Local Government Energy Audit:
Energy Audit Report

Bankbridge Elementary School

Gloucester County Special Services School District

850 Bankbridge Road

Sewell, NJ 08080

March 16, 2018

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate savings are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC Energy Services (TRC) and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for certain measures and conditions, TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Bankbridge Elementary School.

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC, as part of a comprehensive effort to assist New Jersey school districts in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Bankbridge Elementary School is a single-story building totaling 39,081 square foot constructed in 2002. Interior lighting consists mainly of linear T8 fluorescent lamps and fixtures with electronic ballasts which are controlled mainly by manual wall switches. Heating is provided by two non-condensing hot water boilers. The cooling system consists of air-cooled condensing units associated with a system of air handlers all located above the ceiling. A thorough description of the facility and our observations are in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated eight (8) measures. Seven (7) measures were recommended for implementation, which together represent an opportunity to reduce annual energy costs by $22,700 and annual greenhouse gas emissions by 157,068 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 2.1 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Bankbridge Elementary School's annual energy use by 15%.

Figure 1 – Previous 12 Month Utility Costs

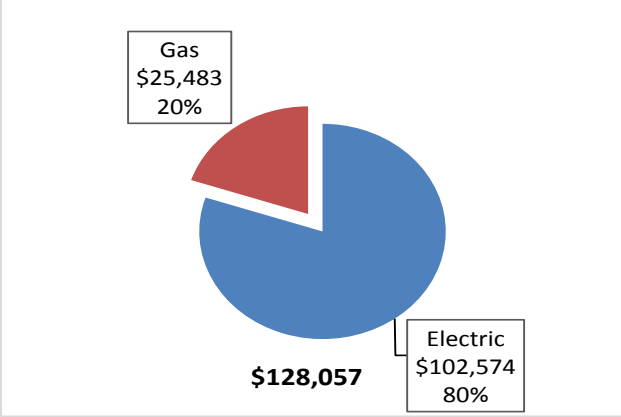
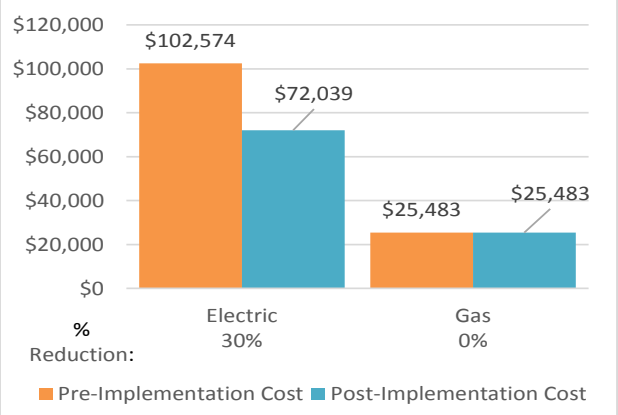


Figure 2 – Potential Post-Implementation Costs



A detailed description of Bankbridge Elementary School's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**110,119**	**12.5**	**0.0**	**$16,026.31**	**$34,621.25**	**$4,605.00**	**$30,016.25**	**1.9**	**110,889**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	108,306	12.4	0.0	$15,762.40	$31,394.60	$4,605.00	$26,789.60	1.7	109,063
ECM 2	Install LED Exit Signs	Yes	1,813	0.1	0.0	$263.90	$3,226.65	$0.00	$3,226.65	12.2	1,826
Lighting Control Measures			**28,903**	**3.3**	**0.0**	**$4,206.37**	**$7,972.00**	**$1,110.00**	**$6,862.00**	**1.6**	**29,105**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	25,379	2.9	0.0	$3,693.55	$6,572.00	$1,110.00	$5,462.00	1.5	25,556
ECM 4	Install High/Low Lighitng Controls	Yes	3,524	0.4	0.0	$512.83	$1,400.00	$0.00	$1,400.00	2.7	3,548
Motor Upgrades			**1,362**	**0.4**	**0.0**	**$198.15**	**$2,262.88**	**$0.00**	**$2,262.88**	**11.4**	**1,371**
ECM 5	Premium Efficiency Motors	Yes	1,362	0.4	0.0	$198.15	$2,262.88	$0.00	$2,262.88	11.4	1,371
Variable Frequency Drive (VFD) Measures			**13,640**	**1.9**	**0.0**	**$1,985.13**	**$7,213.60**	**$0.00**	**$7,213.60**	**3.6**	**13,735**
ECM 6	Install VFDs on Hot Water Pumps	Yes	13,640	1.9	0.0	$1,985.13	$7,213.60	$0.00	$7,213.60	3.6	13,735
Electric Unitary HVAC Measures			**53,831**	**31.9**	**0.0**	**$7,834.38**	**$169,557.75**	**$8,400.00**	**$161,157.75**	**20.6**	**54,208**
	Install High Efficiency Electric AC	No	53,831	31.9	0.0	$7,834.38	$169,557.75	$8,400.00	$161,157.75	20.6	54,208
Plug Load Equipment Control - Vending Machine			**1,954**	**0.0**	**0.0**	**$284.43**	**$460.00**	**$0.00**	**$460.00**	**1.6**	**1,968**
ECM 7	Vending Machine Control	Yes	1,954	0.0	0.0	$284.43	$460.00	$0.00	$460.00	1.6	1,968
TOTALS FOR RECOMMENDE MEASURES			**155,978**	**18.1**		**$22,700.39**	**$52,529.73**	**$5,715.00**	**$46,814.73**	**2.1**	**157,068**
TOTALS FOR EVALUATED MEASURES			**209,809**	**50.0**	**0.0**	**$30,534.77**	**$222,087.48**	**$14,115.00**	**$207,972.48**	**6.8**	**211,276**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient that usage a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

Electric Unitary HVAC measures generally involve replacing older inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide equivalent cooling to older air condition systems at a reduced energy cost. These measures save energy by reducing the power used by the air conditioning systems, due to improved electrical efficiency.

Plug Load Equipment control measures generally involve installing automated devices that limit the power usage or operation of equipment that is plugged into an electric outlet when not in use.

