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

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-3: Install Piping Insulation (Bare Pipe)

Description Insulate heating system piping which are not currently insulated to reduce heat loss from piping and heat gain to the spaces.

Given

		Pipe #1	Pipe #2	Pipe #3	Pipe #4	
Fuel Energy Cost	=				$ 0.91	$/Therm (Nat'l Gas)
Operation (Hours/Week)	=				85	Hours/Week
Operation (Heating Weeks/Year)	=				50	Weeks/Year
Operation (Hours/Year)	=				4250	Hours/Year
Heating Media	=				Water	
Piping Material	=				Cast Iron	
Ambient Temperature	=				72	°F
Pipe Diameter	=	2.00	2	4.0	2.00	inches
Pipe Length	=	100.00	0.00	0.00	0.00	feet

Assumption

Min. Pipe Insulation Recommended	=	1.50	1.50	1.50	1.50	inches
Circulating Temperature	=				150	°F
Heating Efficiency	=				80%	
Pipe Insulation Conductivity	=				0.29	Btu*in./(h*ft2*F)

Formula

Piping Correction Factor = (Current Transmission Coefficient / Reference Transmission Coefficient)
Temperature Correction Factor = (Circulating Temperature - Ambient Temperature) / (Circulating Temperature - Reference Temperature)
Hourly Heat Loss per pipe size and length = (Heat loss per foot [from chart]) x (Piping Correction Factor) x (Temperature Correction Factor) x (Pipe Length)
Seasonal Heat Loss = (Hourly Heat Loss Total) x (Operating hours) / (Heating Efficiency) / (1,000 btu/Mbtu)

Energy Loss = (Seasonal Heat Loss) / (Conversion Factor [MBtu/Unit])
Energy Loss Cost = (Energy Loss) x (cost/unit)

Calculation

Existing

	Current Transmission Coefficient		Reference Transmission Coefficient		
Piping Correction Factor = (	1.40	/	2.00	) =	**0.70**

	Circulating Temp.		Ambient Temp.		Circulating Temp.		Reference Temp.		
Temperature Correction Factor = (	150	-	72	) / (	150	-	80	) =	**1.11**

	Heat Loss per foot		Piping CF		Temperature CF		Pipe Length			
Heat Loss Pipe #1 (Hourly)	= (84.92	) x (	0.70	) x (	1.11	) x (	100.00	) =	6,623	Btuh
Heat Loss Pipe #2 (Hourly)	= (84.92	) x (	0.70	) x (	1.11	) x (	0.00	) =	-	Btuh
Heat Loss Pipe #3 (Hourly)	= (151.61	) x (	0.70	) x (	1.11	) x (	0.00	) =	-	Btuh
Heat Loss Pipe #4 (Hourly)	= (84.92	) x (	0.70	) x (	1.11	) x (	0.00	) =	-	Btuh
									6,623	**Btuh**

	Hourly Heat Loss		operating Hours		Heating Efficiency		Factor			
Seasonal Heat Loss	= (6,623	) x (	4,250	) / (	80%	) / (	1,000	) =	**35,187**	**Mbtu**

	Seasonal Heat Loss		Btu/unit			
Existing Energy Loss	= 35,187	) / (	100	) =	**352**	**Therm**

	Unit		Cost per Unit			
Existing Energy Loss Cost	= (352	) x (	$ 0.91	) =	**$**	**320**

New

	Heat Loss per foot		Piping CF		Temperature CF		Pipe Length			
Heat Loss Pipe #1 (Hourly)	= (13.00	) x (	0.70	) x (	1.11	) x (	100.00	) =	1,014	Btuh
Heat Loss Pipe #2 (Hourly)	= (13.00	) x (	0.70	) x (	1.11	) x (	0.00	) =	-	Btuh
Heat Loss Pipe #3 (Hourly)	= (19.00	) x (	0.70	) x (	1.11	) x (	0.00	) =	-	Btuh
Heat Loss Pipe #4 (Hourly)	= (13.00	) x (	0.70	) x (	1.11	) x (	0.00	) =	-	Btuh
									1,014	**Btuh**

	Hourly Heat Loss		operating Hours		Heating Efficiency		Factor			
Seasonal Heat Loss	= (1,014	) x (	4,250	) / (	80%	) / (	1,000	) =	**5,387**	**Mbtu**

	Seasonal Heat Loss		Btu/unit			
New Energy Loss	= 5,387	) / (	100	) =	**54**	**Therm**

	Unit		Cost per Unit			
New Energy Loss Cost	= (54	) x (	$ 0.91	) =	**$**	**49**

Result

Existing Heat Loss		**352**	**Therm**	**$**	**320**
New Heat Loss		**54**	**Therm**	**$**	**49**
Savings	**100%**	**298**	**Therm**	**$**	**271**	**84.7%**

Conversion Factors

$/MCF (Nat'l Gas)	1	1,030,000	btu/MCF	MCF	Mbh/MCF	1,030	MMbh/MCF	####
$/CCF (Nat'l Gas)	2	103,000	btu/CCF	CCF	Mbh/CCF	103	MMbh/CCF	####
$/CF (Nat'l Gas)	3	1,030	btu/CF	CF	Mbh/CF	1.030	MMbh/CF	####
$/Therm (Nat'l Gas)	4	100,000	btu/Therm	Therm	Mbh/Therm	100	MMbh/Therm	####
$/gal (LP Gas)	5	91,500	btu/gallon	gallons	Mbh/gallon	91.5	MMbh/gallon	####
$/gal (Fuel Oil #2)	6	139,000	btu/gallon	gallons	Mbh/gallon	139	MMbh/gallon	####
$/lb Steam	7	975	btu/lb Steam	lb Steam	Mbh/lb Steam	0.975	MMbh/lb Steam	####
$/1000 lbs Steam	8	975,000	btu/1000 lbs Stear	1000 lbs Steam	Mbh/1000 lbs Steam	975	MMbh/1000 lbs S	####

This chart is not used but is left for future reference

Pipe Diameter (I.d.)	Initial Bare BTU/hr/ft/°F	Final (1) R=2 BTU/hr/ft/°F	Final (2) ASHRAE standard BTU/hr/ft/°F	ASHRAE standard 40-80 Relative thickness in inches	Final (2) ASHRAE stnd x pipe length Btu/hr/°F	Initial Bare x pipe length
1/2	0.27	0.18	0.15	0.75	30.0	54.0
3/4	0.61	0.27	0.21	0.75	42.0	122.0
1	0.77	0.30	0.23	0.75	46.0	154.0
1 1/2	1.06	0.34	0.20	1.00	40.0	212.0
2	1.30	0.36	0.21	1.00	42.0	260.0
3	1.86	0.39	0.22	1.00	44.0	372.0
4	2.30	0.41	0.22	1.00	44.0	460.0
6	3.35	0.44	0.23	1.00	46.0	670.0

Select one pipe length from below: 200

25	ft
50	ft
100	ft
150	ft
200	ft

44%
66%
70%
81%
84%
88%
90%
93%

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-3: Install Piping Insulation (Bare Pipe) - 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.		
Polyethylene Pipe Insulation (2" Pipe)	100	LF	$ 9.35	$ 3.35		$ 960	$ 417	$ -	$ 1,378	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

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

$ 1,378	Subtotal
$ 344	25% Contingency
$ 1,722	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-4: Install Ductwork Insulation

EXISTING CONDITIONS		
Cost of Electricity	$0.15	$ / kWh
Cost Of Natural Gas	$0.91	$ / Therms
Ductwork Dimension A	36	in
Ductwork Dimension B	12	in
Length	144	in
CFM	5,000	ft^3/min
Inlet Temperature	82	F
Relative Humidity	50	%
Existing Heat Loss	4,320	BTU/h

q=UAdT

PROPOSED CONDITIONS		
Proposed Amount of Insulation	2	in
Proposed Heat Loss	792	BTU/h

SAVINGS		
Energy Savings	3,528	BTU/h
Total Heating Savings	209	Therms
Proposed Electric Load	2,849	kWh
Cost Savings	$618	/ year

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

Multipliers	
Material:	1.10
Labor:	1.35
Equipment:	1.10

ECM-8: Insulate AHU Ductwork in Penthouse Mechanical Room - Cost

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
						$ -	$ -	$ -	$ -	
2" Thick Duct Thermal Insulation	90	SF	$ 0.60	$ 2.91		$ 59	$ 354	$ -	$ 413	RS Means 2012
						$ -	$ -	$ -	$ -	

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

$ 413	Subtotal
$ 83	20% Contingency
$ 500	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-5: Install Variable Speed Drives

Variable Inputs

Electric Rate	$0.15	**$/kWh**
Demand Rate	$5.83	**$/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)	Demand Savings (kW)	Energy Savings (kWh)
AHU-2 Supply Fan	AF/BI	1	5.0	5.0	Y	0.75	80.0%	87.0%	2,607	0.475	0.475	-	-	2.0	5,308	2.0	5,308
AHU-3 Supply Fan	AF/BI	1	5.0	5.0	Y	0.75	80.0%	87.0%	2,607	0.475	0.475	-	-	2.0	5,308	2.0	5,308
															Total:	4.1	10,617
																$ 24	$ 1,593

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-5: Install Variable Speed Drives - 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.		
VFD	2	EA	$ 1,706	$ 431		$ 3,505	$ 1,073	$ -	$ 4,577	
Electrical - misc.	2	LS	$ 800	$ 1,000		$ 1,643	$ 2,492	$ -	$ 4,135	
5 HP Motors, totally enclosed, premium efficiency	2	EA	$ 373	$ 79		$ 766	$ 196	$ -	$ 962	
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 9,675	Subtotal
$ 2,419	25% Contingency
$ 12,093	**Total**

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

Newark Board of Education - NJBPU
CHA Project Numer: 27999 or 27998
Facility Name

ECM-6: Re-Commission Building Controls System

Summary: The previous controls contractor did not finish the installation of the DDC controls system. This ECM estimates the anticipated work efforts to finish the outstanding features from the previously unfinished installation.

