EAST BRUNSWICK BOARD OF EDUCATION

EAST BRUNSWICK HIGH SCHOOL

380 Cranbury Road, East Brunswick, NJ 08816

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

February 2016

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CHA PROJECT NO. 31007

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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 the East Brunswick Board Of Education in connection with the New Jersey Board of Public Utilities (NJBPU) Local Government Energy Audit (LGEA) Program. The purpose of this report is to identify energy savings opportunities associated with major energy consumers and inefficient practices. Low-cost and no-cost 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
East Brunswick High School	380 Cranbury Road East Brunswick NJ 08816	360,422	1959

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

Building Name	Electric Savings (kWh)	NG Savings (therms)	Total Savings ($)	Payback (years)
East Brunswick High School	749,708	3,086	100,172	9.0

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

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

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

Summary of Energy Conservation Measures

ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
ECM-1	Replace RTUs with High Efficiency RTUs	749,800	12,028	62.3	19,212	60.7	N
ECM-2	Install Walk-In Controls	22,275	1,267	17.6	0	17.6	Y
ECM-3	Install Kitchen Hood Controls	34,901	3,083	11.3	1,000	11.0	Y
ECM-4	Replace Electric Dishwasher wit Gas	20,000	2,583	7.7	1,785	7.1	Y
ECM-5	Replace Gas fired DHW Heater with Condensing Gas DHW Heater	56,676	996	56.9	1,080	55.8	N
ECM-6	Replace Electric DHW Heater with Condensing Gas DHW Heater	12,524	820	15.3	240	15.0	Y
ECM-L1	Replace Lighting w/ Controls	850,995	92,419	9.2	40,735	8.8	Y
	Total**	**1,747,171**	**113,196**	**15.4**	**64,052**	**14.9**	
	Total(Recommended)	**940,695**	**100,172**	**9.4**	**43,760**	**9.0**	

* Incentive shown is per the New Jersey SmartStart Program.

By implementing the recommended ECMs, the building could result in a total of 325 metric tons of greenhouse gas (GHG) reduction.

CHA has evaluated the potential energy production for the installation of solar photovoltaic panels on the roofs of East Brunswick High School. The summary of results are as follows:

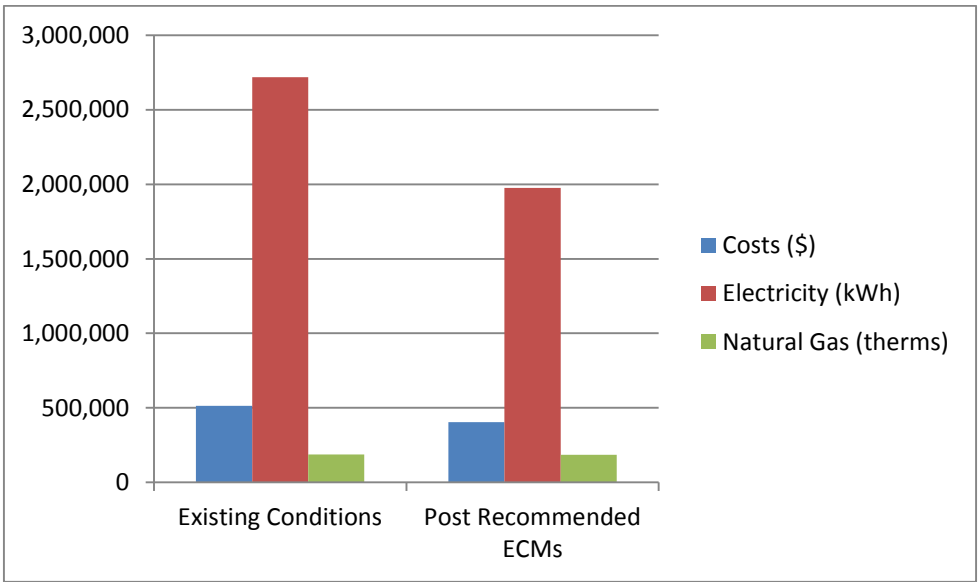
Photovoltaic (PV) Rooftop Solar Power Generation – 570 kW System

Budgetary Cost	Annual Utility Savings			Total Savings	New Jersey Renewable SREC	Payback (without SREC)	Payback (with SREC)	**Recommended**
	Electricity		Natural Gas					
$	kW	kWh	therms	$	$	Years	Years	Y/N
$2,280,000	**570.0**	**690,920**	**0**	**$93,274**	**$172,730**	**24.4**	**8.6**	FS

See alternative energy measure *Solar PV Electricity Generation* in Section 7.0 for detailed information on potential photovoltaic savings

If East Brunswick Board Of Education implements the recommended ECMs, energy savings would be as follows:

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	513,827	413,655	19%
Electricity (kWh)	2,718,513	1,968,805	28%
Natural Gas (therms)	187,315	185,509	1%
Site EUI (kbtu/SF/Yr)	77.7	70.1	



2.0 BUILDING INFORMATION AND EXISTING CONDITIONS

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

Building Name: East Brunswick High School
Address: 380 Cranbury Road, East Brunswick NJ 08816
Gross Floor Area: 360,422 square feet
Number of Floors: Mostly single story with small area occupied on the second story
Year Built: The original construction of the building was completed in 1958. Since then there were some renovation and expansions such as: addition of wings A and B in 2001, renovation of Media Center, and most recent renovation of Cafeteria.

General

Description of Spaces: Besides classrooms and office spaces, this school has a gym, auditorium, library, media center, cafeteria, mechanical rooms, restrooms, and storage spaces.
Description of Occupancy: There are about 2,200 students (grades 9 through 12) and 300 staff members.
Building Usage: The school operates Monday through Friday usually from 6:00 AM to 7:00 PM, with janitors occupying the facility until 11:00 PM. Saturday from 7:00 AM to 3:00 PM and Sunday from 7:00 AM- 12:00 PM.
Construction Materials: 8” Cement Masonry Unit, 2” insulation and 4” face brick.

Roof: The roof is flat and insulated and appears to be in good condition. No ECMs associated with roof replacement were evaluated.
Windows: The facility has double pane windows. No ECM has been evaluated for windows.
Exterior Doors: All exterior doors of the facility are steel doors and observed to be in good condition. No ECM associated with replacing the doors have been evaluated.

Heating Ventilation & Air Conditioning (HVAC) Systems

Heating: The heating to most areas comes from three (3) Bryant 8.5 MMBH input and 6.8 MMBH output water tube gas fired boilers producing heating hot water at about 160F and delivering it to unit ventilators located throughout the building. The boilers are dual fuel, however currently utilize natural gas. There are two (2) 5 HP constant speed HHW pumps operating in lead lag fashion and two (2) HHW pumps 30 HP each operated in lead lag mode and equipped with VSDs.

There are 24 RTUs roof top units of which many are gas fired and electric cooling or cooling only units serving various rooms. An ECM has been evaluated in regards to replacing the RTUs.

Gym is heated via two (2) air handlers that have supply and return fans equipped with VSDs.

Cooling: Cooling is provided for: media center, auditorium, media center, lecture halls and cafeteria via split DX systems. Currently cooling system is being added for gym, however at the time of visit it was not completed yet. HVAC consist of a two zone central cooling and central heating air system.

There are four (4) Window air conditioners. An O&M measure has been included regarding the window AC units.

Ventilation: The fresh air for ventilation is partially provided through roof top equipment. As ventilation rates are assumed to be minimum, there are no ECMs associated with the ventilation system.

Exhaust: This building has multiple fractional HP exhaust fans serving restrooms, science rooms, kitchen and general exhaust located on the roof. The fans are enclosed and therefore the capacities of fan motors are unknown. No ECMs were evaluated for the exhaust fans.

Controls Systems

The building is equipped with HVAC controls. The full EMS Johnson controls are capable of setting schedules and are preprogrammed for setback temperatures. Typical heating temperatures are 68 F and cooling temperatures are set at 74F.

Domestic Hot Water Systems

The boiler room houses two (2) gas fired Hot Water Heaters build in 2005 by PVI, model 54P250 A-MX each 250 gallon capacity. The heating hot water is circulated throughout the building by two (2) circulating inline pumps. An ECM has been evaluated to replace the DHW heaters.

In separate mechanical room there is an electric 75 gallon capacity AO Smith hot water heater serving J Hall. An ECM has been evaluated to convert the DHW heater from electric to natural gas.

Kitchen Equipment

There is a full use kitchen in this building. The kitchen equipment in the building includes various small appliances, commercial coolers, commercial freezers, walk-in freezers, industrial mixers, gas stoves, large food warmers and various small appliances. There is a 15 kW electric dishwasher. The exhaust hood is manually operated during cooking only.

We have evaluated ECMs for changing electric dishwasher to gas fired, installing controls for the hood and installing controls on the walk-in freezer and cooler.

Plug Load

The facility has computers, copiers, printers, woodshop equipment, mechanic shop equipment and residential appliances (microwave, refrigerator) that contribute to the plug load in the building. We have calculated the plug load to have minimal impact compared to other electric consuming devices hence no ECMs associated with plug loads have been evaluated.

Plumbing Systems

There are numerous restrooms in the building. Most of plumbing fixtures are low flow types or are operated on sensors. No ECM associated with plumbing fixtures were evaluated.

Lighting Systems

Indoor lighting predominantly consists of standard T-8s and some spot CFLs. Gym areas have metal halides. Lighting is operated on switches. Outdoors lighting consists of wall mounted CFLs and parking lot post mounted MHs. There are also athletic field lighting poles. ECMs related to replacing the lights with LED lights and adding occupancy sensors to the proposed LED lights have been included.

3.0 UTILITIES

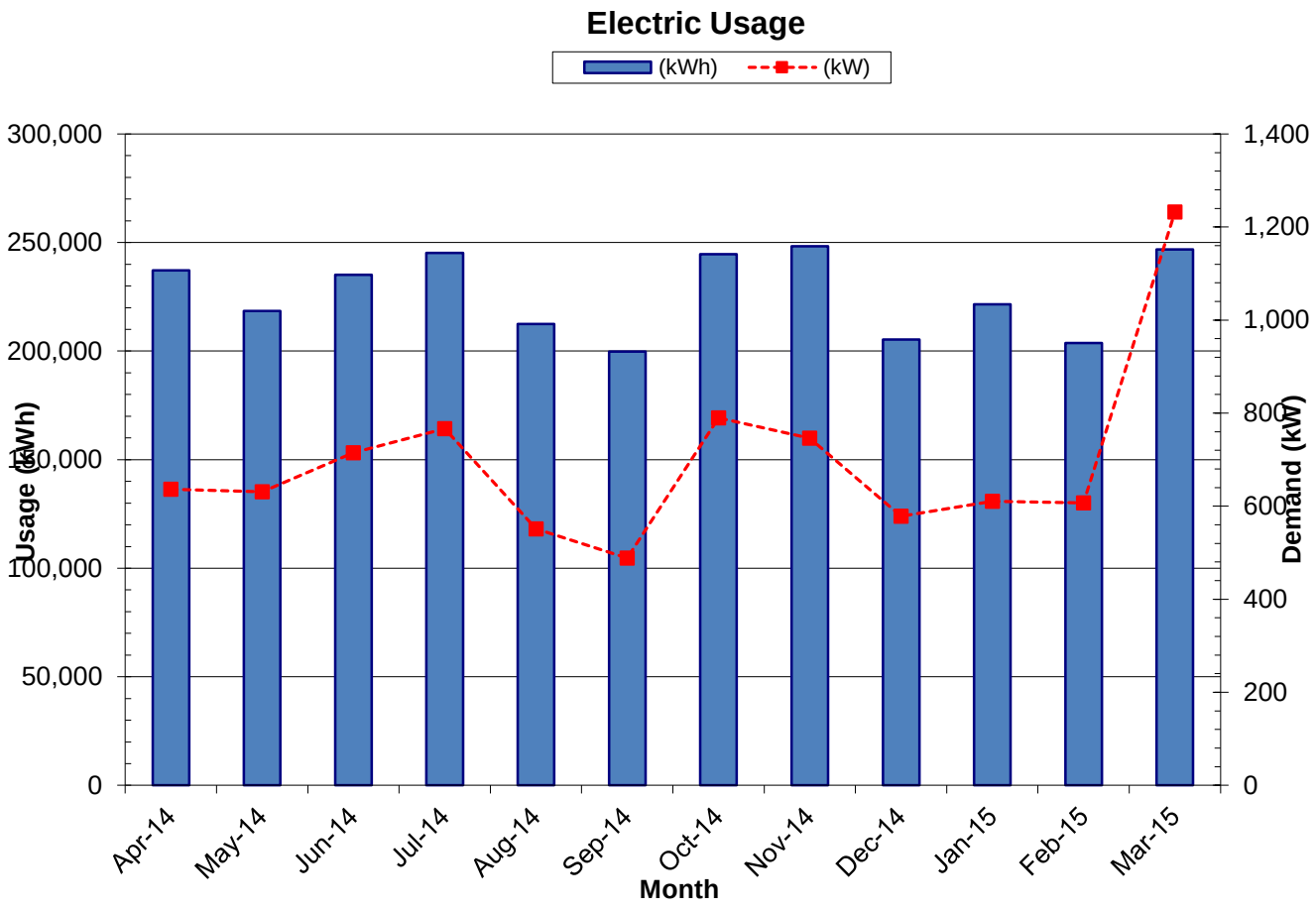
Natural gas, electricity and water are separately metered into this building. Utilities used by the building are delivered and supplied by the following utility companies:

	Electric	Natural Gas	Water
Deliverer	PSE&G	PSE&G	Township of East Brunswick
Supplier	PSE&G	Direct Energy	N/A

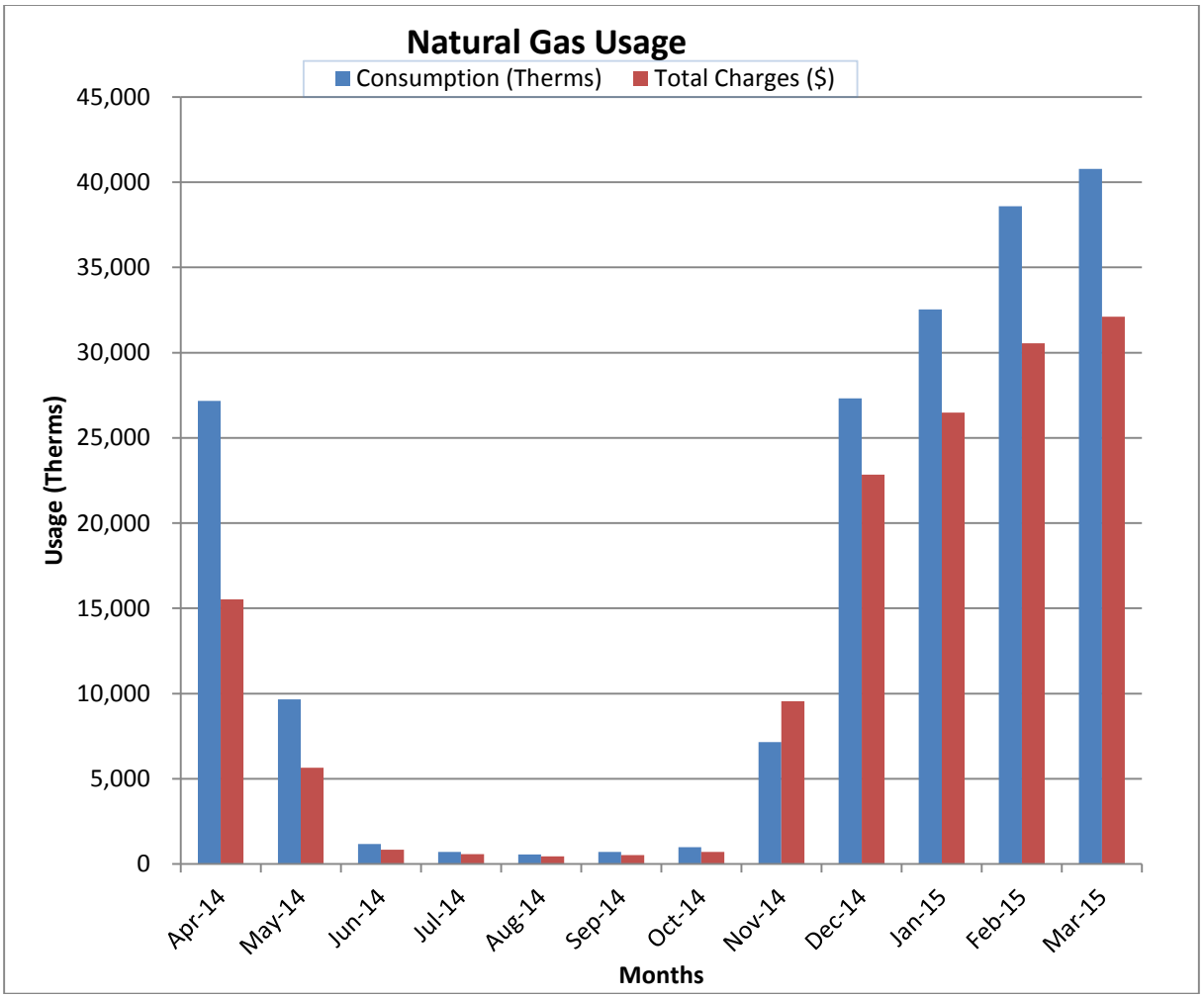
For the 12-month period ending in March 2015, the utilities usages and costs for the building were as follows:

Electric		
Annual Usage	2,718,513	kWh/yr
Annual Cost	368,030	$
Blended Rate	0.135	$/kWh
Consumption Rate	0.119	$/kWh
Demand Rate	5.307	$/kW
Peak Demand	1232.4	kW
Min. Demand	488.6	kW
Avg. Demand	696.1	kW
Natural Gas		
Annual Usage	187,315	Therms/yr
Annual Cost	145,787	$
Rate	0.778	$/therm

Blended Rate: Average rate charged determined by the annual cost / annual usage
Supply Rate: Actual rate charged for electricity usage in kWh (based on most recent electric bill)
Demand Rate: Rate charged for actual electrical demand in kW (based on most recent electric bill)
*Some months that do not have utility data and the missing demand usage are estimated and highlighted in the utility spreadsheet



The electric usage is pretty consistent throughout the year and varies with the usage of the building. The consistency throughout the year reflects the extracurricular and sports use.



