Local Government Energy Audit:
Energy Audit Report

Bankbridge Regional School

Gloucester County Special Services School District

870 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 Regional 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 Regional School is a 79,670-square foot special services school constructed in 2000. 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. Cooling system consists of split systems air conditioners and a water-cooled centrifugal chiller.

A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated a total of ten measures. Nine (9) measures were recommended for implementation, which together represent an opportunity to reduce annual energy costs by $77,035 and annual greenhouse gas emissions by 563,284 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4.5 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 Regional School's annual energy use by 22%.

Figure 1 – Previous 12 Month Utility Costs

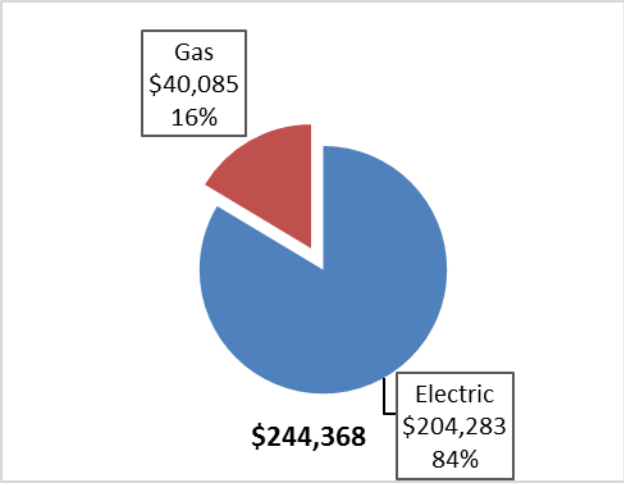
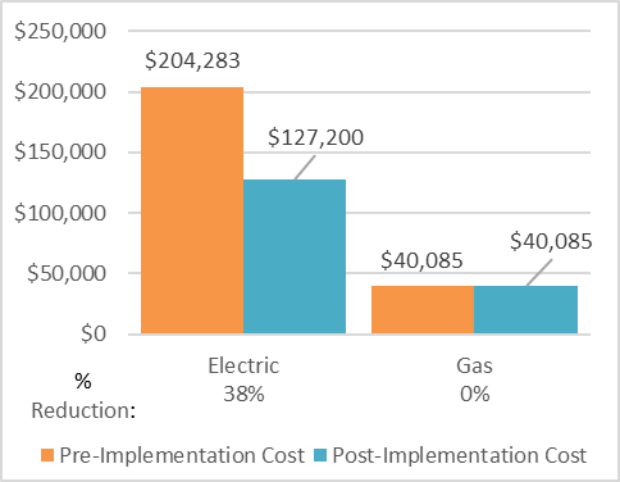


Figure 2 – Potential Post-Implementation Costs



A detailed description of Bankbridge Regional 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 Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**266,549**	**38.6**	**$36,708.49**	**$127,000.13**	**$18,440.00**	**$108,560.13**	**3.0**	**268,413**
ECM 1	Install LED Fixtures	Yes	49,034	6.7	$6,752.82	$33,493.80	$4,050.00	$29,443.80	4.4	49,377
ECM 2	Retrofit Fixtures with LED Lamps	Yes	215,816	31.8	$29,721.62	$90,064.57	$14,390.00	$75,674.57	2.5	217,325
ECM 3	Install LED Exit Signs	Yes	1,699	0.1	$234.05	$3,441.76	$0.00	$3,441.76	14.7	1,711
Lighting Control Measures			**60,620**	**8.9**	**$8,348.48**	**$22,130.00**	**$3,110.00**	**$19,020.00**	**2.3**	**61,044**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	52,601	7.7	$7,244.13	$18,530.00	$3,110.00	$15,420.00	2.1	52,969
ECM 5	Install High/Low Lighitng Controls	Yes	8,019	1.2	$1,104.34	$3,600.00	$0.00	$3,600.00	3.3	8,075
Motor Upgrades			**346**	**0.1**	**$47.67**	**$1,846.72**	**$0.00**	**$1,846.72**	**38.7**	**349**
	Premium Efficiency Motors	No	346	0.1	$47.67	$1,846.72	$0.00	$1,846.72	38.7	349
Variable Frequency Drive (VFD) Measures			**105,483**	**12.2**	**$14,526.81**	**$34,807.15**	**$4,500.00**	**$30,307.15**	**2.1**	**106,220**
ECM 6	Install VFDs on Chilled Water Pumps	Yes	54,787	7.3	$7,545.18	$16,944.10	$3,600.00	$13,344.10	1.8	55,170
ECM 7	Install VFDs on Hot Water Pumps	Yes	37,087	4.9	$5,107.51	$12,668.60	$0.00	$12,668.60	2.5	37,346
ECM 8	Install VFDs on Cooling Tower Fans	Yes	13,608	0.0	$1,874.13	$5,194.45	$900.00	$4,294.45	2.3	13,704
Electric Chiller Replacement			**126,720**	**141.5**	**$17,451.55**	**$197,047.90**	**$10,000.00**	**$187,047.90**	**10.7**	**127,606**
ECM 9	Install High Efficiency Chillers	Yes	126,720	141.5	$17,451.55	$197,047.90	$10,000.00	$187,047.90	10.7	127,606
TOTALS RECOMMENDED MEASURES			**559,372**	**201.3**	**$77,035.33**	**$380,985.18**	**$36,050.00**	**$344,935.18**	**4.5**	**563,284**
TOTALS EVALUATED MEASURES			**559,719**	**201.4**	**$77,083.01**	**$382,831.90**	**$36,050.00**	**$346,781.90**	**4.5**	**563,632**

* - 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 Chiller measures generally involve replacing older inefficient hydronic chillers with modern energy efficient systems. New chillers can provide equivalent cooling compared to older chillers at a reduced energy cost. These measures save energy by reducing chiller energy usage, due to improved electrical and heat transfer efficiency.

Energy Efficient Practices

TRC also identified 11 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 identified at Bankbridge Regional School 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
- Assess Chillers & Request Tune-Ups
- 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 Regional 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	215	kW DC STC
Electric Generation	256,145	kWh/yr
Displaced Cost	$22,280	/yr
Installed Cost	$559,000	

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
- Pay for Performance - Existing Building (P4P)
- 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.

Larger facilities with an interest in a more comprehensive whole building approach to energy conservation should consider participating in the Pay for Performance (P4P) program. Projects eligible for this project program must meet minimum savings requirements. Final incentives are calculated based on actual measured performance achieved at the end of the project. The application process is more involved, and it requires working with a qualified P4P contractor, but the process may result in greater energy savings overall and more lucrative incentives, up to 50% of project's total cost.

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 8.4 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			
Jeanne M. Marston	Facilities Manager	jmarston@gcecny.org	856-415-7755 ext. 3011
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On October 5, 2017, TRC performed an energy audit at Bankbridge Regional School located in Sewell, New Jersey. TRC's auditor met with Jeanne M. Marston to review the facility operations and help focus our investigation on specific energy-using systems.

Bankbridge Regional School is a one-story, 79,670 square foot facility comprised of two campuses and built in 2000. The North Campus serves secondary students with behavioral disabilities in grades 6-12 while the South Campus serves secondary students with multiple disabilities in grades 6-12. Both campuses have their own separate middle school programs offering individualized curriculum for students in grades 6-8. The two campuses are connected and are comprised of several types of spaces including classrooms, administrative offices, gymnasium, retail store, media center, faculty rooms, wood shop, kitchen, cafeteria, music room, green house, storages 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 289 students and 183 teachers and staff members.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Bankbridge Regional School	Weekday	7:00 AM - 6:00 PM
Bankbridge Regional School	Weekend	Closed

2.4 Building Envelope

The building has a concrete foundation and the exterior walls are constructed of cement brick.