Building Information:

25,000 Sq Footage

$0.15 $/kWh Blended
$0.91 $/Therm

EXISTING CONDITIONS		
Existing Facility Total Electric usage	431,280	kWh
Existing Facility Total Gas usage	23,244	Therms
Existing Facility Cooling Electric usage	112,133	kWh[1]
Existing Facility Heating Natural Gas usage	22081.344	Therms[2]
PROPOSED CONDITIONS		
Proposed Facility Cooling Electric Savings	11,213	kWh
Proposed Facility Natural Gas Savings	2208.1344	Therms
SAVINGS		
Retro-Commissioning Electric Savings	11,213	**kWh**
Retro-Commissioning Natural Gas Savings	2,208	**Therms**
Total cost savings	$ 3,691.69	

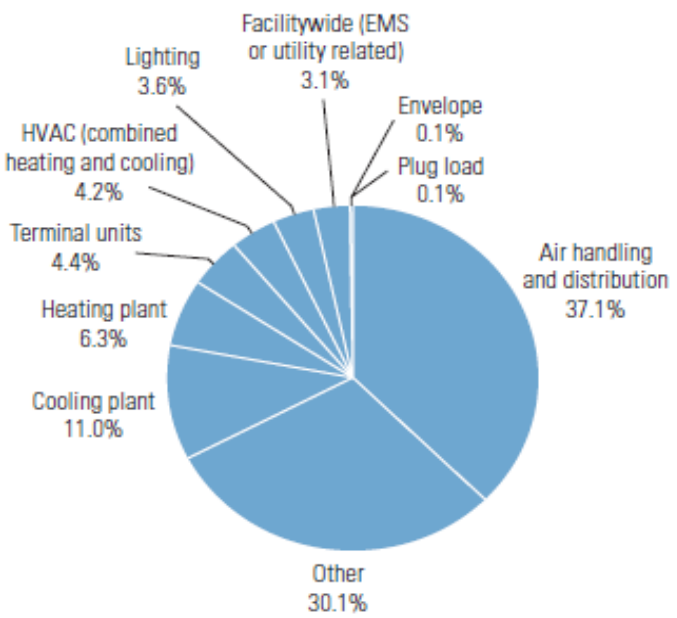
Assumptions

1 26% of facility total electricity dedicated to Cooling based on Building Utility Analysis
2 95% of facility total natural gas dedicated to Heating based on Building Utility Analysis
3 10% Typical Savings associated with Retro-Commissioning of controls based on EPA Energy Star Report (CH 5 - Retrocommissioning)

Figure 5.2: Retrocommissioning results

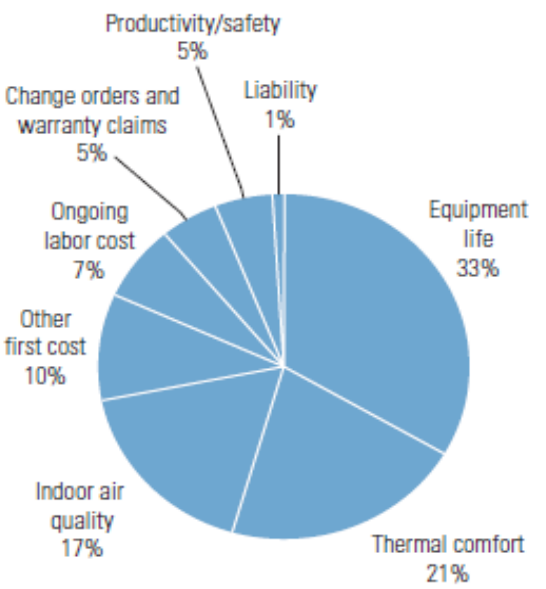
Building energy system deficiencies: A recent study of retrocommissioning revealed a wide variety of problems—those related to the overall HVAC system were the most common type (A). Energy and non-energy benefits: Retrocommissioning provided both energy and non-energy benefits—the most common of these, noted in one-third of the buildings surveyed, was the extension of equipment life (B).

A. Energy system deficiencies



Note: EMS = energy management system.

B. Energy and non-energy benefits



Courtesy: E SOURCE; data from Lawrence Berkeley National Laboratory, Portland Energy Conservation Inc., and Energy Systems Laboratory, Texas A&M University

Newark Board of Education - NJBPU
CHA Project Numer: 27999 or 27998
Facility Name

ECM-6: Re-Commission Building Controls System - 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.		
									$ -	
Controls and Sensors Retro-Commissioning	25000	SF	$ 0.27	INC	INC	$ 6,932	INC	INC	$ 6,932	EPA Estimate
						$ -	$ -	$ -	$ -	

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

$ 6,932	Subtotal
$ 1,733	25% Contingency
$ 8,665	**Total**

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

ECM-7: Install Vending Machine Controls

Summary: 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: $0.150 $/kWh blended

Energy Savings Calculations:

Existing		
Cold Beverage Vending Machine Electric usage	3,504	kWh[1,4,7]
Snack Vending Machine Electric usage	1,752	kWh[2,5,7]
Dual Vending Machine Electric Usage	-	kWh[3,6,7]
Total Vending Machine Electric Usage	5,256	kWh
Proposed		
Cold Beverage Vending Machine Electric usage	551	kWh[8]
Snack Vending Machine Electric usage	315	kWh
Dual Vending Machine Electric Usage	0	kWh
Total Vending Machine Electric Usage	866	kWh
Vending Machine Controls Usage Savings	**4,390**	**kWh**
Total cost savings	**$ 659**	
Estimated Total Project Cost	**$ 400**	[9]
Simple Payback	**1**	**years**

Assumptions

1	1	Number of cold beverage vending machines
2	1	Number of snack vending machines
3	0	Number of dual snack/beverage vending machines
4	400	Average wattage, typical of cold beverage machines based on prior project experience
5	200	Average wattage, typical of snack machines based on prior project experience
6	300	Average wattage, typical of dual snack/beverage machines based on prior project experience
7	8760	Hours per year vending machine plugged in
8	3150	Building Occupied Hours
9	0.50	Vending Machine Traffic Factor (0.75 for High Traffic, 0.5 for Medium, 0.25 for low)
10	$200	Estimated installed cost per vending machine

Newark Board of Education - NJBPU
CHA Project #27999
Dr. Marion A. Bolden Student Center

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2012 Building must have a minimum average electric demand of 100 kW. This minimum is waived for buildings owned by local governements or non-profit organizations.

At a minimum, all recommended measures were used for this calculation. To qualify for P4P incentives, the following P4P requirements must be met:

- At least 15% source energy savings
- No more than 50% savings from lighting measures
- Scope includes more than one measure
- Project has at least a 10% internal rate of return
- At least 50% of the source energy savings must come from investor-owned electricity and/or natural gas (note: exemption for fuel conversions)

Total Building Area (Square Feet)	25,000
Is this audit funded by NJ BPU (Y/N)	Yes

Board of Public Utilites (BPU)

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

	Annual Utilities	
	kWh	Therms
Existing Cost (from utility)	$64,696	$21,154
Existing Usage (from utility)	431,280	23,244
Proposed Savings	76,341	5,476
Existing Total MMBtus	3,796	
Proposed Savings MMBtus	808	
% Energy Reduction	**21.3%**	
Proposed Annual Savings	$16,632	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.21
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.11	$1.21

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$1,250
Incentive #2	$8,398	$6,651	$15,048
Incentive #3	$8,398	$6,651	$15,048
Total All Incentives	**$16,795**	**$13,301**	**$31,346**

Total Project Cost	$103,059

		Allowable Incentive
% Incentives #1 of Utility Cost	1.5%	$1,250
% Incentives #2 of Project Cost*	14.6%	$15,048
% Incentives #3 of Project Cost*	14.6%	$15,048
Total Eligible Incentives* **	**$31,346**	
Project Cost w/ Incentives	$71,713	

Project Payback (years)	
w/o Incentives	w/ Incentives
6.2	4.3

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if it is.

** Maximum allowable amount of Incentive #2 is 25% of total project cost.
Maximum allowable amount of Incentive #3 is 25% of total project cost.