Energy Efficient Practices

TRC also identified 12 low cost or no cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Check for and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Bankbridge Elementary School. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	161	kW DC STC
Electric Generation	191,811	kWh/yr
Displaced Cost	$16,690	/yr
Installed Cost	$418,600	

For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program, you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Amy Capriotti	Asst. Superintendent for Business	acapriotti@gcecnj.org	856-468-1445 ext. 2601
Designated Representative			
Robert G. Gassler	Sr. Facilities Manager	rgassler@gcecnj.org	8564152045 ext. 3603
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On October 12, 2017, TRC performed an energy audit at Bankbridge Elementary School located in Sewell, New Jersey. TRC's auditor met with Robert G. Gassler to review the facility operations and help focus our investigation on specific energy-using systems.

Bankbridge Elementary School is a one-story 39,081 square foot facility built specifically for students from preschool through grade six. It was built in 2002. Its primary purpose is to educate elementary students with disabilities and require programing that is not available in their local school districts. The school is comprised of several space types including classrooms, administrative offices, gymnasium, kitchen, cafeteria, conference rooms, storage and mechanical spaces.

2.3 Building Occupancy

The school operates on a 12-month schedule and is open Monday through Friday. The typical schedule is presented in the table below. During a typical day, the school has approximately 150 students and 77 teachers and staff members.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Bankbridge Elementary School	Weekday	6:00 AM - 11:30 PM
Bankbridge Elementary School	Weekend	8:00 AM - 4:30 PM

2.4 Building Envelope

The building has a concrete foundation and exterior walls are constructed of cement brick. The roofing system consists of a pitched asphalt shingled roof on the facing section and perimeter, and a flat membrane type roof on the back of the building. The roofs are in good condition.

Windows are double pane operable, with aluminum frames which are in good condition and well maintained. Exterior doors consist of glass with aluminum frames and a complete metal frame which are in good condition as well. Overall, the building's envelope is in good condition with no signs of outside air infiltration.

2.5 On-Site Generation

Bankbridge Elementary School has one (1) diesel backup generator located in the boiler room that is used to power emergency lights in case of power outage. The facility has no other on-site electric generation capability.

2.6 Energy-Using Systems

Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's lighting equipment

Lighting System

Interior lighting is provided primarily by 32-Watt linear fluorescent T8 lamps with electronic ballasts. Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers. The gymnasium and the cafeteria lighting systems have been retrofitted to 160 Watt efficient LED fixtures. A small number of compact fluorescent lamps (CFLs) are found in closets, library, and restrooms. Exit signs throughout the facility contain fluorescent lamps.

Interior lighting control is provided primarily by manual wall switches. Rooms 120, 217 and 219 use occupancy sensors.

Exterior lighting has been retrofitted to LED fixtures and consists of 26-Watt and 36-Watt wall pack LED fixtures, 13-Watt LED recessed perimeter fixtures, 62-Watt pole mounted walkway LED fixtures, and 78-Watt, pole-mounted parking lot LED fixtures. Exterior lights are all on timer.

Hot Water Heating System

Heating is provided by two (2) Smith non-condensing hot water boilers with an output capacity of 1,342 MBh each and a combustion efficiency of 82% located in the boiler room. They are original to the building and are well maintained. The heating hot water system is controlled by a building energy management system (BEMS).

Heating hot water is circulated by two (2) 7.5 hp pumps that run on constant speed which are also located in the boiler room. The boilers are configured in a constant flow primary distribution.

The hot water system is enabled based upon outside air temperature. The heating hot water setpoint is 70°F when occupied and 60°F when unoccupied. The pumps supply hot water to six (6) air handlers and 46 variable air volume (VAV) reheat boxes all located above the ceiling. Air distribution is provided to supply air registers by ducts concealed above the ceilings. Return air grilles are in each space. The boilers are set to run year-round with the reheat system.

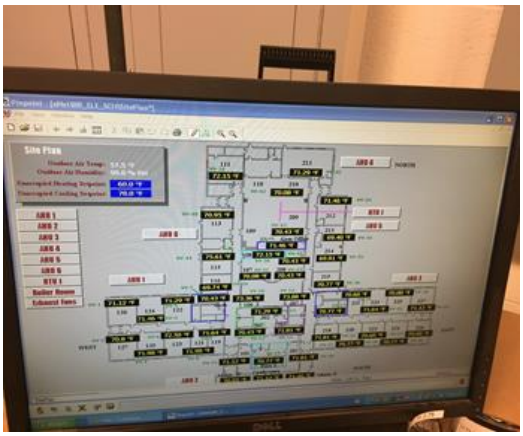
One (1) McQuay air handler with a gas-fired furnace and outside air economizer is also used to condition the facility. It provides a variable air volume with a single 15 hp supply fan and a 7.5 hp return fan. The gas-fired furnace section provides 320 MBh supplemental heating to the facility.

Direct Expansion Air Conditioning System (DX)

Seven (7) McQuay air-cooled condensing units (CU#1 to CU#7) ranging from 12 to 41 tons are used in conjunction with air handlers to condition the building. Three units are on the ground floor and the remaining four are located on the flat roof. They us a scroll compressor and a direct-expansion (DX) coil. The units are 16 years old and have passed their useful life service.

Cooled air is distributed through ducts to 46 variable air volume (VAV) terminals concealed above the ceilings. The cooling system is controlled by a building energy management system. The server room has one (1) 2-ton Sanyo split AC that is controlled by a thermostat.

Building Energy Management System (BEMS)



Most of the facility HVAC is controlled by building energy management system (BEMS). The BEMS aggregates the DDC points from throughout the building and makes instant adjustments to maintain comfort while lowering energy usage. The heating hot water and the cooled air distribution systems are all controlled by the BEMS system capable of providing trends for individual DDC points for up to one-year of historical data

Domestic Hot Water Heating System

Domestic hot water is provided by one Bradford White gas-fired, non-condensing hot water heater with an input rating of 80 MBh and a combustion efficiency of 82%. It has a 100-gallon storage tank. The water heater is two (2) years old and appears in good condition.

The kitchen is served by a separate hot water heater that consist of a gas-fired, non-condensing hot water with an input rating of 200 MBh and a combustion efficiency of 80%. This water heater is three years old and has a 32-gallon storage tank.

