Local Government Energy Audit:
Energy Audit Report

Collings Lakes Elementary School

620 Cains Mill Road

Williamstown, NJ 08094

Buena Regional School District

October 12, 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 saving 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 Collings Lakes Elementary School.

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

This study was conducted by TRC Energy Services (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

Collings Lakes Elementary School is a 32,766 square foot facility comprised primarily of classrooms and office space within a single building. The school building is one floor and includes a multipurpose room, cafeteria, offices, classrooms, a commercial kitchen and mechanical spaces. The building was constructed in 1968.

Lighting at Collings Lakes Elementary School was recently retrofitted in 2014 and primarily consists of LED fixtures, but still has some inefficient incandescent and HID lighting technologies which can be replaced with more efficient LED technology to standardize the lighting throughout the school. HVAC equipment was also recently retrofitted and consists of groundwater source heat pumps, split system heat pumps, and energy recovery ventilators all of which are connected to an energy management system. 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 six measures which together represent an opportunity for Collings Lakes Elementary School to reduce annual energy costs by $5,013 and annual greenhouse gas emissions by 30,405 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4.9 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 Collings Lakes Elementary School's annual energy use by 9%.

Figure 1 – Previous 12 Month Utility Costs

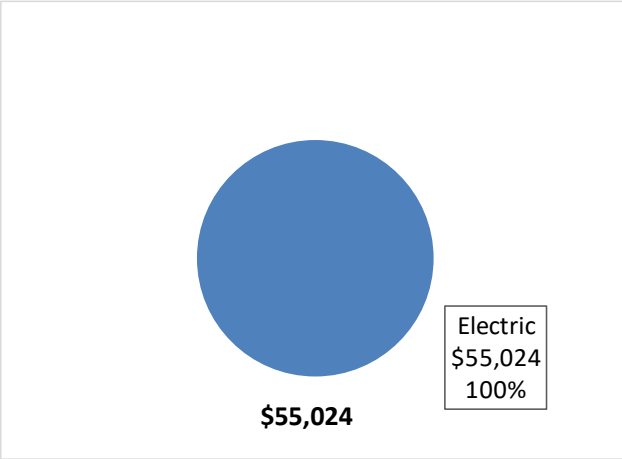
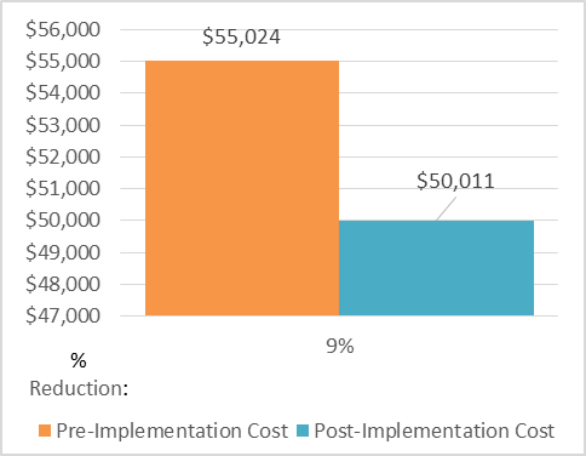


Figure 2 – Potential Post-Implementation Costs



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

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			23,577	3.7	0.0	$3,914.54	$24,824.88	$1,952.00	$22,872.88	5.8	23,742
ECM 1	Install LED Fixtures	Yes	21,567	2.8	0.0	$3,580.80	$23,045.63	$1,500.00	$21,545.63	6.0	21,718
ECM 2	Retrofit Fixtures with LED Lamps	Yes	2,010	0.9	0.0	$333.73	$1,779.25	$452.00	$1,327.25	4.0	2,024
Lighting Control Measures			867	0.4	0.0	$144.02	$540.00	$70.00	$470.00	3.3	874
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	867	0.4	0.0	$144.02	$540.00	$70.00	$470.00	3.3	874
Domestic Water Heating Upgrade			2,489	0.0	0.0	$413.17	$150.57	$0.00	$150.57	0.4	2,506
ECM 4	Install Low-Flow Domestic Hot Water Devices	Yes	2,489	0.0	0.0	$413.17	$150.57	$0.00	$150.57	0.4	2,506
Food Service Equipment & Refrigeration Measures			1,649	0.1	0.0	$273.78	$606.60	$0.00	$606.60	2.2	1,661
ECM 5	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,649	0.1	0.0	$273.78	$606.60	$0.00	$606.60	2.2	1,661
Plug Load Equipment Control - Vending Machine			1,612	0.0	0.0	$267.61	$230.00	$0.00	$230.00	0.9	1,623
ECM 6	Vending Machine Control	Yes	1,612	0.0	0.0	$267.61	$230.00	$0.00	$230.00	0.9	1,623
TOTALS FOR HIGH PRIORITY MEASURES			30,194	4.2	0.0	$5,013.13	$26,352.05	$2,022.00	$24,330.05	4.9	30,405
TOTALS FOR ALL EVALUATED MEASURES			30,194	4.2	0.0	$5,013.13	$26,352.05	$2,022.00	$24,330.05	4.9	30,405