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

Energy Audit of Newark Public Schools - Dr. Marion A. Bolden Student Center
CHA Project No. 27999
ECM-L1 Lighting Replacements

		EXISTING CONDITIONS							RETROFIT CONDITIONS							COST & SAVINGS ANALYSIS						
	Area Description	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh	Number of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Retrofit Control	Annual Hours	Annual kWh	Annual kWh Saved	Annual kW Saved	Annual $ Saved	Retrofit Cost	NJ Smart Start Lighting Incentive	Simple Payback With Out Incentive	Simple Payback
Field Code	Unique description of the location - Room number/Room name: Floor number (if applicable)	No. of fixtures before the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Fixt No.)	Pre-inst. control device	Estimated daily hours for the usage group	(kW/space) * (Annual Hours)	No. of fixtures after the retrofit	"Lighting Fixture Code" Example 2T 40 R F(U) = 2'x2' Troff 40 w Recess. Floor 2 lamps U shape	Code from Table of Standard Fixture Wattages	Value from Table of Standard Fixture Wattages	(Watts/Fixt) * (Number of Fixtures)	Retrofit control device	Estimated annual hours for the usage group	(kW/space) * (Annual Hours)	(Original Annual kWh) - (Retrofit Annual kWh)	(Original Annual kW) - (Retrofit Annual kW)	(kWh Saved) * ($/kWh)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
262	Sign In Area	6	B CF 36 W	CFT36/1	51	0.3	SW	4420	1,353	6	B CF 36 W	CFT36/1	51	0.3	SW	4,420	1,353	-	0.0	$ -	$ -	$0		#DIV/0!
262	Cafeteria	41	B CF 36 W	CFT36/1	51	2.1	SW	2000	4,182	41	B CF 36 W	CFT36/1	51	2.1	SW	2,000	4,182	-	0.0	$ -	$ -	$0		#DIV/0!
117	Stairs	5	CF 23	CFS23/1	23	0.1	SW	4420	508	5	CF 23	CFS23/1	23	0.1	SW	4,420	508	-	0.0	$ -	$ -	$0		#DIV/0!
40LED	Boiler Room	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2800	672	4	T 59 R LED	RTLED38	38	0.2	SW	2,800	426	246	0.1	$ 38.48	$ 945.00	$0	24.6	24.6
35LED	Bathroom	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	OCC	1000	90	1	T 59 R LED	RTLED38	38	0.0	OCC	1,000	38	52	0.1	$ 10.46	$ 236.25	$0	22.6	22.6
35LED	Elevator MER	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 59 R LED	RTLED38	38	0.0	SW	1,000	38	52	0.1	$ 10.46	$ 236.25	$0	22.6	22.6
262	B-06 Offices	14	B CF 36 W	CFT36/1	51	0.7	SW	2000	1,428	14	B CF 36 W	CFT36/1	51	0.7	SW	2,000	1,428	-	0.0	$ -	$ -	$0		#DIV/0!
35LED	B-06 Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2000	360	2	T 59 R LED	RTLED38	38	0.1	SW	2,000	152	208	0.1	$ 34.56	$ 472.50	$0	13.7	13.7
262	B-05 Offices	22	B CF 36 W	CFT36/1	51	1.1	OCC	2000	2,244	22	B CF 36 W	CFT36/1	51	1.1	OCC	2,000	2,244	-	0.0	$ -	$ -	$0		#DIV/0!
35LED	B-05 Offices	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2000	1,620	9	T 59 R LED	RTLED38	38	0.3	SW	2,000	684	936	0.5	$ 155.53	$ 2,126.25	$0	13.7	13.7
7LED	Basement Hallway	7	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.4	SW	4420	1,856	7	2T 46 R LED	2RTLED	25	0.2	SW	4,420	774	1,083	0.2	$ 159.21	$ 1,417.50	$0	8.9	8.9
24	B-14 Mechanical Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1,000	120	-	0.0	$ -	$ -	$0		#DIV/0!
50LED	B-13 Break Room	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	8760	1,577	3	4 ft LED Tube	200732x2	30	0.1	OCC	8,760	788	788	0.1	$ 109.73	$ 490.05	$0	4.5	4.5
262	B-15 Office	14	B CF 36 W	CFT36/1	51	0.7	SW	2000	1,428	14	B CF 36 W	CFT36/1	51	0.7	SW	2,000	1,428	-	0.0	$ -	$ -	$0		#DIV/0!
35LED	B-15 Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2000	360	2	T 59 R LED	RTLED38	38	0.1	SW	2,000	152	208	0.1	$ 34.56	$ 472.50	$0	13.7	13.7
262	B-158 Office	2	B CF 36 W	CFT36/1	51	0.1	SW	2000	204	2	B CF 36 W	CFT36/1	51	0.1	SW	2,000	204	-	0.0	$ -	$ -	$0		#DIV/0!
262	B-08 Closet	1	B CF 36 W	CFT36/1	51	0.1	SW	1000	51	1	B CF 36 W	CFT36/1	51	0.1	SW	1,000	51	-	0.0	$ -	$ -	$0		#DIV/0!
35LED	Maintenance Storage	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	1300	234	2	T 59 R LED	RTLED38	38	0.1	OCC	1,300	99	135	0.1	$ 25.01	$ 472.50	$0	18.9	18.9
117	Maintenance Storage	2	CF 23	CFS23/1	23	0.0	OCC	1300	60	2	CF 23	CFS23/1	23	0.0	OCC	1,300	60	-	0.0	$ -	$ -	$0		#DIV/0!
50LED	Men's Bathroom	1	W 32 W P 2 (ELE)	F42LL	60	0.1	SW	1000	60	1	4 ft LED Tube	200732x2	30	0.0	OCC	1,000	30	30	0.0	$ 6.03	$ 163.35	$0	27.1	27.1
50LED	Women's Bathroom	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	4 ft LED Tube	200732x2	30	0.0	OCC	1,000	30	30	0.0	$ 6.03	$ 163.35	$0	27.1	27.1
262	B-04 Office	10	B CF 36 W	CFT36/1	51	0.5	OCC	2000	1,020	10	B CF 36 W	CFT36/1	51	0.5	OCC	2,000	1,020	-	0.0	$ -	$ -	$0		#DIV/0!
50LED	B-10 Shower	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	4 ft LED Tube	200732x2	30	0.0	OCC	1,000	30	30	0.0	$ 6.03	$ 163.35	$0	27.1	27.1
50LED	B-11 Shower	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	4 ft LED Tube	200732x2	30	0.0	OCC	1,000	30	30	0.0	$ 6.03	$ 163.35	$0	27.1	27.1
71	Lobby Chandelier	8	I 60	I60/1	60	0.5	Breaker	2,122	8	8	CF 26	CFQ26/1-L	27	0.2	Breaker	4,420	955	1,167	0.3	$ 171.56	$ 54.00	$0	0.3	0.3
261LED	Lobby	28	PAR 38 SP	H100/1	100	2.8	OCC	4420	12,376	28	EVO35/10	EVO35/10	39	1.1	OCC	4,420	4,827	7,549	1.7	$ 1,109.92	$ 12,285.00	$980	11.1	10.2
262	Lounge A	16	B CF 36 W	CFT36/1	51	0.8	OCC	2400	1,958	16	B CF 36 W	CFT36/1	51	0.8	OCC	2,400	1,958	-	0.0	$ -	$ -	$0		#DIV/0!
71	Lounge A	8	I 60	I60/1	60	0.5	OCC	2400	1,152	8	CF 26	CFQ26/1-L	27	0.2	OCC	2,400	518	634	0.3	$ 101.59	$ 54.00	$0	0.5	0.5
262	Lounge B	16	B CF 36 W	CFT36/1	51	0.8	OCC	2400	1,958	16	B CF 36 W	CFT36/1	51	0.8	OCC	2,400	1,958	-	0.0	$ -	$ -	$0		#DIV/0!
71	Lounge B	8	I 60	I60/1	60	0.5	OCC	2400	1,152	8	CF 26	CFQ26/1-L	27	0.2	OCC	2,400	518	634	0.3	$ 101.59	$ 54.00	$0	0.5	0.5
40LED	105-Theater	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	$ 84.66	$ 2,362.50	$0	27.9	27.9
