EAST BRUNSWICK BOARD OF EDUCATION

MEMORIAL ELEMENTARY SCHOOL

14 Innes Road, East Brunswick, NJ 08816

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

February 2016

Prepared by:

6 Campus Drive
Parsippany, NJ 07054
(973) 538-2120

CHA PROJECT NO. 31007

TABLE OF CONTENTS

APPENDICES

REPORT DISCLAIMER

This audit was conducted in accordance with the standards developed by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for a Level II audit. Cost and savings calculations for a given measure were estimated to within ±20%, and are based on data obtained from the owner, data obtained during site observations, professional experience, historical data, and standard engineering practice. Cost data does not include soft costs such as engineering fees, legal fees, project management fees, financing, etc.

A thorough walkthrough of the building was performed, which included gathering nameplate information and operating parameters for all accessible equipment and lighting systems. Unless otherwise stated, model, efficiency, and capacity information included in this report were collected directly from equipment nameplates and /or from documentation provided by the owner during the site visit. Typical operation and scheduling information was obtained from interviewing staff and spot measurements taken in the field.

List of Common Energy Audit Abbreviations

- A/C – Air Conditioning
- AHS – Air Handling Unit
- BMS – Building Management System
- Btu – British thermal unit
- CDW – Condenser Water
- CFM – Cubic feet per minute
- CHW – Chilled Water
- DCV – Demand Control Ventilation
- DDC – Direct Digital Control
- DHW – Domestic Hot Water
- DX – Direct Expansion
- EER – Energy Efficiency Ratio
- EF – Exhaust Fan
- EUI – Energy Use Intensity
- Gal – Gallon
- GPD – Gallons per day
- GPF – Gallons Per Flush
- GPH – Gallons per hour
- GPM – Gallons per minute
- GPS – Gallons per second
- HHW – Heating Hot Water
- HID – High Intensity Discharge
- HP – Horsepower
- HRU – Heat Recovery Unit
- HVAC – Heating, Ventilation, Air Conditioning
- HX – Heat Exchanger
- kbtu/mbtu – One thousand (1,000) Btu
- kW – Kilowatt (1,000 watts)
- kWh – Kilowatt-hours
- LED – Light Emitting Diode
- mbh – Thousand Btu per hour
- mmbtu – One million (1,000,000) Btu
- OCC – Occupancy Sensor
- PSI – Pounds per square inch
- RTU – Rooftop Unit
- SBC – System Benefits Charge
- SF – Square foot
- UH – Unit Heater
- V – Volts
- VAV – Variable Air Volume
- VSD – Variable Speed Drive
- W – Watt

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
Memorial Elementary School	14 Innes Road East Brunswick NJ 08816	82,821	2012

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)
Memorial Elementary School	166,702	3,619	29,802	13.9

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

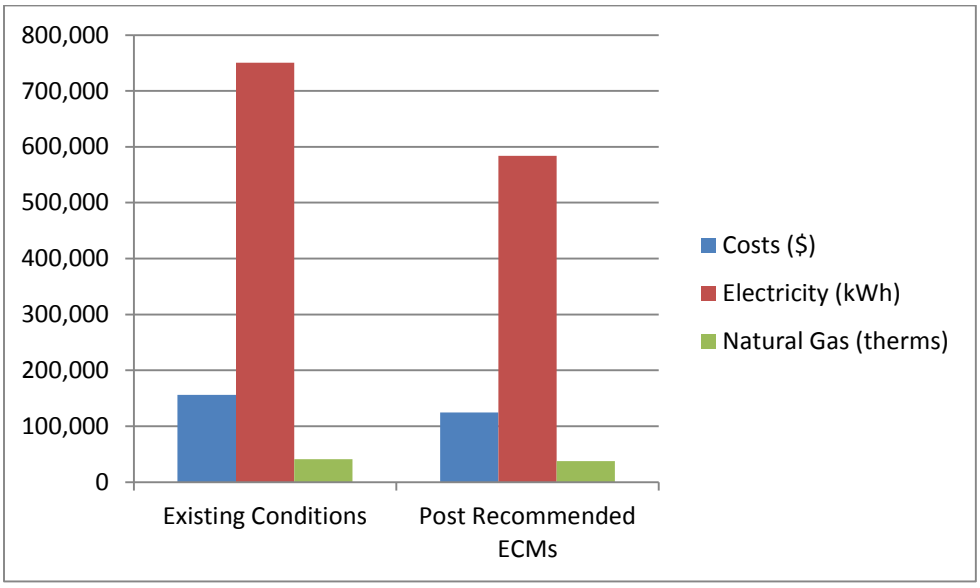
ECM #	Energy Conservation Measure	Est. Costs ($)	Est. Savings ($/year)	Payback w/o Incentive	Potential Incentive ($)*	Payback w/ Incentive	Recommended
ECM-1	Replace PEF units with Energy Recovery Units	242,800	18,188	13.3	-	13.3	Y
ECM-2	Lighting Replacement With Controls	177,703	11,614	15.3	6,025	14.8	Y
	Total**	**420,503**	**29,802**	**14.1**	**6,025**	**13.9**	
	Total(Recommended)	**420,503**	**29,802**	**14.1**	**6,025**	**13.9**	

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

By implementing the recommended ECMs, the building could result in a total of 89.36 metric tons of greenhouse gas (GHG) reduction.

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	155,942	126,140	19%
Electricity (kWh)	750,362	583,660	22%
Natural Gas (therms)	40,991	37,372	9%
Site EUI (kbtu/SF/Yr)	80.4	69.2	



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: Memorial Elementary School
Address: 14 Innes Road, East Brunswick NJ 08816
Gross Floor Area: 82,821 square feet
Number of Floors: There is a single story section that is linked together with a two story building. The one story building is primarily administrative with spaces to house the electrical and mechanical equipment. The two-story section houses classrooms.
Year Built: The school was built in 2012 and is modern.

General

Description of Spaces: Besides classrooms and office spaces, this school has a gym, cafetorium, cafeteria, media center, music room, kitchen, mechanical rooms, and storage spaces.
Description of Occupancy: There are about 600 students enrolled with about 100 staff personnel.
Building Usage: The school operates Monday through Friday from 7:00 AM to 6:00 PM due to after school program and with janitors occupying the facility until 11:00 PM. Typically there are not weekend operations.
Construction Materials: The outside walls are constructed of 8” CMU, 3” insulation and mixture of concrete and wood panels. No ECM associated with wall upgrades was evaluated.
Roof: The roof is flat, insulated and in good condition. No ECM associated with roof replacement was evaluated.

Windows: The windows are double pane in metal frames. No ECM pertaining to window replacements has been evaluated.
Exterior Doors: All exterior doors of the facility are steel doors and are in good condition. No ECM associated with replacing the doors sweeps and seals have been evaluated.

Heating Ventilation & Air Conditioning (HVAC) Systems

In general the building was designed with energy efficiency in mind as the HVAC equipment is Energy Star rated.

Heating:
Heating to most areas comes from (3) Benchmark 2.0 gas fired boilers producing heating hot water and delivering it to unit ventilators located throughout the building. There are (2) 20 HP heating hot water pumps operating in lead lag fashion and utilizing VFDs
There (18) RTUs roof top units serving this building.

Cooling:
The entire building is cooled utilizing DX cooling via rooftop packaged units working with VAV boxes and reheat coils. Several spaces are cooled with split systems

Ventilation: The fresh air for ventilation is 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 many fractional HP exhaust fans serving restrooms, science rooms, kitchen and general exhaust located on the roof. There are also Power Exhaust Fans (PEF) and some are ducted to return plenums. An ECM related to Power Exhaust Fans was evaluated.

Controls Systems

HVAC controls consist of full EMS Johnson controls that are preprogrammed with operating and setback schedules.

Domestic Hot Water Systems

Domestic Hot Water is produced by an AO Smith gas fired 100 gallon capacity hot water heater installed in 2011.

Kitchen Equipment

Operations are mainly warming up and serving. There is no dish washer, nor cooking stove. There is not exhaust hood. No ECM related to kitchen equipment was evaluated.

Plug Load

The facility has computers, copiers, printers, and kitchen appliances that contribute to the plug load in the building. We have evaluated that the plug loads have minimal impact compared to other electric consuming devices therefore no ECMs associated with plug loads have been evaluated.

Plumbing Systems

There are numerous restrooms in the building. Plumbing fixtures are low flow types and many with metering controls. No ECM associated with plumbing fixtures was evaluated.

Lighting Systems

Indoor lighting predominantly consists of standard T-8s and some spot CFLs. Lighting is operated on switches, however there are many occupancy sensors through the building. Outdoor lighting consists of several wall mounted CFLs. There are also pole mounted MHs lamps controlled by sensors. An ECM has been evaluated in regards to the lighting and its controls.

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:

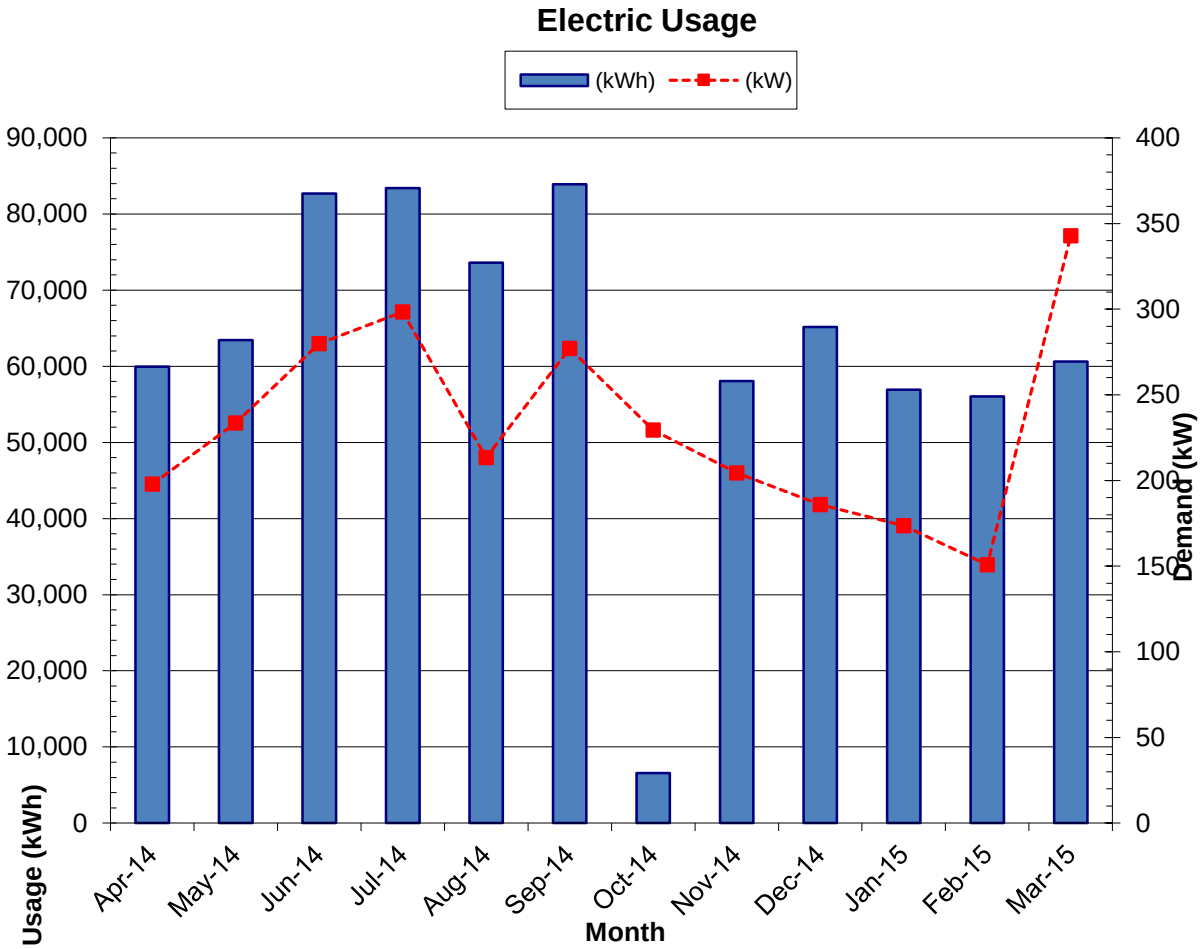
3.0

	Electric	Natural Gas	Water
Deliverer	PSE&G	PSE&G	United Water
Supplier	PSE&G	PSE&G	N/A

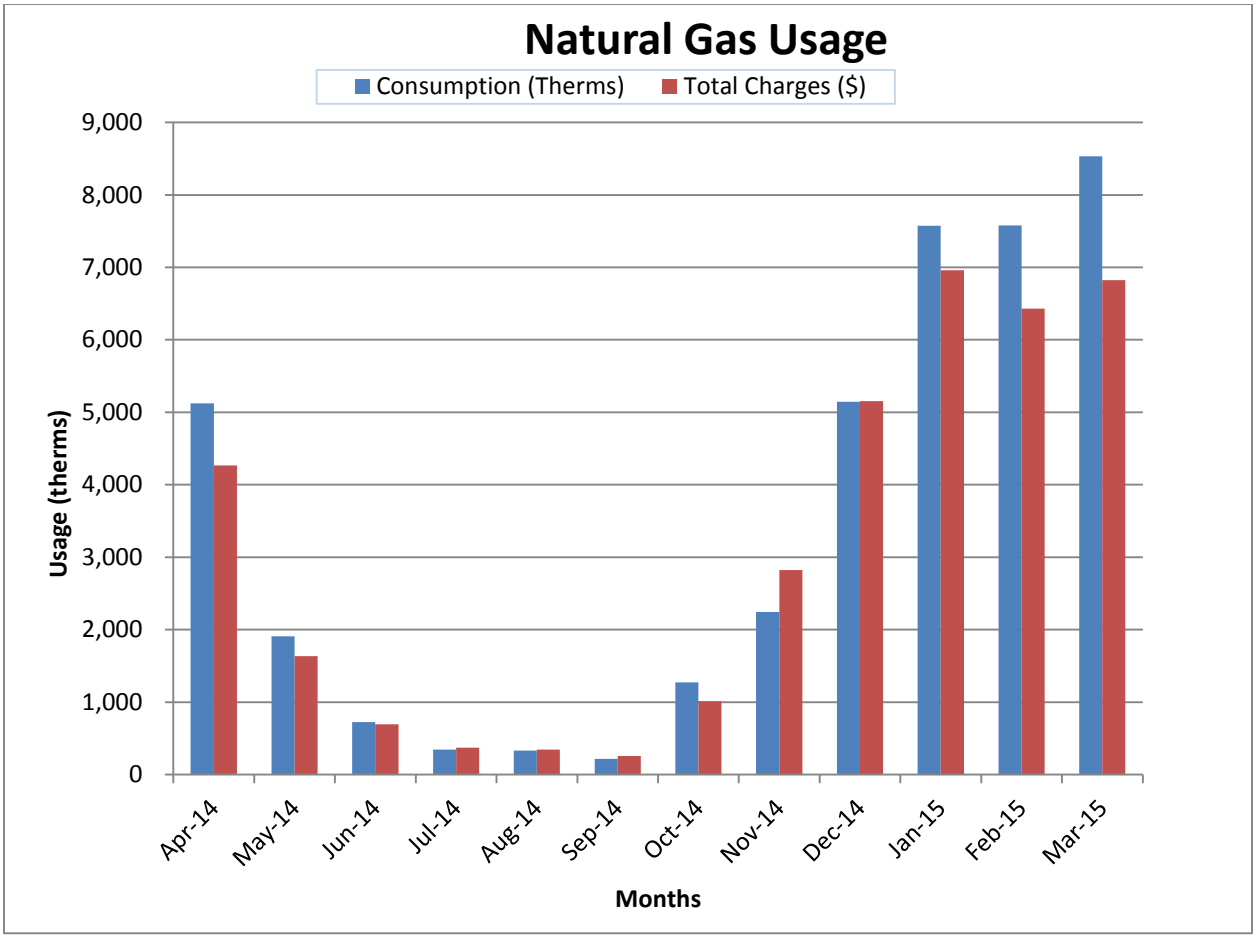
For the 12-month period ending in September 2015, the utilities usages and costs for the building were as follows:

Electric		
Annual Usage	750,362	kWh/yr
Annual Cost	119,165	$
Blended Rate	0.159	$/kWh
Consumption Rate	0.135	$/kWh
Demand Rate	6.34	$/kW
Peak Demand	342.8	kW
Min. Demand	150.8	kW
Avg. Demand	232.3	kW
Natural Gas		
Annual Usage	40,991	Therms/yr
Annual Cost	36,777	$
Blended Rate	0.897	$/therm
Consumption Rate	0.290	$/therm
Demand Rate	0.607	$/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)



The electric usage is consistent throughout the year and varies with the usage of the building except for a drop in October. The reason for the drop in usage of October is unknown to us.



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

See Appendix A for utility analysis.

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

Comparison of Utility Rates to NJ State Average Rates*				Recommended to Shop for Third Party Supplier?
Utility	Units	School Average Rate	NJ Average Rate	
Electricity	$/kWh	$0.159	$0.13	Y
Natural Gas	$/Therm	$0.897	$0.96	N

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

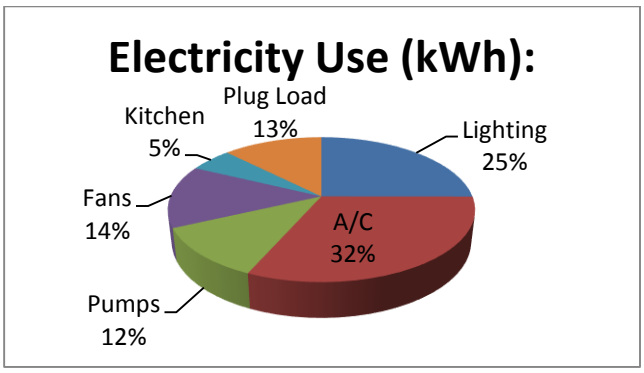
Additional information on selecting a third party energy supplier is available here:

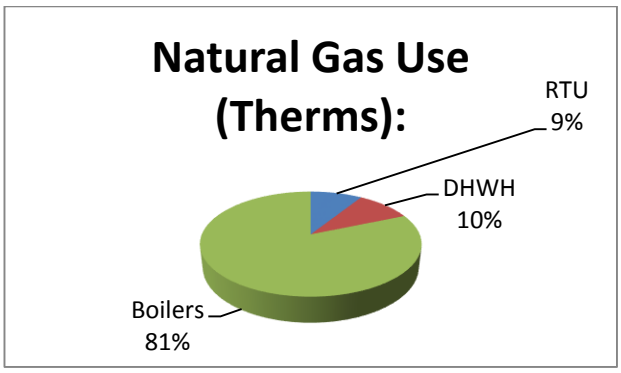
http://www.state.nj.us/bpu/commercial/shopping.html.

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.

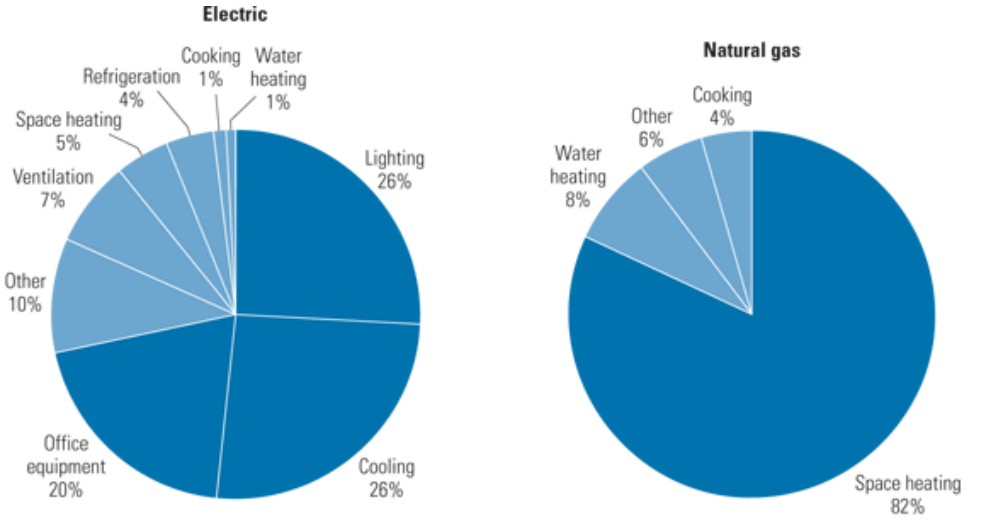
Site End-Use Utility Profile





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

BENCHMARKING

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

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

Site EUI kBtu/ft^2/yr	Source EUI (kBtu/ft^2/yr)	Energy Star Rating (1-100)
79.8	146.7	51

The school has an 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]

ENERGY CONSERVATION MEASURES

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

5.0

- 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 Heat Recovery Units

This measure analyzes energy savings that could result from the installation of a total energy recovery unit to reclaim heat and latent energy contained in the exhausted air from the PEF units and transfer that energy back into the ventilation (outdoor) air stream. Natural Gas and Electrical energy savings result in reduced heating, cooling, and dehumidification loads.