The roofing system consists of a pitched asphalt shingled roof on the front-facing section and perimeter, and a membrane type roof on the back of the building where the HVAC equipment resides.

Windows are double pane operable, with aluminum frames which are in good condition and well maintained.

Exterior doors are glass with aluminum frames and 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 Regional School has one (1) diesel backup generator that is used to power emergency lights in case of a power outage.

2.6 Energy-Using Systems

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

Lighting System

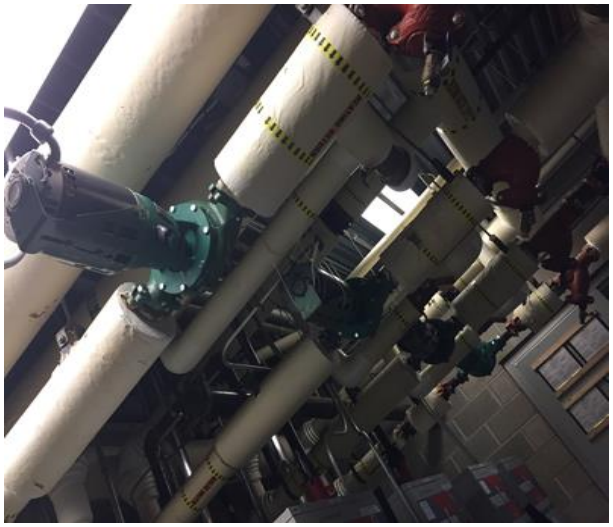
Interior lighting is provided mainly by 32-Watt linear fluorescent T8 lamps with electronic ballasts. Fixtures range in size from two to four feet long troffers with diffusers. The facility has started replacing the mechanical room's high intensity discharge fixtures with 160-Watt LED fixtures. Cafeteria lighting system has been retrofitted with LED linear tubes.

The North and South campus corridors and the main corridor connecting the two campuses have some 100-Watt metal halide lamps. The gymnasium is illuminated with 28-Watt fluorescent T5 lamps using electronic ballasts. The kitchen is lit with 175-Watt metal halide.

Lighting control is provided mainly by manual wall switches except the restrooms which have occupancy sensors as control system. Exit signs throughout the building are fluorescent.

Exterior lighting consists of metal halide pole-mounted roadway and wall mounted fixtures ranging in size from 62 watts to 150 watts each. Additional parking lot pole lighting is LED. All exterior lights are on a timer.

Hot Water Heating System



Heating is provided by four (4) Lochinvar forced draft, non-condensing modular boilers with an output capacity of 850 MBh each and a nominal efficiency of 85%. The boilers are 17 years old and are well maintained.

Heating hot water is circulated throughout the facility via two (2) 20 hp pumps and four (4) 1 hp pumps. The pumps run at constant speed and are all located in the mechanical room.

The heating system is controlled by a Niagara building energy management system (BEMS). The system is enable based upon outside air temperature (70°F adjustable). The system maintains 180°F water temperature at 32°F outdoor air or below. The hot water setpoint is 70°F and the reset is part of the boiler's control package. Boilers are automatically rotated based on 48 hours run time. The boiler with the least amount of run time will become the lead boiler and the boiler that logs 48 hours more run time than the others will be the last boiler fired. Whenever any one boiler fires, its associated 1 hp pump is energized.

Hot water is supplied to 22 air handlers all located above the ceiling which were not accessible during the survey. Also, there are two (2) Trane central stations located on the roof. The air handlers are all constant air volume units. Air distribution is provided to supply air registers by ducts concealed above the ceilings. Return air grilles are in each space.

Chilled Water Air Conditioning System (CHW)

The chilled water system consists of one (1) 400-ton York water-cooled centrifugal chiller located in the mechanical room. Two (2) 30 hp pumps that run at constant speed distribute chilled water to air handlers. The chiller is capable of being automatically or manually indexed to the occupied mode. Chiller setpoint control is achieved by modulating engine speed using a stepper motor which maintains chilled water setpoint within one half of a degree. This is part of the chiller control system.

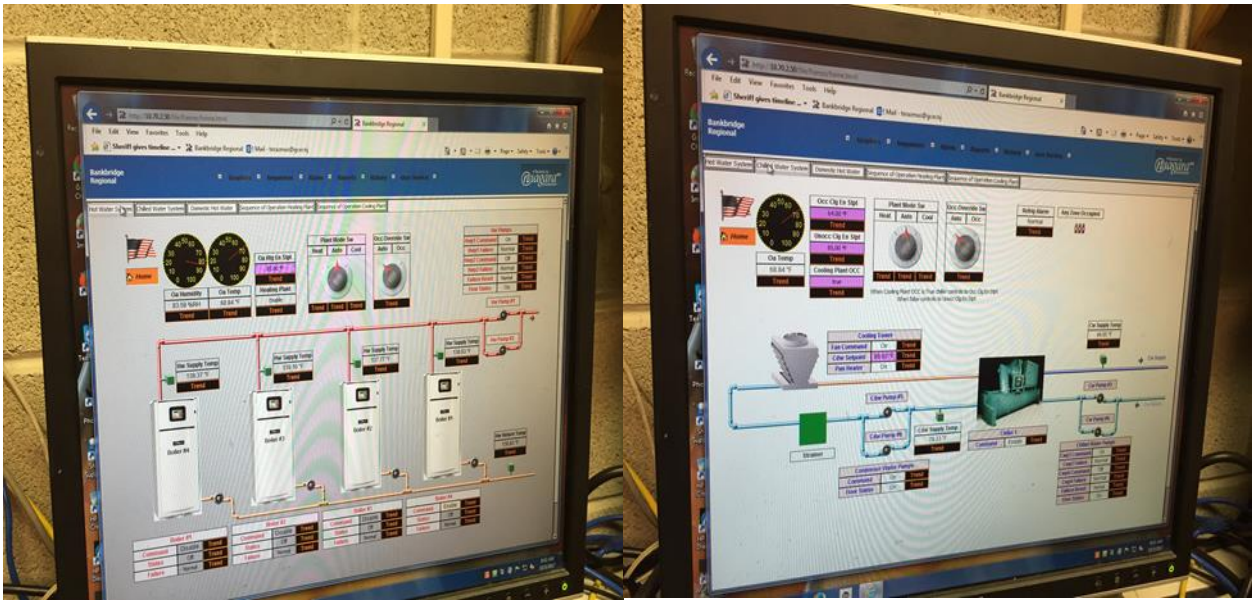
The condenser water system consists of one (1) cooling tower located on the South campus building roof. The cooling tower has one (1) 15 hp fan motor that runs at constant speed. The condenser water is circulated by two (2) 20 hp constant speed pumps.

Whenever the chilled water is enabled, the elected active chilled water pump and condenser water pump are energized to run continuously and combustion damper opens. The cooling tower maintains 85°F condenser entering water temperature. When cooling tower leaving temperature rises to 1°F less than condenser entering water setpoint tower fan is energized at high speed. The chiller and the cooling tower are 17 years old and are original to building.

Direct Expansion Air Conditioning System (DX)

Three (3) split system air conditioners condition the retail store, custodian office and the server room. The units range from 0.8 to 2-ton and are relatively new. They are controlled by a thermostat.

Building Energy Management System (BEMS)



Most of the HVAC is controlled with a Niagara 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 boilers and the chiller plant 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 System

The domestic hot water is provided by one (1) PIVI gas fired non-condensing hot water heater with an input rating of 199 MBh and a combustion efficiency of 82%. It has a 175-gallon storage tank. The water heater is ten years old and appears in good condition.