198LED	106-Storage	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	SW	1300	81	2	2T 46 R LED	2RTLED	25	0.1	SW	1,300	65	16	0.0	$ 2.89	$ 405.00	$0	140.3	140.3
198LED	116-Storage	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	SW	1300	81	2	2T 46 R LED	2RTLED	25	0.1	SW	1,300	65	16	0.0	$ 2.89	$ 405.00	$0	140.3	140.3
35LED	111-Café	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	2400	432	2	T 59 R LED	RTLED38	38	0.1	OCC	2,400	182	250	0.1	$ 40.02	$ 472.50	$0	11.8	11.8
40LED	Men's Bathroom	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	120	2	T 59 R LED	RTLED38	38	0.1	OCC	1,000	76	44	0.0	$ 8.85	$ 472.50	$0	53.4	53.4
40LED	Women's Bathroom	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	120	2	T 59 R LED	RTLED38	38	0.1	OCC	1,000	76	44	0.0	$ 8.85	$ 472.50	$0	53.4	53.4
40LED	Student Lounge	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 59 R LED	RTLED38	38	0.2	SW	2,400	365	211	0.1	$ 33.86	$ 945.00	$0	27.9	27.9
262	Closet	1	B CF 36 W	CFT36/1	51	0.1	SW	1000	51	1	B CF 36 W	CFT36/1	51	0.1	SW	1,000	51	-	0.0	$ -	$ -	$0		#DIV/0!
117	Stairs	9	CF 23	CFS23/1	23	0.2	SW	4420	915	9	CF 23	CFS23/1	23	0.2	SW	4,420	915	-	0.0	$ -	$ -	$0		#DIV/0!
35LED	2nd Floor Hallways	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.6	SW	4420	2,785	7	T 59 R LED	RTLED38	38	0.3	SW	4,420	1,176	1,609	0.4	$ 236.54	$ 1,653.75	$0	7.0	7.0
20LED	Dance Studio	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	$ 215.88	$ 2,695.28	$0	12.5	12.5
35LED	203-Green Room	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	2400	2,160	10	T 59 R LED	RTLED38	38	0.4	SW	2,400	912	1,248	0.5	$ 200.10	$ 2,362.50	$0	11.8	11.8
7LED	203-Green Room	18	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	1.1	SW	2400	2,592	18	2T 46 R LED	2RTLED	25	0.5	SW	2,400	1,080	1,512	0.6	$ 242.43	$ 3,645.00	$0	15.0	15.0
40LED	201-Club Room	39	T 32 R F 2 (ELE)	F42LL	60	2.3	SW	2400	5,616	39	T 59 R LED	RTLED38	38	1.5	SW	2,400	3,557	2,059	0.9	$ 330.17	$ 9,213.75	$0	27.9	27.9
7LED	Hallway	5	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.3	SW	4420	1,326	5	2T 46 R LED	2RTLED	25	0.1	SW	4,420	553	774	0.2	$ 113.72	$ 1,012.50	$0	8.9	8.9
40LED	211-Storage	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1300	468	6	T 59 R LED	RTLED38	38	0.2	SW	1,300	296	172	0.1	$ 31.75	$ 1,417.50	$0	44.7	44.7
50LED	Men's Bathroom	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	1000	180	3	4 ft LED Tube	200732x2	30	0.1	OCC	1,000	90	90	0.1	$ 18.10	$ 490.05	$0	27.1	27.1
20LED	Men's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	OCC	1000	32	1	4 ft LED Tube	200732x1	15	0.0	OCC	1,000	15	17	0.0	$ 3.42	$ 81.68	$0	23.9	23.9
50LED	Women's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	OCC	1000	32	1	4 ft LED Tube	200732x1	15	0.0	OCC	1,000	15	17	0.0	$ 3.42	$ 81.68	$0	23.9	23.9
20LED	Women's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	OCC	1000	32	1	4 ft LED Tube	200732x1	15	0.0	OCC	1,000	15	17	0.0	$ 3.42	$ 81.68	$0	23.9	23.9
35LED	Hallway	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	4420	398	1	T 59 R LED	RTLED38	38	0.0	SW	4,420	168	230	0.1	$ 33.79	$ 236.25	$0	7.0	7.0
117	Stairs	8	CF 23	CFS23/1	23	0.2	SW	4420	813	8	CF 23	CFS23/1	23	0.2	SW	4,420	813	-	0.0	$ -	$ -	$0		#DIV/0!
35LED	3rd Floor Hallway	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	4420	3,978	10	T 59 R LED	RTLED38	38	0.4	SW	4,420	1,680	2,298	0.5	$ 337.91	$ 2,362.50	$0	7.0	7.0
35LED	Men's Bathroom	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	104	0.1	$ 20.92	$ 472.50	$0	22.6	22.6
35LED	Women's Bathroom	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	SW	1,000	76	104	0.1	$ 20.92	$ 472.50	$0	22.6	22.6
50LED	Student Publication	23	W 32 W P 2 (ELE)	F42LL	60	1.4	SW	2400	3,312	23	4 ft LED Tube	200732x2	30	0.7	SW	2,400	1,656	1,656	0.7	$ 265.52	$ 3,757.05	$0	14.1	14.1
35LED	306-Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2000	540	3	T 59 R LED	RTLED38	38	0.1	SW	2,000	228	312	0.2	$ 51.84	$ 708.75	$0	13.7	13.7
35LED	Server Room	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2000	1,080	6	T 59 R LED	RTLED38	38	0.2	SW	2,000	456	624	0.3	$ 103.69	$ 1,417.50	$0	13.7	13.7
7LED	Server Room	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 46 R LED	2RTLED	25	0.0	SW	2,000	50	70	0.0	$ 11.63	$ 202.50	$0	17.4	17.4
50LEd	Media Center	49	W 32 W P 2 (ELE)	F42LL	60	2.9	SW	2400	7,056	49	4 ft LED Tube	200732x2	30	1.5	SW	2,400	3,528	3,528	1.5	$ 565.68	$ 8,004.15	$0	14.1	14.1
117	Media Center	6	CF 23	CFS23/1	23	0.1	SW	2400	331	6	CF 23	CFS23/1	23	0.1	SW	2,400	331	-	0.0	$ -	$ -	$0		#DIV/0!
40LED	Men's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	T 59 R LED	RTLED38	38	0.0	OCC	1,000	38	22	0.0	$ 4.43	$ 236.25	$0	53.4	53.4
40LED	Women's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	T 59 R LED	RTLED38	38	0.0	OCC	1,000	38	22	0.0	$ 4.43	$ 236.25	$0	53.4	53.4
117	Roof Stairs	1	CF 23	CFS23/1	23	0.0	SW	1000	23	1	CF 23	CFS23/1	23	0.0	SW	1,000	23	-	0.0	$ -	$ -	$0		#DIV/0!
238	Exterior	3	WP 400 Po HPS	hps400/1	465	1.4	PHC	4368	6,093	3	WP 400 Po HPS	hps400/1	465	1.4	PHC	4,368	6,093	-	0.0	$ -	$ -	$0		#DIV/0!
117	Exterior	2	CF 23	CFS23/1	23	0.0	PHC	4368	201	2	CF 23	CFS23/1	23	0.0	PHC	4,368	201	-	0.0	$ -	$ -	$0		#DIV/0!
64LED	Exterior	6	175 MH POLE	MH175/1	215	1.3	PHC	4368	5,635	6	ALED2T78	ALED2T78	90	0.5	PHC	4,368	2,359	3,276	0.8	$ 482.26	$ 5,143.50	$1,050	10.7	8.5
	Total	**523**				**32.8**			**92,196**	**523**			**2,834**	**20.7**				**56,095**	**36,100**	**12.1**	**$5,585**	**$71,898**	**$2,030**		
																		Demand Savings			**12.1**	**$849**			
																		kWh Savings			**36,100**	**$4,736**			
																		Total savings				**$5,585**		**12.9**	**12.5**