* - 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.

Domestic Hot Water upgrade measures generally involve replacing older inefficient domestic water heating systems with modern energy efficient systems. New domestic hot water heating systems can provide equivalent, or greater, water heating capacity compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel used for domestic hot water heating due to improved heating efficiency or reducing standby losses.

Food Service Equipment & Refrigeration measures generally involve improvements in the efficiency of cooking, food service, dishwashing, and food storage equipment. These measures may include more efficient convection ovens, steamers, ice machines, or refrigeration. These measures save energy by reducing the energy usage with more energy efficient equipment.

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

Energy Efficient Practices

TRC also identified six 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 Collings Lakes Elementary School include:

- Close Doors and Windows
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Clean Evaporator/Condenser Coils on AC Systems
- 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 Collings Lakes Elementary School. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	80	kW DC STC
Electric Generation	95,310	kWh/yr
Displaced Cost	$8,290	/yr
Installed Cost	$208,000	

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
- Direct Install
- 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.

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives that SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated Direct Install contractor and, in most cases, they will perform the installation work.

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.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) 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 commercial facilities to reduce their 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 facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this 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			
Joe Biluck Jr.	Interim Building & Grounds Supervisor	jbiluck@buena.k12.nj.us	856-697-0800
TRC Energy Services			
Vish Nimbalkar	Auditor	VNaikNimbalkar@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On May 11, 2018, TRC performed an energy audit at Collings Lakes Elementary School located in Williamstown, New Jersey. TRC's team met with Joe Biluck Jr., Interim Building and Grounds Supervisor to review the facility operations and help focus our investigation on specific energy-using systems.

Collings Lakes Elementary School is a 32,766 square foot facility comprised primarily of classrooms and office space within a single building. The school building is one floor and includes a multipurpose room, cafeteria, offices, classrooms, a commercial kitchen and mechanical spaces.

Lighting at Collings Lakes Elementary School was recently retrofitted in 2014 and primarily consists of LED fixtures, but still has some inefficient incandescent and HID lighting technologies which can be replaced with more efficient LED technology to standardize the lighting throughout the school. HVAC equipment was also recently retrofitted and consists of groundwater source heat pumps, split system heat pumps, and energy recovery ventilators all of which are connected to an energy management system (EMS).

The building was constructed in 1968. Four years ago, the school went through a major retrofit which upgraded most of the lighting to LEDs, replaced heat pumps, installed energy recovery ventilators, and an EMS.

2.3 Building Occupancy

The school building is open Monday through Friday. The typical schedule is presented in the table below. The entire facility is used from early September to mid-June for student instruction each year. During a typical day, the facility is occupied by 200 students and 20 teachers/administrators.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Collings Lakes Elementary School	Weekday	9:30 AM - 4:00 PM
Collings Lakes Elementary School	Weekend	Closed

2.4 Building Envelope

The building is constructed of concrete block and structural steel with a stone facade. The building primarily has a flat roof covered with tar and gravel and is not in the best condition. The building has metal frame double-pane windows which are in good condition and show little sign of excessive infiltration when closed.

Figure 7 - Building Envelope

2.5 On-Site Generation

Collings Lakes Elementary School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at the facility is provided mostly by linear LED lamps with electronic ballasts as well as some T8 linear fluorescent lamps. Most of the fixtures are 1-lamp, 4-foot long recessed troffers. Mr. Biluck, the facility's maintenance technician, indicated that the building had a comprehensive LED retrofit about four years ago.

There are only a few small areas of the building that are lit with inefficient 60-Watt or 100-Watt incandescent lamps in ceiling or wall mount fixtures.