Food Service & Refrigeration

The school houses a small institutional kitchen and a cafeteria. The kitchen cooking systems include gas convection ovens, gas griddles and insulated food holding cabinets. The kitchen also has one dishwasher that is an electric high temperature single tank conveyor. The refrigeration systems consist of five (5) standup refrigerators which appear in good condition. The kitchen is well maintained.

Building Plug Load

The building has approximately 136 computers with LCD monitors that are used daily, plus server, three (3) large photocopiers, five (5) printers and five (5) small refrigerators. The computers, monitors, and printers seemed to be all recent models designed with power management software to reduce power when they sit idle for more than a few minutes. There is one server room that has cooling provided by one (1) 2-ton Sanyo split system air conditioner. The facility has two vending machines located in Room 112.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that the faucets are rated as low flow.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

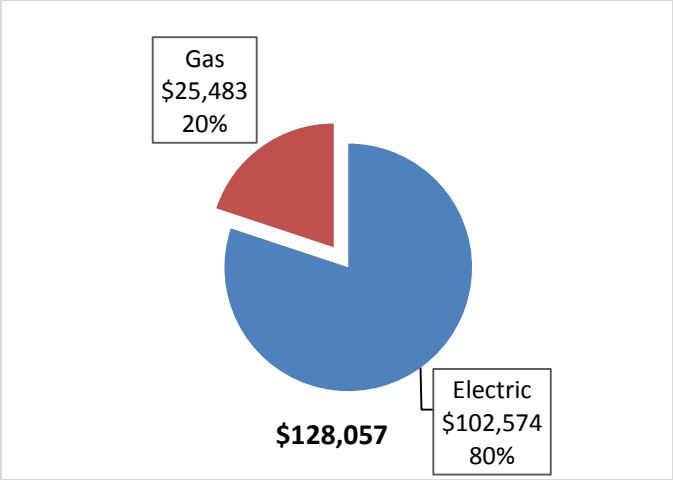
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Bankbridge Elementary School		
Fuel	**Usage**	**Cost**
Electricity	704,800 kWh	$102,574
Natural Gas	22,228 Therms	$25,483
Total		**$128,057**

The current annual energy cost for this facility is $128,057 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.146/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below. The electricity use profile reflects high occupancy in the summer months and confirms the 12 months facility operation.

Figure 9 -Electric Usage & Demand

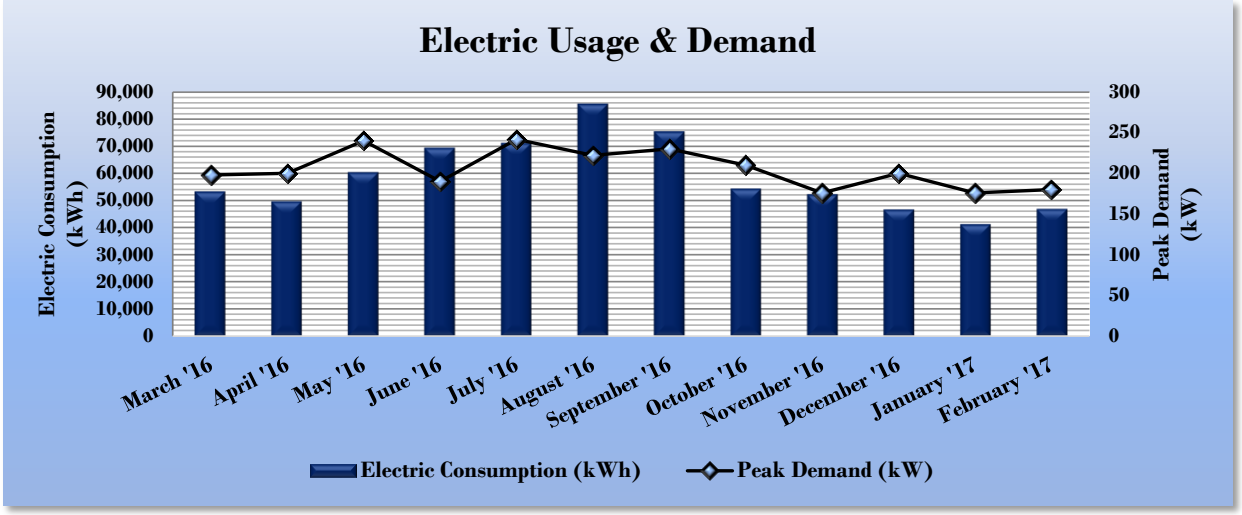


Figure 10 -Electric Usage & Demand

Electric Billing Data for Bankbridge Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/6/16	30	53,200	198	$7,810	No
5/6/16	31	49,600	200	$7,197	No
6/6/16	30	60,200	240	$8,770	No
7/8/16	31	69,200	190	$9,624	No
8/5/16	31	71,000	242	$9,905	No
9/6/16	30	85,400	222	$11,753	No
10/7/16	31	75,200	230	$10,754	No
11/4/16	30	54,200	210	$7,944	No
12/9/16	31	52,200	176	$8,112	No
1/9/17	32	46,600	200	$7,274	No
2/3/17	28	41,200	176	$6,197	No
3/6/17	30	46,800	180	$7,233	No
Totals	**365**	**704,800**	**242**	**$102,574**	0
Annual	**365**	**704,800**	**242**	**$102,574**	

3.3 Natural Gas Usage

Natural Gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.146/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The gas use profile is typical for a facility with a significant heating load relative to boilers usage in the summer months for reheat system.