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

It was observed form the gas utility bills supplied to CHA that there were imbalance charges which were effecting the data to have higher cost and uses appearing as peaks in utility usage. After research it was found that the reasons for this imbalance comes from the daily contracted quantities (DCQ). Below is a description of the DCQ and an explanation of how it causes imbalances.

***Daily Contracted Quantities (DCQ's)**

Residential, Commercial and Industrial customers will have DCQ's (Daily Contracted Quantities) posted to the account, one for each month of the year. These DCQ's are based upon the customer's weather-normalized historical usage, prorated from their meter reading periods to calendar months and then divided by the number of days in the calendar month. These 12 monthly DCQ's are what Public Service would expect the customer to consume, under normal weather conditions and if the customer utilized his gas equipment in the same manner as was utilized historically. However, weather is rarely normal, so we expect that there

will be a difference between actual usage and the DCQ's. This imbalance is used to adjust the DCQ delivery in the second succeeding month. For example, an imbalance from the billing period in February will adjust April's calendar month delivery; March's imbalance will adjust May's delivery. The DCQ's will be updated each year on the anniversary date in which they were originally posted, to correctly reflect any changes in a customer usage pattern or change in equipment.

TPS's must deliver the Aggregate Daily Contract Quantity for its customers as set forth in PSE&G's Gas Tariff -Third Party Supplier Requirements.
*Information taken from PSE&G Third Party Supplier Gas Choice Operating Manual

See Appendix A for utility analysis.

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

Comparison of Utility Rates to NJ State Average Rates*				Recommended to Shop for Third Party Supplier?
Utility	Units	School Average Rate	NJ Average Rate	
Electricity	$/kWh	$0.135	$0.13	Y
Natural Gas	$/Therm	$0.778	$0.96	N

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

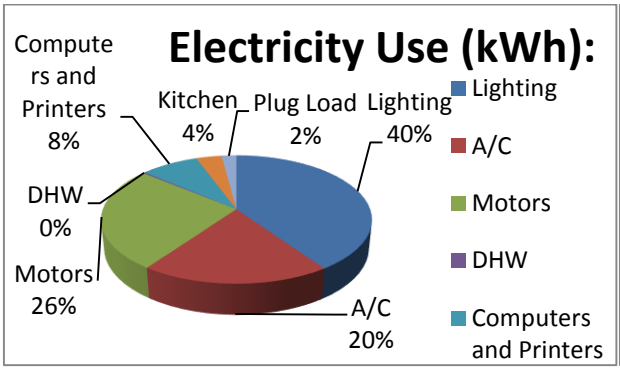
Additional information on selecting a third party energy supplier is available here:

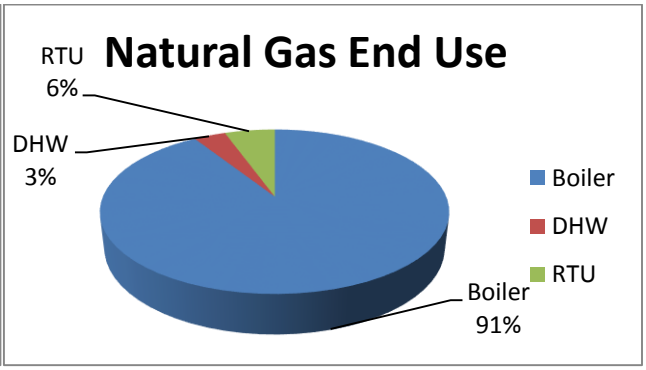
http://www.state.nj.us/bpu/commercial/shopping.html.

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

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

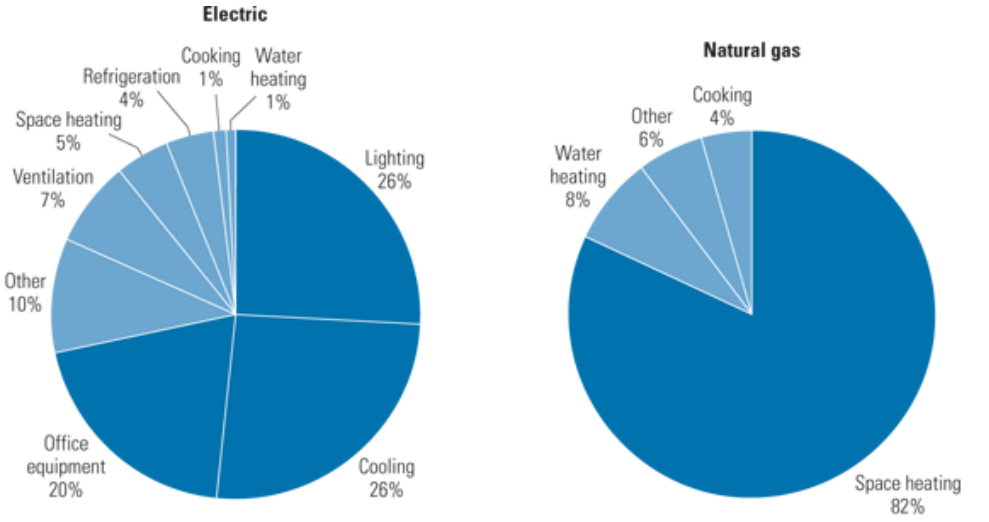
Site End-Use Utility Profile





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

Typical End-Use Utility Profile for Educational Facilities



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

4.0 BENCHMARKING

The EPA Portfolio Manager benchmarking tool provides a site and source Energy Use Intensity (EUI), as well as an Energy Star performance rating for qualifying building types. The EUIs are provided in kBtu/ft2/year, and the performance rating represents how energy efficient a building is on a scale of 1 to 100, with 100 being the most efficient. In order for a building to receive and Energy Star label, the energy benchmark rating must be at least 75. As energy use decreases from implementation of the proposed measures, the Energy Star rating will increase. However, the EPA does not have score for all types of buildings. The buildings that do not have energy rating now are compared with national median EUI.

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

Site EUI kBtu/ft^2/yr	Source EUI (kBtu/ft^2/yr)	Energy Star Rating (1-100)
77.7	135.4	75

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

EPA Portfolio Manager can be accessed with the following:

Web URL: https://portfoliomanager.energystar.gov/pm/login.html

[redacted]

[redacted]

5.0 ENERGY CONSERVATION MEASURES

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

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

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

Energy savings were quantified in the form of:

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

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

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

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

5.1 ECM-1 Replace RTUs with High Efficiency RTUs

The school has 4 rooftop units installed in 1997. The 4 units are either at the end of their useful life or past their useful life. This ECM evaluates the energy savings associated with replacing older less efficient rooftop units with modern high efficiency rooftop units of the same capacities. Calculations show savings in electric power consumption only as it is assumed that the gas furnaces will have the same efficiencies.

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

ECM-1 Replace RTUs with High Efficiency RTUs

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
749,800	45.5	76,746	-	12,028	(0.7)	19,212	62.3	60.7

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

This measure is not recommended

5.2 ECM-2 Install Walk-in Cooler / Freezer Controls

Presently there is one (1) walk-in cooler and one (1) walk-in freezer in this building.

Installing a walk-in cooler/ freezer control system was assessed. The system will monitor both dry and wet bulb temperature within the walk-in unit and allow evaporators and compressors to modulate up and down based on enthalpy set points rather than by dry bulb temperature alone. Savings is a result of reduced run time of evaporator fans, compressors and door heaters.

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

ECM-2 Install Walk-in Cooler / Freezer Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
22,275	-	9,387	-	1,267	(0.4)	-	17.6	17.6

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

This measure is recommended.

5.3 ECM-3 Install Kitchen Hood Controls

Installing a Melink hood control system was evaluated. Upon activation of the Melink system, the hood lights will turn on and the fans reach a preset minimum speed of 10 and 50 percent. When cooking appliances are turned on, the fan speed will increase based on temperature sensed in the exhaust duct. During actual cooking, an optical sensor will sense particulates entering the hood and the speed will increase to 100 percent until smoke and heat are removed.

Energy saving is calculated from reduction of exhaust fan speed and the amount of heated air supplied by the kitchen's make-up air unit (MUA).

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

ECM-3 Install Kitchen Hood Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
34,901	-	4,797	3,131	3,083	(0.1)	1,000	11.3	11.0

This measure is recommended.

5.4 ECM-4 Replace Electric Dishwasher with Gas

The school's kitchen uses an electric dishwasher. The building typically uses this equipment for about 800 hours per year. Natural gas is available in the kitchen and could be used instead of electricity. Implementation would require a new DHW gas fired heater and venting. Monetary cost savings would be achieved through the lower cost of natural gas versus the higher cost of electricity.

The calculation uses estimated electrical consumption and cost for the unit as the baseline, which was converted to natural gas for the proposed case. The difference between the two values is the energy savings.

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

ECM-4 Replace Electric Dishwasher with Gas

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
20,000	7.4	24,619	(1,050)	2,583	0.5	1,785	7.7	7.1

This measure is recommended.

5.5 ECM-5 Replace Gas-Fired DHW Heaters with High Efficiency Condensing Gas-Fired Units

The existing domestic hot water heating system consists of two (2) natural gas fired DHW heaters with 250 gallons of storage capacity each and one (1) electric DHW heater with 75 gallon storage capacity. The natural gas fired DHW heaters have a thermal efficiency of 80%.

Implementation of this ECM will entail replacing the existing DHW heater with a high efficiency condensing water heaters. The proposed DHW heaters include two (2) high efficiency condensing heaters with 130 gallon capacity each which will operate as high as 96% efficiency.

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

ECM-5 Replace Gas-Fired DHW Heaters with High Efficiency Condensing Gas-Fired Units

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
56,676	-	-	1,280	996	(0.7)	1,080	56.9	55.8

This measure is not recommended.

5.6 ECM-6 Replace Electric DHW Heater with High Efficiency Condensing Gas-Fired Units

The existing domestic hot water heating system consists of two (2) natural gas fired DHW heaters with 250 gallons of storage capacity each and one (1) electric DHW heater with 75 gallon storage capacity. The natural gas fired DHW heaters have a thermal efficiency of 80%.

Implementation of this ECM will entail replacing the existing DHW heater with a high efficiency condensing water heaters. The proposed DHW heaters include one (1) high efficiency condensing heaters with 60 gallon capacity which will operate as high as 96% efficiency.

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

ECM-6 Replace Electric DHW Heaters with High Efficiency Condensing Gas-Fired Units

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
12,524,	0.9	8,184	(274)	820	0.1	240	15.3	15.0

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This measure is recommended.

5.7 ECM-L1 Lighting Replacements with Controls

This measure is 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-L1 Lighting Replacements with Controls

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
850,995	126.5	695,226	-	92,419	0.2	40,735	9.2	8.8

This measure is recommended.

5.8 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:

- Purchase Energy Star rated appliances
- Replace filters in air handling equipment and window A/C units regularly
- Add an insulation jacket to domestic water heaters
- Install window A/C covers in winter
- Purchase ENERGY STAR® labeled window air conditioners as they fail
- Install controls on window air conditioners

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. More details can be found at the NJ Clean Energy Program website (http://www.njcleanenergy.com/commercial-industrial/home/home).

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.

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 since the peak electric demand during the 12 month evaluated period was more than 200 KW.

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.

<u>Electric</u>

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

Gas

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

Incentive cap: 25% of total project cost

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

Electric

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

Gas

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

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

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

6.1.4 Energy Savings Improvement Plan

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

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

measures pay the principal of and interest on the bonds; for that reason, the debt service created by the ESOs is not paid from the debt service fund, but is paid from the general fund.

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Local units should carefully consider all alternatives to develop an approach that best meets their needs.

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 area determines how large of a solar array can be installed on any given space. The table below summarizes the approximate area available and the associated solar array size that can be installed.

Available Roof Area (Ft^2)	Potential PV Array Size (kW)
13,665	570

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

Installation of (PV) arrays in the state New Jersey will allow the owner to participate in the New Jersey Solar Renewable Energy Certificates Program (SREC). This is a program that has been set up to allow entities with large amounts of environmentally unfriendly emissions to purchase credits from zero emission (PV) solar-producers. An alternative compliance penalty (ACP) is paid for by the high emission producers and is set each year on a declining scale of 3% per year. One SREC credit is equivalent to 1000 kilowatt hours of PV electrical production; these credits can be traded for period of 15 years from the date of installation. Payments that will be received by the PV producer will change from year to year dependent upon supply and demand. There is no definitive way to calculate an exact price that will be received by the PV producer for SREC credits over the next 15 years. Renewable Energy Consultants estimates an average of $250/SREC for 2016 and this number was utilized in the cash flow for this report.

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

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

Photovoltaic (PV) Rooftop Power Generation

Budgetary Cost	Annual Utility Savings			Total Savings	New Jersey Renewable SREC	Payback (without SREC)	Payback (with SREC)	Recommended
	Electricity		Natural Gas					
$	kW	kWh	Therms	$	$	Years	Years	Y/N
2,800,000	570.0	690,920	0	93,274	172,730	24.4	8.6	FS

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

7.1.2 Solar Thermal Hot Water Generation

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

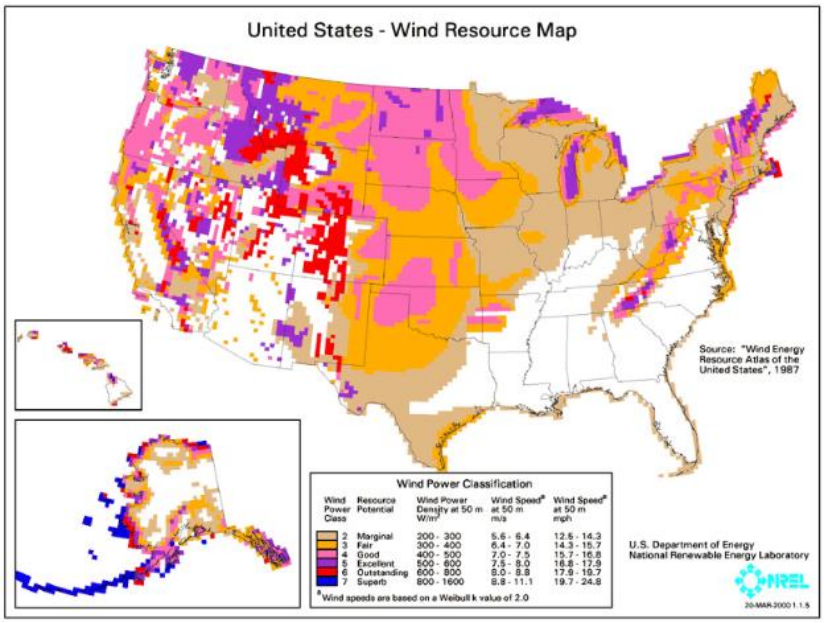
A standard solar hot water system is typically composed of solar collectors, heat storage vessel, piping, circulators, and controls. Systems are typically integrated to work alongside a conventional heating system that provides heat when solar resources are not sufficient. The solar collectors are usually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

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

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

7.2 Wind Powered Turbines

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



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

7.3 Combined Heat and Power Plant

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

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

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

7.4 Demand Response Curtailment

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

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

A pre-approved CSP will require a minimum of 100 kW of load reduction to participate in any curtailment program. From April 2014 through March 2015 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
1232.4	488.6	696.1	N	Y

*the demand is estimated from one month bill

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

8.0 CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for East Brunswick High School.

The following projects should be considered for implementation:

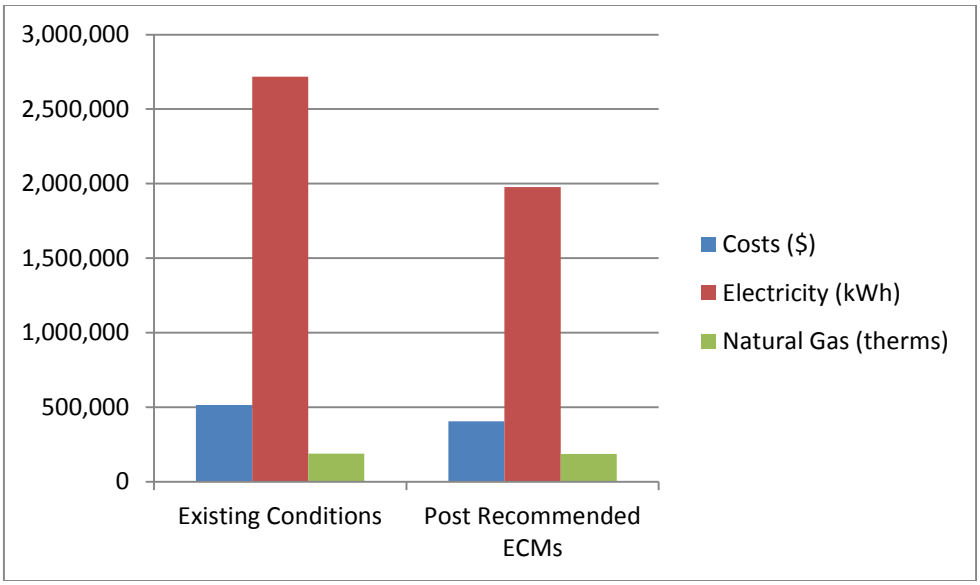
- Install walk-in controls
- Install kitchen hood controls
- Replace electric dishwasher with gas
- Replace electric DHW heater with high efficiency condensing gas-fired unit
- Lighting Replacements / Upgrades W/ Controls

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

Electric Savings (kWh)	Natural Gas Savings (therms)	Total Savings ($)	Payback (years)
749,708	1,806	100,172	9.0

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	513,827	413,655	19%
Electricity (kWh)	2,718,513	1,968,805	28%
Natural Gas (therms)	187,315	185,509	1%
Site EUI (kbtu/SF/Yr)	77.7	70.1	



Next Steps: This energy audit has identified several areas of potential energy savings. East Brunswick Board Of Education can use this information to pursue incentives offered by the NJBPU's NJ Clean Energy Program. A close-out meeting will be scheduled with school staff members to review the ECMs and possible incentive options.