Lighting control in most spaces is provided by occupancy sensors. The occupancy sensors are wall mounted. Hallways and the cafeteria areas do not contain any occupancy sensors and are on manual switches.

The building's exterior lighting consists primarily of efficient LED wallpack fixtures, a few Metal Halide wallpacks, and HID pole mount parking fixtures.



Figure 8 - Lighting Systems

Heating Ventilating and Air Conditioning System

Two 10 ton Trane air source split system heat pumps are used to condition the multipurpose room of the building. Both air handling units are located overhead in the mechanical room, and the condensing units are located on the ground in a gated area on the outside of the building. The units provide a constant air volume, each with a 2 hp supply fan and no return fan. The units utilize a scroll compressor and a direct-expansion (DX) coil. The units each have a 35 kW electric resistance supplemental heating element that is used as needed, typically when the outside air temperature is below 40 °F.

The units are controlled by individual thermostats located in the multipurpose room which are connected to the BEMS. The heat pumps operate when the facility is occupied to maintain the building space temperature setpoint around 72°F. Both heat pumps are reportedly required to maintain the space temperature setpoint during the summer months.

There are 24 Climatemaster groundwater-source heat pump units (WSHPs) ranging from 3 tons to 5 tons. They supply heating, cooling, and ventilation to other areas of the building. A majority of the units are located in dropped ceiling spaces near the zones they serve. As needed, heat is added to or removed from the water loop by geothermal energy. Water loop circulation is maintained by six pumps which have either a 3 hp or 5 hp motor. The WSHPs are constant air volume units with either a single 1 hp or 0.5 hp supply fan and no return fan. A fixed volume of outside air (OSA) is supplied to the WSHPs via four energy recovery ventilators which use exhaust air to precondition the outside air. Each energy recovery unit has a dedicated supply and exhaust fan. Energy recovery supply fans are either 0.75 hp or 1 hp, and exhaust fans are either 0.5 hp or 0.75 hp. All of the WSHPs use direct-expansion (DX) coils and utilize scroll compressors.

The units are controlled by individual thermostats located in zones. The heat pumps are connected to the BEMS and operate based on building occupancy to maintain zone space temperature setpoints around 72°F (adjustable by tenants). The units operate between 9:30 AM and 4:00 PM Monday through Friday.


Figure 9 - Heat Pumps

Building Energy Management System (BEMS)

The majority of the facility systems are controlled with a CM3 Building Solutions building energy management system (BEMS). The BEMS aggregates the DDC points from throughout the building. All of the building zones are DDC. The system is capable of providing occupied and unoccupied schedules for the HVAC equipment and provides alarm information and the capability to provide trend data. The CM3 system does not provide control for the lighting systems.

Figure 10 - BEMS Screenshots

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of a single electric storage tank hot water heater with an input rating of 4.5 kW (~15 kBtu/hr). The water heater has a 40 gallon storage tank. A 1/12 hp recirculation pump distributes 120°F water to the entire site. The recirculation pump operates continuously.

Figure 11 - Domestic Hot Water Heater

Food Service Equipment

The school has an all-electric kitchen that is used to prepare 200 lunches per day for the students and staff. Most of the cooking is done using the four convection ovens and the single large kettle.

There is a conveyor dishwasher that provides hot rinse water.



Figure 12 - Food Service Equipment

Refrigeration

The kitchen has a walk-in refrigerator/freezer that is used to store food prepared for school lunches. The walk-in has a single air cooled compressor. The kitchen also has a free standing commercial size refrigerator, minifridge, and milk cooler. There are also two stand up refrigerators in the facility.


Figure 13 - Walk-in refrigerator/freezer

Building Plug Load

There are 45 computer work stations throughout the facility. There is no centralized PC power management software installed. There are also 14 overhead projectors, ten copiers and printers, and a handful of other miscellaneous appliances such as microwaves, coffee maker, and TVs. The facility also has a refrigerated vending machine.



Figure 14 - Plug Load Equipment

2.7 Water-Using Systems

There are about 14 restrooms at this facility. All of the faucets are assumed to be rated for 1.5 gallons per minute (gpm) or higher.

3 SITE ENERGY USE AND COSTS

Utility data for electricity was analyzed to identify opportunities for savings. In addition, data for Electricity was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.3 for additional information.