Figure 11 -Natural Gas Usage

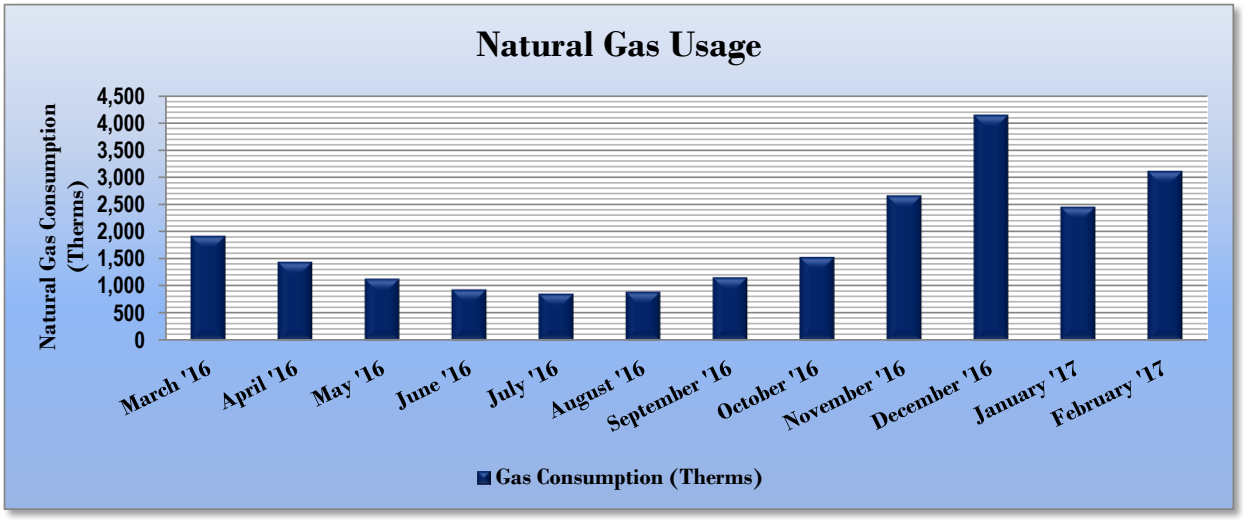


Figure 12 -Natural Gas Usage

Gas Billing Data for Bankbridge Elementary School				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
4/6/16	30	1,918	$2,190	No
5/6/16	31	1,441	$1,633	No
6/6/16	30	1,132	$1,284	No
7/8/16	31	934	$1,066	No
8/5/16	31	856	$974	No
9/6/16	30	896	$1,023	No
10/7/16	31	1,157	$1,338	No
11/4/16	30	1,532	$1,877	No
12/9/16	31	2,658	$3,252	No
1/9/17	32	4,140	$4,653	No
2/3/17	28	2,451	$2,742	No
3/6/17	30	3,111	$3,452	No
Totals	**365**	**22,228**	**$25,483**	0
Annual	**365**	**22,228**	**$25,483**	

3.4 Benchmarking

This facility was benchmarked using Portfolio Manager, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® Score for select building types.

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy." Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Bankbridge Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	252.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	118.4	58.2

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, as shown in the table below:

Figure 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Bankbridge Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	210.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	104.8	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 21.

A Portfolio Manager Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR® Statement of Energy Performance.

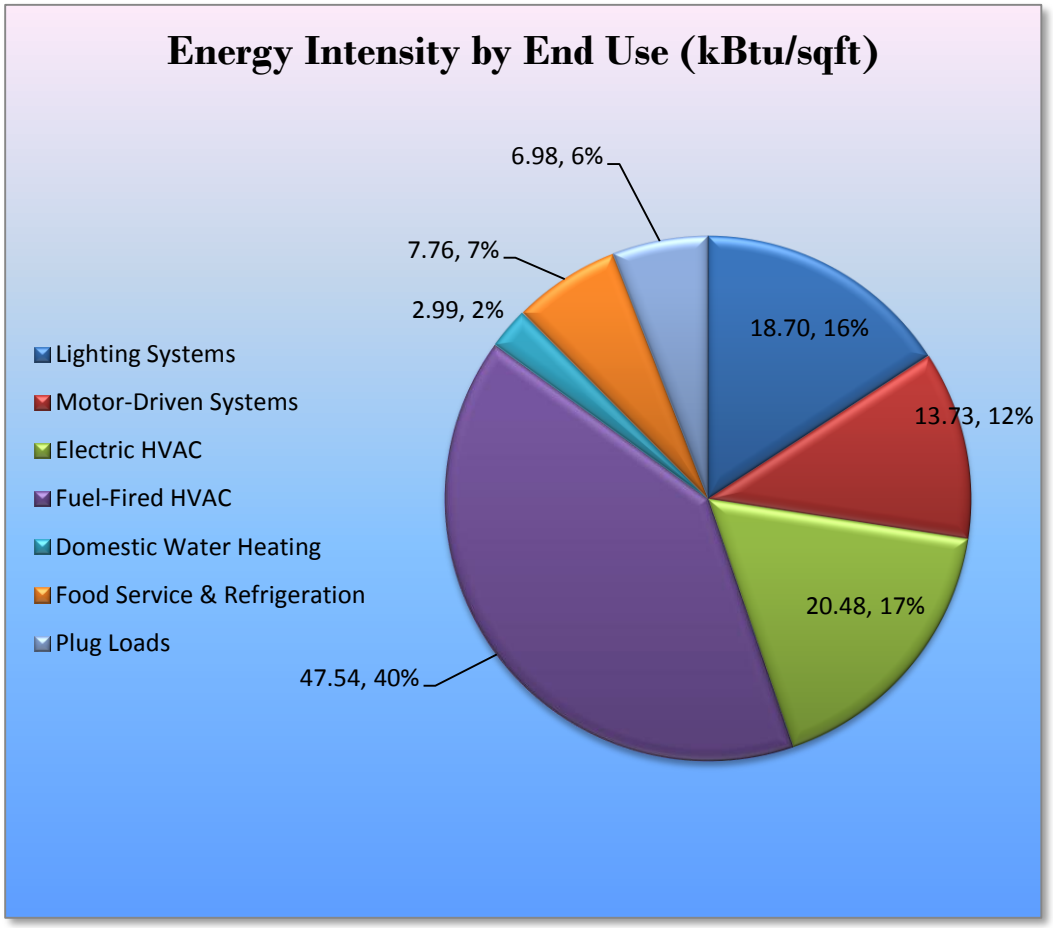
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance. Free online training is available to help you use ENERGY STAR® Portfolio Manager to track your building's performance at: https://www.energystar.gov/buildings/training.