APPENDIX A

Utility Usage Analysis and Alternate Utility Suppliers

Local Government Energy Audit
East Brunswick Board of Education
East Brunswick High School

Electric Service

For Service at: East Brunswick High School
Account No.: 4200009218 **Delivery: PSE&G**
Meter No.: 9195718 **Supply: PSE&G**

					Provider Charges			Unit Costs				
	Consumption		Demand		Delivery	Supplier	Total	Demand	Consumption	Delivery	Supplier	Blended Rate
Month	(kWh)	($)	(kW)	($)	($)	($)	($)	($/kW)	($/kWh)	($/kWh)	($/kWh)	($/kWh)
April-14	237,176	29,204.02	636.1	2,254.60	9,465.20	21,993.42	31,458.62	3.544	0.123	0.040	0.093	0.133
May-14	218,433	26,001.93	630.8	2,235.81	8,906.19	19,331.55	28,237.74	3.544	0.119	0.041	0.089	0.129
June-14	235,099	27,445.17	714.8	2,533.54	9,684.28	20,294.43	29,978.71	3.544	0.117	0.041	0.086	0.128
July-14	245,180	28,513.48	766.8	9,125.30	16,160.41	21,478.37	37,638.78	11.900	0.116	0.066	0.088	0.154
August-14	212,533	26,617.76	551.2	6,709.92	12,851.83	20,475.85	33,327.68	12.173	0.125	0.060	0.096	0.157
September-14	199,724	23,758.93	488.6	5,942.55	11,742.36	17,959.12	29,701.48	12.162	0.119	0.059	0.090	0.149
October-14	244,574	35,712.54	789.7	2,842.45	16,623.31	21,931.68	38,554.99	3.599	0.146	0.068	0.090	0.158
November-14	248,328	27,899.70	746.0	2,685.15	9,697.55	20,887.30	30,584.85	3.599	0.112	0.039	0.084	0.123
December-14	205,382	23,577.13	578.5	2,082.25	7,946.28	17,713.10	25,659.38	3.599	0.115	0.039	0.086	0.125
January-15	221,504	25,112.18	610.6	2,197.79	8,492.92	18,817.05	27,309.97	3.599	0.113	0.038	0.085	0.123
February-15	203,751	22,430.25	607.3	2,185.92	7,721.53	16,894.64	24,616.17	3.599	0.110	0.038	0.083	0.121
March-15	246,829	27,428.48	1,232.4	3,533.06	9,367.81	21,593.73	30,961.54	2.867	0.111	0.038	0.087	0.125
Total (All)	**2,718,513**	**$323,701.58**	**1,232.4**	**44,328.34**	**$128,659.68**	**$239,370.24**	**$368,029.92**	**$5.307**	**$0.119**	**$0.047**	**$0.088**	**$0.135**
Total (last 12-months)	**2,718,513**	**$323,701.58**	**1,232.4**	**44,328**	**$128,659.68**	**$239,370.24**	**$368,029.92**	**$5.307**	**$0.119**	**$0.047**	**$0.088**	**$0.135**
Notes	1A	1B	2A	2B	3	4	5	6	7	8	9	9

1A.) Number of kWh of electric energy used per month
1B.) Consumption charges ($)
2A.) Number of kW of power measured
2B.) Demand charges ($)
3.) Electric charges from Delivery provider
4.) Electric charges from Supply provider - note, includes 8.875% tax
5.) Total charges (Delivery + Supplier)
6.) Demand charges ($) / Demand (kW)
7.) Consumption charges ($) / Consumption (kWh)
8.) Delivery Charges ($) / Consumption (kWh) — 35% of blended rate (fixed portion of the bill that can't be negotiated)
9.) Supplier Charges ($) / Consumption (kWh) — 65% of blended rate (portion of the bill that can be negotiated)
10.) Total Charges ($) / Consumption (kWh)

PSE&G ELECTRIC SERVICE TERRITORY
Last Updated: 10/24/12

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

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

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

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

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

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

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

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

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PSE&G GAS SERVICE TERRITORY
Last Updated: 12/11/14

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

Supplier	Telephone & Web Site	*Customer Class
Ambit Northeast, LLC d/b/a Ambit Energy 103 Carnegie Center Suite 300 Princeton, NJ 08540	877-282-6284 www.ambitenergy.com	**R/C** **ACTIVE**
Amerigreen Energy, Inc. **333 Sylvan Avenue Suite 206** **Englewood Cliffs, NJ 07632**	(888)559-4567 www.amerigreen.com	**R/C/I** **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** **ACTIVE**
Choice Energy, LLC **4257 US Highway 9, Suite 6C** **Freehold, NJ 07728**	(888) 565-4490 www.4choiceenergy.com	**R/C/I**
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. 33 Wood Avenue South, 610 Iselin, NJ 08830	866-867-8328 www.compassenergy.net	**C/I** **ACTIVE**

Compass Energy Gas Services, LLC 33 Wood Avenue South Suite 610 Iselin, NJ 08830	866-867-8328 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 116 Village Boulevard, Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	**C/I** **ACTIVE**
Constellation Energy Gas Choice, Inc. 116 Village Blvd., Suite 200 Princeton, NJ 08540	800-785-4373 www.constellation.com	**R/C/I** **ACTIVE**
Direct Energy Business, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	888-925-9115 http://www.business.directenergy.com/	**R** **ACTIVE**
Direct Energy Business Marketing, LLC (fka Hess Energy Marketing) One Hess Plaza Woodbridge, NJ 07095	(800) 437-7872 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Direct Energy Services, LLC 120 Wood Avenue, Suite 611 Iselin, NJ 08830	(888) 925-9115 www.directenergy.com	**R** **ACTIVE**

Direct Energy Small Business, LLC (fka Hess Small Business Services, LLC) One Hess Plaza Woodbridge, NJ 07095	(888) 464-4377 http://www.business.directenergy.com/	**C/I** **ACTIVE**
Gateway Energy Services Corp. 120 Wood Avenue Suite 611 Iselin, NJ 08830	(866) 348-4193 www.gesc.com	**R/C** **ACTIVE**
Glacial Energy of New Jersey, Inc. 21 Pine Street, Suite 237 Rockaway, NJ 07866	888-452-2425 www.glacialenergy.com	**C/I** **ACTIVE**
Global Energy Marketing, LLC 129 Wentz Avenue Springfield, NJ 07081	800-542-0778 www.globalp.com	**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**
Harborside Energy LLC 101 Hudson Street, Suite 2100 Jersey City, NJ 07302	877-940-3835 www.harborsideenergynj.com	**R/C** **ACTIVE**
Hess Energy, Inc. One Hess Plaza Woodbridge, NJ 07095	800-437-7872 www.hess.com	**C/I** **ACTIVE**
HIKO Energy, LLC 655 Suffern Road Teaneck, NJ 07666	888 264-4908 www.hikoenergy.com	**R/C/I** **ACTIVE**
Hudson Energy Services, LLC 7 Cedar Street Ramsey, 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**

Infinite Energy dba Intelligent Energy 1200 Route 22 East Suite 2000 Bridgewater, NJ 08807-2943	(800) 927-9794 www.InfiniteEnergy.com	**R/C/I** **ACTIVE**
Integrys Energy Services-Natural Gas, LLC 101 Eisenhower Parkway Suite 300 Roseland, NJ 07068	(800) 536-0151 www.integrysenergy.com	**C/I** **ACTIVE**
Jsynergy LLC 445 Cental Ave. Suite 204 Cedarhurst, NY 11516	(516) 331-2020 www.Jsnergyllc.com	**R/C/I** **ACTIVE**
Major Energy Services, LLC 1001 East Lawn Drive Teaneck NJ 07666	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	1-877-750-7046 www.metromediaenergy.com	**C/I** **ACTIVE**
Metro Energy Group, LLC 14 Washington Place Hackensack, NJ 07601	888-53-Metro www.metroenergy.com	**R/C** **ACTIVE**
MPower Energy NJ LLC One University Plaza, Suite 507 Hackensack, NJ 07601	877-286-7693 www.mpowerenergy.com	**R/C/I** **ACTIVE**
NATGASCO (Supreme Energy, Inc.) 532 Freeman Street Orange, NJ 07050	800-840-4427 www.supremeenergyinc.com	**R/C/I** **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 10 North Park Place Suite 420 Morristown, NJ 07960	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. 300 New Brunswick, NJ 08816	888- 313-8086 www.napower.com	**R/C/I** **ACTIVE**
North Eastern States, Inc. d/b/a Entrust Energy 90 Washington Valley Road Bedminster, NJ 07921	(888) 535-6340 www.entrustenergy.com	**R/C/I** **ACTIVE**
Oasis Power, LLC d/b/a Oasis Energy 11152 Westheimer, Suite 901 Houston, TX 77042	(800)324-3046 www.oasisenergy.com	**R/C** **ACTIVE**
Palmco 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**
Plymouth Rock Energy, LLC 338 Maitland Avenue Teaneck, NJ 07666	855-32-POWER (76937) www.plymouthenergy.com	**R/C/I** **ACTIVE**
PPL EnergyPlus, LLC Shrewsbury Executive Offices 788 Shrewsbury Avenue Suite 2200 Tinton Falls, NJ 07724	(732) 741-0505 www.pplenergyplus.com	**C/I** **ACTIVE**
PPL EnergyPlus Retail, LLC Shrewsbury Executive Offices 788 Shrewsbury Avenue, Suite 220 Tinton Falls, NJ 07724	(732) 741-0505 – 2000 www.pplenergyplus.com	**C/I** **ACTIVE**
Public Power & Utility of New Jersey, LLC One International Blvd, Suite 400 Mahwah, NJ 07495	(888) 354-4415 www.ppandu.com	**R/C/I** **ACTIVE**

Residents Energy, LLC 550 Broad Street Newark, NJ 07102	(888) 828-7374 www.residentsenergy.com	**R/C**
Respond Power LLC 1001 East Lawn Drive Teaneck, NJ 07666	(877) 973-7763 www.respondpower.com	**R/C/I** **ACTIVE**
Save on Energy, LLC 1101 Red Ventures Drive Fort Mill, SC 29707	1 (877) 658-3183 www.saveonenergy.com	**R/C** **ACTIVE**
SFE Energy One Gateway Center Suite 2600 Newark, NJ 07012	1 (877) 316-6344 www.sfeenergy.com	**R/C/I** **ACTIVE**
S.J. Energy Partners, Inc. 208 White Horse Pike, Suite 4 Barrington, NJ 08007	(800) 695-0666 www.sjnaturalgas.com	**C** **ACTIVE**
South Jersey Energy Company 1 South Jersey Plaza, Route 54 Folsom, NJ 08037	800-266-6020 www.southjerseyenergy.com	**R/C/I** **ACTIVE**
SouthStar Energy d/b/a New Jersey Energy 1085 Morris Avenue, Suite 155 Union, NJ 07083	(866) 477-8823 www.newjerseyenergy.com	**R/C** **ACTIVE**
Spark Energy Gas, LP/ Spark Energy 2105 City West Blvd. Suite 100 Houston, TX 77042	(713)600-2600 www.sparkenergy.com	**R/C/I** **ACTIVE**
Sperian Energy Corp. Bridgewater Center 1200 Route 22 East Bridgewater, NJ 08807	888-682-8082 www.sperianenergy.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	(877) 369-8150 www.streamenergy.net	**R/C** **ACTIVE**
Summit Energy Services, Inc. 10350 Ormsby Park Place Suite 400 Louisville, KY 40223	1 (800) 90-SUMMIT www.summitenergy.com	**C/I** **ACTIVE**
Systrum Energy 1 Bergen Blvd. Fairview, NJ 07022	877-797-8786 www.systrumenergy.com	**R/C/I** **ACTIVE**
Tiger Natural Gas, Inc. dba Tiger, Inc. 234 20th Avenue Brick, NJ 008724	888-875-6122 www.tigernaturalgas.com	**R/C/I** **ACTIVE**
UGI Energy Services, Inc. dba UGI Energy Link 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	800-427-8545 www.ugienergylink.com	**C/I** **ACTIVE**
UGI Energy Services, Inc. d/b/a GASMARK 224 Strawbridge Drive, Suite 107 Moorestown, NJ 08057	856-273-9995 www.ugienergylink.com	**C/I** **ACTIVE**
Verde Energy USA, Inc. 2001 Route 46 Waterview Plaza, Suite 301 Parsippany, NJ 07054	800-388-3862 www.lowcostpower.com	**R/C** **ACTIVE**
Viridian Energy PA LLC 2001 Route 46, Waterview Plaza Suite 230 Parsippany, NJ 07054	866-663-2508 www.viridian.com	**R/C** **ACTIVE**
Vista Energy Marketing, L.P. 197 State Route 18 South, Suite 3000 South Wing East Brunswick, NJ 08816	888-508-4782 www.vistaenergymarketing.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. 16th Floor Newark, NJ 07102	888-997-8979 www.xoomenergy.com	**R/C/I** **ACTIVE**
Your Energy Holdings, LLC One International Boulevard Suite 400 Mahwah, NJ 07495-0400	855-732-2493 www.thisisyourenergy.com	**R/C/I** **ACTIVE**

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APPENDIX B

Equipment Inventory

East Brunswick Board of Education
CHA Project# 31007 Estimated
East Brunswick High School