Food Service & Refrigeration

The facility houses a small institutional kitchen, a cafeteria and one (1) retail coffee and snack shop. The kitchen cooking systems include gas convection ovens, gas steamers and griddles. The kitchen also has one (1) dishwasher that is an electric low temperature single tank conveyor. The refrigeration systems consist of one (1) walk-in cooler, one (1) walk-in freezer and two (2) standup refrigerators which all appear in good condition. The kitchen is well maintained.

Building Plug Load

The building has approximately 182 computers with LCD monitors that are used daily, plus servers, six (6) large photocopiers, 14 printers and 15 small refrigerators. The computers, monitors, and printers seem 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 (1) server room that has cooling provided by one (1) 1-ton Mitsubishi split system air conditioner. The facility has no vending machines.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that 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 0 for additional information.

3.1 Total Cost of Energy

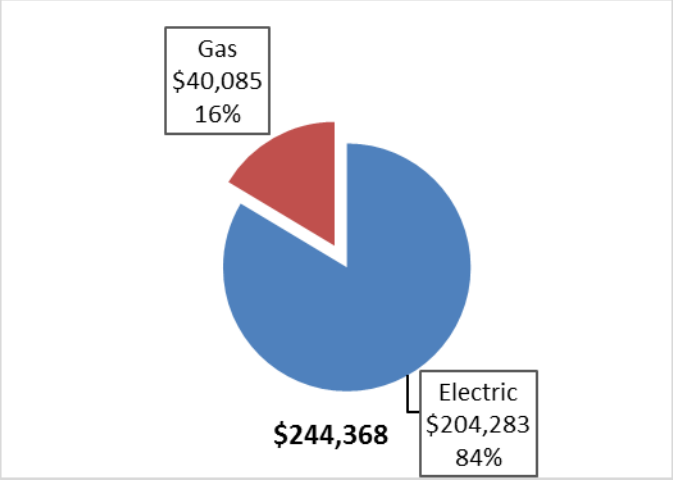
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Bankbridge Regional School		
Fuel	**Usage**	**Cost**
Electricity	1,483,346 kWh	$204,283
Natural Gas	35,278 Therms	$40,085
Total		**$244,368**

The current annual energy cost for this facility is $244,368 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 $0.138/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

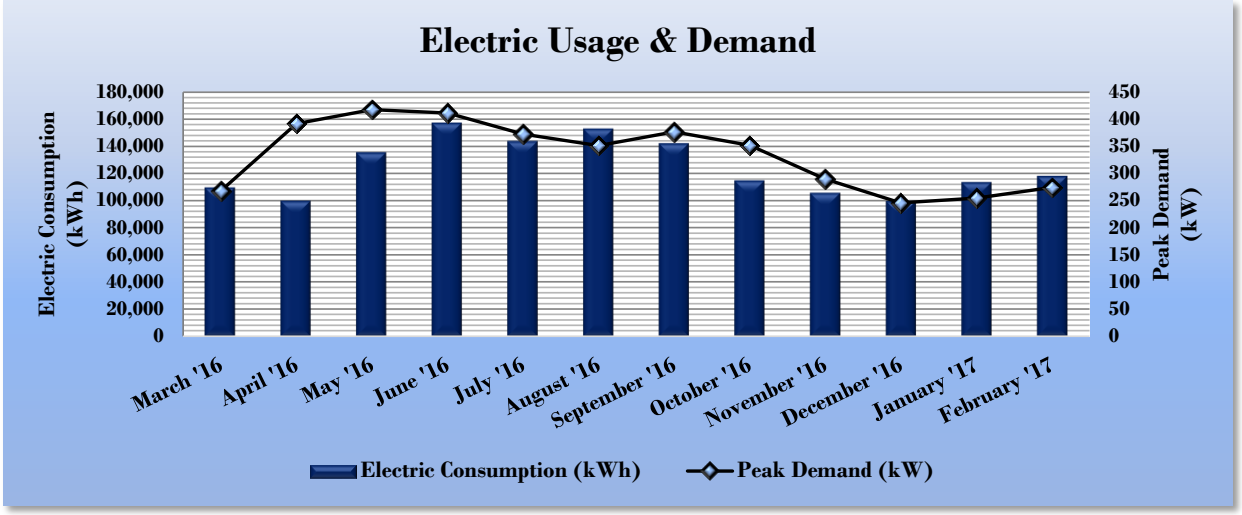


Figure 10 -Electric Usage & Demand

Electric Billing Data for Bankbridge Regional School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/6/16	30	108,893	267	$15,158	No
5/6/16	31	99,261	390	$14,120	No
6/6/16	30	134,604	416	$18,361	No
7/8/16	31	156,334	409	$21,139	No
8/5/16	31	142,882	371	$18,887	No
9/6/16	30	151,956	349	$20,378	No
10/5/16	31	141,210	375	$19,231	No
11/4/16	30	113,987	350	$15,930	No
12/9/16	31	104,992	288	$15,433	No
1/5/17	32	99,022	244	$13,804	No
2/3/17	28	112,873	253	$15,500	No
3/7/17	30	117,330	273	$16,343	No
Totals	**365**	**1,483,346**	**415.512**	**$204,283**	0
Annual	**365**	**1,483,346**	**415.512**	**$204,283**	

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.136/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

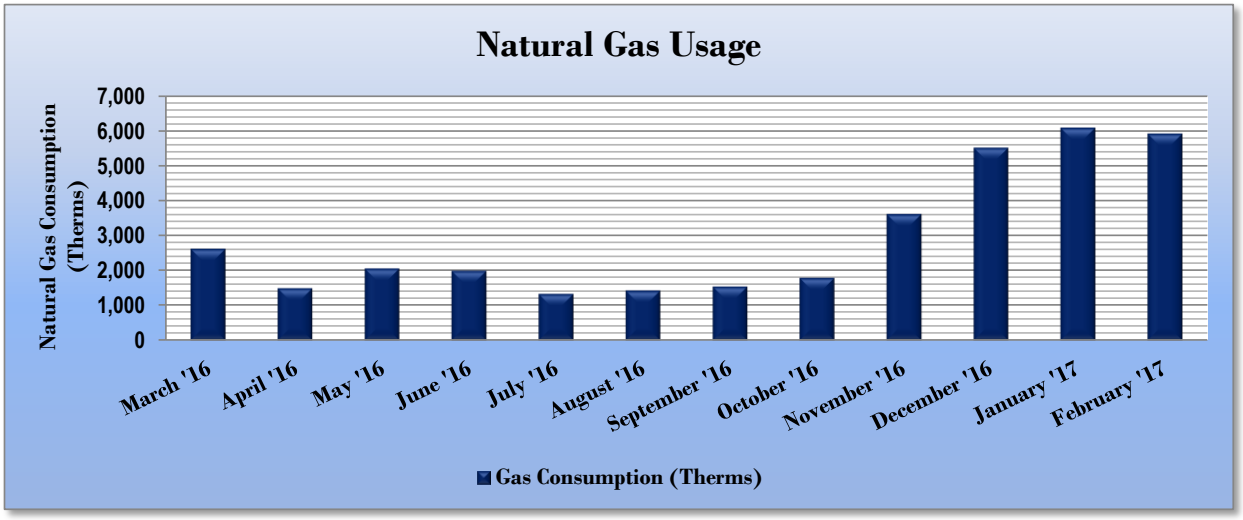


Figure 12 Natural Gas Usage

Gas Billing Data for Bankbridge Regional School				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
4/6/16	30	2,613	$2,971	No
5/6/16	31	1,483	$1,679	No
6/6/16	30	2,053	$2,303	No
7/8/16	31	1,989	$2,233	No
8/5/16	31	1,328	$1,498	No
9/5/16	30	1,420	$1,603	No
10/5/16	31	1,536	$1,755	No
11/4/16	30	1,785	$2,184	No
12/9/16	31	3,602	$4,394	No
1/5/17	32	5,497	$6,166	No
2/3/17	28	6,074	$6,762	No
3/7/17	30	5,898	$6,535	No
Totals	**365**	**35,278**	**$40,085**	0
Annual	**365**	**35,278**	**$40,085**	

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 Regional School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	246.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	107.8	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 Regional School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	170.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	83.9	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 13 including the Green House building.