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 15 - Energy Balance (kBtu/SF,%)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Bankbridge Elementary School regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**110,119**	**12.5**	**0.0**	**$16,026.31**	**$34,621.25**	**$4,605.00**	**$30,016.25**	**1.9**	**110,889**
ECM 1	Retrofit Fixtures with LED Lamps	108,306	12.4	0.0	$15,762.40	$31,394.60	$4,605.00	$26,789.60	1.7	109,063
ECM 2	Install LED Exit Signs	1,813	0.1	0.0	$263.90	$3,226.65	$0.00	$3,226.65	12.2	1,826
Lighting Control Measures		**28,903**	**3.3**	**0.0**	**$4,206.37**	**$7,972.00**	**$1,110.00**	**$6,862.00**	**1.6**	**29,105**
ECM 3	Install Occupancy Sensor Lighting Controls	25,379	2.9	0.0	$3,693.55	$6,572.00	$1,110.00	$5,462.00	1.5	25,556
ECM 4	Install High/Low Lighitng Controls	3,524	0.4	0.0	$512.83	$1,400.00	$0.00	$1,400.00	2.7	3,548
Motor Upgrades		**1,362**	**0.4**	**0.0**	**$198.15**	**$2,262.88**	**$0.00**	**$2,262.88**	**11.4**	**1,371**
ECM 5	Premium Efficiency Motors	1,362	0.4	0.0	$198.15	$2,262.88	$0.00	$2,262.88	11.4	1,371
Variable Frequency Drive (VFD) Measures		**13,640**	**1.9**	**0.0**	**$1,985.13**	**$7,213.60**	**$0.00**	**$7,213.60**	**3.6**	**13,735**
ECM 6	Install VFDs on Hot Water Pumps	13,640	1.9	0.0	$1,985.13	$7,213.60	$0.00	$7,213.60	3.6	13,735
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$284.43**	**$460.00**	**$0.00**	**$460.00**	**1.6**	**1,968**
ECM 7	Vending Machine Control	1,954	0.0	0.0	$284.43	$460.00	$0.00	$460.00	1.6	1,968
TOTALS		**155,978**	**18.1**	**0.0**	**$22,700.39**	**$52,529.73**	**$5,715.00**	**$46,814.73**	**2.1**	**157,068**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**110,119**	**12.5**	**0.0**	**$16,026.31**	**$34,621.25**	**$4,605.00**	**$30,016.25**	**1.9**	**110,889**
ECM 1	Retrofit Fixtures with LED Lamps	108,306	12.4	0.0	$15,762.40	$31,394.60	$4,605.00	$26,789.60	1.7	109,063
ECM 2	Install LED Exit Signs	1,813	0.1	0.0	$263.90	$3,226.65	$0.00	$3,226.65	12.2	1,826

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	108,306	12.4	0.0	$15,762.40	$31,394.60	$4,605.00	$26,789.60	1.7	109,063
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing linear fluorescent and compact fluorescent lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube.

ECM 2: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,813	0.1	0.0	$263.90	$3,226.65	$0.00	$3,226.65	12.2	1,826
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all compact fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.1 Lighting Control Measures

Figure 18 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**28,903**	**3.3**	**0.0**	**$4,206.37**	**$7,972.00**	**$1,110.00**	**$6,862.00**	**1.6**	**29,105**
ECM 3	Install Occupancy Sensor Lighting Controls	25,379	2.9	0.0	$3,693.55	$6,572.00	$1,110.00	$5,462.00	1.5	25,556
ECM 4	Install High/Low Lighitng Controls	3,524	0.4	0.0	$512.83	$1,400.00	$0.00	$1,400.00	2.7	3,548

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
25,379	2.9	0.0	$3,693.55	$6,572.00	$1,110.00	$5,462.00	1.5	25,556

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in restrooms, classrooms, offices and conference rooms. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern

occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
3,524	0.4	0.0	$512.83	$1,400.00	$0.00	$1,400.00	2.7	3,548

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are interior corridors.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period. Energy savings results from only providing full lighting levels when it is required.

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage needs to be provided to ensure that lights turn on in each area as an occupant approaches. Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.2 Motor Upgrades

ECM 5: Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,362	0.4	0.0	$198.15	$2,262.88	$0.00	$2,262.88	11.4	1,371

Measure Description

We recommend replacing the two (2) 7.5 hp standard efficiency hot water motors with NEMA Premium® efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016). Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

4.1.3 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 19 below.

Figure 19 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**13,640**	**1.9**	**0.0**	**$1,985.13**	**$7,213.60**	**$0.00**	**$7,213.60**	**3.6**	**13,735**
ECM 6	Install VFDs on Hot Water Pumps	13,640	1.9	0.0	$1,985.13	$7,213.60	$0.00	$7,213.60	3.6	13,735

ECM 6: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
13,640	1.9	0.0	$1,985.13	$7,213.60	$0.00	$7,213.60	3.6	13,735

Measure Description

We recommend installing a variable frequency drives (VFD) to control the two (2) 7.5 hp hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential

pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.4 Plug Load Equipment Control - Vending Machines

ECM 7: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,954	0.0	0.0	$284.43	$460.00	$0.00	$460.00	1.6	1,968

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

4.2 ECMs Evaluated but Not Recommended

The measures below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 20 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures	**53,831**	**31.9**	**0.0**	**$7,834.38**	**$169,557.75**	**$8,400.00**	**$161,157.75**	**20.6**	**54,208**
Install High Efficiency Electric AC	53,831	31.9	0.0	$7,834.38	$169,557.75	$8,400.00	$161,157.75	20.6	54,208
TOTALS	**53,831**	**31.9**	**0.0**	**$7,834.38**	**$169,557.75**	**$8,400.00**	**$161,157.75**	**20.6**	**54,208**

* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
53,831	31.9	0.0	$7,834.38	$169,557.75	$8,400.00	$161,157.75	20.6	54,208

Measure Description

We evaluated the replacement of old and standard efficiency air-cooled condensing units with high efficiency air-cooled condensing units. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Reasons for not Recommending

The simple payback of this measure exceeds the expected useful life of the equipment and is therefore not recommended based on energy savings alone. This does not prevent the school for considering the implementation of this measures as most of the units appear in poor condition.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20% - 60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6 – 12 months.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost-effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low-cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Check for and Seal Duct Leakage

Duct leakage in commercial buildings typically accounts for 5 to 25 percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building, significantly increasing

cooling and heating costs. By sealing sources of leakage, cooling, heating, and ventilation energy use can be reduced significantly, depending on the severity of air leakage.