3.1 Total Cost of Energy

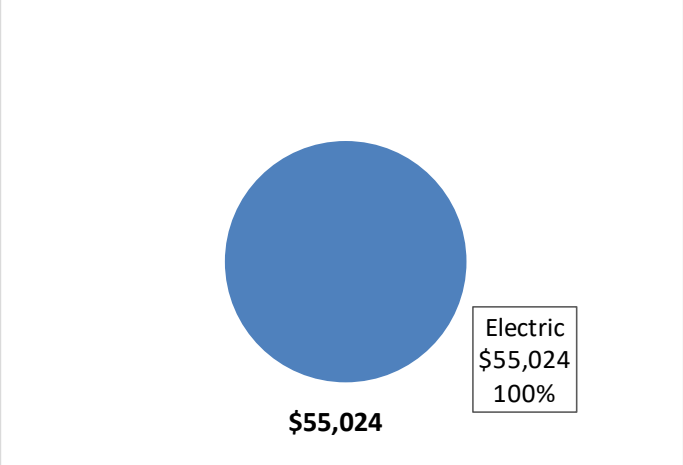
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 15 - Utility Summary

Utility Summary for Collings Lakes Elementary School		
Fuel	Usage	Cost
Electricity	331,408 kWh	$55,024
Total		$55,024

The current annual energy cost for this facility is $55,024 as shown in the chart below.

Figure 16 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.166/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. Winter billing demand does not reflect actual peak demand use but is based on a calculation from the utility, which is why it is so much lower than usage in summer months of July through August. Summer billing demand appears to be reflective of actual demand use; however, energy and demand use in July was an estimated reading from the utility which explains the high demand for relatively low energy consumption. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 17 - Electric Usage & Demand

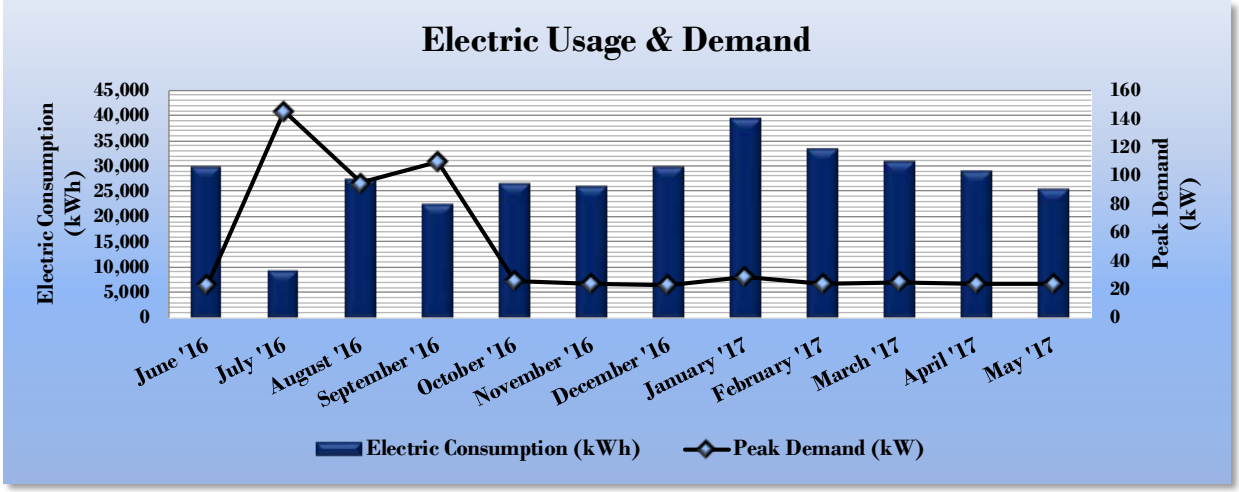


Figure 18 - Electric Usage & Demand

Electric Billing Data for Collings Lakes Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/23/16	31	30,000	23	$30	$4,981
7/22/16	29	9,500	145	$237	$1,877
8/23/16	32	27,500	95	$171	$4,737
9/22/16	30	22,500	110	$209	$4,038
10/25/16	33	26,500	26	$13	$4,392
11/21/16	27	26,000	24	$34	$4,236
12/20/16	29	30,000	23	$35	$4,877
1/23/17	34	39,500	29	$51	$6,406
2/21/17	29	33,500	24	$36	$5,422
3/21/17	28	31,000	25	$36	$5,024
4/21/17	31	29,000	24	$39	$4,718
5/22/17	31	25,500	24	$39	$4,165
Totals	364	330,500	145	$930	$54,873
Annual	365	331,408	145	$932	$55,024

3.3 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 19 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Collings Lakes Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	108.4	141.4
Site Energy Use Intensity (kBtu/ft^2)	34.5	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 20 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Collings Lakes Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	98.8	141.4
Site Energy Use Intensity (kBtu/ft^2)	31.5	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 % of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 90.