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

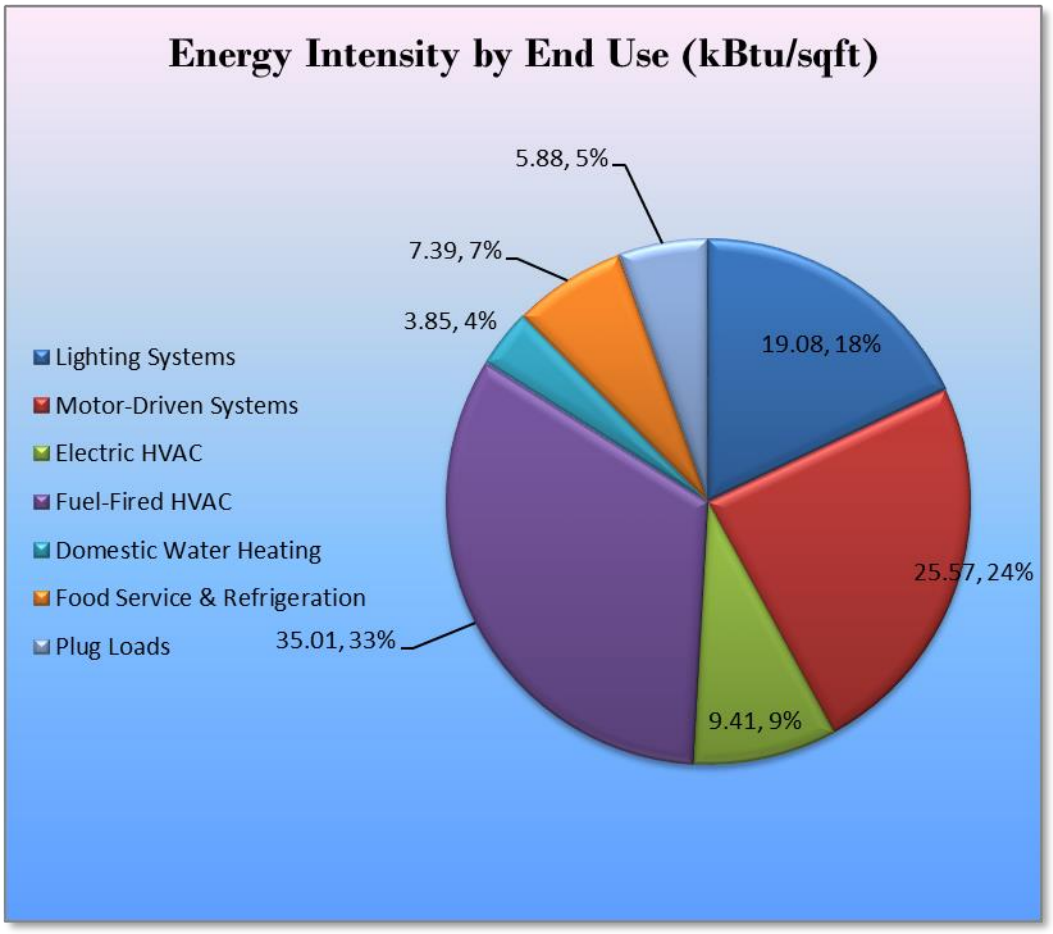
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 Regional 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		**266,549**	**38.6**	**0.0**	**$36,708.49**	**$127,000.13**	**$18,440.00**	**$108,560.13**	**3.0**	**268,413**
ECM 1	Install LED Fixtures	49,034	6.7	0.0	$6,752.82	$33,493.80	$4,050.00	$29,443.80	4.4	49,377
ECM 2	Retrofit Fixtures with LED Lamps	215,816	31.8	0.0	$29,721.62	$90,064.57	$14,390.00	$75,674.57	2.5	217,325
ECM 3	Install LED Exit Signs	1,699	0.1	0.0	$234.05	$3,441.76	$0.00	$3,441.76	14.7	1,711
Lighting Control Measures		**60,620**	**8.9**	**0.0**	**$8,348.48**	**$22,130.00**	**$3,110.00**	**$19,020.00**	**2.3**	**61,044**
ECM 4	Install Occupancy Sensor Lighting Controls	52,601	7.7	0.0	$7,244.13	$18,530.00	$3,110.00	$15,420.00	2.1	52,969
ECM 5	Install High/Low Lighitng Controls	8,019	1.2	0.0	$1,104.34	$3,600.00	$0.00	$3,600.00	3.3	8,075
Variable Frequency Drive (VFD) Measures		**105,483**	**12.2**	**0.0**	**$14,526.81**	**$34,807.15**	**$4,500.00**	**$30,307.15**	**2.1**	**106,220**
ECM 6	Install VFDs on Chilled Water Pumps	54,787	7.3	0.0	$7,545.18	$16,944.10	$3,600.00	$13,344.10	1.8	55,170
ECM 7	Install VFDs on Hot Water Pumps	37,087	4.9	0.0	$5,107.51	$12,668.60	$0.00	$12,668.60	2.5	37,346
ECM 8	Install VFDs on Cooling Tower Fans	13,608	0.0	0.0	$1,874.13	$5,194.45	$900.00	$4,294.45	2.3	13,704
Electric Chiller Replacement		**126,720**	**141.5**	**0.0**	**$17,451.55**	**$197,047.90**	**$10,000.00**	**$187,047.90**	**10.7**	**127,606**
ECM 9	Install High Efficiency Chillers	126,720	141.5	0.0	$17,451.55	$197,047.90	$10,000.00	$187,047.90	10.7	127,606
TOTALS		**559,372**	**201.3**	**0.0**	**$77,035.33**	**$380,985.18**	**$36,050.00**	**$344,935.18**	**4.5**	**563,284**

* - 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).

4.1.1 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		**266,549**	**38.6**	**0.0**	**$36,708.49**	**$127,000.13**	**$18,440.00**	**$108,560.13**	**3.0**	**268,413**
ECM 1	Install LED Fixtures	49,034	6.7	0.0	$6,752.82	$33,493.80	$4,050.00	$29,443.80	4.4	49,377
ECM 2	Retrofit Fixtures with LED Lamps	215,816	31.8	0.0	$29,721.62	$90,064.57	$14,390.00	$75,674.57	2.5	217,325
ECM 3	Install LED Exit Signs	1,699	0.1	0.0	$234.05	$3,441.76	$0.00	$3,441.76	14.7	1,711

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: Install LED Fixtures

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	16,621	2.4	0.0	$2,288.98	$18,257.40	$150.00	$18,107.40	7.9	16,737
Exterior	32,413	4.2	0.0	$4,463.85	$15,236.40	$3,900.00	$11,336.40	2.5	32,640

Measure Description

We recommend replacing existing fixtures containing metal halide lamps with new high-performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

ECM 2: 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	215,816	31.8	0.0	$29,721.62	$90,064.57	$14,390.00	$75,674.57	2.5	217,325
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 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 3: 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	1,699	0.1	0.0	$234.05	$3,441.76	$0.00	$3,441.76	14.7	1,711
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.