Perform Proper Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to retain proper functionality and efficiency of the heating system. Fuel burning equipment should undergo yearly tune-ups to ensure they are operating as safely and efficiently as possible from a combustion standpoint. A tune-up should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Buildup of dirt, dust, or deposits on the internal surfaces of a boiler can greatly affect its heat transfer efficiency. These deposits can accumulate on the water side or fire side of the boiler. Boilers should be cleaned regularly according to the manufacturer's instructions to remove this build up in order to sustain efficiency and equipment life.

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three (3) to four (4) years old have a technician inspect the sacrificial anode annually.

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (http://www3.epa.gov/watersense/products) labeled devices are 1.5 gallons per minute (gpm) for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

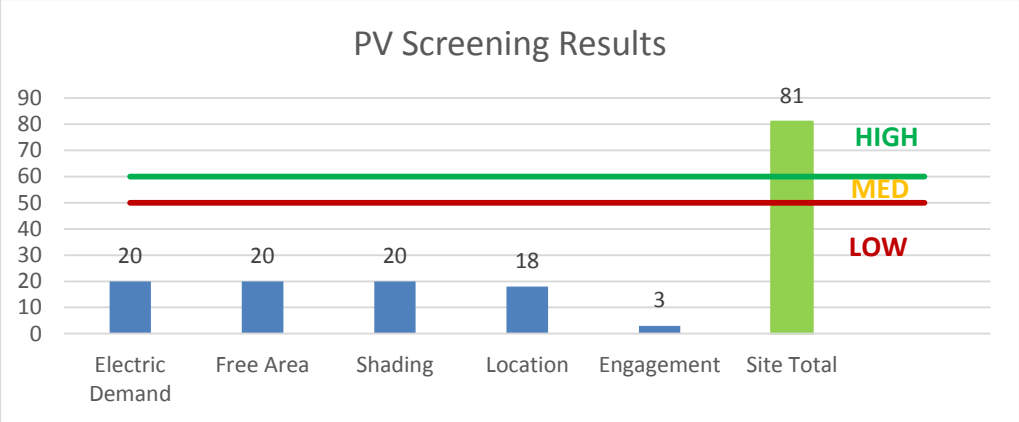
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a High potential for installing a PV array.

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.

Figure 21 - Photovoltaic Screening



Potential	High	
System Potential	161	kW DC STC
Electric Generation	191,811	kWh/yr
Displaced Cost	$16,690	/yr
Installed Cost	$418,600	

Solar projects must register their projects in the SREC Registration Program prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.2 for additional information.

Figure 22 – Rooftop Free Spaces

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

- **Basic Info on Solar PV in NJ**: http://www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ Market**: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1

6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

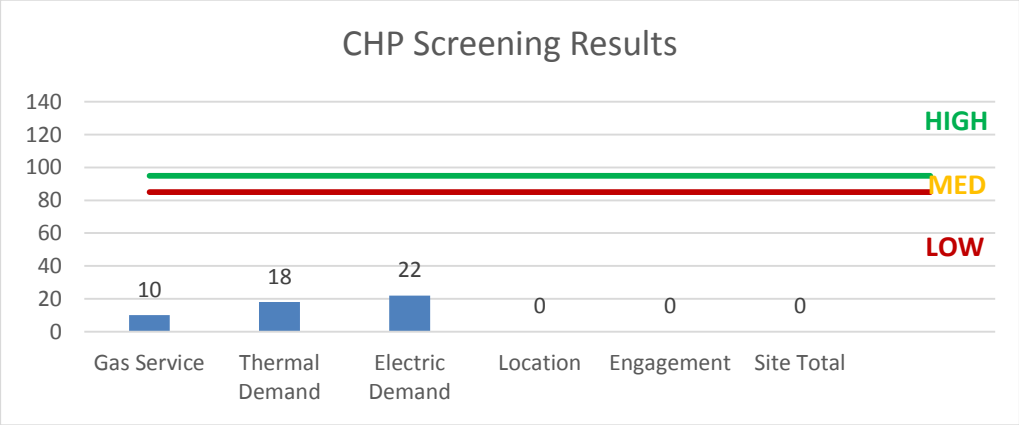
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Low or infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

For a list of qualified firms in New Jersey specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/

Figure 23 - Combined Heat and Power Screening



7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically, an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats, so that air conditioning units run less frequently, or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

In our opinion, this building has a moderate potential for DR curtailment.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 24 for a list of the eligible programs identified for each recommended ECM.

Figure 24 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Retrofit Fixtures with LED Lamps	x					
ECM 2	Install LED Exit Signs						
ECM 3	Install Occupancy Sensor Lighting Controls	x					
ECM 4	Install High/Low Lighitng Controls						
ECM 5	Premium Efficiency Motors						
ECM 6	Install VFDs on Hot Water Pumps						
ECM 7	Vending Machine Control						

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom Measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one-year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

Detailed program descriptions, instructions for applying and applications can be found at: www.njcleanenergy.com/SSB.

8.2 SREC Registration Program

The SREC Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SRP prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. SREC's are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SREC's to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8.3 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs can be leveraged to help further reduce the total project cost of eligible measures.

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

(1) Use an Energy Services Company or "ESCO."
(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
(3) Use a hybrid approach of the two options described above where the ESCO is utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the Energy Savings Plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e. non-utility) energy supplier.