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

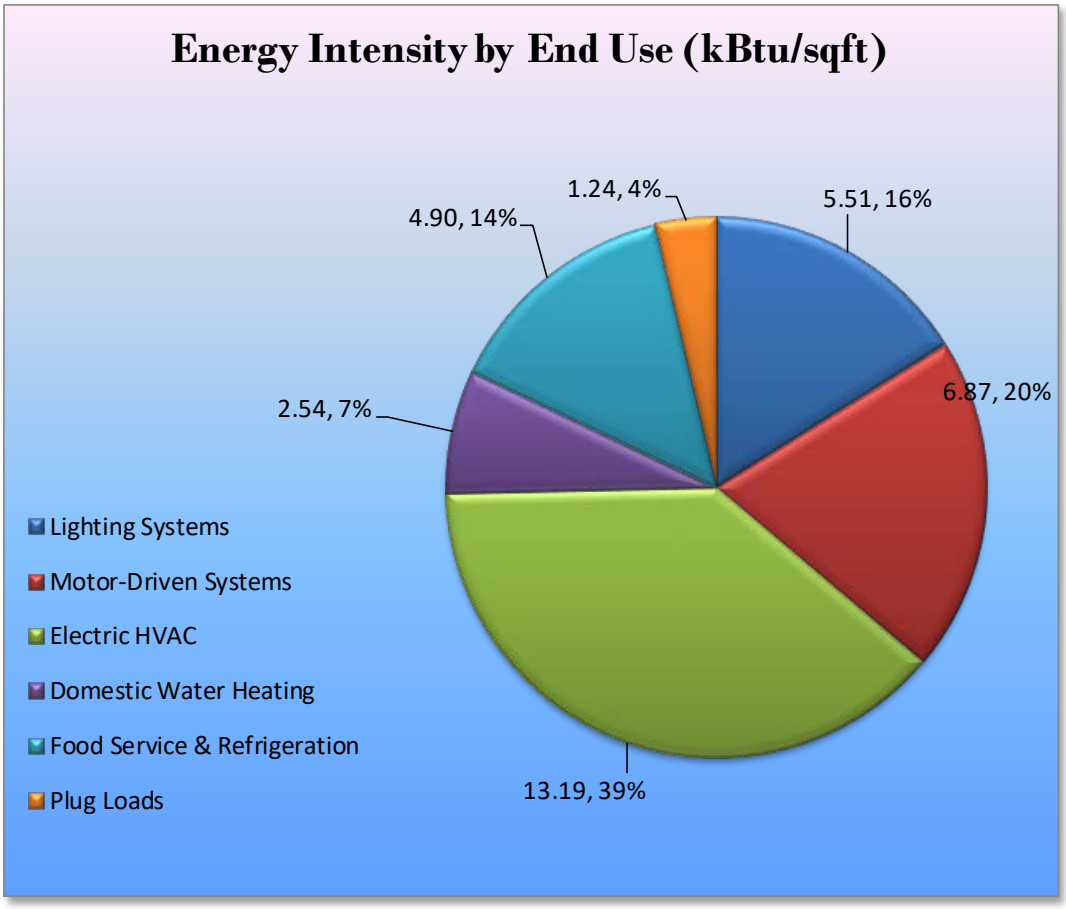
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 ENREGY STAR® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

3.4 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 21 - Energy Balance (% and 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 Collings Lakes Elementary School regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 22 – 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)
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ECM 4	Install Low-Flow Domestic Hot Water Devices	2,489	0.0	0.0	$413.17	$150.57	$0.00	$150.57	0.4	2,506
Food Service Equipment & Refrigeration Measures		1,649	0.1	0.0	$273.78	$606.60	$0.00	$606.60	2.2	1,661
ECM 5	Refrigerator/Freezer Case Electrically Commutated Motors	1,649	0.1	0.0	$273.78	$606.60	$0.00	$606.60	2.2	1,661
Plug Load Equipment Control - Vending Machine		1,612	0.0	0.0	$267.61	$230.00	$0.00	$230.00	0.9	1,623
ECM 6	Vending Machine Control	1,612	0.0	0.0	$267.61	$230.00	$0.00	$230.00	0.9	1,623
TOTALS		30,194	4.2	0.0	$5,013.13	$26,352.05	$2,022.00	$24,330.05	4.9	30,405

* - 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

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 23 below.