Implementation would involve installation of heat recovery units and ductwork connected to the discharge side of the existing exhaust fan(s). The duct would be installed on the roof and extended to the fresh air intake areas within the facility.

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

ECM-1 Heat Recovery for PEF

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
242,800	0	93,973	3,619	18,188	(0.3)	-	13.3	13.3

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

This measure is recommended.

5.2 ECM-2 Lighting Replacements/Upgrades

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-2 Lighting Replacements/Upgrades

Budgetary Cost	Annual Utility Savings				ROI	Potential Incentive*	Payback (without incentive)	Payback (with incentive)
	Electricity		Natural Gas	Total				
$	kW	kWh	Therms	$		$	Years	Years
177,703	23.6	72,729	0	11,614	(0.2)	6,025	15.3	14.8

This measure is recommended.

5.3 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:

- Replace filters in air handling equipment regularly
- Check exhaust fans for backdraft dampers and install dampers if they are not present

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. Refer to Appendix D for more information on this program.

6.1.5 Renewable Energy Incentive Program

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

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

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

ALTERNATIVE ENERGY SCREENING EVALUATION

7.1 Solar

7.1.1 Photovoltaic Rooftop Solar Power Generation

7.0

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)
15,016	50

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
200,000	50.00	60,598	0	9,635	15,150	20.8	8.1	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.

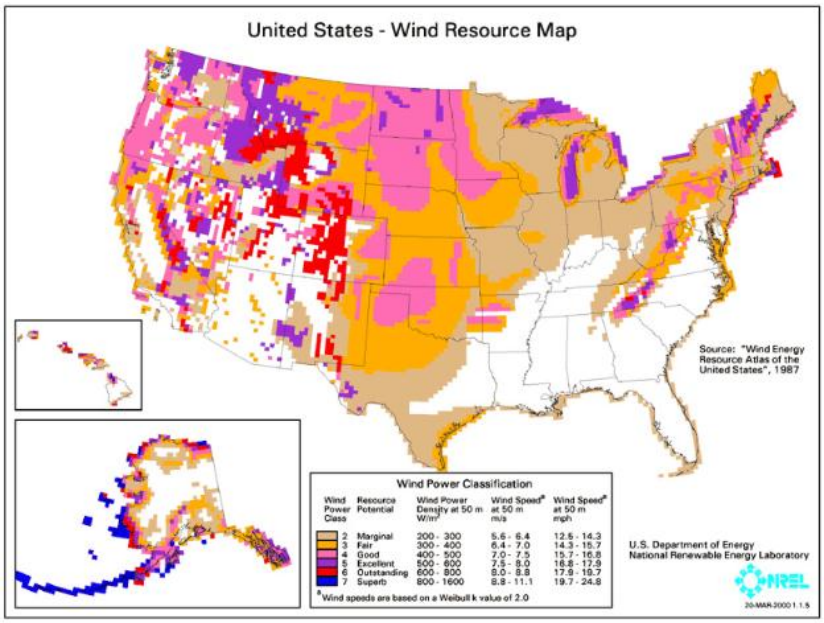
Several options exist for using active solar thermal systems for space heating. The most common method is called a passive solar hot water system involves using glazed collectors to heat a liquid held in a storage tank (similar to an active solar hot water system described above which requires pumping). 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 October 2014 through September 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
342.8	150.8	232.3	N	Y

*the demand is estimated from one month bill

This measure is not recommended due to the lack of enough onsite generation and load shedding capabilities.

CONCLUSIONS & RECOMMENDATIONS

The following section summarizes the LGEA energy audit conducted by CHA for Memorial Elementary School.

The following projects should be considered for implementation:

8.0

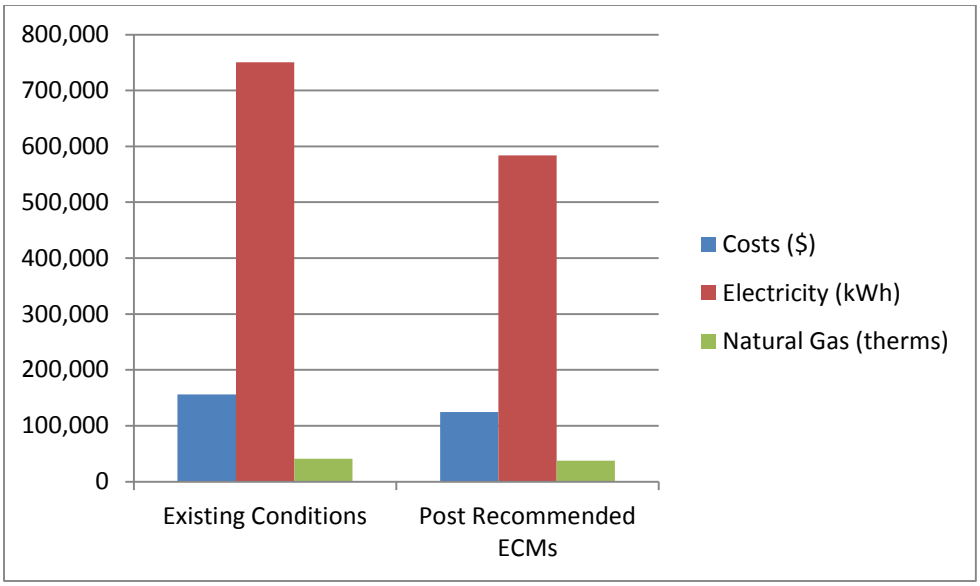
- Heat Recovery for Power Exhaust Fans
- Lighting Replacements / Upgrades W/ Controls

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)
166,702	3,619	29,802	13.9

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

	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	155,942	126,140	19%
Electricity (kWh)	750,362	583,660	22%
Natural Gas (therms)	40,991	37,372	9%
Site EUI (kbtu/SF/Yr)	80.4	69.2	



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
Memorial Elementary School

Utility Bills: Account Numbers

Account Number	Building	Type
4218300208	Memorial Elementary School	Electric
4217750404	Memorial Elementary School	Gas

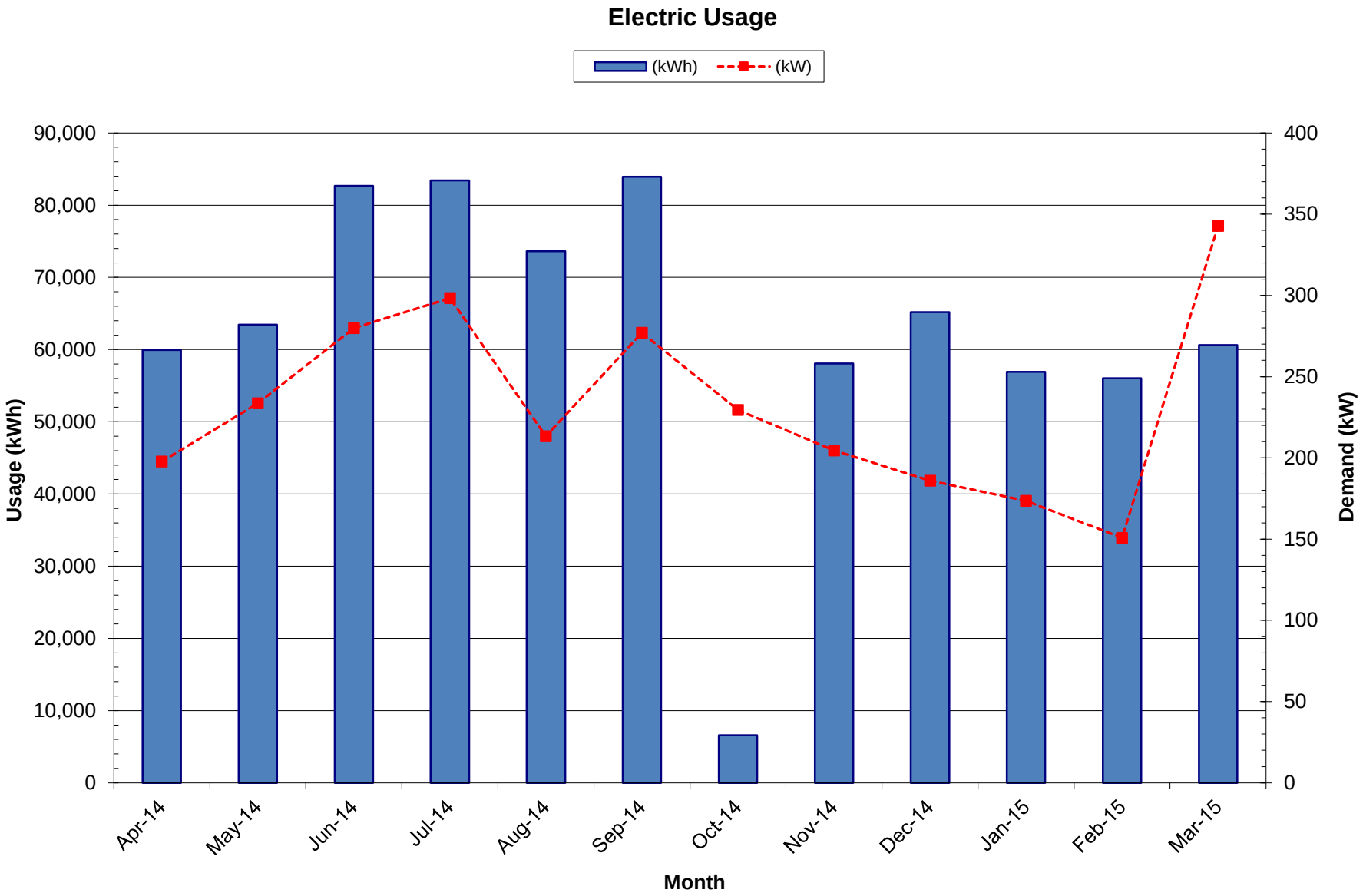
Local Government Energy Audit
East Brunswick Board of Education
Memorial Elementary School