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third-party supplier, review and compare prices at the end of the current contract or every couple year.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third-party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility is not purchasing natural gas from a third-party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third-party supplier, review and compare prices at the end of the current contract or every couple of years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.19	1,705	0.0	$248.14	$526.50	$90.00	1.76
Boiler Room	1	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	$8.80	$107.56	$0.00	12.23
Mechanical Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,494	0.33	2,873	0.0	$418.08	$818.00	$140.00	1.62
Mechanical Room	2	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	$17.59	$215.11	$0.00	12.23
Room 111	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 111	1	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	$8.80	$107.56	$0.00	12.23
Room 111	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.04	379	0.0	$55.14	$117.00	$20.00	1.76
Room 112	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.12	1,077	0.0	$156.78	$341.60	$65.00	1.76
West Wing Corridor	27	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	27	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,494	0.69	6,030	0.0	$877.52	$2,306.40	$0.00	2.63
West Wing Corridor	6	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	6	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	363	0.0	$52.78	$645.33	$0.00	12.23
Room 114	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Room 116	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Girls Restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,494	0.08	670	0.0	$97.50	$459.60	$35.00	4.35
Girls Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Boys Restroom	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,992	0.04	333	0.0	$48.46	$126.40	$0.00	2.61
Boys Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Room 117	1	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	25	4,992	0.02	166	0.0	$24.23	$63.50	$0.00	2.62
Room 118	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Room 120	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,494	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,494	0.04	265	0.0	$38.60	$117.00	$20.00	2.51
Room 121	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.25	2,155	0.0	$313.56	$567.20	$110.00	1.46
Room 122	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 123	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 124	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 125	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 126	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 127	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 119	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.25	2,155	0.0	$313.56	$567.20	$110.00	1.46
Room 103	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 104	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 105	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 106	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,494	0.10	893	0.0	$130.00	$368.80	$20.00	2.68
Room 107 - Library	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,494	0.23	2,010	0.0	$292.51	$684.80	$20.00	2.27
Room 107 - Library	7	Compact Fluorescent: 18x4 4-PIN	Wall Switch	72	4,992	Relamp	Yes	7	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	35	3,494	0.22	1,909	0.0	$277.80	$560.50	$20.00	1.95
Room 107 - Library	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,992	0.06	568	0.0	$82.71	$150.40	$30.00	1.46
Room 107 - Library	1	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	$8.80	$107.56	$0.00	12.23
Room 108	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 101 - Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.16	1,436	0.0	$209.04	$416.80	$80.00	1.61
Room 101 - Office	2	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	$17.59	$215.11	$0.00	12.23
File Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Dr. Guy Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Work Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Conference Room	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,494	0.13	1,117	0.0	$162.50	$432.00	$20.00	2.54
Administration Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Open Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.16	1,436	0.0	$209.04	$416.80	$80.00	1.61
Open Office	2	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	$17.59	$215.11	$0.00	12.23
Faculty Prep Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.21	1,795	0.0	$261.30	$492.00	$95.00	1.52
Mens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Mens Restroom	1	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	25	4,992	0.02	166	0.0	$24.23	$63.50	$0.00	2.62
Womens Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Womens Restroom	1	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	35	4,992	0.01	109	0.0	$15.87	$63.50	$0.00	4.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Corridor Main Office	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,494	0.08	670	0.0	$97.50	$389.60	$0.00	4.00
Room 102	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Nurse Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 203	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.04	379	0.0	$55.14	$117.00	$20.00	1.76
Restroom	1	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	25	4,992	0.02	166	0.0	$24.23	$63.50	$0.00	2.62
East Wing Corridor	32	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	32	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,494	0.82	7,146	0.0	$1,040.02	$2,622.40	$0.00	2.52
East Wing Corridor	5	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$43.98	$537.78	$0.00	12.23
Room 204	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 205	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 206	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 207 - Conference Room	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,494	0.10	893	0.0	$130.00	$368.80	$20.00	2.68
Room 208 - Library	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	9	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,494	0.23	2,010	0.0	$292.51	$684.80	$20.00	2.27
Room 208 - Library	7	Compact Fluorescent: 18x4 4-PIN	Wall Switch	72	4,992	Relamp	Yes	7	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	35	3,494	0.22	1,909	0.0	$277.80	$560.50	$20.00	1.95
Room 208 - Library	1	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	$8.80	$107.56	$0.00	12.23
Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.08	718	0.0	$104.52	$266.40	$50.00	2.07
Room 221 - Therapy Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.74	6,464	0.0	$940.68	$1,469.60	$290.00	1.25
Room 221 - Therapy Room	2	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	$17.59	$215.11	$0.00	12.23
Room 212	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.33	2,873	0.0	$418.08	$717.60	$140.00	1.38
Room 212	1	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	25	4,992	0.02	166	0.0	$24.23	$63.50	$0.00	2.62
Room 213	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.25	2,155	0.0	$313.56	$567.20	$110.00	1.46
Room 214	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.25	2,155	0.0	$313.56	$567.20	$110.00	1.46
Room 215	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Boys Restroom	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,992	0.04	333	0.0	$48.46	$126.40	$0.00	2.61
Boys Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Girls Restroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,494	0.08	670	0.0	$97.50	$459.60	$35.00	4.35
Girls Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Room 216	1	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	25	4,992	0.02	166	0.0	$24.23	$63.50	$0.00	2.62
Room 218	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 220	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 222	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 224	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 227	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 226	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 225	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 223	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.37	3,232	0.0	$470.34	$792.80	$155.00	1.36
Room 221	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,494	0.25	2,155	0.0	$313.56	$567.20	$110.00	1.46
Room 219	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,494	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,494	0.04	265	0.0	$38.60	$117.00	$20.00	2.51
Room 217 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	3,494	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,494	0.02	133	0.0	$19.30	$58.50	$10.00	2.51
Gymnasium	12	LED - Fixtures: Downlight Pendant	Wall Switch	160	4,992	None	No	12	LED - Fixtures: Downlight Pendant	Wall Switch	160	4,992	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gymnasium	2	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	$17.59	$215.11	$0.00	12.23
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.04	379	0.0	$55.14	$117.00	$20.00	1.76
Gymnasium	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.04	379	0.0	$55.14	$117.00	$20.00	1.76
Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.04	379	0.0	$55.14	$117.00	$20.00	1.76
Cafeteria	8	LED - Fixtures: Downlight Pendant	Wall Switch	160	4,992	None	Yes	8	LED - Fixtures: Downlight Pendant	Occupancy Sensor	160	3,494	0.25	2,204	0.0	$320.83	$116.00	$20.00	0.30
Cafeteria	3	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	181	0.0	$26.39	$322.67	$0.00	12.23
Kitchen	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,992	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,992	0.36	3,126	0.0	$454.93	$827.20	$165.00	1.46
Kitchen	2	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	$17.59	$215.11	$0.00	12.23
Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.04	379	0.0	$55.14	$117.00	$20.00	1.76
Janitorial Closet	1	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	144	0.0	$20.89	$58.50	$10.00	2.32