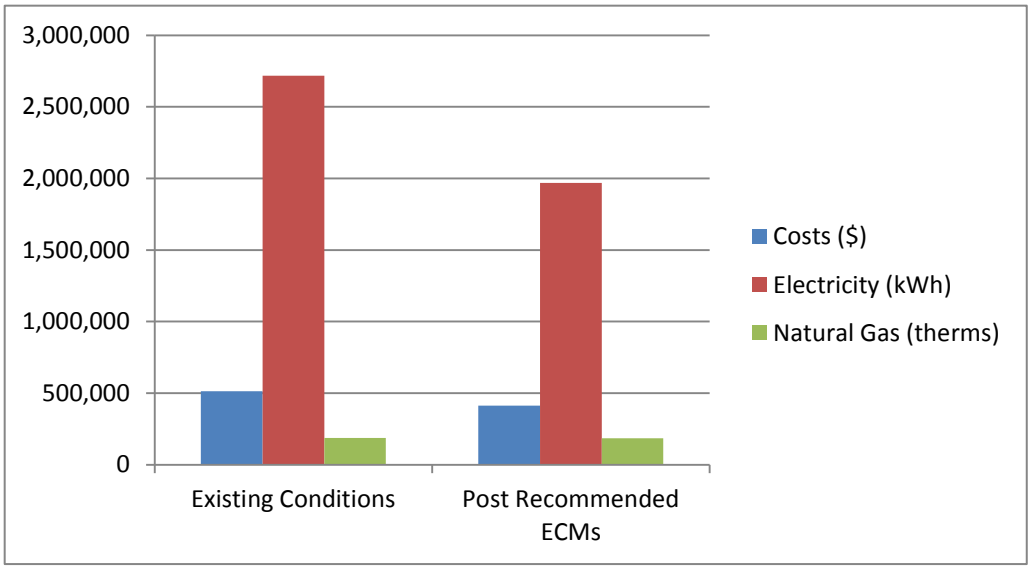
Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size	Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
Boiler	2	Bryan	RW850-W-FDGO		Heating/NG	8500MBH	80.0%	Boiler Room	School	1997	11	
Domestic Hot Water Heater	2		50P 250A -MX	162277-1	Gas	250gal/540000BTU	80%	Boiler Room	School	2009	6	
Pump Motor	2	US Electrical Motors	T645A	N/A	Electric Motor	30	92.4%	Boiler Room	School	2004	6	
Hot Water Pump Motor	2	Armstrong	N/A	N/A	Electric Motor	5HP	89.5%	Boiler Room	School	2004	6	
Hot Water Pump Motor	3	WEG	0005180P3E184JM-S	TO01C0XOXH0000302515	Electric Motor	5HP	90.2%	Boiler Room	School	2004	6	
Rooftop Unit	1	Trane	TCD210C40-ACA	R411038590	Heating/Cooling	17.5T	10EER	Roof	D-22 Music Room	2001	0	
Rooftop Unit	1	Trane	TCD049C40CBD	R24104763D	Cooling	4T	9EER	Roof	C-19	2001	0	
Rooftop Unit	1	Trane	N/A	N/A	Cooling	N/A	N/A	Roof	C-14/C-18	2001	0	
Rooftop Unit	1	Trane	TCD049C40CBD	R24164724D	Cooling	4T	9EER	Roof	C-13	2001	0	
Rooftop Unit	1	Trane	TCD049C40CBD	R24104773D	Cooling	4T	9EER	Roof	M-1 Trainers Room	2001	0	
Rooftop Unit	1	Trane	TCD121C40CAA	R25100699D	Cooling	10T	9EER	Roof	E-7	2001	0	
Rooftop Unit	1	Trane	TCD121C40CAA	R25100604D	Cooling	5T	9EER	Roof	E-6	2001	0	
Rooftop Unit	1	Trane	TCD061C40CBD	R25100180D	Cooling	5T	9EER	Roof	E-10 Photography	2001	0	
Rooftop Unit	1	Trane	TCD061C40CBD	R25100023D	Cooling	5T	9EER	Roof	E-11	2001	0	
Rooftop Unit	1	Trane	TCD061C40CBD	R24104748D	Cooling	5T	9EER	Roof	G-5/G-6	2001	0	
Rooftop Unit	1	Carrier	50TM016511AA	1706U07193	Cooling	15T	10.8EER	Roof	Media	2001	0	
Rooftop Unit	1	Carrier	50TM016511AA	586008976	Cooling	15T	10.8EER	Roof	Media	2001	0	
Rooftop Unit	1	Trane	SLHFC204B036C4ED9001 AODEOGOKCOORT008000	COOF16674	Cooling	20T	11EER	Roof	A/B Section	2001	0	
Rooftop Unit	1	Lennox	GCS24D653130-14 Coil	5697H050-52	Heating/Cooling	130000BTU/2T	80%/9EER	Roof	Conference room Media Center	2001	0	
Rooftop Unit	1	Lennox	LGA150SH21	5697G03330	Heating/Cooling	235000BTU/12.5T		Roof	Upper Media Center	2001	0	
Rooftop Unit	1	Carrier	50TM0008A501	3706G20615	Cooling	7.5T	11EER	Roof	L7	2001	0	
Rooftop Unit	1	Lennox	GCS24653130-1Y	5697E00561	Heating/Cooling	130000BTU/2T	80%/9EER	Roof	Lower Media center	2001	0	
Rooftop Unit	1	Trane	TSCA012LBA	K00F97106	Cooling	1T	9EER	Roof	Cafetera Senior Section	2001	0	
Rooftop Unit	1	Trane	RAUCC25BY03 ABDF00000	C05J08330	Cooling	25T	11EER	Roof		2001	0	
Rooftop Unit	1	Lennox	GCS24D653-130-14	5697H5047	Heating/Cooling	130000BTU/2T	80%/9EER	Roof	Computer Lab (G4)	2001	0	
Rooftop Unit	1	Trane	TCD061C40CBO	R25100187D	Cooling	5T	9EER	Roof	G8	2001	0	
Rooftop Unit	1	Trane	TCD061C40CBD	R25100145D	Cooling	5T	9EER	Roof	G7	2001	0	
Rooftop Unit	1	Trane	TCP024F100AA	R234T6Y2H	Cooling	2T	9EER	Roof	G10	2001	0	
Rooftop Unit	1	Trane	SLHFC30437101F39D1001ABCEDGOKL00R008000	C05J08314	Cooling	30T	11EER	Roof	Caffe	2001	0	
Rooftop Unit	1	Trane	SFHFC304371110H26D1001ABCEDGOKC00800080000	C05J08313	Cooling	30T	11EER	Roof	Caffe	2001	0	

APPENDIX C

ECM Calculations

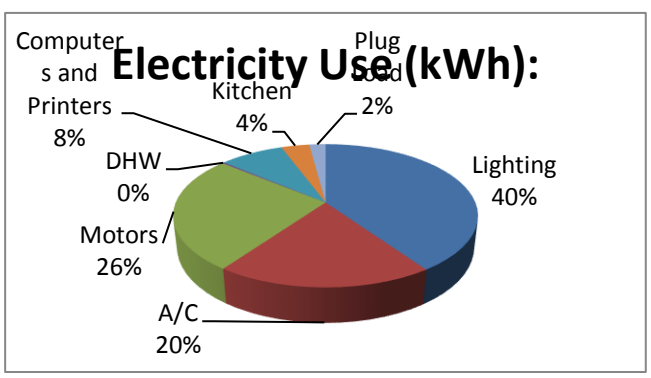
East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

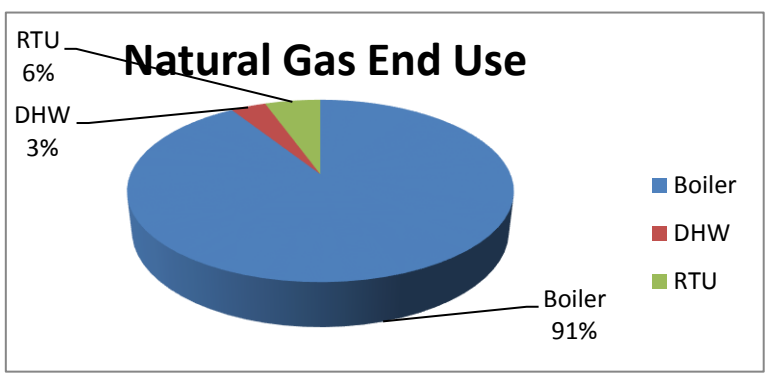
	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	513,827	413,655	19%
Electricity (kWh)	2,718,513	1,968,805	28%
Natural Gas (therms)	187,315	185,509	1%
Site EUI (kbtu/SF/Yr)	77.7	70.1	



East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
2,718,513	Total	Based on utility analysis	
1,097,274	Lighting	From Lighting Calculations	40%
529,829	A/C	From Calc	19%
709,906	Motors	Est	26%
8,184	DHW	From Calc	0%
220,000	Computers and Printers	Est	8%
97,274	Kitchen	Est	4%
56,046	Plug Load	Est	2%
			100%
Natural Gas Use (Therms):		**Notes/Comments:**	
187,315	Total	Based on utility analysis	
170,319	Boiler	From utilities	91%
6,600	DHW	From utilities	4%
10,396	RTU	Est	6%
			100%





East Brunswick BOE
CHA Project Number: 31007

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
$ 0.135	$/kWh blended		0.000420205	360,422	$ 368,030	$ 145,797	
$ 0.119	$/kWh supply	2,718,513	0.000420205				
$ 5.31	$/kW	1,232.4	0				
$ 0.78	$/Therm	187,315	0.00533471				
	$/kgals		0				
	$/Gal						

East Brunswick High School

Recommend? Y or N		Item	Savings kW	kWh	therms	No. 2 Oil gal	Water kgal	$	Cost	Simple Payback	Life Expectancy	Equivalent CO_2 (Metric tons)	NJ Smart Start Incentives	Direct Install Eligible (Y/N)	Payback w/ Incentives	Simple Projected Lifetime Savings kW	kWh	therms	kgal/yr	$	ROI	NPV	IRR
N	ECM-1	Replace RTU with High Efficiency RTU	45.5	76,746	0	0	0	12,028	$ 749,800	62.3	15	32.2	$ 19,212	N	60.7	682.0	1,151,196	0	0	$ 198,842	(0.7)	($586,997)	-13.9%
Y	ECM-2	Install Walk-In Controls	0.0	9,387	0	0	0	1,267	$ 22,275	17.6	10	3.9	$ -	N	17.6	0.0	93,868	0	0	$ 12,672	(0.4)	($11,465)	-9.1%
Y	ECM-3	Install Kitchen Hood Controls	0.0	4,797	3,131	0	0	3,083	$ 34,901	11.3	10	18.7	$ 1,000	N	11.0	0.0	47,968	31,307	0	$ 30,832	(0.1)	($7,600)	-1.7%
Y	ECM-4	Convert Booster Heater Ele-Gas	7.4	24,619	(1,050)	0	0	2,583	$ 20,000	7.7	10.0	4.7	$ 1,785	N	7.1	73.9	246,190	(10,500)	0	$ 29,770	0.5	$3,819	6.9%
N	ECM-5	Replace Gas fired DHW Heater with Condensing Gas DHW Heater	0.0	0	1,280	0	0	996	$ 56,676	56.9	15.0	6.8	$ 1,080	N	55.8	0.0	0	19,202	0	$ 14,939	(0.7)	($43,707)	-13.2%
Y	ECM-6	Replace Electric DHW Heater with Condensing Gas DHW Heater	0.9	8,184	(274)	0	0	820	$ 12,524	15.3	15.0	2.0	$ 240	N	15.0	14.0	122,755	(4,116)	0	$ 14,262	0.1	($2,497)	0.0%
Y	ECM-L1	Lighting Replacement With Controls	138.1	702,722	0	0	0	92,419	$ 850,995	9.2	10.0	295.3	$ 40,735	N	8.8	1,381.0	7,027,220	0	0	$ 1,036,622	0.2	($21,910)	2.5%
		Total	**191.9**	**826,455**	**3,086**	**0**	**0**	**$ 113,196**	**$ 1,747,171**	**15.4**	**12.1**	**364**	**$ 64,052**		**14.9**	**2,151**	**8,689,197**	**35,893**	-	**$ 1,337,940**	**(0.2)**	**($556,364)**	**-3.2%**
		Recommended Measures (highlighted green above)	**146.4**	**749,708**	**1,806**	**0**	**0**	**$ 100,172**	**$ 940,695**	**9.4**	**11.0**	**325**	**$ 43,760**		**9.0**	**1,469**	**7,538,001**	**16,691**	-	**$ 1,124,159**	**0.2**	**$29,920**	**3.6%**
		% of Existing	**12%**	**27.58%**	**0.96%**	**#DIV/0!**	**#DIV/0!**																

	City:	Newark, NJ				
Occupied Hours/Week		100	70	70	70	50
		Building	Auditorium	Gymnasium	Library	Classrooms
	Enthalpy	Operating	Occupied	Occupied	Occupied	Occupied
Temp	h (Btu/lb)	Bin Hours	Hours	Hours	Hours	Hours	Hours	Hours
102.5								
97.5	35.4	6	4	3	3	3	3	2
92.5	37.4	31	18	13	13	13	13	9
87.5	35.0	131	78	55	55	55	55	39
82.5	33.0	500	298	208	208	208	208	149
77.5	31.5	620	369	258	258	258	258	185
72.5	29.9	664	395	277	277	277	277	198
67.5	27.2	854	508	356	356	356	356	254
62.5	24.0	927	552	386	386	386	386	276
57.5	20.3	600	357	250	250	250	250	179
52.5	18.2	730	435	304	304	304	304	217
47.5	16.0	491	292	205	205	205	205	146
42.5	14.5	656	390	273	273	273	273	195
37.5	12.5	1,023	609	426	426	426	426	304
32.5	10.5	734	437	306	306	306	306	218
27.5	8.7	334	199	139	139	139	139	99
22.5	7.0	252	150	105	105	105	105	75
17.5	5.4	125	74	52	52	52	52	37
12.5	3.7	47	28	20	20	20	20	14
7.5	2.1	34	20	14	14	14	14	10
2.5	1.3	1	1	0	0	0	0	0
-2.5								
-7.5								

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

Heating System Efficiency	84%
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

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-1: Replace Unitary HVAC Equipment With More Efficient Unitary Equipment

Description: This ECM evaluates the energy savings associated with replacing older less efficient heating and cooling equipment with modern high efficiency unitary equipment havings the same capacity

Quantity	Capacity (Tons)	Equipment Description	General Type	Cooling Capacity (Btu/h)	Heating Capacity (Btu/h)	EER
4	5	RTU	HVAC	240,000		10
1	15	RTU	HVAC	180,000		11
1	7.5	RTU	HVAC	90,000		11
1	12	RTU	HVAC	144,000		10
4	4	RTU	HVAC	192,000		10
3	25	RTU	HVAC	900,000		11
3	30	RTU	HVAC	1,080,000		11
1	2	RTU	HVAC	24,000		10

Item	Value	Units	Formula/Comments	
Demand Rate	$ 5.31	/ kW		
Electricity Rate	$ 0.12	/kWh		
FORMULA CONSTANTS				
Coincidence Factor	0.67		NJ Protocols	
Conversion	3.412	btu/kW		
COOLING - HVAC				
Cooling Capacity	2,850,000	btu/hr		btuh
Baseline EER	10.5		See Table Below	EERb
Proposed EER	14.0		Equipment	EERq
Equivalent Full Load Hours	1,131	hrs	NJ Protocols	
Demand Savings	45.46	kW		
Energy Savings	76,746	kWh		
HEATING - Heat Pump				
Heating Capacity	-	btu/h		
Baseline Heating EER	10.5		See Table Below	
Proposed Heating EER	14.0		Equipment	
Equivalent Full Load Hours	800	hrs	NJ Protocols	
Heating Savings	-	kWh		
COOLING - Heat Pump				
Cooling Capacity	-	btu/h		
Baseline Cooling EER	10.5		See Table Below	
Proposed Cooling EER	14.0		Equipment	
Equivalent Full Load Hours	381	hrs	NJ Protocols	
Cooling Savings	-	kWh		
SAVINGS				
Demand Savings	45.46	kW		
Energy Savings	76,746	kWh		

Savings calculation formulas are taken from NJ Protocols document for Electric HVAC Equipment

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

Multipliers	
Material:	1.03
Labor:	1.25
Equipment:	1.12

ECM-1: Replace Unitary HVAC Equipment With More Efficient Unitary Equipment - CE

Description	QTY	UNIT	UNIT COSTS			SUBTOTAL COSTS			TOTAL COST	REMARKS
			MAT.	LABOR	EQUIP.	MAT.	LABOR	EQUIP.		
Demolition	19	EA	$ -	$ 750	$ 10,000	$ -	$ 17,756	$ 213,560	$ 231,316	
(4) 5 Ton RTU	4	EA	$ 4,250	$ 1,500	$ -	$ 17,459	$ 7,476	$ -	$ 24,935	RS Means
(1) 15 Ton RTU	1	EA	$ 18,500	$ 2,200	$ -	$ 19,000	$ 2,741	$ -	$ 21,741	RS Means
(1) 7.5 Ton RTU	1	EA	$ 5,000	$ 1,500	$ -	$ 5,135	$ 1,869	$ -	$ 7,004	RS Means
(1) 2 Ton RTU	1	EA	$ 2,500	$ 1,500	$ -	$ 2,568	$ 1,869	$ -	$ 4,437	RS Means
(1) 12 Ton RTU	1	EA	$ 7,500	$ 1,750	$ -	$ 7,703	$ 2,181	$ -	$ 9,883	RS Means
(4) 4 Ton RTU	4	EA	$ 3,500	$ 1,500	$ -	$ 14,378	$ 7,476	$ -	$ 21,854	RS Means
(3) 35 Ton RTU	3	EA	$ 30,000	$ 3,500	$ -	$ 92,430	$ 13,083	$ -	$ 105,513	RS Means
(3) 30 Ton RTU	3	EA	$ 27,750	$ 3,500	$ -	$ 85,498	$ 13,083	$ -	$ 98,581	RS Means
Reprogram DDC system	19	EA	$ 75	$ 300	$ -	$ 1,463	$ 7,102	$ -	$ 8,566	RS Means
Electrical - misc.	19	LS	$ 500	$ 500	$ -	$ 9,757	$ 11,837	$ -	$ 21,594	RS Means
			$ -	$ -		$ -	$ -	$ -	$ -	

$ 555,422	Subtotal
$ 194,398	35% Contingency
$ 749,800	**Total**

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

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-2: Walk-in Cooler & Freezer EC Motor Retrofits

ECM Description :
For kitchens that contain walk-in coolers and freezers, CoolTrol is a controller that reduces energy consumption by controlling off of dewpoint temperature. Compressor cycling is reduced and the evaporator fans run 25% to 80% less. Door and frame heaters are also installed and controlled by store dew point temperature; this can reduce run time by up to 95% in coolers and 60% in freezers. The evaporator fan motors are also replaced with hi-efficiency fan motors saving 40% to 70% in energy. The proposed system comprises of an anti-sweat door controller, evaporator fan motor replacement and CoolTrol Cooler Control System.