Energy Audit of Newark Public Schools - Dr. Marion A. Bolden Student Center

CHA Project No. 27999

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)	($/kWh) * (kW Saved) *	Cost for renovations to lighting system		Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
262	Sign In Area	6	B CF 36 W	CFT36/1	51	0.3	SW	4420	1,352.5	6	B CF 36 W	CFT36/1	51	0.3	None	4420	1,352.5	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	Cafeteria	41	B CF 36 W	CFT36/1	51	2.1	SW	2000	4,182.0	41	B CF 36 W	CFT36/1	51	2.1	None	2000	4,182.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Stairs	5	CF 23	CFS23/1	23	0.1	SW	4420	508.3	5	CF 23	CFS23/1	23	0.1	None	4420	508.3	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Boiler Room	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2800	672.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2800	672.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Bathroom	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	OCC	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	None	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Elevator MER	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90.0	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	None	1000	90.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	B-06 Offices	14	B CF 36 W	CFT36/1	51	0.7	SW	2000	1,428.0	14	B CF 36 W	CFT36/1	51	0.7	None	2000	1,428.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	B-06 Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2000	360.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2000	360.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	B-05 Offices	22	B CF 36 W	CFT36/1	51	1.1	OCC	2000	2,244.0	22	B CF 36 W	CFT36/1	51	1.1	None	2000	2,244.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	B-05 Offices	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2000	1,620.0	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	None	2000	1,620.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
7LED	Basement Hallway	7	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.4	SW	4420	1,856.4	7	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.4	None	4420	1,856.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
24	B-14 Mechanical Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120.0	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	None	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	B-13 Break Room	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	8760	1,576.8	3	W 32 W P 2 (ELE)	F42LL	60	0.2	None	8760	1,576.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	B-15 Office	14	B CF 36 W	CFT36/1	51	0.7	SW	2000	1,428.0	14	B CF 36 W	CFT36/1	51	0.7	None	2000	1,428.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	B-15 Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2000	360.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	1600	288.0	72.0	0.0	$9.45	$128.25	$20.00	13.6	11.5
262	B-15B Office	2	B CF 36 W	CFT36/1	51	0.1	SW	2000	204.0	2	B CF 36 W	CFT36/1	51	0.1	OCC	1600	163.2	40.8	0.0	55.35	$128.25	$20.00	24.0	20.2
262	B-08 Closet	1	B CF 36 W	CFT36/1	51	0.1	SW	1000	51.0	1	B CF 36 W	CFT36/1	51	0.1	None	1000	51.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Maintenance Storage	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	1300	234.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	1300	234.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Maintenance Storage	2	CF 23	CFS23/1	23	0.0	OCC	1300	59.8	2	CF 23	CFS23/1	23	0.0	None	1300	59.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Men's Bathroom	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60.0	1	W 32 W P 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Women's Bathroom	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60.0	1	W 32 W P 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	B-04 Office	10	B CF 36 W	CFT36/1	51	0.5	OCC	2000	1,020.0	10	B CF 36 W	CFT36/1	51	0.5	None	2000	1,020.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	B-10 Shower	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60.0	1	W 32 W P 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	B-11 Shower	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60.0	1	W 32 W P 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Lobby Chandelier	8	I 60	I60/1	60	0.5	Breaker		2,121.6	8	I 60	I60/1	60	0.5	None	4420	2,121.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
261LED	Lobby	28	PAR 38 SP	H100/1	100	2.8	OCC	4420	12,376.0	28	PAR 38 SP	H100/1	100	2.8	None	4420	12,376.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	Lounge A	16	B CF 36 W	CFT36/1	51	0.8	OCC	2400	1,958.4	16	B CF 36 W	CFT36/1	51	0.8	None	2400	1,958.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Lounge A	8	I 60	I60/1	60	0.5	OCC	2400	1,152.0	8	I 60	I60/1	60	0.5	None	2400	1,152.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	Lounge B	16	B CF 36 W	CFT36/1	51	0.8	OCC	2400	1,958.4	16	B CF 36 W	CFT36/1	51	0.8	None	2400	1,958.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
71	Lounge B	8	I 60	I60/1	60	0.5	OCC	2400	1,152.0	8	I 60	I60/1	60	0.5	None	2400	1,152.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	105-Theater	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	None	2400	1,440.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
198LED	106-Storage	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	SW	1300	80.6	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	None	1300	80.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
198LED	116-Storage	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	SW	1300	80.6	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	None	1300	80.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	111-Café	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	2400	432.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	2400	432.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Men's Bathroom	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	120.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Women's Bathroom	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	120.0	2	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	120.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Student Lounge	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576.0	4	T 32 R F 2 (ELE)	F42LL	60	0.2	None	2400	576.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
262	Closet	1	B CF 36 W	CFT36/1	51	0.1	SW	1000	51.0	1	B CF 36 W	CFT36/1	51	0.1	None	1000	51.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Stairs	9	CF 23	CFS23/1	23	0.2	SW	4420	914.9	9	CF 23	CFS23/1	23	0.2	None	4420	914.9	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	2nd Floor Hallways	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.6	SW	2400	2,784.6	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.6	None	4420	2,784.6	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Dance Studio	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	None	2400	2,534.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	203-Green Room	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	2400	2,160.0	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	None	2400	2,160.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
7LED	203-Green Room	18	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	1.1	SW	2400	2,592.0	18	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	1.1	None	2400	2,592.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	201-Club Room	39	T 32 R F 2 (ELE)	F42LL	60	2.3	SW	2400	5,616.0	39	T 32 R F 2 (ELE)	F42LL	60	2.3	None	2400	5,616.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
7LED	Hallway	5	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.3	SW	4420	1,326.0	5	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.3	None	4420	1,326.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	211-Storage	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1300	468.0	6	T 32 R F 2 (ELE)	F42LL	60	0.4	None	1300	468.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Men's Bathroom	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	1000	180.0	3	W 32 W P 2 (ELE)	F42LL	60	0.2	None	1000	180.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Men's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	OCC	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	None	1000	32.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Women's Bathroom	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	1000	180.0	3	W 32 W P 2 (ELE)	F42LL	60	0.2	None	1000	180.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
20LED	Women's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	OCC	1000	32.0	1	S 32 C F 1 (ELE)	F41LL	32	0.0	None	1000	32.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Hallway	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	4420	397.8	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	None	4420	397.8	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Stairs	8	CF 23	CFS23/1	23	0.2	SW	4420	813.3	8	CF 23	CFS23/1	23	0.2	None	4420	813.3	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	3rd Floor Hallway	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	4420	3,978.0	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	None	4420	3,978.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Men's Bathroom	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	1000	180.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Women's Bathroom	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180.0	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	None	1000	180.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
50LED	Student Publication	23	W 32 W P 2 (ELE)	F42LL	60	1.4	SW	2400	3,312.0	23	W 32 W P 2 (ELE)	F42LL	60	1.4	OCC	1680	2,318.4	993.6	0.0	$130.36	$128.25	$20.00	1.0	0.8
35LED	306-Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2000	540.0	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	None	2000	540.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
35LED	Server Room	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2000	1,080.0	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	OCC	1600	864.0	216.0	0.0	$28.34	$128.25	$20.00	4.5	3.8
7LED	Server Room	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120.0	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	OCC	1600	96.0	24.0	0.0	$3.15	$128.25	$20.00	40.7	34.4
50LEd	Media Center	49	W 32 W P 2 (ELE)	F42LL	60	2.9	SW	2400	7,056.0	49	W 32 W P 2 (ELE)	F42LL	60	2.9	OCC	1680	4,939.2	2,116.8	0.0	$277.72	$128.25	$20.00	0.5	0.4
117	Media Center	6	CF 23	CFS23/1	23	0.1	SW	2400	331.2	6	CF 23	CFS23/1	23	0.1	OCC	1680	231.8	99.4	0.0	$13.04	$128.25	$20.00	9.8	8.3
40LED	Men's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	60.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
40LED	Women's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	60.0	1	T 32 R F 2 (ELE)	F42LL	60	0.1	None	1000	60.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Roof Stairs	1	CF 23	CFS23/1	23	0.0	SW	1000	23.0	1	CF 23	CFS23/1	23	0.0	None	1000	23.0	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
238	Exterior	3	WP 400 Po HPS	hps400/1	465	1.4	PHC	4368	6,093.4	3	WP 400 Po HPS	hps400/1	465	1.4	None	4368	6,093.4	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
117	Exterior	2	CF 23	CFS23/1	23	0.0	PHC	4368	200.9	2	CF 23	CFS23/1	23	0.0	None	4368	200.9	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
64LED	Exterior	6	175 MH POLE	MH175/1	215	1.3	PHC	4368	5,634.7	6	175 MH POLE	MH175/1	215	1.3	None	4368	5,634.7	0.0	0.0	$0.00	$0.00	$0.00		#DIV/0!
															0	#N/A	#VALUE!	#VALUE!	#N/A	#VALUE!			#VALUE!	#VALUE!
	Total	**523**				**32.8**			**92195.6**	**523.0**				**32.8**			**88633.1**	**3562.6**	**0.0**	**467.4**	**897.8**	**140.0**		
																	Demand Savings			**0.0**	**$0**			
																	kWh Savings			**3,563**	**$467**			
																	Total Savings				**$467**		**1.9**	**1.6**