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,992	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.02	189	0.0	$27.57	$58.50	$10.00	1.76
Restroom	2	Compact Fluorescent: 18x3 4-PIN	Wall Switch	54	4,992	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	25	4,992	0.04	333	0.0	$48.46	$127.00	$0.00	2.62
Court Yard	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	26	4,380	None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	26	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Wallpack	21	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	26	4,380	None	No	21	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	26	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Recessed Light	12	LED - Fixtures: Ceiling Mount	Daylight Dimming	13	4,380	None	No	12	LED - Fixtures: Ceiling Mount	Daylight Dimming	13	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Front Entrance	4	LED - Fixtures: LED Corn Bulb	Daylight Dimming	36	4,380	None	No	4	LED - Fixtures: LED Corn Bulb	Daylight Dimming	36	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Walkway Light	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	62	4,380	None	No	11	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	62	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Parking Lot Light	20	LED - Fixtures: Parking Garage Fixture	Daylight Dimming	78	4,380	None	No	20	LED - Fixtures: Parking Garage Fixture	Daylight Dimming	78	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rooftop	School - RTU1	1	Supply Fan	15.0	94.0%	Yes	2,805	No	94.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	School - RTU1	1	Return Fan	7.0	92.0%	No	2,805	No	92.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Heating Hot Water System	2	Heating Hot Water Pump	7.5	85.5%	No	2,550	Yes	91.0%	Yes	2	2.25	15,002	0.0	$2,183.28	$9,476.48	$0.00	4.34
Boiler Room	Boilers	2	Combustion Air Fan	0.3	71.0%	No	2,500	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Kitchen	1	Kitchen Hood Exhaust Fan	1.0	71.0%	No	2,500	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	School	1	Exhaust Fan	0.5	71.0%	No	2,700	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	School	2	Exhaust Fan	0.3	71.0%	No	2,700	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler Room	2	Supply Fan	0.3	71.0%	No	2,700	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	Diswhaser Machine	1	Other	2.0	84.0%	No	1,500	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-1	1	Supply Fan	7.5	88.5%	No	2,700	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-1	1	Return Fan	3.0	84.0%	No	2,700	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-2	1	Supply Fan	5.0	84.0%	No	2,700	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-2	1	Return Fan	3.0	84.0%	No	2,700	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-3	1	Supply Fan	7.5	88.5%	No	2,700	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-3	1	Return Fan	5.0	88.5%	No	2,700	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-4	1	Supply Fan	3.0	84.0%	No	2,700	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-4	1	Return Fan	2.0	82.0%	No	2,700	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-5	1	Supply Fan	3.0	84.0%	No	2,700	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-5	1	Return Fan	2.0	82.0%	No	2,700	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-6	1	Supply Fan	5.0	88.5%	No	2,700	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Above Ceiling	AHU-6	1	Return Fan	3.0	84.0%	No	2,700	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 112	Room 112	1	Split-System AC	2.00		Yes	1	Split-System AC	2.00		14.00		No	0.64	1,077	0.0	$156.76	$2,992.44	$184.00	17.92
Groud Floor	School - CU#1	1	Split-System AC	19.00		Yes	1	Split-System AC	19.00		11.50		No	4.69	7,914	0.0	$1,151.79	$22,037.12	$1,501.00	17.83
Groud Floor	School - CU#2	1	Split-System AC	19.00		Yes	1	Split-System AC	19.00		11.50		No	4.69	7,914	0.0	$1,151.79	$22,037.12	$1,501.00	17.83
Groud Floor	School - CU#3	1	Split-System AC	27.00		Yes	1	Split-System AC	27.00		10.50		No	4.86	8,212	0.0	$1,195.09	$32,150.83	$2,133.00	25.12
Rooftop	School - CU#4	1	Split-System AC	12.00		Yes	1	Split-System AC	12.00		11.50		No	2.96	4,998	0.0	$727.44	$13,918.18	$948.00	17.83
Rooftop	School - CU#5	1	Split-System AC	12.00		Yes	1	Split-System AC	12.00		11.50		No	2.96	4,998	0.0	$727.44	$13,918.18	$948.00	17.83
Rooftop	School - CU#6	1	Split-System AC	15.00		Yes	1	Split-System AC	15.00		11.50		No	3.70	6,248	0.0	$909.31	$17,397.73	$1,185.00	17.83
Rooftop	School - CU#7	1	Split-System AC	41.00		Yes	1	Split-System AC	41.00		10.50		No	7.39	12,470	0.0	$1,814.76	$45,106.15	$0.00	24.86

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rooftop	School - RTU1	1	Furnace	320.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	School Building	2	Non-Condensing Hot Water Boiler	1,342.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School Building	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	Kitchen	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Gas Convection Oven (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Griddle (3 Feet Width)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	3	Insulated Food Holding Cabinet (3/4 Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Single Tank Conveyor (High Temp)	Electric	N/A	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	136	Desktop/LCD Monitors	204.0	Yes
School	3	Copy Machine	850.0	Yes
School	5	Printer	245.0	Yes
School	3	Microwave	1,000.0	No
School	5	Refrigerator	275.0	Yes
School	4	TV	244.0	Yes
Room 214	1	Electric Range	1,700.0	No
Room 214	1	Washing Machine	1,200.0	No
Room 214	1	Electric Dyer	1,500.0	No
Kitchen	2	Commercial Coffee Maker	1,250.0	No
Sever Room	1	Server Rack & Accessories	5,000.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 112	1	Refrigerated	Yes	0.00	1,612	0.0	$234.58	$230.00	$0.00	0.98
Room 112	1	Non-Refrigerated	Yes	0.00	343	0.0	$49.85	$230.00	$0.00	4.61

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Bankbridge Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 39,081
Built: 2002

For Year Ending: February 28, 2017
Date Generated: November 28, 2017

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
Bankbridge Elementary School 850 Bankbridge Road Sewell, New Jersey 08080	Gloucester County Special Services School District 1360 Tanyard Road Sewell, NJ 08080 856-468-6530	Amy Capriotti 1360 Tanyard Road Sewell, NJ 08080 856-468-1445 ext. 2601 acapriotti@gcecnj.org

Property ID: 6146347

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
117.2 kBtu/ft²

Source EUI
250.9 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	2,389,567 (52%)	
Natural Gas (kBtu)	2,191,267 (48%)	

National Median Comparison	
National Median Site EUI (kBtu/ft²)	90.7
National Median Source EUI (kBtu/ft²)	194
% Diff from National Median Source EUI	29%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	382

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)