Utility Cost

$0.14 $/kWh Blended

EXISTING CONDITIONS			
Walk-In Freezer(s)			
Existing Freezer Controls?	N		
Quantity of Walk-In Freezers	1		
Nameplate Amps of Freezer Evaporator Fan	6		AmpsEF
Nameplate Volts of Freezer Evaporator Fan	230		VoltsEF
Phase of Evaporator Fan	1		PhaseEF
Power Factor of Evaporator Fan	0.55		PFEF
Operating Hours	8,760	hrs	
Load Reduction	65%		LR
Electricity Savings (Evaporator Fan)	4,322	kWh	kWhEF
Electricity Savings (Evaporator Fan Reduced Heat)	1,936	kWh	kWhRH
Total Walk-In Freezer(s) Electricity Savings	6,258	kWh	
Walk-In Cooler(s)			
Existing Cooler Controls?	N		
Quantity of Walk-In Coolers	1		
Nameplate Amps of Cooler Evaporator Fan	3		
Nameplate Volts of Cooler Evaporator Fan	230		
Phase of Evaporator Fan	1		
Power Factor of Evaporator Fan	0.55		
Operating Hours	8,760	hrs	
Load Reduction	65%		
Electricity Savings (Evaporator Fan)	2,161	kWh	
Electricity Savings (Evaporator Fan Reduced Heat)	968	kWh	
Total Walk-In Cooler(s) Electricity Savings	3,129	kWh	
SAVINGS			
Total Electricity Savings	**9,387**	**kWh**	

Savings calculation formulas are taken from NJ Protocols document for Walk-in Controller

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

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-2: Walk-in Cooler & Freezer EC Motor Retrofits - 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.		
									$ -	
Turnkey Walk-In Controller & Equipment	1	EA	$ 10,000	$ 5,000	$ -	$ 10,270	$ 6,230	$ -	$ 16,500	Vendor Estimate
						$ -	$ -	$ -	$ -	

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

$ 16,500	Subtotal
$ 5,775	35% Contingency
$ 22,275	**Total**

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-3: Kitchen Hood Control

Description: This ECM evaluates the thermal and electrical energy savings associated with the implementation of a variable flow controlled exhaust hood (Fan) and make-up air unit. The Hood controller uses infrared heat sensors to detect the level of smoke produced by the cooking operations and automatically adjsustes the

Item	Value	Units	Formula/Comments	
Fuel Cost	$ 0.78	/ Therm		
Electricity Cost	$ 0.14	/kWh		
FORMULA CONSTANTS				
Conversion	0.746	HP/kW		
Constant	24	hrs/day		
Constant	1.08	(btu/hr)/CFM·F		
Conversion	3,412	btu/kWh		
ELECTRIC FAN SAVINGS				
Facility Type	School			
Quantity of Kitchen Hood Fan Motors	1			Q
Kitchen Hood Fan Motor HP	5.0	HP		HP
Motor Load Factor	0.90		NJ Protocols	LF
Efficiency of Fan Motor(s)	85.0%			FEFF
Kitchen Hood Fan Run Hours	2,080			RH
Fan Motor Power Reduction (From VFD)	0.584			PR
Fan Electricity Savings	4,797	kWh		
HEATING SAVINGS				
Kitchen is Heated?	Y			
Square Footage of Kitchen	1,200	ft^2	Estimated	SF
Code Required Ventilation Rate	0.70	CFM/ft^2	NJ Protocols	CFM/SF
Ventilation Oversize Factor	1.40		NJ Protocols	OF
Flow Reductuion (from VFD/Control)	0.310			FR
Heating Degree Day	2,783		NJ Protocols Table	HDD
Heating System Efficiency	84%		AFUE (%)	HEFF
Heating Savings	313	MMbtu		
Heating Savings	3,131	Therms		
COOLING SAVINGS				
Kitchen is Cooled?	N			
Cooling Degree Day	-		NJ Protocols Table	CDD
Cooling System Efficiency	-		COP	CEFF
Cooling Savings	-	kWh		
TOTAL SAVINGS				
Electricity Savings	4,797	kWh		
Fuel Savings	3,131	Therms		

Savings calculation formulas are taken from NJ Protocols document for Kitchen Hood

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-3: Kitchen Hood Control - 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.		
Me-Link Kitchen Hood Control System	1	EA	$ 15,000	$ 2,000		$ 15,405	$ 2,492	$ -	$ 17,897	Vendor Estimation
Electrical - misc.	1	LS	$ 3,500	$ 3,500		$ 3,595	$ 4,361	$ -	$ 7,956	Eng Est
						$ -	$ -	$ -	$ -	
						$ -	$ -	$ -	$ -	

$ 25,853	Subtotal
$ 9,048	35% Contingency
$ 34,901	**Total**

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

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-4: Dishwasher Booster Heater Conversion

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

Item	Value	Units	Formula/Comments
Baseline Fuel Cost	$ 0.78	/ Therm	
Electricity Cost	$ 0.12	$/kWh	
Demand Cost	$ 5.31	$/kWh	
FORMULA CONSTANTS			
CF	0.3		Coincidence Factor (NJ Protocols)
EFLH	1,000		Equivalent Full Load Hours (NJ Protocols)
PROPOSED EQUIPMENT			
Input Rating	105,000	btu/hr	
Efficiency	80%		
SAVINGS			
Electricity Savings	24,619	kWh	
Demand Savings	7	kW	
Fuel Usage	1,050	Therms	

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

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-4: Dishwasher Booster Heater Conversion - 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.		
						$ -	$ -	$ -	$ -	
Remove Electric Booster heater	1	EA		$ 500		$ -	$ 623	$ -	$ 623	Eng est
Natural Gas Fired Booster Heater	1	EA	$ 7,500	$ 2,500		$ 7,703	$ 3,115	$ -	$ 10,818	Internet price
Venting	1	EA	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	RS Means
Piping	1	EA	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	RS Means
Electric	1	EA	$ 500	$ 500		$ 514	$ 623	$ -	$ 1,137	Eng Est

$ 14,850	Subtotal
$ 5,198	35% Contingency
$ 20,000	**Total**

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

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

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

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

Item	Value	Units	Formula/Comments
Avg. Monthly Utility Demand by Water Heater	**600**	Therms/month	Calculated from utility bill
Total Annual Utility Demand by Water Heater	720,000	MBTU/yr	1therm = 100 MBTU
Existing DHW Heater Efficiency	81%		Per manufacturer nameplate
Total Annual Hot Water Demand (w/ standby losses)	583,200	MBTU/yr	
Existing Tank Size	250	Gallons	Per manufacturer nameplate
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	˚F	Per building personnel
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	3.6	MBH	
Annual Standby Hot Water Load	31,646	MBTU/yr	
New Tank Size	130	Gallons	Based on Takagi Flash T-H1 instantaneous, condensing DHW Heater
Hot Water Piping System Capacity	5	Gallons	Estimated Per existing system (includes HWR piping)
Hot Water Temperature	140	˚F	
Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	1.9	MBH	
Annual Standby Hot Water Load	16,754	MBTU/yr	
Total Annual Hot Water Demand	568,308	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		
Proposed Fuel Use	5,920	Therns	Standby Losses and inefficient DHW heater eliminated
Utility Cost	$0.78	$/Therm	
Existing Operating Cost of DHW	$5,602	$/yr	
Proposed Operating Cost of DHW	$4,606	$/yr	

Savings Summary:

Utility	Energy Savings	Cost Savings
Therms/yr	1,280	$996

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

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

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.		
Condensing Gas-Fired DHW Heater	2	EA	$ 12,000	$ 3,500	$ -	$ 24,648	$ 8,722	$ -	$ 33,370	Internet
piping and valves	1	LS	$ 500	$ 500	$ -	$ 514	$ 623	$ -	$ 1,137	Eng Est
electric	2	EA	$ -	$ 500	$ -	$ -	$ 1,246	$ -	$ 1,246	Eng Est
Existing Tank Demoliton	1	LS	$ -	$ 5,000	$ -	$ -	$ 6,230	$ -	$ 6,230	Eng Est

$ 41,983	Subtotal
$ 14,694	35% Contingency
$ 56,676	**Total**

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

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-6: Replace Electric DHW Heater Condensing Gas-Fired DHW Heater

Description: This ECM evaluates the energy savings associated with replacing an electric tank type water heater with a high efficiency instantaneous natural gas fired water heater.

Item	Value	Units	Formula/Comments
Occupied days per week	5	days/wk	
Occupied weeks per year	50	week/yr	
Water supply Temperature	55	˚F	Termperature of water coming into building
Hot Water Temperature	130	˚F	
Hot Water Usage per day	128	gal/day	Calculated from usage below
Annual Hot Water Energy Demand	19,992	MBTU/yr	Energy required to heat annual quantity of hot water to setpoint
Existing Tank Size	75	Gallons	Per manufacturer nameplate
Hot Water Temperature	130	˚F	Per building personnel
Average Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.9	MBH	
Annual Standby Hot Water Load	7,939	MBTU/yr	
Total Annual Hot Water Demand (w/ standby losses)	27,931	Mbtu/yr	Building demand plus standby losses
Existing Water Heater Efficiency	100%		Per Manufacturer
Total Annual Energy Required	27,931	Mbtu/yr	
Total Annual Electric Required	**8,184**	**kWh/yr**	**Electrical Savings**
Average Annual Electric Demand	0.93	kW	
Peak Electric Demand	**9.00**	**kW**	**Per Manufacturer's Nameplate (Demand Savings)**
New Tank Size	60	Gallons	tankless
Hot Water Temperature	130	˚F	
Average Room Temperature	72	˚F	
Standby Losses (% by Volume)	2.5%		(2.5% of stored capacity per hour, per U.S. Department of Energy)
Standby Losses (Heat Loss)	0.7	MBH	
Annual Standby Hot Water Load	6,351	MBTU/yr	
Prop Annual Hot Water Demand (w/ standby losses)	26,343	MBTU/yr	
Proposed Avg. Hot water heater efficiency	96%		Based on Navien CR180 instantaneous, condensing DHW Heater
Proposed Total Annual Energy Required	27,441	MBTU/yr	
Proposed Fuel Use	274	Therms/yr	Standby Losses and inefficient DHW heater eliminated
Purposed Therms use	(274.41)	Therms/year	
KWh Savings	8183.6361	KWh/ year	

Daily Hot Water Demand

			#USES PER DAY		FULL TIME OCCUPANTS**				
FIXTURE	*BASE WATER USE GPM	DURATION OF USE (MIN)	MALE	FEMALE	MALE	FEMALE	TOTAL GAL/DAY	% HOT WATER	TOTAL HW GAL/DAY
LAVATORY (Low-Flow Lavs use 0.5 GPM)	2	0.2	3	3	15	15	36	50%	18
SHOWER	2.5	5	1	1	0	0	0	75%	0
Kitchen SINK	2.5	0.5	1	1	8	8	20	75%	15
MOP SINK	2.5	2	1	1	2	2	20	75%	15
Dishwasher (gal per use)	10	1	1	1	4	4	80	100%	80
						TOTAL	76		**128**

*GPM is per standard fixtures, adjust as necessary if actual GPM is known.
**These are the occupanct that use the fixtures. If fixture does not exist change to (0).

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

ECM-6: Replace Electric DHW Heater Condensing Gas-Fired DHW Heater

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.		
Instantaneous Gas-Fired DHW Heater	1	EA	$ 5,000	$ 1,000		$ 5,135	$ 1,246	$ -	$ 6,381	Internet
piping and valves	1	LS	$ 1,000	$ 1,000		$ 1,027	$ 1,246	$ -	$ 2,273	Eng Est
electric	1	EA		$ 500		$ -	$ 623	$ -	$ 623	Eng Est

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

$ 9,277	Subtotal
$ 3,247	35% Contingency
$ 12,524	**Total**

East Brunswick BOE
CHA Project Number: 31007
East Brunswick High School

New Jersey Pay For Performance Incentive Program

Note: The following calculation is based on the New Jersey Pay For Performance Incentive Program per April, 2015.
Building must have a minimum average electric demand of 200 kW and minimum area of building is 50,000 ft to be most cost-effective for commercial and industrial buildings. However, multifamily buildings with peak demand over 100kW are still eligible. Market manager has the discretion to approve applications that fall below 200kW minimum.

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
- up to 70% of lighting savings may be considered but performance target will increase by 1% for each percent over 50%
- Scope should includes two or more unique measures
- 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)	360,422
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)	$368,030	$145,797
Existing Usage (from utility)	2,718,513	187,315
Proposed Savings	749,708	1,806
Existing Total MMBtus	28,938	
Proposed Savings MMBtus	2,746	
% Energy Reduction	**9.5%**	
Proposed Annual Savings	$100,172	

	Min (Savings = 15%)		Increase (Savings > 15%)		Max Incentive		Achieved Incentive	
	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm	$/kWh	$/therm
Incentive #2	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00
Incentive #3	$0.09	$0.90	$0.005	$0.05	$0.11	$1.25	$0.00	$0.00

	Incentives $		
	Elec	Gas	Total
Incentive #1	$0	$0	$0
Incentive #2	$0	$0	$0
Incentive #3	$0	$0	$0
Total All Incentives	**$0**	**$0**	**$0**

Total Project Cost	$940,695

		Allowable Incentive
% Incentives #1 of Utility Cost*	0.0%	$0
% Incentives #2 of Project Cost**	0.0%	$0
% Incentives #3 of Project Cost**	0.0%	$0
Total Eligible Incentives***	**$0**	
Project Cost w/ Incentives	$940,695	

Project Payback (years)	
w/o Incentives	w/ Incentives
9.4	9.4

* Maximum allowable incentive is 50% of annual utility cost if not funded by NJ BPU, and %25 if LGEA is funded by NJBPU.
** Maximum allowable amount of Incentive #2 is 50% of total project cost.
**Maximum allowable amount of Incentive #3 is 50% 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 East Brunswick High School
CHA Project No. 31007
Existing Lighting & Audit Input

Cost of Electricity: **$0.119** **$/kWh**
$5.31 **$/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
34LED	H	Hallways	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	6912	7,714		NONE	
241LED	Hallways	Hallways	21	R 250 Q 1	h250/1	250	5.25	SW	6912	36,288		NONE	
241LED	Hallways	Hallways	18	R 250 Q 1	h250/1	250	4.50	SW	6912	31,104		NONE	
34LED	Hallways	Hallways	20	1T 32 C F 2 (ELE)	F42ILL	62	1.24	SW	6912	8,571		NONE	
34LED	Hallway G	Hallways	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	6912	7,714		NONE	
34LED	F	Hallways	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	6912	7,714		NONE	
34LED	Cafeteria	Cafeteria	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	3456	1,071		OCC	
34LED	Cafeteria	Cafeteria	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	3456	857		OCC	
34LED	D	Hallways	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	6912	7,714		NONE	
34LED	D	Hallways	7	1T 32 C F 2 (ELE)	F42ILL	62	0.43	SW	6912	3,000		NONE	
34LED	E	Hallways	19	1T 32 C F 2 (ELE)	F42ILL	62	1.18	SW	6912	8,142		NONE	
34LED	Cafeteria entry	Hallways	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	6912	1,714		NONE	
7LED	Audit entry	Hallways	14	2T 32 R F 2 (u)	FU2LL	60	0.84	SW	6912	5,806		NONE	
23	Audit entry	Hallways	10	X 5 W CF 2	ECF5/2	20	0.20	SW	6912	1,382		NONE	
34LED	C	Hallways	30	1T 32 C F 2 (ELE)	F42ILL	62	1.86	SW	6912	12,856		NONE	
34LED	C	Hallways	32	1T 32 C F 2 (ELE)	F42ILL	62	1.98	SW	6912	13,713		NONE	
34LED	M	Hallways	10	1T 32 C F 2 (ELE)	F42ILL	62	0.62	SW	6912	4,285		NONE	
34LED	M	Hallways	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	6912	2,571		NONE	
34LED	H,I,Y,K,L	Hallways	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	6912	5,143		NONE	
34LED	L	Hallways	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	6912	7,714		NONE	
198LED	Main Enterence	Hallways	24	2T 17 R F 2 (ELE)	F22LL	31	0.74	SW	6912	5,143		NONE	
34LED	Main Enterence	Hallways	8	1T 32 C F 2 (ELE)	F42ILL	62	0.50	SW	6912	3,428		NONE	
34LED	Main Enterence	Hallways	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	6912	857		NONE	
34LED	Main Enterence	Hallways	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	6912	2,571		NONE	
34LED	Main Enterence	Hallways	8	1T 32 C F 2 (ELE)	F42ILL	62	0.50	SW	6912	3,428		NONE	
34LED	A	Hallways	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	6912	6,857		NONE	
34LED	Door 44	Hallways	8	1T 32 C F 2 (ELE)	F42ILL	62	0.50	SW	6912	3,428		NONE	
34LED	Stairs	Hallways	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	6912	2,143		NONE	
34LED	B	Hallways	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	6912	6,857		NONE	
23	Round	Hallways	8	X 5 W CF 2	ECF5/2	20	0.16	SW	6912	1,106		NONE	
34LED	Round	Hallways	8	1T 32 C F 2 (ELE)	F42ILL	62	0.50	SW	6912	3,428		NONE	
34LED	B	Hallways	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	6912	5,143		NONE	
34LED	End	Hallways	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	6912	857		NONE	
34LED	Stairway	Hallways	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	6912	2,143		NONE	
34LED	?	Hallways	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	6912	1,714		NONE	
34LED	Gym	Gymnasium	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339		NONE	
34LED	Hall	Hallways	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	6912	2,143		NONE	
34LED	Hall	Hallways	7	1T 32 C F 2 (ELE)	F42ILL	62	0.43	SW	6912	3,000		NONE	
105LED	Elect. . .	Mechanical Room	4	W 32 W F 1	F41LL	32	0.13	SW	2304	295		NONE	
34LED	Elect. . .	Mechanical Room	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	2304	286		NONE	
34LED	Staircase	Hallways	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	6912	857		NONE	
231LED	Front Side	Outdoor Lighting	8	WP400MH1	MH400/1	458	3.66	Breaker	3456	12,663		NONE	
141LED	Enterence	Outdoor Lighting	12	HPS 200	HPS200/1	250	3.00	Breaker	3456	10,368		NONE	
141LED	Enterence	Outdoor Lighting	8	HPS 200	HPS200/1	250	2.00	Breaker	3456	6,912		NONE	
231LED	Parking	Outdoor Lighting	8	WP400MH1	MH400/1	458	3.66	Breaker	3456	12,663		NONE	
141LED	Parking	Outdoor Lighting	4	HPS 200	HPS200/1	250	1.00	Breaker	3456	3,456		NONE	
231LED	Parking	Outdoor Lighting	36	WP400MH1	MH400/1	458	16.49	Breaker	3456	56,983		NONE	
141LED	Building	Outdoor Lighting	4	HPS 200	HPS200/1	250	1.00	Breaker	3456	3,456		NONE	
231LED	Pole	Outdoor Lighting	5	WP400MH1	MH400/1	458	2.29	Breaker	3456	7,914		NONE	
231LED	Pole	Outdoor Lighting	1	WP400MH1	MH400/1	458	0.46	Breaker	3456	1,583		NONE	
35LED	8	Classrooms	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.45	SW	4320	1,944		OCC	
23	7	Classrooms	37	X 5 W CF 2	ECF5/2	20	0.74	SW	4320	3,197		OCC	
23	7	Classrooms	16	X 5 W CF 2	ECF5/2	20	0.32	SW	4320	1,382		OCC	
34LED	6	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804		OCC	
34LED	6	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071		OCC	
34LED	9	Classrooms	27	1T 32 C F 2 (ELE)	F42ILL	62	1.67	SW	4320	7,232		OCC	
34LED	9	Classrooms	7	1T 32 C F 2 (ELE)	F42ILL	62	0.43	SW	4320	1,875		OCC	
34LED	5	Classrooms	27	1T 32 C F 2 (ELE)	F42ILL	62	1.67	SW	4320	7,232		OCC	
34LED	4	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607		OCC	
34LED	3	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607		OCC	
34LED	10	Classrooms	9	1T 32 C F 2 (ELE)	F42ILL	62	0.56	SW	4320	2,411		OCC	
34LED	2	Classrooms	27	1T 32 C F 2 (ELE)	F42ILL	62	1.67	SW	4320	7,232		OCC	
34LED	11	Classrooms	27	1T 32 C F 2 (ELE)	F42ILL	62	1.67	SW	4320	7,232		OCC	
34LED	12	Classrooms	9	1T 32 C F 2 (ELE)	F42ILL	62	0.56	SW	4320	2,411		OCC	
34LED	13	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428		OCC	
34LED	1	Classrooms	27	1T 32 C F 2 (ELE)	F42ILL	62	1.67	SW	4320	7,232		OCC	
35LED	Library	Classrooms	43	T 32 R F 3 (ELE)	F43ILL/2	90	3.87	SW	4320	16,718		OCC	
35LED	Library	Classrooms	22	T 32 R F 3 (ELE)	F43ILL/2	90	1.98	SW	4320	8,554		OCC	
35LED	Library	Classrooms	77	T 32 R F 3 (ELE)	F43ILL/2	90	6.93	SW	4320	29,938		OCC	
23	Library	Classrooms	35	X 5 W CF 2	ECF5/2	20	0.70	SW	4320	3,024		OCC	
35LED	Library	Classrooms	48	T 32 R F 3 (ELE)	F43ILL/2	90	4.32	SW	4320	18,662		OCC	