Energy Audit of Newark Public Schools - Dr. Marion A. Bolden Student Center
CHA Project No. 27999
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
262	Sign In Area	6	B CF 36 W	CFT36/1	51	0.3	SW	4420	1,353	6	B CF 36 W	CFT36/1	51	0.3	None	4,420	1,353	-	0.0	$ -	$ -	$ -		
262	Cafeteria	41	B CF 36 W	CFT36/1	51	2.1	SW	2000	4,182	41	B CF 36 W	CFT36/1	51	2.1	None	2,000	4,182	-	0.0	$ -	$ -	$ -		
117	Stairs	5	CF 23	CFS23/1	23	0.1	SW	4420	508	5	CF 23	CFS23/1	23	0.1	None	4,420	508	-	0.0	$ -	$ -	$ -		
40LED	Boiler Room	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2800	672	4	T 59 R LED	RTLED38	38	0.2	None	2,800	426	246	0.1	$ 38.48	$ 945.00	$ -	24.6	24.6
35LED	Bathroom	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	OCC	1000	90	1	T 59 R LED	RTLED38	38	0.0	None	1,000	38	52	0.1	$ 10.46	$ 236.25	$ -	22.6	22.6
35LED	Elevator MER	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	1000	90	1	T 59 R LED	RTLED38	38	0.0	None	1,000	38	52	0.1	$ 10.46	$ 236.25	$ -	22.6	22.6
262	B-06 Offices	14	B CF 36 W	CFT36/1	51	0.7	SW	2000	1,428	14	B CF 36 W	CFT36/1	51	0.7	None	2,000	1,428	-	0.0	$ -	$ -	$ -		
35LED	B-06 Offices	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2000	360	2	T 59 R LED	RTLED38	38	0.1	None	2,000	152	208	0.1	$ 34.56	$ 472.50	$ -	13.7	13.7
262	B-05 Offices	22	B CF 36 W	CFT36/1	51	1.1	OCC	2000	2,244	22	B CF 36 W	CFT36/1	51	1.1	None	2,000	2,244	-	0.0	$ -	$ -	$ -		
35LED	B-05 Offices	9	T 32 R F 3 (ELE)	F43ILL/2	90	0.8	SW	2000	1,620	9	T 59 R LED	RTLED38	38	0.3	None	2,000	684	936	0.5	$ 155.53	$ 2,126.25	$ -	13.7	13.7
7LED	Basement Hallway	7	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.4	SW	4420	1,856	7	2T 46 R LED	2RTLED	25	0.2	None	4,420	774	1,083	0.2	$ 159.21	$ 1,417.50	$ -	8.9	8.9
24	B-14 Mechanical Room	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	SW	1000	120	2	1B 32 P F 2 (ELE)	F42LL	60	0.1	None	1,000	120	-	0.0	$ -	$ -	$ -		
50LED	B-13 Break Room	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	8760	1,577	3	4 ft LED Tube	200732x2	30	0.1	None	8,760	788	788	0.1	$ 109.73	$ 490.05	$ -	4.5	4.5
262	B-15 Office	14	B CF 36 W	CFT36/1	51	0.7	SW	2000	1,428	14	B CF 36 W	CFT36/1	51	0.7	None	2,000	1,428	-	0.0	$ -	$ -	$ -		
35LED	B-15 Office	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2000	360	2	T 59 R LED	RTLED38	38	0.1	OCC	1,600	122	238	0.1	$ 38.55	$ 600.75	$ 20	15.6	15.1
262	B-158 Office	2	B CF 36 W	CFT36/1	51	0.1	SW	2000	204	2	B CF 36 W	CFT36/1	51	0.1	OCC	1,600	163	41	0.0	$ 5.35	$ 128.25	$ 20	24.0	20.2
262	B-08 Closet	1	B CF 36 W	CFT36/1	51	0.1	SW	1000	51	1	B CF 36 W	CFT36/1	51	0.1	None	1,000	51	-	0.0	$ -	$ -	$ -		
35LED	Maintenance Storage	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	1300	234	2	T 59 R LED	RTLED38	38	0.1	None	1,300	99	135	0.1	$ 25.01	$ 472.50	$ -	18.9	18.9
117	Maintenance Storage	2	CF 23	CFS23/1	23	0.0	OCC	1300	60	2	CF 23	CFS23/1	23	0.0	None	1,300	60	-	0.0	$ -	$ -	$ -		
50LED	Men's Bathroom	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	4 ft LED Tube	200732x2	30	0.0	None	1,000	30	30	0.0	$ 6.03	$ 163.35	$ -	27.1	27.1
50LED	Women's Bathroom	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	4 ft LED Tube	200732x2	30	0.0	None	1,000	30	30	0.0	$ 6.03	$ 163.35	$ -	27.1	27.1
262	B-04 Office	10	B CF 36 W	CFT36/1	51	0.5	OCC	2000	1,020	10	B CF 36 W	CFT36/1	51	0.5	None	2,000	1,020	-	0.0	$ -	$ -	$ -		
50LED	B-10 Shower	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	4 ft LED Tube	200732x2	30	0.0	None	1,000	30	30	0.0	$ 6.03	$ 163.35	$ -	27.1	27.1
50LED	B-11 Shower	1	W 32 W P 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	4 ft LED Tube	200732x2	30	0.0	None	1,000	30	30	0.0	$ 6.03	$ 163.35	$ -	27.1	27.1
71	Lobby Chandelier	8	I 60	I60/1	60	0.5	Breaker	4420	2,122	8	CF 26	CFQ26/1-L	27	0.2	None	4,420	955	1,167	0.3	$ 171.56	$ 54.00	$ -	0.3	0.3
261LED	Lobby	28	PAR 38 SP	H100/1	100	2.8	OCC	4420	12,376	28	EVO35/10	EVO35/10	39	1.1	None	4,420	4,827	7,549	1.7	$ 1,109.92	$ 12,285.00	$ 980	11.1	10.2
262	Lounge A	16	B CF 36 W	CFT36/1	51	0.8	OCC	2400	1,958	16	B CF 36 W	CFT36/1	51	0.8	None	2,400	1,958	-	0.0	$ -	$ -	$ -		
71	Lounge A	8	I 60	I60/1	60	0.5	OCC	2400	1,152	8	CF 26	CFQ26/1-L	27	0.2	None	2,400	518	634	0.3	$ 101.59	$ 54.00	$ -	0.5	0.5
262	Lounge B	16	B CF 36 W	CFT36/1	51	0.8	OCC	2400	1,958	16	B CF 36 W	CFT36/1	51	0.8	None	2,400	1,958	-	0.0	$ -	$ -	$ -		
71	Lounge B	8	I 60	I60/1	60	0.5	OCC	2400	1,152	8	CF 26	CFQ26/1-L	27	0.2	None	2,400	518	634	0.3	$ 101.59	$ 54.00	$ -	0.5	0.5
40LED	105-Theater	10	T 32 R F 2 (ELE)	F42LL	60	0.6	SW	2400	1,440	10	T 59 R LED	RTLED38	38	0.4	None	2,400	912	528	0.2	$ 84.66	$ 2,362.50	$ -	27.9	27.9
198LED	106-Storage	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	SW	1300	81	2	2T 46 R LED	2RTLED	25	0.1	None	1,300	65	16	0.0	$ 2.89	$ 405.00	$ -	140.3	140.3
198LED	116-Storage	2	2T 17 R F 2 (ELE) REFLECTOR	F22LL	31	0.1	SW	1300	81	2	2T 46 R LED	2RTLED	25	0.1	None	1,300	65	16	0.0	$ 2.89	$ 405.00	$ -	140.3	140.3
35LED	111-Café	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	OCC	2400	432	2	T 59 R LED	RTLED38	38	0.1	None	2,400	182	250	0.1	$ 40.02	$ 472.50	$ -	11.8	11.8
40LED	Men's Bathroom	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	120	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	44	0.0	$ 8.85	$ 472.50	$ -	53.4	53.4
40LED	Women's Bathroom	2	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	120	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	44	0.0	$ 8.85	$ 472.50	$ -	53.4	53.4
40LED	Student Lounge	4	T 32 R F 2 (ELE)	F42LL	60	0.2	SW	2400	576	4	T 59 R LED	RTLED38	38	0.2	None	2,400	365	211	0.1	$ 33.86	$ 945.00	$ -	27.9	27.9
262	Closet	1	B CF 36 W	CFT36/1	51	0.1	SW	1000	51	1	B CF 36 W	CFT36/1	51	0.1	None	1,000	51	-	0.0	$ -	$ -	$ -		
117	Stairs	9	CF 23	CFS23/1	23	0.2	SW	4420	915	9	CF 23	CFS23/1	23	0.2	None	4,420	915	-	0.0	$ -	$ -	$ -		
35LED	2nd Floor Hallways	7	T 32 R F 3 (ELE)	F43ILL/2	90	0.6	SW	4420	2,785	7	T 59 R LED	RTLED38	38	0.3	None	4,420	1,176	1,609	0.4	$ 236.54	$ 1,653.75	$ -	7.0	7.0
20LED	Dance Studio	33	S 32 C F 1 (ELE)	F41LL	32	1.1	SW	2400	2,534	33	4 ft LED Tube	200732x1	15	0.5	None	2,400	1,188	1,346	0.6	$ 215.88	$ 2,695.28	$ -	12.5	12.5
35LED	203-Green Room	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	2400	2,160	10	T 59 R LED	RTLED38	38	0.4	None	2,400	912	1,248	0.5	$ 200.10	$ 2,362.50	$ -	11.8	11.8
7LED	203-Green Room	18	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	1.1	SW	2400	2,592	18	2T 46 R LED	2RTLED	25	0.5	None	2,400	1,080	1,512	0.6	$ 242.43	$ 3,645.00	$ -	15.0	15.0
40LED	201-Club Room	39	T 32 R F 2 (ELE)	F42LL	60	2.3	SW	2400	5,616	39	T 59 R LED	RTLED38	38	1.5	None	2,400	3,557	2,059	0.9	$ 330.17	$ 9,213.75	$ -	27.9	27.9
7LED	Hallway	5	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.3	SW	4420	1,326	5	2T 46 R LED	2RTLED	25	0.1	None	4,420	553	774	0.2	$ 113.72	$ 1,012.50	$ -	8.9	8.9
40LED	211-Storage	6	T 32 R F 2 (ELE)	F42LL	60	0.4	SW	1300	468	6	T 59 R LED	RTLED38	38	0.2	None	1,300	296	172	0.1	$ 31.75	$ 1,417.50	$ -	44.7	44.7
50LED	Men's Bathroom	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	1000	180	3	4 ft LED Tube	200732x2	30	0.1	None	1,000	90	90	0.1	$ 18.10	$ 490.05	$ -	27.1	27.1
20LED	Men's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	OCC	1000	32	1	4 ft LED Tube	200732x1	15	0.0	None	1,000	15	17	0.0	$ 3.42	$ 81.68	$ -	23.9	23.9
50LED	Women's Bathroom	3	W 32 W P 2 (ELE)	F42LL	60	0.2	OCC	1000	180	3	4 ft LED Tube	200732x2	30	0.1	None	1,000	90	90	0.1	$ 18.10	$ 490.05	$ -	27.1	27.1
20LED	Women's Bathroom	1	S 32 C F 1 (ELE)	F41LL	32	0.0	OCC	1000	32	1	4 ft LED Tube	200732x1	15	0.0	None	1,000	15	17	0.0	$ 3.42	$ 81.68	$ -	23.9	23.9
35LED	Hallway	1	T 32 R F 3 (ELE)	F43ILL/2	90	0.1	SW	4420	398	1	T 59 R LED	RTLED38	38	0.0	None	4,420	168	230	0.1	$ 33.79	$ 236.25	$ -	7.0	7.0
117	Stairs	8	CF 23	CFS23/1	23	0.2	SW	4420	813	8	CF 23	CFS23/1	23	0.2	None	4,420	813	-	0.0	$ -	$ -	$ -		
35LED	3rd Floor Hallway	10	T 32 R F 3 (ELE)	F43ILL/2	90	0.9	SW	4420	3,978	10	T 59 R LED	RTLED38	38	0.4	None	4,420	1,680	2,298	0.5	$ 337.91	$ 2,362.50	$ -	7.0	7.0
35LED	Men's Bathroom	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	104	0.1	$ 20.92	$ 472.50	$ -	22.6	22.6
35LED	Women's Bathroom	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	1000	180	2	T 59 R LED	RTLED38	38	0.1	None	1,000	76	104	0.1	$ 20.92	$ 472.50	$ -	22.6	22.6
50LED	Student Publication	23	W 32 W P 2 (ELE)	F42LL	60	1.4	SW	2400	3,312	23	4 ft LED Tube	200732x2	30	0.7	OCC	1,680	1,159	2,153	0.7	$ 330.70	$ 3,885.30	$ 20	11.7	11.7
35LED	306-Offices	3	T 32 R F 3 (ELE)	F43ILL/2	90	0.3	SW	2000	540	3	T 59 R LED	RTLED38	38	0.1	None	2,000	228	312	0.2	$ 51.84	$ 708.75	$ -	13.7	13.7
35LED	Server Room	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	2000	1,080	6	T 59 R LED	RTLED38	38	0.2	OCC	1,600	365	715	0.3	$ 115.65	$ 1,545.75	$ 20	13.4	13.2
7LED	Server Room	1	2T 32 R F 2 (u) (ELE) Thin Tube	FU2LL	60	0.1	SW	2000	120	1	2T 46 R LED	2RTLED	25	0.0	OCC	1,600	40	80	0.0	$ 12.94	$ 330.75	$ 20	25.6	24.0
50LED	Media Center	49	W 32 W P 2 (ELE)	F42LL	60	2.9	SW	2400	7,056	49	4 ft LED Tube	200732x2	30	1.5	OCC	1,680	2,470	4,586	1.5	$ 704.54	$ 8,132.40	$ 20	11.5	11.5
117	Media Center	6	CF 23	CFS23/1	23	0.1	SW	2400	331	6	CF 23	CFS23/1	23	0.1	OCC	1,680	232	99	0.0	$ 13.04	$ 128.25	$ 20	9.8	8.3
40LED	Men's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	T 59 R LED	RTLED38	38	0.0	None	1,000	38	22	0.0	$ 4.43	$ 236.25	$ -	53.4	53.4
40LED	Women's Bathroom	1	T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	1000	60	1	T 59 R LED	RTLED38	38	0.0	None	1,000	38	22	0.0	$ 4.43	$ 236.25	$ -	53.4	53.4
117	Roof Stairs	1	CF 23	CFS23/1	23	0.0	SW	1000	23	1	CF 23	CFS23/1	23	0.0	None	1,000	23	-	0.0	$ -	$ -	$ -		
238	Exterior	3	WP 400 Po HPS	hps400/1	465	1.4	PHC	4368	6,093	3	WP 400 Po HPS	hps400/1	465	1.4	None	4,368	6,093	-	0.0	$ -	$ -	$ -		
117	Exterior	2	CF 23	CFS23/1	23	0.0	PHC	4368	201	2	CF 23	CFS23/1	23	0.0	None	4,368	201	-	0.0	$ -	$ -	$ -		
64LED	Exterior	6	175 MH POLE	MH175/1	215	1.3	PHC	4368	5,635	6	ALED2T78	ALED2T78	90	0.5	None	4,368	2,359	3,276	0.8	$ 482.26	$ 5,143.50	$ 1,050	10.7	8.5
															0	#N/A								#VALUE!
S	**Total**	**523**				**32.8**			**92,196**	**523**				**20.7**				**54,269**		**12.1**	**5,825**	**72,795**	**$2,170**		
S																		**Demand Savings**			**12.1**	**5849**			
S																		**kWh Savings**			**37,927**	**54,976**			
S																		**Total Savings**				**$5,825**		**12.5**	**12.1**