4.1.2 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		**60,620**	**8.9**	**0.0**	**$8,348.48**	**$22,130.00**	**$3,110.00**	**$19,020.00**	**2.3**	**61,044**
ECM 4	Install Occupancy Sensor Lighting Controls	52,601	7.7	0.0	$7,244.13	$18,530.00	$3,110.00	$15,420.00	2.1	52,969
ECM 5	Install High/Low Lighitng Controls	8,019	1.2	0.0	$1,104.34	$3,600.00	$0.00	$3,600.00	3.3	8,075

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 4: 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)
52,601	7.7	0.0	$7,244.13	$18,530.00	$3,110.00	$15,420.00	2.1	52,969

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in restrooms, storage rooms, classrooms, administrative 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 5: 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)
8,019	1.2	0.0	$1,104.34	$3,600.00	$0.00	$3,600.00	3.3	8,075

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.

4.1.3 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		**105,483**	**12.2**	**0.0**	**$14,526.81**	**$34,807.15**	**$4,500.00**	**$30,307.15**	**2.1**	**106,220**
ECM 6	Install VFDs on Chilled Water Pumps	54,787	7.3	0.0	$7,545.18	$16,944.10	$3,600.00	$13,344.10	1.8	55,170
ECM 7	Install VFDs on Hot Water Pumps	37,087	4.9	0.0	$5,107.51	$12,668.60	$0.00	$12,668.60	2.5	37,346
ECM 8	Install VFDs on Cooling Tower Fans	13,608	0.0	0.0	$1,874.13	$5,194.45	$900.00	$4,294.45	2.3	13,704

ECM 6: Install VFDs on Chilled 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)
54,787	7.3	0.0	$7,545.18	$16,944.10	$3,600.00	$13,344.10	1.8	55,170

Measure Description

We recommend installing a variable frequency drives (VFD) to control the two (2) 30 hp chilled water pumps. This measure requires that chilled water coils be served by 2-way valves and that a differential pressure sensor be installed in the chilled water loop. As the chilled 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 chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

For systems with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping off will have to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

ECM 7: 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)
37,087	4.9	0.0	$5,107.51	$12,668.60	$0.00	$12,668.60	2.5	37,346

Measure Description

We recommend installing a variable frequency drives (VFD) to control the two (2) 20 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.

ECM 8: Install VFD on Cooling Tower Fan

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)
13,608	0.0	0.0	$1,874.13	$5,194.45	$900.00	$4,294.45	2.3	13,704

Measure Description

We recommend installing a variable frequency drives (VFD) to control the 15 hp cooling tower fan motor. The VFD will allow the cooling tower fan to operate at the minimum speed necessary to maintain the temperature of the condenser water returning to the chiller. Energy savings results from reducing fan speed (and power) when there is a reduced load on the chiller and outside air wet bulb temperatures are depressed. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.4 Electric Chiller Replacement

ECM 9: Install High Efficiency Chillers

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)
126,720	141.5	0.0	$17,451.55	$197,047.90	$10,000.00	$187,047.90	10.7	127,606

Measure Description

We recommend replacing older existing electric chiller with new high efficiency chiller. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile. Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity. Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles. Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water. In any given size range variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

The savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings associated with this measure is based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

4.2 ECMs Evaluated but Not Recommended

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

4.2.1 Motor Upgrades

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)
346	0.1	0.0	$47.67	$1,846.72	$0.00	$1,846.72	38.7	349

Measure Description

We evaluated replacing the cooling tower's standard efficiency motor with NEMA Premium® efficiency motor. Our evaluation assumed that the existing motor would be replaced with a motor of equivalent size and type. 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.

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.

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.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

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.

Assess Chillers & Request Tune-Ups

Chillers are responsible for a substantial portion of a commercial building's overall energy usage. When components of a chiller are not optimized, this can quickly result in a noticeable increase in energy bills. Chiller diagnostics can produce a 5% to 10% cost avoidance potential from discovery and implementation of low/no cost optimization strategies.

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.

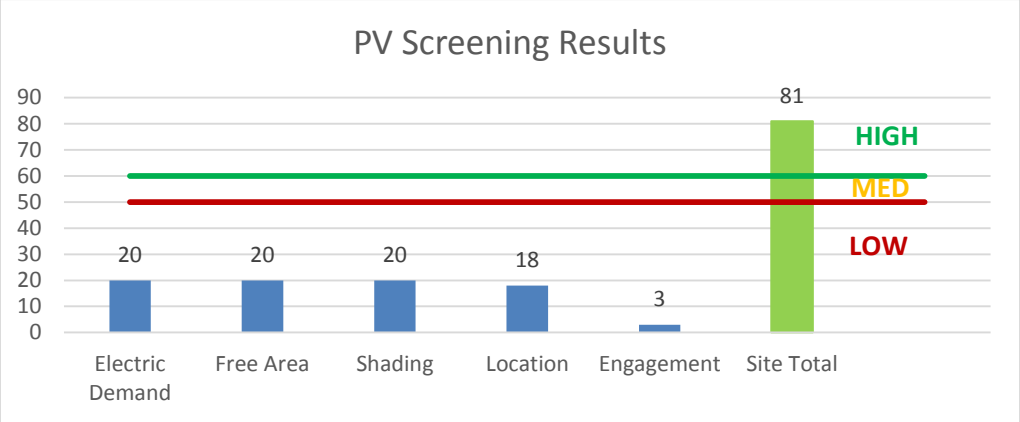
6.1 Photovoltaic

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 meet these minimum criteria for cost-effective PV installation.