Energy Audit of East Brunswick High School
CHA Project No. 31007
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			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
34LED	Electrical	Mechanical Room	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	2304	429	NONE	
34LED	Boys Rm	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	Girls RM	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	k1	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	k14.1	Classrooms	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	4320	536	OCC	
34LED	k13	Classrooms	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	4320	536	OCC	
34LED	k12	Classrooms	11	1T 32 C F 2 (ELE)	F42ILL	62	0.68	SW	4320	2,946	OCC	
34LED	k2	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	k11	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	k3	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	k10	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	k4	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607	OCC	
34LED	k5	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	k9	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	k8	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	k6	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	k7	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	Electrical	Mechanical Room	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	2304	286	NONE	
34LED	j7	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	j6	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
23	j2	Classrooms	3	X 5 W CF 2	ECF5/2	20	0.06	SW	4320	259	OCC	
34LED	j5	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	j5	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	j9	Classrooms	23	1T 32 C F 2 (ELE)	F42ILL	62	1.43	SW	4320	6,160	OCC	
34LED	j10	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
23	j9	Classrooms	3	X 5 W CF 2	ECF5/2	20	0.06	SW	4320	259	OCC	
23	j11	Classrooms	3	X 5 W CF 2	ECF5/2	20	0.06	SW	4320	259	OCC	
34LED	j11	Classrooms	23	1T 32 C F 2 (ELE)	F42ILL	62	1.43	SW	4320	6,160	OCC	
34LED	j4	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	j2	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	j6	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	i9	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i10	Classrooms	30	1T 32 C F 2 (ELE)	F42ILL	62	1.86	SW	4320	8,035	OCC	
34LED	i8	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i11	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607	OCC	
34LED	i7	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
34LED	i12	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i6	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i13	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i5	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	i14	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i4	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i3	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	i15	Classrooms	9	1T 32 C F 2 (ELE)	F42ILL	62	0.56	SW	4320	2,411	OCC	
34LED	i2	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	Boys Rm	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	Girls RM	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	l1	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h21	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	h1	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h17	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	h17	Classrooms	1	1T 32 C F 2 (ELE)	F42ILL	62	0.06	SW	4320	268	OCC	
34LED	h2	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	h15	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	h3	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h4	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h14	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h5	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	h13	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h6	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h12	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	h7	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	h11	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607	OCC	
34LED	h8	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	h10	Classrooms	30	1T 32 C F 2 (ELE)	F42ILL	62	1.86	SW	4320	8,035	OCC	
34LED	h9	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
35LED	Electrical	Mechanical Room	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.18	SW	2304	415	NONE	
34LED	g11	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g8	Classrooms	21	1T 32 C F 2 (ELE)	F42ILL	62	1.30	SW	4320	5,625	OCC	
34LED	g12	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g7	Classrooms	21	1T 32 C F 2 (ELE)	F42ILL	62	1.30	SW	4320	5,625	OCC	

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	Area Description	Usage	No. of Fixtures	Standard Fixture Code	Fixture Code	Watts per Fixture	kW/Space	Exist Control	Annual Hours	Annual kWh		
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
34LED	g13	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g6	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g14	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g5	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g15	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g4	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	g4	Classrooms	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	4320	536	OCC	
34LED	g11	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g2	Classrooms	1	1T 32 C F 2 (ELE)	F42ILL	62	0.06	SW	4320	268	OCC	
34LED	g17	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	g1	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
35LED	g10	Classrooms	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.54	SW	4320	2,333	2	
34LED	f1	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f2	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	f17	Classrooms	8	1T 32 C F 2 (ELE)	F42ILL	62	0.50	SW	4320	2,143	OCC	
34LED	f3	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f4	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f16	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f5	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	f15	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f6	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f14	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f14	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	f13	Classrooms	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	4320	536	OCC	
34LED	f7	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	f8	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	f11	Classrooms	20	1T 32 C F 2 (ELE)	F42ILL	62	1.24	SW	4320	5,357	OCC	
34LED	f9	Classrooms	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	f10	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	e6	Classrooms	64	1T 32 C F 2 (ELE)	F42ILL	62	3.97	SW	4320	17,142	OCC	
34LED	e8	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	e7	Classrooms	64	1T 32 C F 2 (ELE)	F42ILL	62	3.97	SW	4320	17,142	OCC	
34LED	e7/6	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	Cafeteria	Cafeteria	132	1T 32 C F 2 (ELE)	F42ILL	62	8.18	SW	3456	28,284	OCC	
23	Cafeteria	Cafeteria	42	X 5 W CF 2	ECF5/2	20	0.84	SW	3456	2,903	OCC	
34LED	Cafeteria	Cafeteria	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	3456	857	OCC	
34LED	Cafeteria	Cafeteria	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	3456	3,428	OCC	
34LED	Boys Rm	Restroom	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
34LED	Girls RM	Restroom	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
34LED	Staff Café	Cafeteria	10	1T 32 C F 2 (ELE)	F42ILL	62	0.62	SW	3456	2,143	OCC	
34LED	Kitchen	Kitchen	44	1T 32 C F 2 (ELE)	F42ILL	62	2.73	SW	2304	6,285	OCC	
34LED	Storage	Storage	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	3456	429	OCC	
34LED	Storage	Storage	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	3456	2,571	OCC	
34LED	d19	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	d18	Classrooms	8	1T 32 C F 2 (ELE)	F42ILL	62	0.50	SW	4320	2,143	OCC	
34LED	d17	Classrooms	20	1T 32 C F 2 (ELE)	F42ILL	62	1.24	SW	4320	5,357	OCC	
34LED	e18	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
34LED	e17	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	e16	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	e1	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	e1	Classrooms	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	4320	536	OCC	
34LED	e14	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
34LED	e2	Classrooms	27	1T 32 C F 2 (ELE)	F42ILL	62	1.67	SW	4320	7,232	OCC	
34LED	e11	Classrooms	33	1T 32 C F 2 (ELE)	F42ILL	62	2.05	SW	4320	8,839	OCC	
34LED	e3	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	e4	Classrooms	18	1T 32 C F 2 (ELE)	F42ILL	62	1.12	SW	4320	4,821	OCC	
34LED	e10	Classrooms	21	1T 32 C F 2 (ELE)	F42ILL	62	1.30	SW	4320	5,625	OCC	
34LED	Electrical	Mechanical Room	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	2304	571	NONE	
34LED	d13	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607	OCC	
34LED	d12	Classrooms	9	1T 32 C F 2 (ELE)	F42ILL	62	0.56	SW	4320	2,411	OCC	
34LED	d10	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607	OCC	
34LED	d7	Classrooms	33	1T 32 C F 2 (ELE)	F42ILL	62	2.05	SW	4320	8,839	OCC	
34LED	d8	Classrooms	11	1T 32 C F 2 (ELE)	F42ILL	62	0.68	SW	4320	2,946	OCC	
34LED	Storage	Storage	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	3456	643	OCC	
34LED	d22	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
23	d22	Classrooms	17	X 5 W CF 2	ECF5/2	20	0.34	SW	4320	1,469	OCC	
34LED	d22	Classrooms	34	1T 32 C F 2 (ELE)	F42ILL	62	2.11	SW	4320	9,107	OCC	
34LED	Storage	Storage	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	3456	1,286	OCC	
34LED	d5	Classrooms	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	4320	4,285	OCC	
34LED	d4	Classrooms	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	4320	4,285	OCC	
34LED	Boys Rm	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	

Energy Audit of East Brunswick High School
CHA Project No. 31007
Existing Lighting & Audit Input

Cost of Electricity: **$0.119** **$/kWh**
$5.31 **$/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
34LED	Girls RM	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	Auditorium	Auditorium	28	1T 32 C F 2 (ELE)	F42ILL	62	1.74	SW	2880	5,000	None	
23	Storage	Storage	3	X 5 W CF 2	ECF5/2	20	0.06	SW	3456	207	OCC	
34LED	c34	Classrooms	13	1T 32 C F 2 (ELE)	F42ILL	62	0.81	SW	4320	3,482	OCC	
34LED	Boys Rm	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	Girls RM	Restroom	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	Faculty BR	Restroom	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
34LED	c24	Classrooms	15	1T 32 C F 2 (ELE)	F42ILL	62	0.93	SW	4320	4,018	OCC	
34LED	c25	Classrooms	15	1T 32 C F 2 (ELE)	F42ILL	62	0.93	SW	4320	4,018	OCC	
34LED	c28	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
34LED	c26	Classrooms	15	1T 32 C F 2 (ELE)	F42ILL	62	0.93	SW	4320	4,018	OCC	
34LED	c27	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	62	0.74	SW	4320	3,214	OCC	
35LED	c1	Classrooms	38	T 32 R F 3 (ELE)	F43ILL/2	90	3.42	SW	4320	14,774	OCC	
34LED	c16	Classrooms	24	1T 32 C F 2 (ELE)	F42ILL	62	1.49	SW	4320	6,428	OCC	
34LED	Mens Br	Restroom	5	1T 32 C F 2 (ELE)	F42ILL	62	0.31	SW	4320	1,339	OCC	
34LED	Womens BR	Restroom	6	1T 32 C F 2 (ELE)	F42ILL	62	0.37	SW	4320	1,607	OCC	
34LED	Main Office	Offices	47	1T 32 C F 2 (ELE)	F42ILL	62	2.91	SW	4320	12,588	OCC	
34LED	Main Office	Offices	1	1T 32 C F 2 (ELE)	F42ILL	62	0.06	SW	4320	268	OCC	
34LED	Main Office	Offices	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
35LED	a1	Classrooms	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.26	SW	4320	5,443	OCC	
34LED	a6	Classrooms	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	4320	4,285	OCC	
34LED	a2	Classrooms	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	4320	4,285	OCC	
34LED	a3	Classrooms	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	4320	4,285	OCC	
34LED	a4	Classrooms	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	4320	4,285	OCC	
34LED	a5	Classrooms	16	1T 32 C F 2 (ELE)	F42ILL	62	0.99	SW	4320	4,285	OCC	
34LED	a2	Classrooms	2	1T 32 C F 2 (ELE)	F42ILL	62	0.12	SW	4320	536	OCC	
34LED	Storage	Storage	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	3456	643	OCC	
34LED	b28	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b27	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b2	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b3	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b26	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b25	Classrooms	21	1T 32 C F 2 (ELE)	F42ILL	62	1.30	SW	4320	5,625	OCC	
34LED	b7	Classrooms	4	1T 32 C F 2 (ELE)	F42ILL	62	0.25	SW	4320	1,071	OCC	
34LED	b6	Classrooms	3	1T 32 C F 2 (ELE)	F42ILL	62	0.19	SW	4320	804	OCC	
34LED	b24	Classrooms	21	1T 32 C F 2 (ELE)	F42ILL	62	1.30	SW	4320	5,625	OCC	
34LED	b27	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b10	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b11	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b22	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b21	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b12	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
34LED	b13	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	62	0.87	SW	4320	3,750	OCC	
	Total		**3,454**				**248.53**			**1,108,900**		