APPENDIX D

New Jersey Board of Public Utilities Incentives

i. **Smart Start**

ii. **Direct Install**

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

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

I. SMART START

NJ SmartStart Buildings

Program Overview

With New Jersey SmartStart Buildings ...

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

Special Notice

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

Visit the Sandy web page for details and important links.

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

- Project Categories
- Custom Measures
- Incentives for Qualifying Equipment and Projects
- Program Terms and Conditions
- Find a Trade Ally

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

Getting Started

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

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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

Support for Custom Energy-Efficiency Measures

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

Incentives for Qualifying Equipment and Projects

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

Find out more about equipment incentives

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

Home | Residential | Commercial & Industrial | Renewable Energy
About Us | Press Room | Library | FAQs | Calendar | Newsletters | Contact Us | Site

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

EQUIPMENT INCENTIVES

FOOD SERVICE EQUIPMENT

APPLICATION FORMS

TOOLS AND RESOURCES

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Home » Commercial & Industrial » Programs » NJ SmartStart Buildings

Equipment Incentives

Special Notice

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

Visit the Sandy web page for details and important links.

More reasons for a smart start on your next project!

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

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

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

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

Electric Chillers

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

Gas Cooling

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

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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

Electric Unitary HVAC

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

Ground Source Heat Pumps

Closed Loop ($450-750 per ton)

Gas Heating

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

Variable Frequency Drives

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

Natural Gas Water Heating

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

Premium Motors

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

Refrigerator/Freezer Case Premium Efficiency Motors (ECM)

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

Prescriptive Lighting

New Linear Fluorescent

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

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

Lighting Controls

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

Refrigeration

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

Food Service Equipment

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

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

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

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

Other Equipment Incentives*

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

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

II. DIRECT INSTALL

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

PARTICIPATION STEPS

PARTICIPATING CONTRACTORS

SUSTAINABLE JERSEY

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

Direct Install

NEW JERSEY'S CLEAN ENERGY PROGRAM
DIRECT Install

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

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

ELIGIBILITY

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

SYSTEMS & EQUIPMENT ADDRESSED BY THE PROGRAM

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

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

III. PAY FOR PERFORMANCE (P4P)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

EXISTING BUILDINGS

PARTICIPATION STEPS

APPLICATIONS AND FORMS

APPROVED PARTNERS

NEW CONSTRUCTION

FAQS

BECOME A PARTNER

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

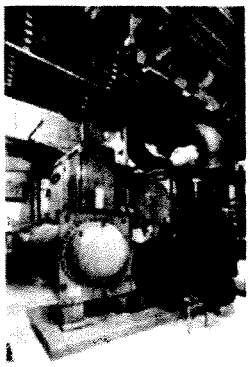
ENERGY BENCHMARKING

Pay for Performance - Existing Buildings

Download program applications and incentive forms.