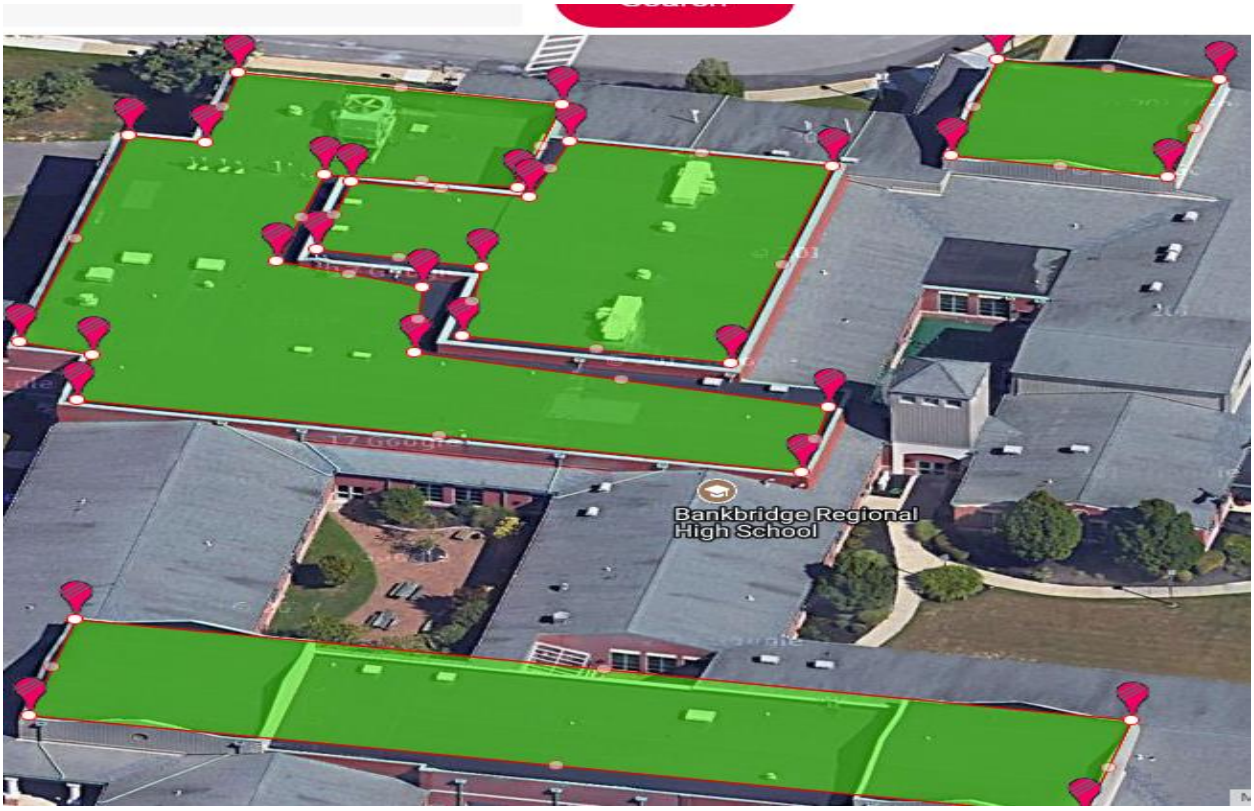
Figure 20 - Photovoltaic Screening



Potential	High	
System Potential	215	kW DC STC
Electric Generation	256,145	kWh/yr
Displaced Cost	$22,280	/yr
Installed Cost	$559,000	

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 8.3 for additional information.

Figure 21 – Flat 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.

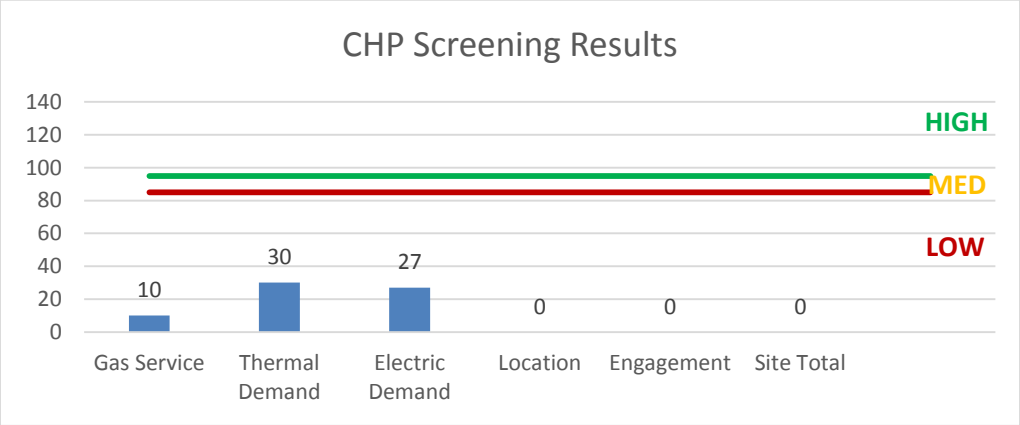
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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 22 - 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.

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 23 for a list of the eligible programs identified for each recommended ECM.

Figure 23 - 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	Install LED Fixtures	x			x		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers				x		
ECM 3	Retrofit Fixtures with LED Lamps	x			x		
ECM 4	Install LED Exit Signs				x		
ECM 5	Install Occupancy Sensor Lighting Controls	x			x		
ECM 6	Install High/Low Lighitng Controls				x		
ECM 7	Install VFDs on Chilled Water Pumps	x			x		
ECM 8	Install VFDs on Hot Water Pumps	x			x		
ECM 9	Install VFDs on Cooling Tower Fans				x		
ECM 10	Install High Efficiency Chillers	x			x		

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 Pay for Performance - Existing Buildings

Overview

The Pay for Performance – Existing Buildings (P4P EB) program is designed for larger customers with a peak demand over 200 kW in any of the preceding 12 months. Under this program the minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings. P4P is a generally a good option for medium to large sized facilities looking to implement as many measures as possible under a single project in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also utilize the P4P program.

Incentives

Incentives are calculated based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

How to Participate

To participate in the P4B EB program you will need to contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, the Partner will help further evaluate the measures identified in this report through development of the Energy Reduction Plan (ERP), assist you in implementing selected measures, and verify actual savings one year after the installation. At each of these three milestones your Partner will also facilitate securing program incentives.

Approval of the final scope of work is required by the program prior to installation completion. Although installation can be accomplished by a contractor of your choice (some P4P Partners are also contractors) or by internal personnel, the Partner must remain involved to ensure compliance with the program guidelines and requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: www.njcleanenergy.com/P4P.

8.3 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.

8.4 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 are available 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 year.

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
Mechanical Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	No	10	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,900	0.37	2,512	0.0	$345.89	$951.33	$200.00	2.17
Mechanical Room	2	LED - Fixtures: Downlight Pendant	Wall Switch	160	3,900	None	No	2	LED - Fixtures: Downlight Pendant	Wall Switch	160	3,900	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	2	Metal Halide: (1) 400W Lamp	Wall Switch	458	3,900	Fixture Replacement	No	2	LED - Fixtures: Downlight Pendant	Wall Switch	160	3,900	0.39	2,673	0.0	$368.13	$1,217.16	$10.00	3.28
Mechanical 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	$8.32	$107.56	$0.00	12.92
Maintenance Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.19	1,317	0.0	$181.35	$496.53	$100.00	2.19
North Wing Corridor	5	Exit Signs: Fluorescent	None	12	3,900	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	3,900	0.02	135	0.0	$18.53	$537.78	$0.00	29.02
North Wing Corridor	42	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,640	Relamp	Yes	42	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,548	1.07	6,839	0.0	$941.86	$3,454.40	$0.00	3.67
North Wing Corridor	4	Metal Halide: (1) 100W Lamp	Wall Switch	128	3,640	Fixture Replacement	Yes	4	LED - Fixtures: Downlight Pendant	Occupancy Sensor	30	2,548	0.28	1,792	0.0	$246.74	$3,314.32	$160.00	12.78
North Wing Vestibule	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,640	Relamp	Yes	9	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,548	0.23	1,466	0.0	$201.83	$768.80	$0.00	3.81
North Wing Vestibule	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	$16.65	$215.11	$0.00	12.92
Room N134	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.41	2,805	0.0	$386.35	$993.50	$170.00	2.13
Room N134	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.01	72	0.0	$9.88	$48.20	$10.00	3.87
Room N132	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,510	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.41	2,525	0.0	$347.71	$993.50	$170.00	2.37
Room N132	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,510	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,510	0.01	65	0.0	$8.89	$48.20	$10.00	4.29
Room N130	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,510	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.41	2,525	0.0	$347.71	$993.50	$170.00	2.37
Room N130	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,510	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,510	0.01	65	0.0	$8.89	$48.20	$10.00	4.29
Room C130A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,510	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,510	0.02	133	0.0	$18.34	$58.50	$10.00	2.64
Room N128	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,510	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,457	0.60	3,703	0.0	$509.98	$1,519.00	$260.00	2.47
North Wing Office	14	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,640	Relamp	Yes	14	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,548	0.19	1,237	0.0	$170.29	$790.80	$160.00	3.70
Room N125	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81
Restroom	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.02	114	0.0	$15.68	$96.40	$20.00	4.87
Room N103	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room N104	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room N105	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room N106	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19