Energy Audit of East Brunswick High School
CHA Project No. 31007
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
34LED	H	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	6912	7,714	18	4 ft LED Tube	200732x2	30	0.5	NONE	6,912	3,732	3,981	0.6	$ 510.46	$ 4,206.60	$ 180	8.2	7.9
241LED	Hallways	21	R 250 Q 1	h250/1	250	5.3	SW	6912	36,288	21	FXLED78	FXLED78/1	78	1.6	NONE	6,912	11,322	24,966	3.6	$ 3,201.00	$ 17,728.11	$ 2,100	5.5	4.9
241LED	Hallways	18	R 250 Q 1	h250/1	250	4.5	SW	6912	31,104	18	FXLED78	FXLED78/1	78	1.4	NONE	6,912	9,704	21,400	3.1	$ 2,743.71	$ 15,195.52	$ 1,800	5.5	4.9
34LED	Hallways	20	1T 32 C F 2 (ELE)	F42ILL	62	1.2	SW	6912	8,571	20	4 ft LED Tube	200732x2	30	0.6	NONE	6,912	4,147	4,424	0.6	$ 567.18	$ 4,674.00	$ 200	8.2	7.9
34LED	Hallway G	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	6912	7,714	18	4 ft LED Tube	200732x2	30	0.5	NONE	6,912	3,732	3,981	0.6	$ 510.46	$ 4,206.60	$ 180	8.2	7.9
34LED	F	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	6912	7,714	18	4 ft LED Tube	200732x2	30	0.5	NONE	6,912	3,732	3,981	0.6	$ 510.46	$ 4,206.60	$ 180	8.2	7.9
34LED	Cafeteria	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	3456	1,071	5	4 ft LED Tube	200732x2	30	0.2	OCC	2,592	389	683	0.2	$ 91.41	$ 1,296.75	$ 70	14.2	13.4
34LED	Cafeteria	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	3456	857	4	4 ft LED Tube	200732x2	30	0.1	OCC	2,592	311	546	0.1	$ 73.13	$ 1,063.05	$ 60	14.5	13.7
34LED	D	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	6912	7,714	18	4 ft LED Tube	200732x2	30	0.5	NONE	6,912	3,732	3,981	0.6	$ 510.46	$ 4,206.60	$ 180	8.2	7.9
34LED	D	7	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	6912	3,000	7	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,452	1,548	0.2	$ 198.51	$ 1,635.90	$ 70	8.2	7.9
34LED	E	19	1T 32 C F 2 (ELE)	F42ILL	62	1.2	SW	6912	8,142	19	4 ft LED Tube	200732x2	30	0.6	NONE	6,912	3,940	4,202	0.6	$ 538.82	$ 4,440.30	$ 190	8.2	7.9
34LED	Cafeteria entry	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	6912	1,714	4	4 ft LED Tube	200732x2	30	0.1	NONE	6,912	829	885	0.1	$ 113.44	$ 934.80	$ 40	8.2	7.9
7LED	Audit entry	14	2T 32 R F 2 (u)	FU2LL	60	0.8	SW	6912	5,806	14	2T 25 R LED	2RTLED	25	0.4	NONE	6,912	2,419	3,387	0.5	$ 434.24	$ 2,835.00	$ 280	6.5	5.9
23	Audit entry	10	X 5 W CF 2	ECF5/2	20	0.2	SW	6912	1,382	10	X 5 W CF 2	ECF5/2	20	0.2	NONE	6,912	1,382	-	0.0	$ -	$ -	$ -		
34LED	C	30	1T 32 C F 2 (ELE)	F42ILL	62	1.9	SW	6912	12,856	30	4 ft LED Tube	200732x2	30	0.9	NONE	6,912	6,221	6,636	1.0	$ 850.76	$ 7,011.00	$ 300	8.2	7.9
34LED	C	32	1T 32 C F 2 (ELE)	F42ILL	62	2.0	SW	6912	13,713	32	4 ft LED Tube	200732x2	30	1.0	NONE	6,912	6,636	7,078	1.0	$ 907.48	$ 7,478.40	$ 320	8.2	7.9
34LED	M	10	1T 32 C F 2 (ELE)	F42ILL	62	0.6	SW	6912	4,285	10	4 ft LED Tube	200732x2	30	0.3	NONE	6,912	2,074	2,212	0.3	$ 283.59	$ 2,337.00	$ 100	8.2	7.9
34LED	M	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	6912	2,571	6	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,244	1,327	0.2	$ 170.15	$ 1,402.20	$ 60	8.2	7.9
34LED	H,I,Y,K,L	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	6912	5,143	12	4 ft LED Tube	200732x2	30	0.4	NONE	6,912	2,488	2,654	0.4	$ 340.31	$ 2,804.40	$ 120	8.2	7.9
34LED	L	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	6912	7,714	18	4 ft LED Tube	200732x2	30	0.5	NONE	6,912	3,732	3,981	0.6	$ 510.46	$ 4,206.60	$ 180	8.2	7.9
198LED	Main Enterence	24	2T 17 R F 2 (ELE)	F22LL	31	0.7	SW	6912	5,143	24	2T 25 R LED	2RTLED	25	0.6	NONE	6,912	4,147	995	0.1	$ 127.61	$ 4,860.00	$ 360	38.1	35.3
34LED	Main Enterence	8	1T 32 C F 2 (ELE)	F42ILL	62	0.5	SW	6912	3,428	8	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,659	1,769	0.3	$ 226.87	$ 1,869.60	$ 80	8.2	7.9
34LED	Main Enterence	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	6912	857	2	4 ft LED Tube	200732x2	30	0.1	NONE	6,912	415	442	0.1	$ 56.72	$ 467.40	$ 20	8.2	7.9
34LED	Main Enterence	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	6912	2,571	6	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,244	1,327	0.2	$ 170.15	$ 1,402.20	$ 60	8.2	7.9
34LED	Main Enterence	8	1T 32 C F 2 (ELE)	F42ILL	62	0.5	SW	6912	3,428	8	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,659	1,769	0.3	$ 226.87	$ 1,869.60	$ 80	8.2	7.9
34LED	A	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	6912	6,857	16	4 ft LED Tube	200732x2	30	0.5	NONE	6,912	3,318	3,539	0.5	$ 453.74	$ 3,739.20	$ 160	8.2	7.9
34LED	Door 44	8	1T 32 C F 2 (ELE)	F42ILL	62	0.5	SW	6912	3,428	8	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,659	1,769	0.3	$ 226.87	$ 1,869.60	$ 80	8.2	7.9
34LED	Stairs	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	6912	2,143	5	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,037	1,106	0.2	$ 141.79	$ 1,168.50	$ 50	8.2	7.9
34LED	B	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	6912	6,857	16	4 ft LED Tube	200732x2	30	0.5	NONE	6,912	3,318	3,539	0.5	$ 453.74	$ 3,739.20	$ 160	8.2	7.9
23	Round	8	X 5 W CF 2	ECF5/2	20	0.2	SW	6912	1,106	8	X 5 W CF 2	ECF5/2	20	0.2	NONE	6,912	1,106	-	0.0	$ -	$ -	$ -		
34LED	Round	8	1T 32 C F 2 (ELE)	F42ILL	62	0.5	SW	6912	3,428	8	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,659	1,769	0.3	$ 226.87	$ 1,869.60	$ 80	8.2	7.9
34LED	B	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	6912	5,143	12	4 ft LED Tube	200732x2	30	0.4	NONE	6,912	2,488	2,654	0.4	$ 340.31	$ 2,804.40	$ 120	8.2	7.9
34LED	End	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	6912	857	2	4 ft LED Tube	200732x2	30	0.1	NONE	6,912	415	442	0.1	$ 56.72	$ 467.40	$ 20	8.2	7.9
34LED	Stairway	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	6912	2,143	5	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,037	1,106	0.2	$ 141.79	$ 1,168.50	$ 50	8.2	7.9
34LED	?	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	6912	1,714	4	4 ft LED Tube	200732x2	30	0.1	NONE	6,912	829	885	0.1	$ 113.44	$ 934.80	$ 40	8.2	7.9
34LED	Gym	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	NONE	4,320	648	691	0.2	$ 92.44	$ 1,168.50	$ 50	12.6	12.1
34LED	Hall	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	6912	2,143	5	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,037	1,106	0.2	$ 141.79	$ 1,168.50	$ 50	8.2	7.9
34LED	Hall	7	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	6912	3,000	7	4 ft LED Tube	200732x2	30	0.2	NONE	6,912	1,452	1,548	0.2	$ 198.51	$ 1,635.90	$ 70	8.2	7.9
105LED	Elect. . .	4	W 32 W F 1	F41LL	32	0.1	SW	2304	295	4	4 ft LED Tube	200732x1	15	0.1	NONE	2,304	138	157	0.1	$ 22.97	$ 326.70	$ 20	14.2	13.3
34LED	Elect. . .	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	2304	286	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,304	138	147	0.1	$ 21.62	$ 467.40	$ 20	21.6	20.7
34LED	Staircase	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	6912	857	2	4 ft LED Tube	200732x2	30	0.1	NONE	6,912	415	442	0.1	$ 56.72	$ 467.40	$ 20	8.2	7.9
231LED	Front Side	8	WP400MH1	MH400/1	458	3.7	Breaker	3456	12,663	8	WPLED2T78	WPLED2T78	91	0.7	NONE	3,456	2,516	10,147	2.9	$ 1,394.45	$ 8,193.53	$ 800	5.9	5.3
141LED	Enterence	12	HPS 200	HPS200/1	250	3.0	Breaker	3456	10,368	12	FXLED78	FXLED78/1	78	0.9	NONE	3,456	3,235	7,133	2.1	$ 980.29	$ 10,130.35	$ 1,200	10.3	9.1
141LED	Enterence	8	HPS 200	HPS200/1	250	2.0	Breaker	3456	6,912	8	FXLED78	FXLED78/1	78	0.6	NONE	3,456	2,157	4,755	1.4	$ 653.53	$ 6,753.56	$ 800	10.3	9.1
231LED	Parking	8	WP400MH1	MH400/1	458	3.7	Breaker	3456	12,663	8	WPLED2T78	WPLED2T78	91	0.7	NONE	3,456	2,516	10,147	2.9	$ 1,394.45	$ 8,193.53	$ 800	5.9	5.3
141LED	Parking	4	HPS 200	HPS200/1	250	1.0	Breaker	3456	3,456	4	FXLED78	FXLED78/1	78	0.3	NONE	3,456	1,078	2,378	0.7	$ 326.76	$ 3,376.78	$ 400	10.3	9.1
231LED	Parking	36	WP400MH1	MH400/1	458	16.5	Breaker	3456	56,983	36	WPLED2T78	WPLED2T78	91	3.3	NONE	3,456	11,322	45,661	13.2	$ 6,275.01	$ 36,870.88	$ 3,600	5.9	5.3
141LED	Building	4	HPS 200	HPS200/1	250	1.0	Breaker	3456	3,456	4	FXLED78	FXLED78/1	78	0.3	NONE	3,456	1,078	2,378	0.7	$ 326.76	$ 3,376.78	$ 400	10.3	9.1
231LED	Pole	5	WP400MH1	MH400/1	458	2.3	Breaker	3456	7,914	5	WPLED2T78	WPLED2T78	91	0.5	NONE	3,456	1,572	6,342	1.8	$ 871.53	$ 5,120.96	$ 500	5.9	5.3
231LED	Pole	1	WP400MH1	MH400/1	458	0.5	Breaker	3456	1,583	1	WPLED2T78	WPLED2T78	91	0.1	NONE	3,456	314	1,268	0.4	$ 174.31	$ 1,024.19	$ 100	5.9	5.3
35LED	8	5	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	4320	1,944	5	T 59 R LED	RTLED38	38	0.2	OCC	3,240	616	1,328	0.3	$ 174.64	$ 1,309.50	$ 95	7.5	7.0
23	7	37	X 5 W CF 2	ECF5/2	20	0.7	SW	4320	3,197	37	X 5 W CF 2	ECF5/2	20	0.7	OCC	3,240	2,398	799	0.0	$ 95.10	$ 128.25	$ 20	1.3	1.1
23	7	16	X 5 W CF 2	ECF5/2	20	0.3	SW	4320	1,382	16	X 5 W CF 2	ECF5/2	20	0.3	OCC	3,240	1,037	346	0.0	$ 41.13	$ 128.25	$ 20	3.1	2.6
34LED	6	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	6	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	9	27	1T 32 C F 2 (ELE)	F42ILL	62	1.7	SW	4320	7,232	27	4 ft LED Tube	200732x2	30	0.8	OCC	3,240	2,624	4,607	0.9	$ 603.29	$ 6,438.15	$ 290	10.7	10.2
34LED	9	7	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,875	7	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	680	1,194	0.2	$ 156.41	$ 1,764.15	$ 90	11.3	10.7
34LED	5	27	1T 32 C F 2 (ELE)	F42ILL	62	1.7	SW	4320	7,232	27	4 ft LED Tube	200732x2	30	0.8	OCC	3,240	2,624	4,607	0.9	$ 603.29	$ 6,438.15	$ 290	10.7	10.2
34LED	4	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	3	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	10	9	1T 32 C F 2 (ELE)	F42ILL	62	0.6	SW	4320	2,411	9	4 ft LED Tube	200732x2	30	0.3	OCC	3,240	875	1,536	0.3	$ 201.10	$ 2,231.55	$ 110	11.1	10.5
34LED	2	27	1T 32 C F 2 (ELE)	F42ILL	62	1.7	SW	4320	7,232	27	4 ft LED Tube	200732x2	30	0.8	OCC	3,240	2,624	4,607	0.9	$ 603.29	$ 6,438.15	$ 290	10.7	10.2
34LED	11	27	1T 32 C F 2 (ELE)	F42ILL	62	1.7	SW	4320	7,232	27	4 ft LED Tube	200732x2	30	0.8	OCC	3,240	2,624	4,607	0.9	$ 603.29	$ 6,438.15	$ 290	10.7	10.2
34LED	12	9	1T 32 C F 2 (ELE)	F42ILL	62	0.6	SW	4320	2,411	9	4 ft LED Tube	200732x2	30	0.3	OCC	3,240	875	1,536	0.3	$ 201.10	$ 2,231.55	$ 110	11.1	10.5
34LED	13	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	1	27	1T 32 C F 2 (ELE)	F42ILL	62	1.7	SW	4320	7,232	27	4 ft LED Tube	200732x2	30	0.8	OCC	3,240	2,624	4,607	0.9	$ 603.29	$ 6,438.15	$ 290	10.7	10.2
35LED	Library	43	T 32 R F 3 (ELE)	F43ILL/2	90	3.9	SW	4320	16,718	43	T 59 R LED	RTLED38	38	1.6	OCC	3,240	5,294	11,424	2.2	$ 1,501.88	$ 10,287.00	$ 665	6.8	6.4
35LED	Library	22	T 32 R F 3 (ELE)	F43ILL/2	90	2.0	SW	4320	8,554	22	T 59 R LED	RTLED38	38	0.8	OCC	3,240	2,709	5,845	1.1	$ 768.40	$ 5,325.75	$ 350	6.9	6.5
35LED	Library	77	T 32 R F 3 (ELE)	F43ILL/2	90	6.9	SW	4320	29,938	77	T 59 R LED	RTLED38	38	2.9	OCC	3,240	9,480	20,457	4.0	$ 2,689.42	$ 18,319.50	$ 1,175	6.8	6.4
23	Library	35	X 5 W CF 2	ECF5/2	20	0.7	SW	4320	3,024	35	X 5 W CF 2	ECF5/2	20	0.7	OCC	3,240	2,268	756	0.0	$ 89.96	$ 128.25	$ 20	1.4	1.2
35LED	Library	48	T 32 R F 3 (ELE)	F43ILL/2	90	4.3	SW	4320	18,662	48	T 59 R LED	RTLED38	38	1.8	OCC	3,240	5,910	12,753	2.5	$ 1,676.52	$ 11,468.25	$ 740	6.8	6.4
34LED	Electrical	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	2304	429	3	4 ft LED Tube	200732x2	30	0.1	NONE	2,304	207	221	0.1	$ 32.43	$ 701.10	$ 30	21.6	20.7
34LED	Boys Rm	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	Girls RM	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	k1	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	k14.1	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	536	2	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	194	341	0.1	$ 44.69	$ 595.65	$ 40	13.3	12.4
34LED	k13	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	536	2	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	194	341	0.1	$ 44.69	$ 595.65	$ 40	13.3	12.4
34LED	k12	11	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	2,946	11	4 ft LED Tube	200732x2	30	0.3	OCC	3,240	1,069	1,877	0.4	$ 245.78	$ 2,698.95	$ 130	11.0	10.5
34LED	k2	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	k11	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	k3	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	k10	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	k4	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	k5	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	k9	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	k8	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	k6	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	k7	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	Electrical	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	2304	286	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,304	138	147	0.1	$ 21.62	$ 467.40	$ 20	21.6	20.7
34LED	j7	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	j6	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
23	j2	3	X 5 W CF 2	ECF5/2	20	0.1	SW	4320	259	3	X 5 W CF 2	ECF5/2	20	0.1	OCC	3,240	194	65	0.0	$ 7.71	$ 128.25	$ 20	16.6	14.0
34LED	j5	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	j5	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	j9	23	1T 32 C F 2 (ELE)	F42ILL	62	1.4	SW	4320	6,160	23	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,236	3,925	0.7	$ 513.91	$ 5,503.35	$ 250	10.7	10.2
34LED	j10	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
23	j9	3	X 5 W CF 2	ECF5/2	20	0.1	SW	4320	259	3	X 5 W CF 2	ECF5/2	20	0.1	OCC	3,240	194	65	0.0	$ 7.71	$ 128.25	$ 20	16.6	14.0
23	j11	3	X 5 W CF 2	ECF5/2	20	0.1	SW	4320	259	3	X 5 W CF 2	ECF5/2	20	0.1	OCC	3,240	194	65	0.0	$ 7.71	$ 128.25	$ 20	16.6	14.0
34LED	j11	23	1T 32 C F 2 (ELE)	F42ILL	62	1.4	SW	4320	6,160	23	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,236	3,925	0.7	$ 513.91	$ 5,503.35	$ 250	10.7	10.2
34LED	j4	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	j2	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	j6	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	i9	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i10	30	1T 32 C F 2 (ELE)	F42ILL	62	1.9	SW	4320	8,035	30	4 ft LED Tube	200732x2	30	0.9	OCC	3,240	2,916	5,119	1.0	$ 670.32	$ 7,139.25	$ 320	10.7	10.2
34LED	i8	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i11	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	i7	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	i12	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i6	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i13	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i5	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	i14	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i4	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i3	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	i15	9	1T 32 C F 2 (ELE)	F42ILL	62	0.6	SW	4320	2,411	9	4 ft LED Tube	200732x2	30	0.3	OCC	3,240	875	1,536	0.3	$ 201.10	$ 2,231.55	$ 110	11.1	10.5
34LED	i2	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	Boys Rm	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	Girls RM	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	l1	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h21	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	h1	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h17	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6