Electric Service

For Service at: **Memorial Elementary School**
Account No.: **4218300208** **Delivery:** **PSE&G**
Meter No.: **9212450** **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	59,953	8,340.06	197.8	701.08	2,803.60	6,237.54	9,041.14	3.544	0.139	0.047	0.104	0.151
May-14	63,443	8,478.45	233.6	827.97	3,031.08	6,275.34	9,306.42	3.544	0.134	0.048	0.099	0.147
June-14	82,666	10,522.43	279.9	3,341.58	6,022.68	7,841.33	13,864.01	11.938	0.127	0.073	0.095	0.168
July-14	83,414	11,122.00	298.3	3,591.59	6,230.55	8,483.04	14,713.59	12.040	0.133	0.075	0.102	0.176
August-14	73,605	10,048.36	213.3	2,594.24	4,966.64	7,675.96	12,642.60	12.162	0.137	0.067	0.104	0.172
September-14	83,916	10,859.21	277.0	3,368.98	6,021.58	8,206.61	14,228.19	12.162	0.129	0.072	0.098	0.170
October-14	6,576	816.59	229.5	55.07	255.72	615.94	871.66	0.240	0.124	0.039	0.094	0.133
November-14	58,061	8,202.56	204.5	736.08	2,660.74	6,277.90	8,938.64	3.599	0.141	0.046	0.108	0.154
December-14	65,174	8,821.07	186.0	669.49	2,784.35	6,706.21	9,490.56	3.599	0.135	0.043	0.103	0.146
January-15	56,903	7,912.73	173.5	624.50	2,520.00	6,017.23	8,537.23	3.599	0.139	0.044	0.106	0.150
February-15	56,029	7,850.86	150.8	542.79	2,416.59	5,977.06	8,393.65	3.599	0.140	0.043	0.107	0.150
March-15	60,622	8,520.05	342.8	617.36	2,614.26	6,523.15	9,137.41	1.801	0.141	0.043	0.108	0.151
Total (All)	**750,362**	**$101,494.37**	**342.8**	**17,670.73**	**$42,327.79**	**$76,837.31**	**$119,165.10**	**$6.340**	**$0.135**	**$0.056**	**$0.102**	**$0.159**
Total (last 12-months)	**750,362**	**$101,494.37**	**342.8**	**17,671**	**$42,327.79**	**$76,837.31**	**$119,165.10**	**$6.340**	**$0.135**	**$0.056**	**$0.102**	**$0.159**
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 ($) / Consumption (kWh) 36% of blended rate (fixed portion of the bill that can't be negotiated)
9.) Supplier Charges ($) / Consumption (kWh) 64% of blended rate (portion of the bill that can be negotiated)
10.) Total Charges ($) / Consumption (kWh)

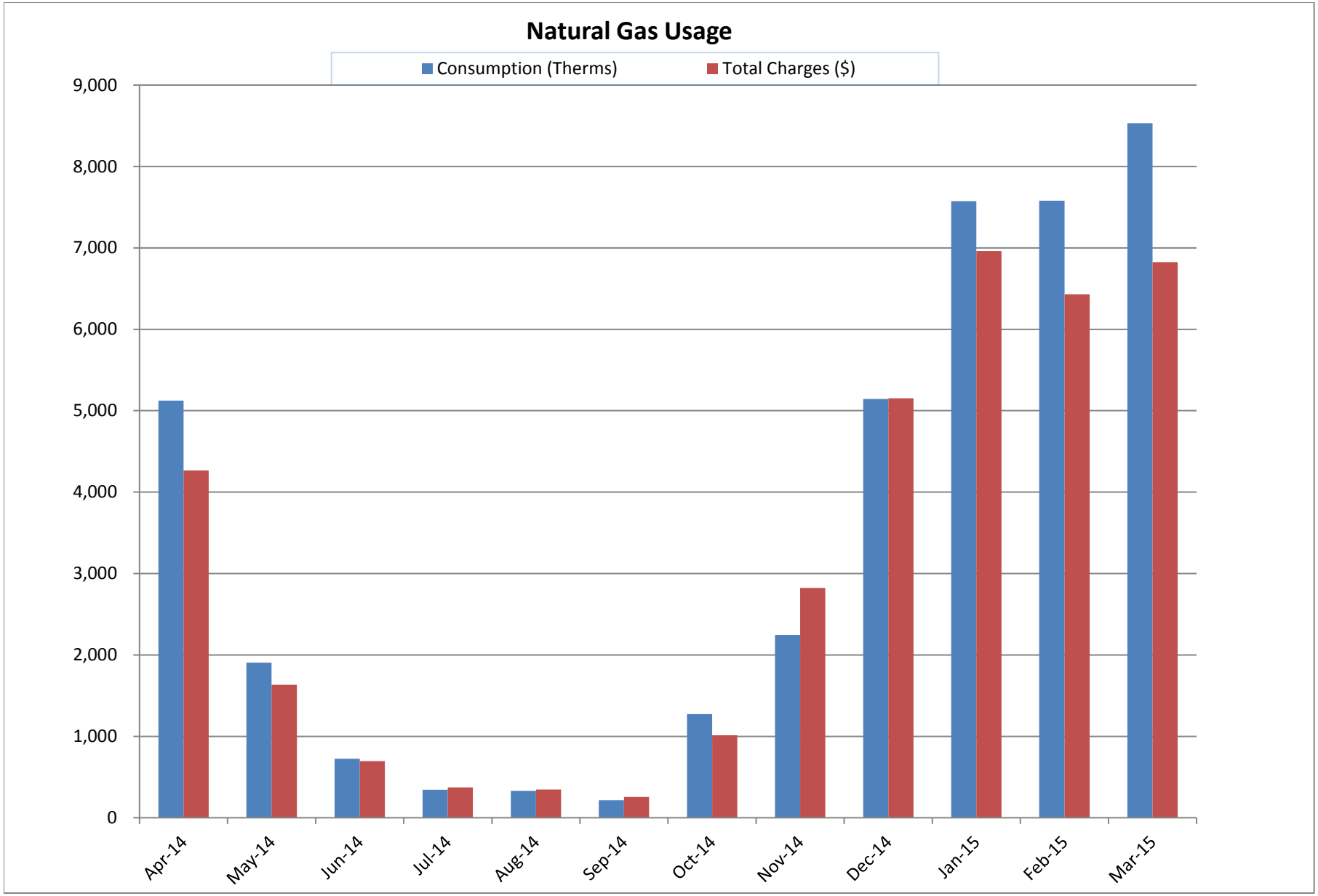

Electric Usage
(kWh)
(kW)
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
400
350
300
250
200
150
100
50
0
Usage (kWh)
Demand (kW)
Apr-14
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Month

Local Government Energy Audit
East Brunswick Board of Education
Memorial Elementary School

Natural Gas Service

For Service at: **Memorial Elementary School**
Account No.: **4217750404**
Meter No: **3765295**
Delivery: **PSE&G**
Supply: **PSE&G**

Month	Consumption (Therms)	Supply Charge ($)	Delivery Charge ($)	Total Charges ($)	Supply Rate ($/Therm)	Delivery Rate ($/Therm)	Total Rate ($/Therm)
April-14	5,124.8	3,659.10	607.78	4,266.88	0.714	0.119	0.833
May-14	1,906.3	1,322.83	310.49	1,633.32	0.694	0.163	0.857
June-14	725.2	506.03	190.10	696.13	0.698	0.262	0.960
July-14	343.9	232.48	140.21	372.69	0.676	0.408	1.084
August-14	329.9	209.46	136.51	345.97	0.635	0.414	1.049
September-14	215.6	130.68	125.00	255.68	0.606	0.580	1.186
October-14	1,273.7	786.01	227.45	1,013.46	0.617	0.179	0.796
November-14	2,243.9	1,383.34	1,437.87	2,821.21	0.616	0.641	1.257
December-14	5,144.2	3,281.06	1,872.13	5,153.19	0.638	0.364	1.002
January-15	7,573.3	4,758.84	2,203.07	6,961.91	0.628	0.291	0.919
February-15	7,578.5	4,176.77	2,253.84	6,430.61	0.551	0.297	0.849
March-15	8,531.9	4,431.67	2,393.84	6,825.51	0.519	0.281	0.800
Total (All)	**40,991.2**	**$24,878.27**	**$11,898.29**	**$36,776.56**	**0.607**	**0.290**	**0.897**
Total (last 12-months)	**40,991.2**	**$24,878.27**	**$11,898.29**	**$36,776.56**	**0.607**	**0.290**	**0.897**
		67.6%	32.4%	100.0%			


Natural Gas Usage
Consumption (Therms)
Total Charges ($)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Apr-14
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15

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

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

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

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

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

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

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

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

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

Back to the main supplier page

PSE&G GAS SERVICE TERRITORY
Last Updated: 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**

Back to main supplier information page

APPENDIX B

Equipment Inventory

East Brunswick Board of Education
CHA Project# 31007
Estimated
Memorial Elementary School

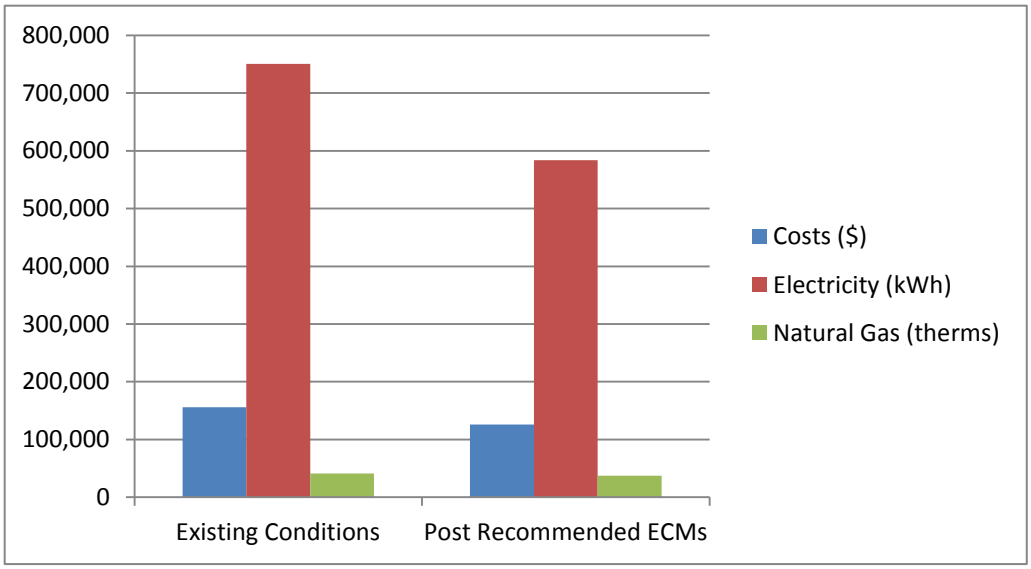
Description	QTY	Manufacturer Name	Model No.	Serial No.	Equipment Type / Utility	Capacity/Size	Efficiency	Location	Areas/Equipment Served	Date Installed	Remaining Useful Life (years)	Other Info.
HHW Pumps	2	Baldor Reliancer	EM2515T	39K057W915	Electric	20HP	93%	Boiler Room	Boiler	2011	10	
DHW Heater	1	A.O.Smith	BTH120A100	9281053000	Nat Gas	100 Gal	96%	Boiler Room	Restrooms	2011	10	
Boilers	3	Aerco	Benchmark 2.0	N/A	Heating/Nat Gas	1860 MBH	96%	Boiler Room	Heating	2011	25	
Split System	6	SANYO	Various	Various	Cooling/Electric	Various	N/A	Roof	N/A	2011	10	
Roof Top Unit	1	Fisen	J10ZJC00Q4DZZ50003A	N1L1384683	Cooling/Electric	10T	11 EER	Roof	N/A	2011	10	
Roof Top Unit	3	Fisen	V33DC04Q6CBNAM	Various	Cooling/Electric	25T	10.5 EER	Roof	N/A	2011	10	
Roof Top Unit	2	YORK	D2EZ024A06A	Various	Cooling/Electric	2T	12.6 EER	Roof	N/A	2011	10	
Power Exhaust Fan	2	CanFan	8110-MHPE050-HNN4	72770-A	Electric	5 HP	N/A	Roof	RTU	2011	10	
Roof Top Unit	2	Fisen	V34EC04Q7CBNAM	Various	Cooling/Electric	30T	10.5 EER	Roof	N/A	2011	10	
Power Exhaust Fan	2	CanFan	8114-MHPE075-HNN4	72770-A	Electric	7.5 HP	N/A	Roof	RTU	2011	10	
Roof Top Unit	1	Fisen	J06ZJC00Q4DZZ50001A	N1L1384423	Cooling/Electric	6T	11 EER	Roof	N/A	2011	10	
Roof Top Unit	1	Fisen	J15ZJC00Q4DZZ10013B	N1L1386644	Cooling/Electric	15T	11 EER	Roof	N/A	2011	10	
Roof Top Unit	3	Fisen	J07ZJC00Q4DZZ50003A	Various	Cooling/Electric	7T	11 EER	Roof	N/A	2011	10	
Power Exhaust Fan	1	CanFan	8104-MHPE020-NNN4	72770-A	Electric	2 HP	N/A	Roof	RTU	2011	10	
Roof Top Unit	3	Fisen	J12ZJC00Q4DZZ50004A	Various	Cooling/Electric	12T	11 EER	Roof	N/A	2011	10	
Roof Top Unit	1	Fisen	J18ZJC00Q4DZZ10006B	N1L1386635	Cooling/Electric	18T	11 EER	Roof	N/A	2011	10	