	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 N107	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room N101	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room N102	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Nurse Office	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$29.65	$144.60	$30.00	3.87
Room E113	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Room E114	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Room E111	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.01	57	0.0	$7.84	$48.20	$10.00	4.87
Main Entrance Corridor	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,730	0.15	1,047	0.0	$144.16	$579.20	$0.00	4.02
Main Entrance Corridor	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	$16.65	$215.11	$0.00	12.92
Main Corridor	22	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	22	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,730	0.56	3,838	0.0	$528.60	$1,790.40	$0.00	3.39
South Wing Corridor	50	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	50	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,730	1.27	8,723	0.0	$1,201.35	$4,160.00	$0.00	3.46
South Wing Corridor	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	$24.97	$322.67	$0.00	12.92
Main Corridor	4	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	242	0.0	$33.30	$430.22	$0.00	12.92
Main Corridor	4	Metal Halide: (1) 100W Lamp	Wall Switch	128	3,900	Fixture Replacement	Yes	4	LED - Fixtures: Downlight Pendant	Occupancy Sensor	30	2,730	0.28	1,920	0.0	$264.36	$3,314.32	$160.00	11.93
South High Office	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,730	0.12	852	0.0	$117.29	$549.80	$110.00	3.75
South High Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.01	57	0.0	$7.84	$48.20	$10.00	4.87
Room S114	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81
Room N123	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.01	72	0.0	$9.88	$48.20	$10.00	3.87
Room N122	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$29.65	$144.60	$30.00	3.87
Room N108	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room N121	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,730	0.10	698	0.0	$96.11	$368.80	$20.00	3.63
Room N109	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.14	935	0.0	$128.78	$408.50	$70.00	2.63
Room N118	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81

	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
Boys Restroom	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$29.65	$144.60	$30.00	3.87
Girls Restroom	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$29.65	$144.60	$30.00	3.87
Room N111A	2	Compact Fluorescent: CFL Circle	Wall Switch	18	3,900	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	3,900	0.01	63	0.0	$8.65	$125.30	$0.00	14.49
Room N136	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81
Room C117 Media Center	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.58	3,950	0.0	$544.04	$1,257.60	$260.00	1.83
Room C116	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81
Room C117	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	$16.65	$215.11	$0.00	12.92
Room C118	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.19	1,317	0.0	$181.35	$496.53	$100.00	2.19
Room C119 Server Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.19	1,317	0.0	$181.35	$496.53	$100.00	2.19
Room C115	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.19	1,317	0.0	$181.35	$496.53	$100.00	2.19
Room C114	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.19	1,317	0.0	$181.35	$496.53	$100.00	2.19
Room C113	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.19	1,317	0.0	$181.35	$496.53	$100.00	2.19
Room C111 Retail Store	20	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.96	6,584	0.0	$906.73	$2,134.67	$440.00	1.87
Room S208	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	1.15	7,901	0.0	$1,088.07	$2,515.20	$520.00	1.83
Room S209	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	1.15	7,901	0.0	$1,088.07	$2,515.20	$520.00	1.83
Room S210	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	1.15	7,901	0.0	$1,088.07	$2,515.20	$520.00	1.83
Room S211	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	1.15	7,901	0.0	$1,088.07	$2,515.20	$520.00	1.83
Room S206	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	1.15	7,901	0.0	$1,088.07	$2,515.20	$520.00	1.83
Room S207	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	1.15	7,901	0.0	$1,088.07	$2,515.20	$520.00	1.83
Room S213	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.02	144	0.0	$19.77	$96.40	$20.00	3.87
Middle South Corridor	55	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	55	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,730	1.40	9,596	0.0	$1,321.49	$4,476.00	$0.00	3.39
Middle South Corridor	7	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	7	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	423	0.0	$58.27	$752.89	$0.00	12.92
Middle South Corridor	4	Metal Halide: (1) 100W Lamp	Wall Switch	128	3,900	Fixture Replacement	Yes	4	LED - Fixtures: Downlight Pendant	Occupancy Sensor	30	2,730	0.28	1,920	0.0	$264.36	$3,314.32	$160.00	11.93
Gymnasium	12	Linear Fluorescent - T5: 4' T5 (28W) - 4L	Wall Switch	120	3,900	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.62	4,273	0.0	$588.51	$1,257.60	$260.00	1.70
Gymnasium	4	Exit Signs: Fluorescent	None	12	8,760	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	None	29	8,760	-0.04	-685	0.0	-$94.34	$234.00	$40.00	-2.06

	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
Storage Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.16	1,122	0.0	$154.54	$467.00	$80.00	2.50
Room C126	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$350.00	$60.00	2.81
Room C127	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,730	0.14	946	0.0	$130.33	$598.00	$120.00	3.67
Room C124	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.04	287	0.0	$39.53	$192.80	$40.00	3.87
Room C125	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$29.65	$144.60	$30.00	3.87
Room C127	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.27	1,870	0.0	$257.57	$701.00	$120.00	2.26
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.01	57	0.0	$7.84	$48.20	$10.00	4.87
Room S104	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S101	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S103	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room N150	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$20.38	$58.50	$10.00	2.38
Faculty Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.01	57	0.0	$7.84	$48.20	$10.00	4.87
Boys Restroom	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.03	171	0.0	$23.52	$144.60	$30.00	4.87
Girls Restroom	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.03	171	0.0	$23.52	$144.60	$30.00	4.87
Room S112	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$20.38	$58.50	$10.00	2.38
Room N148	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Room N142	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.60	4,115	0.0	$566.64	$1,519.00	$260.00	2.22
Room N142	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	$8.32	$107.56	$0.00	12.92
Room N142	1	Metal Halide: (1) 175W Lamp	Wall Switch	215	3,900	Fixture Replacement	Yes	1	LED - Fixtures: Downlight Pendant	Occupancy Sensor	50	2,730	0.12	807	0.0	$111.18	$3,248.58	$425.00	25.40
Wood Shop Entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Wood Shop Entrance	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	$8.32	$107.56	$0.00	12.92
Room S107	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S108	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S109	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S110	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19

	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 S105	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S106	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S101	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Room S102	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Wood Shop	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S122	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.01	72	0.0	$9.88	$48.20	$10.00	3.87
Room S123	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$29.65	$144.60	$30.00	3.87
Room S214	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.03	215	0.0	$29.65	$144.60	$30.00	3.87
Room S212	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Room S205	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Office	14	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	14	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,730	0.19	1,325	0.0	$182.46	$790.80	$160.00	3.46
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.01	57	0.0	$7.84	$48.20	$10.00	4.87
Faculty Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.01	57	0.0	$7.84	$48.20	$10.00	4.87
Room S202	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S203	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S204	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S201	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.66	4,489	0.0	$618.16	$1,636.00	$280.00	2.19
Room S225	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.11	748	0.0	$103.03	$466.00	$80.00	3.75
Boys Restroom	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.03	171	0.0	$23.52	$144.60	$30.00	4.87
Girls Restroom	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	3,094	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,094	0.03	171	0.0	$23.52	$144.60	$30.00	4.87
Room S228	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$20.38	$58.50	$10.00	2.38
Room S138	25	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	25	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.68	4,676	0.0	$643.91	$1,694.50	$290.00	2.18
Room S136	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.41	2,805	0.0	$386.35	$993.50	$170.00	2.13
Room S137	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$20.38	$58.50	$10.00	2.38