The Greater the Savings, the Greater Your Incentives

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



Eligibility

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

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

ENERGY STAR Portfolio Manager

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

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

Incentives

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

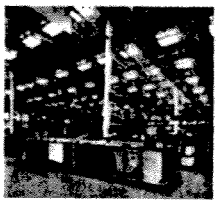
TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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

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



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

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

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

Steps to Participation

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

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

BPU New Jersey Board of Public Utilities

PAY FOR PERFORMANCE APPLICATION FORM

July 1, 2013 - June 30, 2014

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

Instructions

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

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

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

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

Partner Information

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

Project Information

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

Funding

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

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

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

Additional Project information

Additional Utility Account(s)

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

Additional Comments:

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

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

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

Visit our website: NJCleanEnergy.com/P4P

Pay For Performance-Existing Buildings

Participation Agreement

Definitions:

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

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

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

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

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

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

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

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

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

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

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

Program Manager – TRC Energy Services.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

IV. ENERGY SAVINGS IMPROVEMENT PLAN (ESIP)

COMMERCIAL, INDUSTRIAL AND LOCAL GOVERNMENT

HURRICANE SANDY

PROGRAMS

NJ SMARTSTART BUILDINGS

PAY FOR PERFORMANCE

COMBINED HEAT & POWER AND FUEL CELLS

LOCAL GOVERNMENT ENERGY AUDIT

LARGE ENERGY USERS PROGRAM

ENERGY SAVINGS IMPROVEMENT PROGRAM

DIRECT INSTALL

ENERGY BENCHMARKING

OIL, PROPANE & MUNICIPAL ELECTRIC CUSTOMERS

EDA PROGRAMS

SBC CREDIT PROGRAM

PAST PROGRAMS

TOOLS AND RESOURCES

PROGRAM UPDATES

CONTACT US

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Energy Savings Improvement Program

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

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

Local Government
School Districts (K-12)

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

The Board also adopted protocols to measure energy savings:

Measuring Energy Savings
Procedures for Implementation

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

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

FIRST STEP – ENERGY AUDIT

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

ENERGY REDUCTION PLANS

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

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

ESIP PROGRAM

Final version 42413

BPU RULES

1. Public Entity must decide if they will use an ESCO or DIY method or Hybrid thereof prior to issuing the RFP and the RFP must state the intended method. A change in the project procurement model after the RFP closing date will be cause for immediate rejection and disqualification of potential Clean Energy program incentives.

2. RFP procedures shall be adhered to as per the legislation, including the use of BPU approved forms. Any alteration of the forms, without prior approval from the BPU shall be grounds for rejection.

3. RFP must include copy of an audit (ASHRAE Level II w/Level III for lighting) and audit must be prepared by a firm classified by DPMC in the 036 discipline.

4. All firms, including professional services, whether using ESCO or DIY model, must be DPMC classified.

5. If an Architect is engaged by the public entity, the architectural fees are the responsibility of the public entity and must be paid directly to the firm. These fees may be included in the energy cost savings analysis and payback.

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

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

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

7. There shall be no negative cash flow in any year of the program.
   section 7 (1)(a)
   > "the energy savings resulting from the program will be sufficient to cover the cost of the program's energy conservation measures."

8. SREC values are not permitted to be used in the energy cost savings calculations.

9. Capital cost avoidance values are not to be used in the energy savings calculations.

10. Operational and Maintenance (O&M) cost savings may be permitted in the cost savings calculations, but only with supporting documentation.

11. Blended utility rates shall not be permitted. Use the actual utility tariff or local contracted rates if there is a third party supplier.

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

12. Contracted third party utility rates may only be used for the term of the contract (5 yr. maximum) Subsequent years are to be projected at the utility tariff rates plus the annual BPU escalation rates.

13. Public entity shall conduct M&V (measurement and verification) at the one (1) year operational date and shall provide a copy of the M&V report to the Board of Public Utilities.

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

14. The decisions made by BPU staff regarding compliance or other issues that arise in connection with the RFP procurement process shall be considered a final decision of the BPU. Any appeal will need to be through the New Jersey Superior Court, Appellate Division.

15. For the RFP proposals only, Demand Response (DR) revenues claimed by ESCO's can only be projected for a maximum period of three (3) years. DR revenue projections beyond three years will not be permitted. DR revenues must be included and presented under the "Energy Rebates/Incentives" column of FORM VI.

16. ESCO "fees" proposed during the RFP phase of the project cannot increase post-award. ESCO's are required to maintain the fee percentages through final contract negotiations and construction of the Board approved Energy Savings Plan

17. Public Bid openings shall be held on the due date of the proposal submissions. The public entity shall announce the name of the bidder and the total dollar amount. After award of a contract, all proposals received will be made available by the owner for public inspection

18. Rejection of bids by the public entity shall be conducted in accordance with the appropriate sections of the applicable legislation, as stated in Title 40A:11-13.2. Additionally all proposals must be returned to the respective ESCO's upon rejection.

19. Field changes that exceed 5% of the project cost require BPU approval.

20. Energy Savings Plans (ESP) that is dependent upon incentives from the Clean Energy Program must review the current program requirements, at the time of application, for each incentive to insure eligibility. If any program incentive is denied, resubmission of all ESIP related forms will be necessary to remain ESIP qualified.

APPENDIX E

Photovoltaic Analysis

27999 - Newark Public Schools
Dr. Marion A. Bolden Student Center

Cost of Electricity	$0.150	/kWh
Electricity Usage	431,280	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 incentive)	Payback (with incentive)
$	kW	kWh	therms	$	$	$	$	$	Years	Years
$0	**0.0**	**4,996**	**0**	**$749**	**0**	**$749**	**$0**	**$849**	**0.0**	**0.0**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $170 /1000kwh

Area Output*
172 m2
1,851 ft2

Perimeter Output*
66 m
216 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
-263 ft2

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

8 watt/ft2
-2,105 DC watts
0 kW Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle	40	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	180	Enter into PV Watts (default)
Zip Code	07107	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
4,996 annual kWh calculated in PV Watts program

% Offset Calc

Usage	431,280	(from utilities)
PV Generation	4,996	(generated using PV Watts)
% offset	1%	

* http://www.freemaptools.com/area-calculator.htm
** http://www.flettexchange.com
*** http://rredc.nrel.gov/solar/calculators/pvwatts/version1/US/New_Jersey/Newark.html

PVWatts * * * AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Newark
State:	New_Jersey
Latitude:	40.70° N
Longitude:	74.17° W
Elevation:	9 m
PV System Specifications	
DC Rating:	4.0 kW
DC to AC Derate Factor:	0.830
AC Rating:	3.3 kW
Array Type:	Fixed Tilt
Array Tilt:	20.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	15.0 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	2.78	292	43.80
2	3.54	337	50.55
3	4.35	446	66.90
4	4.95	472	70.80
5	5.69	548	82.20
6	5.86	531	79.65
7	5.73	530	79.50
8	5.47	500	75.00
9	4.91	448	67.20
10	3.99	389	58.35
11	2.68	261	39.15
12	2.35	242	36.30
Year	4.36	4996	749.40

Output Hourly Performance Data * Output Results as Text

About the Hourly Performance Data Saving Text from a Browser

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

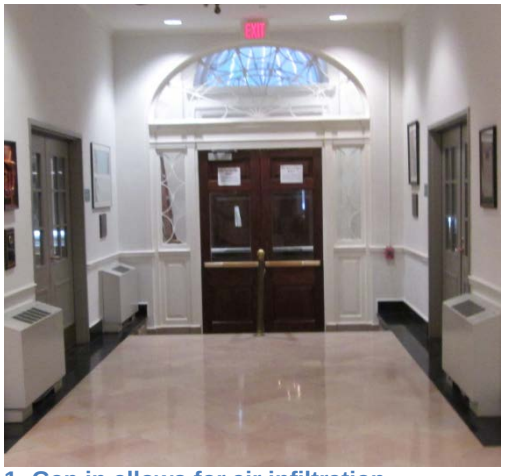
Please send questions and comments regarding PVWATTS to Webmaster

Disclaimer and copyright notice

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

APPENDIX F

Photos

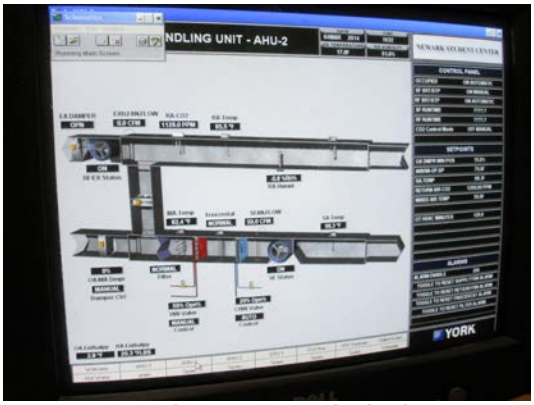


1: Gap in allows for air infiltration

2: VFDs showing CHW Pump #4 operating

4: Rooftop ductwork not insulated

5: Un-insulated piping on roof



6: System needs retro-commissioning

APPENDIX G

EPA Portfolio Manager

ENERGY STAR® Statement of Energy Performance

Dr. Marion Bolden Student Center

Primary Property Function: K-12 School
Gross Floor Area (ft²): 37,000
Built: 1900

For Year Ending: May 31, 2013
Date Generated: May 13, 2014

ENERGY STAR® Score[1]

5

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
Dr. Marion Bolden Student Center 230 Broadway Newark, New Jersey 07104	Newark Public Schools 2 Cedar Street Newark, NJ 07102 (____)____-_____	Newark Public Schools 2 Cedar Street Newark, NJ 07102 9737337334 webmaster@nps.k12.nj.us

Property ID: 4039534

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
103.8 kBtu/ft²

Source EUI
193.8 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	2,337,241 (61%)
Electric - Grid (kBtu)	1,501,826 (39%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	61
National Median Source EUI (kBtu/ft²)	114
% Diff from National Median Source EUI	70%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	314

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)