APPENDIX C

ECM Calculations

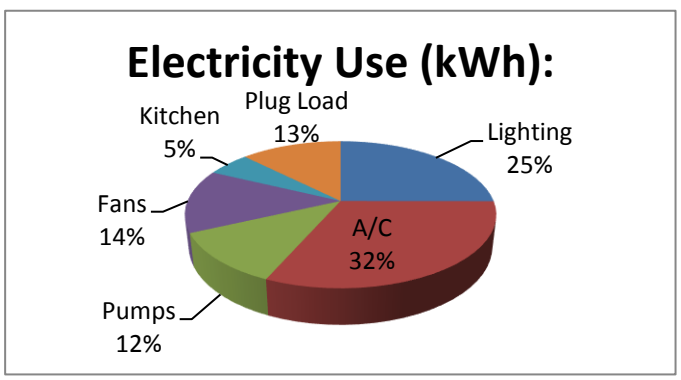
East Brunswick BOE
CHA Project Number: 31007
Memorial Elementary School

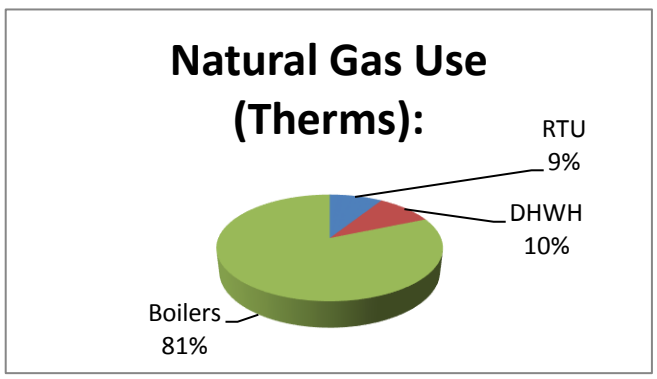
	Existing Conditions	Post Recommended ECMs	Percent Savings
Costs ($)	155,942	126,140	19%
Electricity (kWh)	750,362	583,660	22%
Natural Gas (therms)	40,991	37,372	9%
Site EUI (kbtu/SF/Yr)	80.4	69.2	



East Brunswick BOE
CHA Project Number: 31007
Memorial Elementary School

Utility End Use Analysis			
Electricity Use (kWh):		**Notes/Comments:**	
750,362	Total	Based on utility analysis	
187,893	Lighting	From Lighting Calculations	25%
236,997	A/C	Estimated	32%
86,292	Pumps	Estimated	12%
105,051	Fans	Estimated	14%
40,129	Kitchen	Estimated	5%
94,001	Plug Load	Estimated	13%
			100%
Natural Gas Use (Therms):		**Notes/Comments:**	
40,991	Total	Based on utility analysis	
3,689	RTU	Estimated	9%
3,960	DHWH	Estimated	10%
33,342	Boilers	Estimated	81%
			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		
$ 0.159	$/kWh blended		0.000420205	82,821	Electric	Natural Gas	Fuel Oil
$ 0.135	$/kWh supply	750,362	0.000420205		$ 119,165	$ 36,777	
$ 6.34	$/kW	342.8	0				
$ 0.90	$/Therm	40,991	0.00533471				
	$/kgals		0				
	$/Gal						

Memorial Elementary 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
y	ECM-1	Replace PEF units with Energy Recovery Units	0.0	93,973	3,619	0	0	18,188	$ 242,800	13.3	10.0	58.8	$ -	N	13.3	0.0	939,730	36,191	0	$181,881	(0.3)	($87,652)	-4.9%
Y	ECM-2	Lighting Replacement With Controls	23.6	72,729	0	0	0	11,614	$ 177,703	15.3	10.0	30.6	$ 6,025	N	14.8	236.0	727,290	0	0	$133,594	(0.2)	($72,609)	-6.5%
		Total	**23.6**	**166,702**	**3,619**	**0**	**0**	**$ 29,802**	**$ 420,503**	**14.1**	**10.0**	**89.36**	**$ 6,025**		**13.9**	**236.00**	**1667020.06**	**36191.49**	**0.00**	**$315,475**	**(0.2)**	**($160,261)**	**-5.6%**
		Recommended Measures (highlighted green above)	**23.6**	**166,702**	**3,619**	**0**	**0**	**$ 29,802**	**$ 420,503**	**14.1**	**10.0**	**89.36**	**$ 6,025**	**0**	**13.9**	**236.00**	**1667020.06**	**36191.49**	**0.00**	**$315,475**	**(0.2)**	**($160,261)**	**-5.6%**
		% of Existing	**7%**	**22.22%**	**8.83%**																		

City: Newark, NJ

Occupied Hours/Week			55	70	70	70	50
			Building Operating	Auditorium Occupied	Gymnasium Occupied	Library Occupied	Classrooms Occupied
Temp	Enthalpy h (Btu/lb)	Bin Hours	Hours	Hours	Hours	Hours	Hours
102.5							
97.5	35.4	6	2	3	3	3	2
92.5	37.4	31	10	13	13	13	9
87.5	35.0	131	43	55	55	55	39
82.5	33.0	500	164	208	208	208	149
77.5	31.5	620	203	258	258	258	185
72.5	29.9	664	217	277	277	277	198
67.5	27.2	854	280	356	356	356	254
62.5	24.0	927	303	386	386	386	276
57.5	20.3	600	196	250	250	250	179
52.5	18.2	730	239	304	304	304	217
47.5	16.0	491	161	205	205	205	146
42.5	14.5	656	215	273	273	273	195
37.5	12.5	1,023	335	426	426	426	304
32.5	10.5	734	240	306	306	306	218
27.5	8.7	334	109	139	139	139	99
22.5	7.0	252	83	105	105	105	75
17.5	5.4	125	41	52	52	52	37
12.5	3.7	47	15	20	20	20	14
7.5	2.1	34	11	14	14	14	10
2.5	1.3	1	0	0	0	0	0
-2.5							
-7.5							

Multipliers	
Material:	1.027
Labor:	1.246
Equipment:	1.124

Heating System Efficiency	92%
Cooling Eff (kW/ton)	1.04

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
Memorial Elementary School

ECM-1 Install Energy Recovery

Summary:
This measure analyzes energy savings that could result from the installation of a total energy recovery unit to reclaim heat and latent energy from the exhausted air from the PEF units and transfer that energy back into the ventilation (outdoor) air stream. Natural Gas and Electrical energy savings result in reduced heating, cooling, dehumidification loads.

Energy Recovery Capacities	
315,333	Peak BTUH Cooling Energy Recovered*
370,980	Peak BTUH Heating Energy Recovered*

*See unit data table below

Bin Data		Heating	Cooling	Heating Energy Recovered	Cooling Energy Recovered
OAT	Hours	% Load	% Load	Therms	kWh
97.5	2	0%	100%	0	227
92.5	10	0%	98%	0	1,145
87.5	43	0%	95%	0	4,710
82.5	164	0%	93%	0	17,492
77.5	203	0%	90%	0	21,085
72.5	217	0%	87%	0	21,935
67.5	280	0%	85%	0	27,379
62.5	303	0%	82%	0	0
57.5	196	0%	80%	0	0
52.5	239	0%	77%	0	0
47.5	161	53%	0%	391	0
42.5	215	58%	0%	573	0
37.5	335	63%	0%	971	0
32.5	240	68%	0%	752	0
27.5	109	73%	0%	368	0
22.5	83	78%	0%	296	0
17.5	41	83%	0%	157	0
12.5	15	88%	0%	62	0
7.5	11	93%	0%	48	0
2.5	0	98%	0%	1	0
-2.5	0	100%	0%	0	0
Totals:				**3,619**	**93,973**

ECM-2 Install Energy Recovery
Affected Equipment & ERU Schedule

RTU Data						Exhaust Fan Data	
Tag	Service	Total CFM	Return CFM	Summer Discharge (°F)	Winter Discharge (°F)	Tag	CFM
RTUs 6 to 10	Various areas	45200	43825	54.47	88.5	PEF 6 to 10	17175

Energy Recovery Unit Data							
Tag	Supply CFM (RTU OA)	Summer Leaving Air Temp (°F)	Summer Recovery Effectiveness (%)	Summer Energy Recovered (Btu/hr)	Winter Leaving Air Temp (°F)	Winter Recovery Effectiveness (%)	Winter Energy Recovered (Btu/hr)
ERU	17175	76	72.23%	315333	56	75.49%	370980