	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 S132	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.49	3,366	0.0	$463.62	$1,285.00	$220.00	2.30
Room S133	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Room S135	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.04	296	0.0	$40.77	$117.00	$20.00	2.38
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.01	72	0.0	$9.88	$48.20	$10.00	3.87
Room C109	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.25	1,683	0.0	$231.81	$642.50	$110.00	2.30
Room C110	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.22	1,496	0.0	$206.05	$584.00	$100.00	2.35
Kitchen	7	Metal Halide: (1) 175W Lamp	Wall Switch	215	3,900	Fixture Replacement	Yes	7	LED - Fixtures: Downlight Pendant	Occupancy Sensor	50	2,730	0.83	5,651	0.0	$778.26	$4,480.06	$70.00	5.67
Kitchen Hood	8	Metal Halide: (1) 70W Lamp	Wall Switch	95	3,900	Fixture Replacement	No	8	LED - Fixtures: Downlight Pendant	Wall Switch	15	3,900	0.42	2,870	0.0	$395.30	$4,868.64	$40.00	12.21
Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,900	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,730	0.10	658	0.0	$90.67	$306.27	$60.00	2.72
Kitchen	2	Exit Signs: Fluorescent	Wall Switch	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.01	121	0.0	$16.65	$215.11	$0.00	12.92
Kitchen	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.22	1,496	0.0	$206.05	$584.00	$100.00	2.35
Cafeteria	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	None	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.09	585	0.0	$80.60	$116.00	$20.00	1.19
Cafeteria	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.02	144	0.0	$19.77	$96.40	$20.00	3.87
Room C112	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.25	1,683	0.0	$231.81	$642.50	$110.00	2.30
Room C121 Music Room	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,730	0.12	852	0.0	$117.29	$549.80	$110.00	3.75
Room C121 Music Room	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	Yes	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,730	0.82	5,611	0.0	$772.70	$2,103.00	$360.00	2.26
Storage Room	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,900	0.02	144	0.0	$19.77	$96.40	$20.00	3.87
Room C121 Music Room	2	Exit Signs: Fluorescent	None	12	3,900	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	3,900	0.01	54	0.0	$7.41	$215.11	$0.00	29.02
Restroom	6	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,900	Relamp	Yes	6	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,730	0.08	568	0.0	$78.20	$559.20	$95.00	5.94
Storage Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,900	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,900	0.02	148	0.0	$20.38	$58.50	$10.00	2.38
Exterior Walkway Lights	26	Metal Halide: (1) 175W Lamp	Daylight Dimming	215	4,380	Fixture Replacement	No	26	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	50	4,380	2.81	21,609	0.0	$2,975.90	$10,157.60	$2,600.00	2.54
Parking Lot	25	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	86	4,380	None	No	25	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	86	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Wallpack	13	Metal Halide: (1) 175W Lamp	Daylight Dimming	215	4,380	Fixture Replacement	No	13	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	50	4,380	1.41	10,804	0.0	$1,487.95	$5,078.80	$1,300.00	2.54
Exterior Wallpack	22	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	62	4,380	None	No	22	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	62	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
Rootop	Central Station Air Handler	2	Supply Fan	3.0	81.5%	No	2,600	No	81.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Heating System	4	Heating Hot Water Pump	1.0	82.0%	No	2,600	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Heating System	2	Heating Hot Water Pump	20.0	91.0%	No	2,600	No	91.0%	Yes	2	4.94	37,087	0.0	$5,107.51	$12,668.60	$0.00	2.48
Mechanical Room	Chilled Water System	2	Chilled Water Pump	30.0	92.4%	No	2,600	No	92.4%	Yes	2	7.30	54,787	0.0	$7,545.18	$16,944.10	$3,600.00	1.77
Mechanical Room	Condensate System	2	Condenser Water Pump	20.0	91.0%	No	2,600	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Cooling Tower	1	Cooling Tower Fan	15.0	91.5%	No	2,600	Yes	93.0%	Yes	1	0.10	13,955	0.0	$1,921.80	$7,041.17	$900.00	3.20
Rooftop	School	1	Exhaust Fan	0.3	71.0%	No	2,340	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	School	1	Kitchen Hood Exhaust Fan	0.5	71.0%	No	2,340	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	School	5	Exhaust Fan	0.3	71.0%	No	2,340	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	School	12	Exhaust Fan	0.8	71.0%	No	2,340	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Gymnasium	2	Exhaust Fan	0.3	71.0%	No	2,340	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Green House	Green House	6	Ventilation Fan	0.3	71.0%	No	2,340	No	71.0%	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	2,340	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	2,340	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	2,340	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	2,340	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	2,340	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	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-4	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-4	1	Return Fan	3.0	82.0%	No	2,340	No	82.0%	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-5	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-5	1	Return Fan	3.0	82.0%	No	2,340	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	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-6	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-7	1	Supply Fan	7.5	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-7	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-8	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-8	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-9	1	Supply Fan	7.5	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-9	1	Supply Fan	5.0	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-10	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-10	1	Supply Fan	5.0	82.0%	No	2,340	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-11	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-11	1	Return Fan	2.0	82.0%	No	2,340	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-12	1	Supply Fan	5.0	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-12	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-13	1	Supply Fan	7.5	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-13	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-14	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-14	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	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-15	1	Supply Fan	7.5	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-15	1	Return Fan	5.0	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-16	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-16	1	Return Fan	3.0	82.0%	No	2,340	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-17	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-17	1	Return Fan	3.0	82.0%	No	2,340	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-18	1	Supply Fan	5.0	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-18	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-19	1	Supply Fan	7.5	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-19	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-20	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-20	1	Return Fan	3.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-21	1	Supply Fan	7.5	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-21	1	Return Fan	5.0	88.5%	No	2,340	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-22	1	Supply Fan	5.0	84.0%	No	2,340	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Above Ceiling	AHU-22	1	Return Fan	3.0	82.0%	No	2,340	No	82.0%	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
Ground Floor	WAWA Store	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground Floor	Custodian Office	1	Split-System AC	0.80		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Server Room	Server Room	1	Split-System AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	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
Mechanical Room	School Building	1	Water-Cooled Centrifugal Chiller	400.00	Yes	1	Water-Cooled Centrifugal Chiller	Variable	400.00	0.59	0.37	141.50	126,720	0.0	$17,451.55	$197,047.90	$10,000.00	10.72

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
Mechanical Room	School Building	4	Non-Condensing Hot Water Boiler	850.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	2	Warm Air Unit Heater	30.00	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
Mechanical Room	School Building	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	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	Cooler (35F to 55F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	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	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker 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	Ice Making Head (≥450 lbs/day), Batch	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 Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
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 (4 Feet Width)	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

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 (Low 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	182	Desktop/LCD Monitors	191.0	Yes
School	15	Refrigerators	175.0	Yes
School	9	Microwave	1,000.0	No
School	4	Coffee Machine	950.0	No
School	6	Copy Machine	850.0	Yes
School	14	Printers	155.0	Yes
School	3	Toaster	950.0	No
School	3	Electric Oven	1,500.0	No
Room 142	1	Refrigerator - Science	1,500.0	No
Room 142	1	Refrigerator - Science	1,750.0	No
Room C111	1	Refrigerator - Science	1,500.0	No
Room S132	1	Washing Machine	1,200.0	No
Room S132	1	Electric Dryer	1,500.0	No
Sever Room	1	Server Rack & Accessories	5,000.0	Yes

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Bankbridge Regional School (Campus)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 81,670
Built: 2000

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 Regional School (Campus) 870 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@gcsdnj.org

Property ID: 5145670

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
109.6 kBtu/ft²

Source EUI
244 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	5,037,024 (56%)
Natural Gas (kBtu)	3,914,597 (44%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	76.1
National Median Source EUI (kBtu/ft²)	169.4
% Diff from National Median Source EUI	44%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	767

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)