Energy Audit of East Brunswick High School
CHA Project No. 31007
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
34LED	h17	1	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	268	1	4 ft LED Tube	200732x2	30	0.0	OCC	3,240	97	171	0.0	$ 22.34	$ 361.95	$ 30	16.2	14.9
34LED	h2	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	h15	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	h3	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h4	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h14	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h5	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	h13	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h6	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h12	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	h7	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	h11	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	h8	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	h10	30	1T 32 C F 2 (ELE)	F42ILL	62	1.9	SW	4320	8,035	30	4 ft LED Tube	200732x2	30	0.9	OCC	3,240	2,916	5,119	1.0	$ 670.32	$ 7,139.25	$ 320	10.7	10.2
34LED	h9	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
35LED	Electrical	2	T 32 R F 3 (ELE)	F43ILL/2	90	0.2	SW	2304	415	2	T 59 R LED	RTLED38	38	0.1	NONE	2,304	175	240	0.1	$ 35.14	$ 472.50	$ 30	13.4	12.6
34LED	g11	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g8	21	1T 32 C F 2 (ELE)	F42ILL	62	1.3	SW	4320	5,625	21	4 ft LED Tube	200732x2	30	0.6	OCC	3,240	2,041	3,583	0.7	$ 469.23	$ 5,035.95	$ 230	10.7	10.2
34LED	g12	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g7	21	1T 32 C F 2 (ELE)	F42ILL	62	1.3	SW	4320	5,625	21	4 ft LED Tube	200732x2	30	0.6	OCC	3,240	2,041	3,583	0.7	$ 469.23	$ 5,035.95	$ 230	10.7	10.2
34LED	g13	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g6	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g14	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g5	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g15	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g4	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	g4	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	536	2	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	194	341	0.1	$ 44.69	$ 595.65	$ 40	13.3	12.4
34LED	g11	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g2	1	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	268	1	4 ft LED Tube	200732x2	30	0.0	OCC	3,240	97	171	0.0	$ 22.34	$ 361.95	$ 30	16.2	14.9
34LED	g17	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	g1	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
35LED	g10	6	T 32 R F 3 (ELE)	F43ILL/2	90	0.5	SW	4320	2,333	6	T 59 R LED	RTLED38	38	0.2	2	3,240	739	1,594	0.3	$ 209.56	$ 1,417.50	$ 90	6.8	6.3
34LED	f1	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f2	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	f17	8	1T 32 C F 2 (ELE)	F42ILL	62	0.5	SW	4320	2,143	8	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	778	1,365	0.3	$ 178.75	$ 1,997.85	$ 100	11.2	10.6
34LED	f3	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f4	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f16	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f5	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	f15	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f6	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f14	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f14	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	f13	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	536	2	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	194	341	0.1	$ 44.69	$ 595.65	$ 40	13.3	12.4
34LED	f7	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	f8	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	f11	20	1T 32 C F 2 (ELE)	F42ILL	62	1.2	SW	4320	5,357	20	4 ft LED Tube	200732x2	30	0.6	OCC	3,240	1,944	3,413	0.6	$ 446.88	$ 4,802.25	$ 220	10.7	10.3
34LED	f9	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	f10	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	e6	64	1T 32 C F 2 (ELE)	F42ILL	62	4.0	SW	4320	17,142	64	4 ft LED Tube	200732x2	30	1.9	OCC	3,240	6,221	10,921	2.0	$ 1,430.02	$ 15,085.05	$ 660	10.5	10.1
34LED	e8	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	e7	64	1T 32 C F 2 (ELE)	F42ILL	62	4.0	SW	4320	17,142	64	4 ft LED Tube	200732x2	30	1.9	OCC	3,240	6,221	10,921	2.0	$ 1,430.02	$ 15,085.05	$ 660	10.5	10.1
34LED	e7/6	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	Cafeteria	132	1T 32 C F 2 (ELE)	F42ILL	62	8.2	SW	3456	28,284	132	4 ft LED Tube	200732x2	30	4.0	OCC	2,592	10,264	18,020	4.2	$ 2,413.33	$ 30,976.65	$ 1,340	12.8	12.3
23	Cafeteria	42	X 5 W CF 2	ECF5/2	20	0.8	SW	3456	2,903	42	X 5 W CF 2	ECF5/2	20	0.8	OCC	2,592	2,177	726	0.0	$ 86.37	$ 128.25	$ 20	1.5	1.3
34LED	Cafeteria	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	3456	857	4	4 ft LED Tube	200732x2	30	0.1	OCC	2,592	311	546	0.1	$ 73.13	$ 1,063.05	$ 60	14.5	13.7
34LED	Cafeteria	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	3456	3,428	16	4 ft LED Tube	200732x2	30	0.5	OCC	2,592	1,244	2,184	0.5	$ 292.53	$ 3,867.45	$ 180	13.2	12.6
34LED	Boys Rm	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	Girls RM	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	Staff Café	10	1T 32 C F 2 (ELE)	F42ILL	62	0.6	SW	3456	2,143	10	4 ft LED Tube	200732x2	30	0.3	OCC	2,592	778	1,365	0.3	$ 182.83	$ 2,465.25	$ 120	13.5	12.8
34LED	Kitchen	44	1T 32 C F 2 (ELE)	F42ILL	62	2.7	SW	2304	6,285	44	4 ft LED Tube	200732x2	30	1.3	OCC	1,728	2,281	4,004	1.4	$ 566.18	$ 10,411.05	$ 460	18.4	17.6
34LED	Storage	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	3456	429	2	4 ft LED Tube	200732x2	30	0.1	OCC	2,592	156	273	0.1	$ 36.57	$ 595.65	$ 40	16.3	15.2
34LED	Storage	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	3456	2,571	12	4 ft LED Tube	200732x2	30	0.4	OCC	2,592	933	1,638	0.4	$ 219.39	$ 2,932.65	$ 140	13.4	12.7
34LED	d19	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	d18	8	1T 32 C F 2 (ELE)	F42ILL	62	0.5	SW	4320	2,143	8	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	778	1,365	0.3	$ 178.75	$ 1,997.85	$ 100	11.2	10.6
34LED	d17	20	1T 32 C F 2 (ELE)	F42ILL	62	1.2	SW	4320	5,357	20	4 ft LED Tube	200732x2	30	0.6	OCC	3,240	1,944	3,413	0.6	$ 446.88	$ 4,802.25	$ 220	10.7	10.3
34LED	e18	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	e17	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	e16	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	e1	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	e1	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	536	2	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	194	341	0.1	$ 44.69	$ 595.65	$ 40	13.3	12.4
34LED	e14	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	e2	27	1T 32 C F 2 (ELE)	F42ILL	62	1.7	SW	4320	7,232	27	4 ft LED Tube	200732x2	30	0.8	OCC	3,240	2,624	4,607	0.9	$ 603.29	$ 6,438.15	$ 290	10.7	10.2
34LED	e11	33	1T 32 C F 2 (ELE)	F42ILL	62	2.0	SW	4320	8,839	33	4 ft LED Tube	200732x2	30	1.0	OCC	3,240	3,208	5,631	1.1	$ 737.35	$ 7,840.35	$ 350	10.6	10.2
34LED	e3	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	e4	18	1T 32 C F 2 (ELE)	F42ILL	62	1.1	SW	4320	4,821	18	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,750	3,072	0.6	$ 402.19	$ 4,334.85	$ 200	10.8	10.3
34LED	e10	21	1T 32 C F 2 (ELE)	F42ILL	62	1.3	SW	4320	5,625	21	4 ft LED Tube	200732x2	30	0.6	OCC	3,240	2,041	3,583	0.7	$ 469.23	$ 5,035.95	$ 230	10.7	10.2
34LED	Electrical	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	2304	571	4	4 ft LED Tube	200732x2	30	0.1	NONE	2,304	276	295	0.1	$ 43.25	$ 934.80	$ 40	21.6	20.7
34LED	d13	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	d12	9	1T 32 C F 2 (ELE)	F42ILL	62	0.6	SW	4320	2,411	9	4 ft LED Tube	200732x2	30	0.3	OCC	3,240	875	1,536	0.3	$ 201.10	$ 2,231.55	$ 110	11.1	10.5
34LED	d10	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	d7	33	1T 32 C F 2 (ELE)	F42ILL	62	2.0	SW	4320	8,839	33	4 ft LED Tube	200732x2	30	1.0	OCC	3,240	3,208	5,631	1.1	$ 737.35	$ 7,840.35	$ 350	10.6	10.2
34LED	d8	11	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	2,946	11	4 ft LED Tube	200732x2	30	0.3	OCC	3,240	1,069	1,877	0.4	$ 245.78	$ 2,698.95	$ 130	11.0	10.5
34LED	Storage	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	3456	643	3	4 ft LED Tube	200732x2	30	0.1	OCC	2,592	233	410	0.1	$ 54.85	$ 829.35	$ 50	15.1	14.2
34LED	d22	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
23	d22	17	X 5 W CF 2	ECF5/2	20	0.3	SW	4320	1,469	17	X 5 W CF 2	ECF5/2	20	0.3	OCC	3,240	1,102	367	0.0	$ 43.70	$ 128.25	$ 20	2.9	2.5
34LED	d22	34	1T 32 C F 2 (ELE)	F42ILL	62	2.1	SW	4320	9,107	34	4 ft LED Tube	200732x2	30	1.0	OCC	3,240	3,305	5,802	1.1	$ 759.70	$ 8,074.05	$ 360	10.6	10.2
34LED	Storage	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	3456	1,286	6	4 ft LED Tube	200732x2	30	0.2	OCC	2,592	467	819	0.2	$ 109.70	$ 1,530.45	$ 80	14.0	13.2
34LED	d5	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	4320	4,285	16	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,555	2,730	0.5	$ 357.50	$ 3,867.45	$ 180	10.8	10.3
34LED	d4	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	4320	4,285	16	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,555	2,730	0.5	$ 357.50	$ 3,867.45	$ 180	10.8	10.3
34LED	Boys Rm	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	Girls RM	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	Auditorium	28	1T 32 C F 2 (ELE)	F42ILL	62	1.7	SW	2880	5,000	28	4 ft LED Tube	200732x2	30	0.8	None	2,880	2,419	2,580	0.9	$ 364.14	$ 6,543.60	$ 280	18.0	17.2
23	Storage	3	X 5 W CF 2	ECF5/2	20	0.1	SW	3456	207	3	X 5 W CF 2	ECF5/2	20	0.1	OCC	2,592	156	52	0.0	$ 6.17	$ 128.25	$ 20	20.8	17.5
34LED	c34	13	1T 32 C F 2 (ELE)	F42ILL	62	0.8	SW	4320	3,482	13	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,264	2,218	0.4	$ 290.47	$ 3,166.35	$ 150	10.9	10.4
34LED	Boys Rm	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	Girls RM	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	Faculty BR	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	c24	15	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	4,018	15	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,458	2,560	0.5	$ 335.16	$ 3,633.75	$ 170	10.8	10.3
34LED	c25	15	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	4,018	15	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,458	2,560	0.5	$ 335.16	$ 3,633.75	$ 170	10.8	10.3
34LED	c28	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
34LED	c26	15	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	4,018	15	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,458	2,560	0.5	$ 335.16	$ 3,633.75	$ 170	10.8	10.3
34LED	c27	12	1T 32 C F 2 (ELE)	F42ILL	62	0.7	SW	4320	3,214	12	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,166	2,048	0.4	$ 268.13	$ 2,932.65	$ 140	10.9	10.4
35LED	c1	38	T 32 R F 3 (ELE)	F43ILL/2	90	3.4	SW	4320	14,774	38	T 59 R LED	RTLED38	38	1.4	OCC	3,240	4,679	10,096	2.0	$ 1,327.24	$ 9,105.75	$ 590	6.9	6.4
34LED	c16	24	1T 32 C F 2 (ELE)	F42ILL	62	1.5	SW	4320	6,428	24	4 ft LED Tube	200732x2	30	0.7	OCC	3,240	2,333	4,095	0.8	$ 536.26	$ 5,737.05	$ 260	10.7	10.2
34LED	Mens Br	5	1T 32 C F 2 (ELE)	F42ILL	62	0.3	SW	4320	1,339	5	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	486	853	0.2	$ 111.72	$ 1,296.75	$ 70	11.6	11.0
34LED	Womens BR	6	1T 32 C F 2 (ELE)	F42ILL	62	0.4	SW	4320	1,607	6	4 ft LED Tube	200732x2	30	0.2	OCC	3,240	583	1,024	0.2	$ 134.06	$ 1,530.45	$ 80	11.4	10.8
34LED	Main Office	47	1T 32 C F 2 (ELE)	F42ILL	62	2.9	SW	4320	12,588	47	4 ft LED Tube	200732x2	30	1.4	OCC	3,240	4,568	8,020	1.5	$ 1,050.17	$ 11,112.15	$ 490	10.6	10.1
34LED	Main Office	1	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	268	1	4 ft LED Tube	200732x2	30	0.0	OCC	3,240	97	171	0.0	$ 22.34	$ 361.95	$ 30	16.2	14.9
34LED	Main Office	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
35LED	a1	14	T 32 R F 3 (ELE)	F43ILL/2	90	1.3	SW	4320	5,443	14	T 59 R LED	RTLED38	38	0.5	OCC	3,240	1,724	3,720	0.7	$ 488.98	$ 3,435.75	$ 230	7.0	6.6
34LED	a6	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	4320	4,285	16	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,555	2,730	0.5	$ 357.50	$ 3,867.45	$ 180	10.8	10.3
34LED	a2	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	4320	4,285	16	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,555	2,730	0.5	$ 357.50	$ 3,867.45	$ 180	10.8	10.3
34LED	a3	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	4320	4,285	16	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,555	2,730	0.5	$ 357.50	$ 3,867.45	$ 180	10.8	10.3
34LED	a4	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	4320	4,285	16	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,555	2,730	0.5	$ 357.50	$ 3,867.45	$ 180	10.8	10.3
34LED	a5	16	1T 32 C F 2 (ELE)	F42ILL	62	1.0	SW	4320	4,285	16	4 ft LED Tube	200732x2	30	0.5	OCC	3,240	1,555	2,730	0.5	$ 357.50	$ 3,867.45	$ 180	10.8	10.3
34LED	a2	2	1T 32 C F 2 (ELE)	F42ILL	62	0.1	SW	4320	536	2	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	194	341	0.1	$ 44.69	$ 595.65	$ 40	13.3	12.4
34LED	Storage	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	3456	643	3	4 ft LED Tube	200732x2	30	0.1	OCC	2,592	233	410	0.1	$ 54.85	$ 829.35	$ 50	15.1	14.2
34LED	b28	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b27	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b2	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b3	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4

Energy Audit of East Brunswick High School
CHA Project No. 31007
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) * (kWh Saved)	Cost for renovations to lighting system	Prescriptive Lighting Measures	Length of time for renovations cost to be recovered	Length of time for renovations cost to be recovered
34LED	b26	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b25	21	1T 32 C F 2 (ELE)	F42ILL	62	1.3	SW	4320	5,625	21	4 ft LED Tube	200732x2	30	0.6	OCC	3,240	2,041	3,583	0.7	$ 469.23	$ 5,035.95	$ 230	10.7	10.2
34LED	b7	4	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	1,071	4	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	389	683	0.1	$ 89.38	$ 1,063.05	$ 60	11.9	11.2
34LED	b6	3	1T 32 C F 2 (ELE)	F42ILL	62	0.2	SW	4320	804	3	4 ft LED Tube	200732x2	30	0.1	OCC	3,240	292	512	0.1	$ 67.03	$ 829.35	$ 50	12.4	11.6
34LED	b24	21	1T 32 C F 2 (ELE)	F42ILL	62	1.3	SW	4320	5,625	21	4 ft LED Tube	200732x2	30	0.6	OCC	3,240	2,041	3,583	0.7	$ 469.23	$ 5,035.95	$ 230	10.7	10.2
34LED	b27	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b10	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b11	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b22	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b21	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b12	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
34LED	b13	14	1T 32 C F 2 (ELE)	F42ILL	62	0.9	SW	4320	3,750	14	4 ft LED Tube	200732x2	30	0.4	OCC	3,240	1,361	2,389	0.4	$ 312.82	$ 3,400.05	$ 160	10.9	10.4
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
S	**Total**	**3,454**				**248.5**			**1,108,900**	**3,454**				**110.4**			**406,179**		**138.1**	**92,421**	**877,350**	**$49,575**		
S																	**Demand Savings**			**138.1**	**$8,797**			
S																	**kWh Savings**			**702,722**	**$83,624**			
S																	**Total Savings**				**$92,421**		**9.5**	**9.0**

APPENDIX D

Photos

HHW Pumps

DHW HEATER

Boilers

RTU

Exhaust Fan – Kitchen Hood

Unit Heater

East Brunswick Schools
East Brunswick High School

Cost of Electricity	$0.135	/kWh
Electricity Usage	2,718,513	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
$2,280,000	**570.0**	**690,920**	**0**	**$93,274**	**0**	**$93,274**	**$0**	**$172,730**	**24.4**	**8.6**

** Estimated Solar Renewable Energy Certificate Program (SREC) SREC for 15 Years= $250 /1000kwh

Area Output*
13,665 m2
147,089 ft2

Perimeter Output*
1,905 m
6,250 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
71,901 ft2

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

8	watt/ft2	
575,204	DC watts	
570	kW	Enter into PV Watts

PV Watts Inputs***

Array Tilt Angle	10	Enter into PV Watts (always 20 if flat, if pitched - enter estimated roof angle)
Array Azimuth	178	Enter into PV Watts (default)
Zip Code	08816	Enter into PV Watts
DC/AC Derate Factor	0.83	Enter info PV Watts

PV Watts Output
690,920 annual kWh calculated in PV Watts program

% Offset Calc

Usage	2,718,513	(from utilities)
PV Generation	690,920	(generated using PV Watts)
% offset	25%	

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

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at http://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

The energy output range is based on analysis of 30 years of historical weather data for nearby , and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

690,920 kWh per Year *

System output may range from 664,596 to 723,739kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)	Energy Value ($)
January	2.39	36,518	4,930
February	3.17	43,387	5,857
March	4.07	60,498	8,167
April	4.83	67,263	9,081
May	5.70	79,516	10,735
June	5.94	78,152	10,550
July	5.77	77,518	10,465
August	5.38	71,826	9,697
September	4.65	61,741	8,335
October	3.61	51,013	6,887
November	2.35	33,368	4,505
December	2.01	30,120	4,066
Annual	**4.16**	**690,920**	**$ 93,275**

Location and Station Identification

Requested Location	730 18 north east brunswick, nj
Weather Data Source	(TMY2) NEWARK, NJ 23 mi
Latitude	40.7° N
Longitude	74.17° W

PV System Specifications *(Commercial)*

DC System Size	570 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	10°
Array Azimuth	178°
System Losses	14%
Inverter Efficiency	96%
DC to AC Size Ratio	1.1

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.14 $/kWh
Initial Cost	4.00 $/Wdc
Cost of Electricity Generated by System	0.12 $/kWh

Selected Incentives

Residential Renewable Energy Tax Credit

Investment Tax Credit (ITC)	Percent of Cost: 30%

These values can be compared to get an idea of the cost-effectiveness of this system. However, system costs, system financing options (including 3rd party ownership) and complex utility rates can significantly change the relative value of the PV system.

APPENDIX F

EPA Benchmarking Report

ENERGY STAR® Statement of Energy Performance

East Brunswick High School

75

ENERGY STAR® Score[1]

Primary Property Function: K-12 School
Gross Floor Area (ft²): 360,422
Built: 1959

For Year Ending: March 31, 2015
Date Generated: February 05, 2016

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
East Brunswick High School 380 Cranbury Road East Brunswick, New Jersey 08816	_____ , (____)____-_____	____ _____ , (____)____-_____ _____

Property ID: 4795923

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
77.7 kBtu/ft²

Source EUI
135.4 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	9,275,556 (33%)
Natural Gas (kBtu)	18,731,541 (67%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	100.5
National Median Source EUI (kBtu/ft²)	175.2
% Diff from National Median Source EUI	-23%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	2,237

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)