East Brunswick BOE
CHA Project Number: 31007
Memorial Elementary School

ECM-1 Install Energy Recovery - 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.		
						$ -	$ -	$ -	$ -	
Energy Recovery Units	5	EA	$ 7,500	$ 5,000		$ 38,513	$ 31,150	$ -	$ 69,663	Vendor Quote
Misc. Electrical	5	EA	$ 500	$ 1,000		$ 2,568	$ 6,230	$ -	$ 8,798	RSMeans 2015
Ductwork	5	EA	$ 5,000	$ 7,500		$ 25,675	$ 46,725	$ -	$ 72,400	RSMeans 2015
Ductwork Insulation	5	EA	$ 1,000	$ 500		$ 5,135	$ 3,115	$ -	$ 8,250	RSMeans 2015
controls	5	EA	$ 1,000	$ 1,000		$ 5,135	$ 6,230	$ -	$ 11,365	Eng Est
TAB	5	EA	$ -	$ 1,500		$ -	$ 9,345	$ -	$ 9,345	RSMeans 2015
						$ -	$ -	$ -	$ -	

Note: cost Estimates are for energy calculations only - do not use for procurement

$ 179,820	Subtotal
$ 62,937	35% Contingency
$ 242,800	**Total**

East Brunswick BOE
CHA Project Number: 31007
Memorial Elementary 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)	82,821
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)	$119,165	$36,777
Existing Usage (from utility)	750,362	40,991
Proposed Savings	166,702	3,619
Existing Total MMBtus	6,863	
Proposed Savings MMBtus	948	
% Energy Reduction	**13.8%**	
Proposed Annual Savings	$29,802	

	Source to S
Electric Grid	3.14
Electric Onsite	1
Natural Gas	1.05
Fuel Oil/Propane	1.01
District Steam/HHW	1.2
District CHW	1
Other	1

	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	$420,503

		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	$420,503	

Project Payback (years)	
w/o Incentives	w/ Incentives
14.1	14.1

* 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 Memorial Elementary School
CHA Project No. 31007
Existing Lighting & Audit Input

Cost of Electricity: **$0.135 $/kWh**
$6.34 $/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	Hallway	Hallways	17	1T 32 C F 2 (ELE)	F42ILL	59	1.00	SW	5520	5,537	NONE	
34LED	Storage	Storage	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	OCC	1380	163	NONE	
34LEd	129DR	Storage	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	OCC	1380	163	NONE	
32LED	129	Utility	1	1T 32 R F 2 (ELE)	F42LL	60	0.06	OCC	3000	180	NONE	
32LED	131	Classrooms	9	1T 32 R F 2 (ELE)	F42LL	60	0.54	OCC	2587.5	1,397	NONE	
32LED	133	Classrooms	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	OCC	2587.5	621	NONE	
32LED	132	Classrooms	4	1T 32 R F 2 (ELE)	F42LL	60	0.24	OCC	2587.5	621	NONE	
34LED	Stairs	Hallways	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	SW	5520	651	NONE	
32LED	130	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	127	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	128	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	129	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	121	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	122	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	123	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	124	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	Special Ed	Classrooms	10	1T 32 R F 2 (ELE)	F42LL	60	0.60	OCC	2587.5	1,553	NONE	
7LED	Boys BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675	NONE	
7LED	Girls BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675	NONE	
7LED	Staff BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	Staff BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	129 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	121 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	122 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	123 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	124 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	127 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
34LED	Hallway	Hallways	16	1T 32 C F 2 (ELE)	F42ILL	59	0.94	SW	5520	5,211	NONE	
32LED	119	Classrooms	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	OCC	2587.5	932	NONE	
32LED	120	Classrooms	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	OCC	2587.5	932	NONE	
32LED	115	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	116	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	117	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	118	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
7LED	115 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	116 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	117 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
7LED	118 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
34LED	Stairs	Hallways	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	SW	5520	651	NONE	
32LED	114	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
7LED	114 BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
32LED	113	Classrooms	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	OCC	2587.5	932	NONE	
34LED	113 DR	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81	NONE	
34LED	Electrical	Utility	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	3000	177	NONE	
34LED	115 EMR	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81	NONE	
32LED	Hallway	Hallways	13	1T 32 R F 2 (ELE)	F42LL	60	0.78	OCC	5520	4,306	NONE	
34LEd	Computer Lab	Lab	18	1T 32 C F 2 (ELE)	F42ILL	59	1.06	OCC	2587.5	2,748	NONE	
32LED	102	Classrooms	2	1T 32 R F 2 (ELE)	F42LL	60	0.12	OCC	2587.5	311	NONE	
34LEd	Misc	General	3	1T 32 C F 2 (ELE)	F42ILL	59	0.18	OCC	5000	885	NONE	
34LED	102 DR	General	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	OCC	5000	590	NONE	
34LED	102 ME	Utility	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	3000	177	NONE	
32LED	Nurse	Offices	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863	NONE	
32LED	Main office	Offices	22	1T 32 R F 2 (ELE)	F42LL	60	1.32	OCC	2587.5	3,416	NONE	
34LED	Parent Liason	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81	NONE	
34LED	Parent Liason	Offices	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	2587.5	153	NONE	
34LED	Principal	Offices	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	OCC	2587.5	305	NONE	
34LED	Conference	Offices	3	1T 32 C F 2 (ELE)	F42ILL	59	0.18	OCC	2587.5	458	NONE	
32LED	Waiting	Offices	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	OCC	2587.5	932	NONE	
34LED	Misc Office	Offices	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	2587.5	153	NONE	
34LED	Misc Office	Offices	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	2587.5	153	NONE	
34LED	Misc Office	Offices	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	2587.5	153	NONE	
34LED	Misc Office	Offices	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	2587.5	153	NONE	
32LED	Entry	Hallways	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	5520	1,987	NONE	
34LED	112ES	Utility	4	1T 32 C F 2 (ELE)	F42ILL	59	0.24	SW	3000	708	NONE	
34LED	Chiller Room	Mechanical Room	5	1T 32 C F 2 (ELE)	F42ILL	59	0.30	SW	1840	543	NONE	
34LED	Backup controls	Mechanical Room	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	SW	1840	109	NONE	
34LED	Boiler room	Mechanical Room	3	1T 32 C F 2 (ELE)	F42ILL	59	0.18	SW	1840	326	NONE	
7LED	Boiler room	Mechanical Room	1	2T 32 R F 2 (u)	FU2LL	60	0.06	SW	1840	110	NONE	
7LED	Staff BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225	NONE	
34LED	111 CL	Classrooms	12	1T 32 C F 2 (ELE)	F42ILL	59	0.71	OCC	2587.5	1,832	NONE	
34LED	Kiln	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81	NONE	

Energy Audit of Memorial Elementary School
CHA Project No. 31007
Existing Lighting & Audit Input

Cost of Electricity: **$0.135** **$/kWh**
$6.34 **$/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	Art Storage	Storage	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	OCC	1380	163		NONE	
34LED	109	Classrooms	14	1T 32 C F 2 (ELE)	F42ILL	59	0.83	OCC	2587.5	2,137		NONE	
34LED	Instrument Storage	Storage	3	1T 32 C F 2 (ELE)	F42ILL	59	0.18	OCC	1380	244		NONE	
34LED	Group instruction	Classrooms	6	1T 32 C F 2 (ELE)	F42ILL	59	0.35	OCC	2587.5	916		NONE	
7LED	Boys BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675		NONE	
7LED	Girls BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675		NONE	
7LED	Staff BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225		NONE	
7LED	Staff BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225		NONE	
34LED	1063 Faculty work Rm	Offices	10	1T 32 C F 2 (ELE)	F42ILL	59	0.59	OCC	2587.5	1,527		NONE	
7LED	Custodian Closet	Janitor	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3000	180		NONE	
80	Hallway	Hallways	26	SP 36 R CF 1	CFT36/1	51	1.33	SW	5520	7,320		NONE	
34LED	Program Facilitator	Offices	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	OCC	2587.5	305		NONE	
34LED	Gym Storage	Storage	3	1T 32 C F 2 (ELE)	F42ILL	59	0.18	SW	1380	244		NONE	
273LED	Gym Storage	Gymnasium	18	Gym QL300	QL300/1	300	5.40	SW	3450	18,630		NONE	
34LED	Cafeteria Stage	Gymnasium	4	1T 32 C F 2 (ELE)	F42ILL	59	0.24	OCC	3450	814		NONE	
273LED	Cafeteria	Cafeteria	12	Gym QL300	QL300/1	300	3.60	OCC	2300	8,280		NONE	
18LED	Kitchen Stroage	Storage	2	T 32 R F 4 (ELE)	F44ILL	112	0.22	OCC	1380	309		NONE	
18LED	Kitchen	Kitchen	16	T 32 R F 4 (ELE)	F44ILL	112	1.79	OCC	3000	5,376		NONE	
7LED	Kitchen	Kitchen	6	2T 32 R F 2 (u)	FU2LL	60	0.36	OCC	3000	1,080		NONE	
7LED	Boys BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675		NONE	
7LED	Girls BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675		NONE	
34LED	Storage	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81		NONE	
34LED	Electrical	Utility	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	SW	3000	177		NONE	
34LED	Pump Room	Utility	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	SW	3000	177		NONE	
34LED	Fire Pump	Utility	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	SW	3000	177		NONE	
34LEd	Hallway	Hallways	24	1T 32 C F 2 (ELE)	F42ILL	59	1.42	SW	5520	7,816		NONE	
32LED	223	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	224	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	217	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	218	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	219	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	220	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	Special Ed	Classrooms	10	1T 32 R F 2 (ELE)	F42LL	60	0.60	OCC	2587.5	1,553		NONE	
7LEd	Special Ed BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225		NONE	
7LED	Boys BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675		NONE	
7LED	Girls BR	Restoom	3	2T 32 R F 2 (u)	FU2LL	60	0.18	OCC	3750	675		NONE	
7LED	Staff BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225		NONE	
7LED	Staff BR	Restoom	1	2T 32 R F 2 (u)	FU2LL	60	0.06	OCC	3750	225		NONE	
32LED	211	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	212	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	213	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	214	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
34LED	Stairs	Hallways	6	1T 32 C F 2 (ELE)	F42ILL	59	0.35	OCC	5520	1,954		NONE	
34LED	Storage	Storage	2	1T 32 C F 2 (ELE)	F42ILL	59	0.12	OCC	1380	163		NONE	
34LED	Storage	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81		NONE	
34LED	Electrical	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	SW	1380	81		NONE	
80	Hallway	Hallways	23	SP 36 R CF 1	CFT36/1	51	1.17	SW	5520	6,475		NONE	
34LED	Hallway	Hallways	14	1T 32 C F 2 (ELE)	F42ILL	59	0.83	SW	5520	4,560		NONE	
32LEd	209	Classrooms	7	1T 32 R F 2 (ELE)	F42LL	60	0.42	OCC	2587.5	1,087		NONE	
32LED	210	Classrooms	7	1T 32 R F 2 (ELE)	F42LL	60	0.42	OCC	2587.5	1,087		NONE	
32LED	205	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	206	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	207	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	208	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	203	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	204	Classrooms	12	1T 32 R F 2 (ELE)	F42LL	60	0.72	OCC	2587.5	1,863		NONE	
32LED	Stairs	Hallways	6	1T 32 R F 2 (ELE)	F42LL	60	0.36	SW	5520	1,987		NONE	
34LED	Storage	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81		NONE	
34LED	Storage	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.06	OCC	1380	81		NONE	
80	Hallway	Hallways	12	SP 36 R CF 1	CFT36/1	51	0.61	SW	5520	3,378		NONE	
34LEd	Hallway	Hallways	10	1T 32 C F 2 (ELE)	F42ILL	59	0.59	SW	5520	3,257		NONE	
	Total		**858**				**58.85**			**187,893**			

Energy Audit of Memorial Elementary 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	Hallway	17	1T 32 C F 2 (ELE)	F42ILL	59	1.0	SW	5520	5,537	17	4 ft LED Tube	200732x2	30	0.5	NONE	5,520	2,815	2,721	0.5	$ 404.89	$ 3,972.90	$ 170	9.8	9.4
34LED	Storage	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	163	2	4 ft LED Tube	200732x2	30	0.1	NONE	1,380	83	80	0.1	$ 15.22	$ 467.40	$ 20	30.7	29.4
34LEd	129DR	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	163	2	4 ft LED Tube	200732x2	30	0.1	NONE	1,380	83	80	0.1	$ 15.22	$ 467.40	$ 20	30.7	29.4
32LED	129	1	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	3000	180	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,000	90	90	0.0	$ 14.43	$ 233.70	$ 5	16.2	15.8
32LED	131	9	1T 32 R F 2 (ELE)	F42LL	60	0.5	OCC	2587.5	1,397	9	4 ft LED Tube	200732x2	30	0.3	NONE	2,588	699	699	0.3	$ 114.86	$ 2,103.30	$ 45	18.3	17.9
32LED	133	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	2587.5	621	4	4 ft LED Tube	200732x2	30	0.1	NONE	2,588	311	311	0.1	$ 51.05	$ 934.80	$ 20	18.3	17.9
32LED	132	4	1T 32 R F 2 (ELE)	F42LL	60	0.2	OCC	2587.5	621	4	4 ft LED Tube	200732x2	30	0.1	NONE	2,588	311	311	0.1	$ 51.05	$ 934.80	$ 20	18.3	17.9
34LED	Stairs	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	SW	5520	651	2	4 ft LED Tube	200732x2	30	0.1	NONE	5,520	331	320	0.1	$ 47.63	$ 467.40	$ 20	9.8	9.4
32LED	130	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	127	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	128	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	129	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	121	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	122	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	123	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	124	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	Special Ed	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	OCC	2587.5	1,553	10	4 ft LED Tube	200732x2	30	0.3	NONE	2,588	776	776	0.3	$ 127.62	$ 2,337.00	$ 50	18.3	17.9
7LED	Boys BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
7LED	Girls BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
7LED	Staff BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	Staff BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	129 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	121 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	122 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	123 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	124 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	127 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
34LED	Hallway	16	1T 32 C F 2 (ELE)	F42ILL	59	0.9	SW	5520	5,211	16	4 ft LED Tube	200732x2	30	0.5	NONE	5,520	2,650	2,561	0.5	$ 381.07	$ 3,739.20	$ 160	9.8	9.4
32LED	119	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	2587.5	932	6	4 ft LED Tube	200732x2	30	0.2	NONE	2,588	466	466	0.2	$ 76.57	$ 1,402.20	$ 30	18.3	17.9
32LED	120	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	2587.5	932	6	4 ft LED Tube	200732x2	30	0.2	NONE	2,588	466	466	0.2	$ 76.57	$ 1,402.20	$ 30	18.3	17.9
32LED	115	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	116	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	117	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	118	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
7LED	115 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	116 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	117 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	118 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
34LED	Stairs	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	SW	5520	651	2	4 ft LED Tube	200732x2	30	0.1	NONE	5,520	331	320	0.1	$ 47.63	$ 467.40	$ 20	9.8	9.4
32LED	114	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
7LED	114 BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
32LED	113	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	2587.5	932	6	4 ft LED Tube	200732x2	30	0.2	NONE	2,588	466	466	0.2	$ 76.57	$ 1,402.20	$ 30	18.3	17.9
34LED	113 DR	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
34LED	Electrical	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	3000	177	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,000	90	87	0.0	$ 13.95	$ 233.70	$ 10	16.8	16.0
34LED	115 EMR	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
32LED	Hallway	13	1T 32 R F 2 (ELE)	F42LL	60	0.8	OCC	5520	4,306	13	4 ft LED Tube	200732x2	30	0.4	NONE	5,520	2,153	2,153	0.4	$ 320.30	$ 3,038.10	$ 65	9.5	9.3
34LEd	Computer Lab	18	1T 32 C F 2 (ELE)	F42ILL	59	1.1	OCC	2587.5	2,748	18	4 ft LED Tube	200732x2	30	0.5	NONE	2,588	1,397	1,351	0.5	$ 222.05	$ 4,206.60	$ 180	18.9	18.1
32LED	102	2	1T 32 R F 2 (ELE)	F42LL	60	0.1	OCC	2587.5	311	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,588	155	155	0.1	$ 25.52	$ 467.40	$ 10	18.3	17.9
34LEd	Misc	3	1T 32 C F 2 (ELE)	F42ILL	59	0.2	OCC	5000	885	3	4 ft LED Tube	200732x2	30	0.1	NONE	5,000	450	435	0.1	$ 65.34	$ 701.10	$ 30	10.7	10.3
34LED	102 DR	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	5000	590	2	4 ft LED Tube	200732x2	30	0.1	NONE	5,000	300	290	0.1	$ 43.56	$ 467.40	$ 20	10.7	10.3
34LED	102 ME	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	3000	177	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,000	90	87	0.0	$ 13.95	$ 233.70	$ 10	16.8	16.0
32LED	Nurse	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	Main office	22	1T 32 R F 2 (ELE)	F42LL	60	1.3	OCC	2587.5	3,416	22	4 ft LED Tube	200732x2	30	0.7	NONE	2,588	1,708	1,708	0.7	$ 280.76	$ 5,141.40	$ 110	18.3	17.9
34LED	Parent Liason	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
34LED	Parent Liason	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	2587.5	153	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,588	78	75	0.0	$ 12.34	$ 233.70	$ 10	18.9	18.1
34LED	Principal	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	2587.5	305	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,588	155	150	0.1	$ 24.67	$ 467.40	$ 20	18.9	18.1
34LED	Conference	3	1T 32 C F 2 (ELE)	F42ILL	59	0.2	OCC	2587.5	458	3	4 ft LED Tube	200732x2	30	0.1	NONE	2,588	233	225	0.1	$ 37.01	$ 701.10	$ 30	18.9	18.1
32LED	Waiting	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	2587.5	932	6	4 ft LED Tube	200732x2	30	0.2	NONE	2,588	466	466	0.2	$ 76.57	$ 1,402.20	$ 30	18.3	17.9
34LED	Misc Office	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	2587.5	153	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,588	78	75	0.0	$ 12.34	$ 233.70	$ 10	18.9	18.1
34LED	Misc Office	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	2587.5	153	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,588	78	75	0.0	$ 12.34	$ 233.70	$ 10	18.9	18.1
34LED	Misc Office	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	2587.5	153	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,588	78	75	0.0	$ 12.34	$ 233.70	$ 10	18.9	18.1
34LED	Misc Office	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	2587.5	153	1	4 ft LED Tube	200732x2	30	0.0	NONE	2,588	78	75	0.0	$ 12.34	$ 233.70	$ 10	18.9	18.1
32LED	Entry	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	5520	1,987	6	4 ft LED Tube	200732x2	30	0.2	NONE	5,520	994	994	0.2	$ 147.83	$ 1,402.20	$ 30	9.5	9.3
34LED	112ES	4	1T 32 C F 2 (ELE)	F42ILL	59	0.2	SW	3000	708	4	4 ft LED Tube	200732x2	30	0.1	NONE	3,000	360	348	0.1	$ 55.81	$ 934.80	$ 40	16.8	16.0
34LED	Chiller Room	5	1T 32 C F 2 (ELE)	F42ILL	59	0.3	SW	1840	543	5	4 ft LED Tube	200732x2	30	0.2	NONE	1,840	276	267	0.1	$ 47.05	$ 1,168.50	$ 50	24.8	23.8
34LED	Backup controls	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	SW	1840	109	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,840	55	53	0.0	$ 9.41	$ 233.70	$ 10	24.8	23.8
34LED	Boiler room	3	1T 32 C F 2 (ELE)	F42ILL	59	0.2	SW	1840	326	3	4 ft LED Tube	200732x2	30	0.1	NONE	1,840	166	160	0.1	$ 28.23	$ 701.10	$ 30	24.8	23.8
7LED	Boiler room	1	2T 32 R F 2 (u)	FU2LL	60	0.1	SW	1840	110	1	2T 25 R LED	2RTLED	25	0.0	NONE	1,840	46	64	0.0	$ 11.36	$ 202.50	$ 20	17.8	16.1
7LED	Staff BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
34LED	111 CL	12	1T 32 C F 2 (ELE)	F42ILL	59	0.7	OCC	2587.5	1,832	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	900	0.3	$ 148.04	$ 2,804.40	$ 120	18.9	18.1
34LED	Kiln	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
34LED	Art Storage	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	163	2	4 ft LED Tube	200732x2	30	0.1	NONE	1,380	83	80	0.1	$ 15.22	$ 467.40	$ 20	30.7	29.4
34LED	109	14	1T 32 C F 2 (ELE)	F42ILL	59	0.8	OCC	2587.5	2,137	14	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	1,087	1,051	0.4	$ 172.71	$ 3,271.80	$ 140	18.9	18.1
34LED	Instrument Storage	3	1T 32 C F 2 (ELE)	F42ILL	59	0.2	OCC	1380	244	3	4 ft LED Tube	200732x2	30	0.1	NONE	1,380	124	120	0.1	$ 22.83	$ 701.10	$ 30	30.7	29.4
34LED	Group instruction	6	1T 32 C F 2 (ELE)	F42ILL	59	0.4	OCC	2587.5	916	6	4 ft LED Tube	200732x2	30	0.2	NONE	2,588	466	450	0.2	$ 74.02	$ 1,402.20	$ 60	18.9	18.1
7LED	Boys BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
7LED	Girls BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
7LED	Staff BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	Staff BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
34LED	1063 Faculty work Rm	10	1T 32 C F 2 (ELE)	F42ILL	59	0.6	OCC	2587.5	1,527	10	4 ft LED Tube	200732x2	30	0.3	NONE	2,588	776	750	0.3	$ 123.36	$ 2,337.00	$ 100	18.9	18.1
7LED	Custodian Closet	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3000	180	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,000	75	105	0.0	$ 16.84	$ 202.50	$ 20	12.0	10.8
80	Hallway	26	SP 36 R CF 1	CFT36/1	51	1.3	SW	5520	7,320	26	SP 36 R CF 1	CFT36/1	51	1.3	NONE	5,520	7,320	-	0.0	$ -	$ -	$ -		
34LED	Program Facilitator	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	2587.5	305	2	4 ft LED Tube	200732x2	30	0.1	NONE	2,588	155	150	0.1	$ 24.67	$ 467.40	$ 20	18.9	18.1
34LED	Gym Storage	3	1T 32 C F 2 (ELE)	F42ILL	59	0.2	SW	1380	244	3	4 ft LED Tube	200732x2	30	0.1	NONE	1,380	124	120	0.1	$ 22.83	$ 701.10	$ 30	30.7	29.4
273LED	Gym Storage	18	Gym QL300	QL300/1	300	5.4	SW	3450	18,630	18	Gym QL300	QL300/1	300	5.4	NONE	3,450	18,630	-	0.0	$ -	$ -	$ -		
34LED	Cafeteria Stage	4	1T 32 C F 2 (ELE)	F42ILL	59	0.2	OCC	3450	814	4	4 ft LED Tube	200732x2	30	0.1	NONE	3,450	414	400	0.1	$ 62.85	$ 934.80	$ 40	14.9	14.2
273LED	Cafeteria	12	Gym QL300	QL300/1	300	3.6	OCC	2300	8,280	12	Gym QL300	QL300/1	300	3.6	NONE	2,300	8,280	-	0.0	$ -	$ -	$ -		
18LED	Kitchen Stroage	2	T 32 R F 4 (ELE)	F44ILL	112	0.2	OCC	1380	309	2	T 74 R LED	RTLED50	50	0.1	NONE	1,380	138	171	0.1	$ 32.54	$ 472.50	$ 50	14.5	13.0
18LED	Kitchen	16	T 32 R F 4 (ELE)	F44ILL	112	1.8	OCC	3000	5,376	16	T 74 R LED	RTLED50	50	0.8	NONE	3,000	2,400	2,976	1.0	$ 477.23	$ 3,780.00	$ 400	7.9	7.1
7LED	Kitchen	6	2T 32 R F 2 (u)	FU2LL	60	0.4	OCC	3000	1,080	6	2T 25 R LED	2RTLED	25	0.2	NONE	3,000	450	630	0.2	$ 101.03	$ 1,215.00	$ 120	12.0	10.8
7LED	Boys BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
7LED	Girls BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
34LED	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
34LED	Electrical	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	SW	3000	177	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,000	90	87	0.0	$ 13.95	$ 233.70	$ 10	16.8	16.0
34LED	Pump Room	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	SW	3000	177	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,000	90	87	0.0	$ 13.95	$ 233.70	$ 10	16.8	16.0
34LED	Fire Pump	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	SW	3000	177	1	4 ft LED Tube	200732x2	30	0.0	NONE	3,000	90	87	0.0	$ 13.95	$ 233.70	$ 10	16.8	16.0
34LEd	Hallway	24	1T 32 C F 2 (ELE)	F42ILL	59	1.4	SW	5520	7,816	24	4 ft LED Tube	200732x2	30	0.7	NONE	5,520	3,974	3,842	0.7	$ 571.61	$ 5,608.80	$ 240	9.8	9.4
32LED	223	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	224	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	217	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	218	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	219	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	220	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	Special Ed	10	1T 32 R F 2 (ELE)	F42LL	60	0.6	OCC	2587.5	1,553	10	4 ft LED Tube	200732x2	30	0.3	NONE	2,588	776	776	0.3	$ 127.62	$ 2,337.00	$ 50	18.3	17.9
7LEd	Special Ed BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	Boys BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
7LED	Girls BR	3	2T 32 R F 2 (u)	FU2LL	60	0.2	OCC	3750	675	3	2T 25 R LED	2RTLED	25	0.1	NONE	3,750	281	394	0.1	$ 61.14	$ 607.50	$ 60	9.9	9.0
7LED	Staff BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
7LED	Staff BR	1	2T 32 R F 2 (u)	FU2LL	60	0.1	OCC	3750	225	1	2T 25 R LED	2RTLED	25	0.0	NONE	3,750	94	131	0.0	$ 20.38	$ 202.50	$ 20	9.9	9.0
32LED	211	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	212	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	213	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	214	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
34LED	Stairs	6	1T 32 C F 2 (ELE)	F42ILL	59	0.4	OCC	5520	1,954	6	4 ft LED Tube	200732x2	30	0.2	NONE	5,520	994	960	0.2	$ 142.90	$ 1,402.20	$ 60	9.8	9.4
34LED	Storage	2	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	163	2	4 ft LED Tube	200732x2	30	0.1	NONE	1,380	83	80	0.1	$ 15.22	$ 467.40	$ 20	30.7	29.4
34LED	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
34LED	Electrical	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	SW	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
80	Hallway	23	SP 36 R CF 1	CFT36/1	51	1.2	SW	5520	6,475	23	SP 36 R CF 1	CFT36/1	51	1.2	NONE	5,520	6,475	-	0.0	$ -	$ -	$ -		
34LED	Hallway	14	1T 32 C F 2 (ELE)	F42ILL	59	0.8	SW	5520	4,560	14	4 ft LED Tube	200732x2	30	0.4	NONE	5,520	2,318	2,241	0.4	$ 333.44	$ 3,271.80	$ 140	9.8	9.4
32LEd	209	7	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	2587.5	1,087	7	4 ft LED Tube	200732x2	30	0.2	NONE	2,588	543	543	0.2	$ 89.33	$ 1,635.90	$ 35	18.3	17.9
32LED	210	7	1T 32 R F 2 (ELE)	F42LL	60	0.4	OCC	2587.5	1,087	7	4 ft LED Tube	200732x2	30	0.2	NONE	2,588	543	543	0.2	$ 89.33	$ 1,635.90	$ 35	18.3	17.9
32LED	205	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9

Energy Audit of Memorial Elementary 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
32LED	206	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	207	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	208	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	203	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	204	12	1T 32 R F 2 (ELE)	F42LL	60	0.7	OCC	2587.5	1,863	12	4 ft LED Tube	200732x2	30	0.4	NONE	2,588	932	932	0.4	$ 153.14	$ 2,804.40	$ 60	18.3	17.9
32LED	Stairs	6	1T 32 R F 2 (ELE)	F42LL	60	0.4	SW	5520	1,987	6	4 ft LED Tube	200732x2	30	0.2	NONE	5,520	994	994	0.2	$ 147.83	$ 1,402.20	$ 30	9.5	9.3
34LED	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
34LED	Storage	1	1T 32 C F 2 (ELE)	F42ILL	59	0.1	OCC	1380	81	1	4 ft LED Tube	200732x2	30	0.0	NONE	1,380	41	40	0.0	$ 7.61	$ 233.70	$ 10	30.7	29.4
80	Hallway	12	SP 36 R CF 1	CFT36/1	51	0.6	SW	5520	3,378	12	SP 36 R CF 1	CFT36/1	51	0.6	NONE	5,520	3,378	-	0.0	$ -	$ -	$ -		
34LEd	Hallway	10	1T 32 C F 2 (ELE)	F42ILL	59	0.6	SW	5520	3,257	10	4 ft LED Tube	200732x2	30	0.3	NONE	5,520	1,656	1,601	0.3	$ 238.17	$ 2,337.00	$ 100	9.8	9.4
															0	#N/A								#VALUE!
															0	#N/A								#VALUE!
S	**Total**	**858**				**58.9**			**187,893**	**858**				**35.2**			**115,164**		**23.6**	**11,616**	**177,703**	**$6,025**		
S																	**Demand Savings**			**23.6**	**$1,798**			
S																	**kWh Savings**			**72,729**	**$9,818**			
S																	**Total Savings**				**$11,616**		**15.3**	**14.8**

APPENDIX D

Photos

Memorial Elementary School

HHW Pumps

DHW Heater

Boiler

Power Exhaust Fan

RTU

APPENDIX E

Photovoltaic Analysis

East Brunswick Schools
Memorial Elementary School

Cost of Electricity	$0.159	/kWh
Electricity Usage	750,362	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
$200,000	**50.0**	**60,598**	**0**	**$9,635**	**0**	**$9,635**	**$0**	**$15,150**	**20.8**	**8.1**

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

Area Output*
1,395 m2
15,016 ft2

Perimeter Output*
200 m
656 ft

Available Roof Space for PV:
(Area Output - 10 ft x Perimeter) x 85%
7,186 ft2

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

8	watt/ft2	
57,487	DC watts	
50	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	175	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
60,598 annual kWh calculated in PV Watts program

% Offset Calc

Usage	750,362	(from utilities)
PV Generation	60,598	(generated using PV Watts)
% offset	8%	

* 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

60,598 kWh per Year *

System output may range from 58,289 to 63,477kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)	Energy Value ($)
January	2.39	3,199	509
February	3.16	3,805	605
March	4.07	5,306	844
April	4.83	5,900	938
May	5.70	6,975	1,109
June	5.94	6,857	1,090
July	5.76	6,798	1,081
August	5.38	6,300	1,002
September	4.65	5,415	861
October	3.61	4,474	711
November	2.35	2,928	466
December	2.01	2,641	420
Annual	**4.15**	**60,598**	**$ 9,636**

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	50 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	10°
Array Azimuth	175°
System Losses	14%
Inverter Efficiency	96%
DC to AC Size Ratio	1.1

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.16 $/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

51

ENERGY STAR® Score[1]

Memorial Elementary School

Primary Property Function: K-12 School
Gross Floor Area (ft²): 82,821
Built: 2012

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
Memorial Elementary School 14 Innes Road East Brunswick, New Jersey 08816	_____ , (____)____-_____	____ _____ , (____)____-_____ _____

Property ID: 4795672

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
79.8 kBtu/ft²

Source EUI
146.7 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	2,491,995 (38%)
Natural Gas (kBtu)	4,118,100 (62%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	81
National Median Source EUI (kBtu/ft²)	148.8
% Diff from National Median Source EUI	-1%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	552

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)