Figure 23 – 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		23,577	3.7	0.0	$3,914.54	$24,824.88	$1,952.00	$22,872.88	5.8	23,742
ECM 1	Install LED Fixtures	21,567	2.8	0.0	$3,580.80	$23,045.63	$1,500.00	$21,545.63	6.0	21,718
ECM 2	Retrofit Fixtures with LED Lamps	2,010	0.9	0.0	$333.73	$1,779.25	$452.00	$1,327.25	4.0	2,024

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	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	21,567	2.8	0.0	$3,580.80	$23,045.63	$1,500.00	$21,545.63	6.0	21,718

Measure Description

We recommend replacing exterior wall-mounted and pole-mounted fixtures containing HID 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.

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

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	2,010	0.9	0.0	$333.73	$1,779.25	$452.00	$1,327.25	4.0	2,024
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing incandescent and linear fluorescent lighting technologies 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 tubes and more than ten times longer than many incandescent lamps.

4.1.1 Lighting Control Measures

Our recommendation for upgrades to existing lighting controls is summarized in Figure 24 below.

Figure 24 – 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		867	0.4	0.0	$144.02	$540.00	$70.00	$470.00	3.3	874
ECM 3	Install Occupancy Sensor Lighting Controls	867	0.4	0.0	$144.02	$540.00	$70.00	$470.00	3.3	874

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

ECM 3:Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
867	0.4	0.0	$144.02	$540.00	$70.00	$470.00	3.3	874

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in the cafeteria. 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.

4.1.2 Domestic Hot Water Heating System Upgrades

Our recommendation for domestic water heating system improvements is summarized in Figure 25 below.

Figure 25 - Summary of Domestic Water Heating 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)
Domestic Water Heating Upgrade		2,489	0.0	0.0	$413.17	$150.57	$0.00	$150.57	0.4	2,506
ECM 4	Install Low-Flow Domestic Hot Water Devices	2,489	0.0	0.0	$413.17	$150.57	$0.00	$150.57	0.4	2,506

ECM 4: Install Low-Flow DHW Devices

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)
2,489	0.0	0.0	$413.17	$150.57	$0.00	$150.57	0.4	2,506

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy.

Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.3 Food Service Equipment & Refrigeration Measures

Our recommendation for food service and refrigeration measures is summarized in Figure 26 below.

Figure 26 - Summary of Food Service Equipment & Refrigeration 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)
Food Service Equipment & Refrigeration Measures		1,649	0.1	0.0	$273.78	$606.60	$0.00	$606.60	2.2	1,661
ECM 5	Refrigerator/Freezer Case Electrically Commutated Motors	1,649	0.1	0.0	$273.78	$606.60	$0.00	$606.60	2.2	1,661

ECM 5: Refrigerator/Freezer Case Electrically Commutated Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,649	0.1	0.0	$273.78	$606.60	$0.00	$606.60	2.2	1,661

Measure Description

We recommend replacing shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in the existing freezer. These fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By employing variable-speed technology, EC motors are able to optimize fan usage. Because these motors are brushless and utilize DC power, losses due to friction and phase shifting are eliminated. Savings for this measure take into account both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

4.1.4 Plug Load Equipment Control - Vending Machines

Our recommendation for plug load equipment control – vending machine measures is summarized in Figure 27 below.

Figure 27 - Summary of Plug Load Equipment Control – Vending Machines 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)
Plug Load Equipment Control - Vending Machine		1,612	0.0	0.0	$267.61	$230.00	$0.00	$230.00	0.9	1,623
ECM 6	Vending Machine Control	1,612	0.0	0.0	$267.61	$230.00	$0.00	$230.00	0.9	1,623

ECM 6: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,612	0.0	0.0	$267.61	$230.00	$0.00	$230.00	0.9	1,623

Measure Description

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

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.

Close Doors and Windows

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

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.

Clean Evaporator/Condenser Coils on AC Systems

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

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 to four 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 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).

Refer to Section 4.1.2 for any low-flow ECM recommendations.

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.

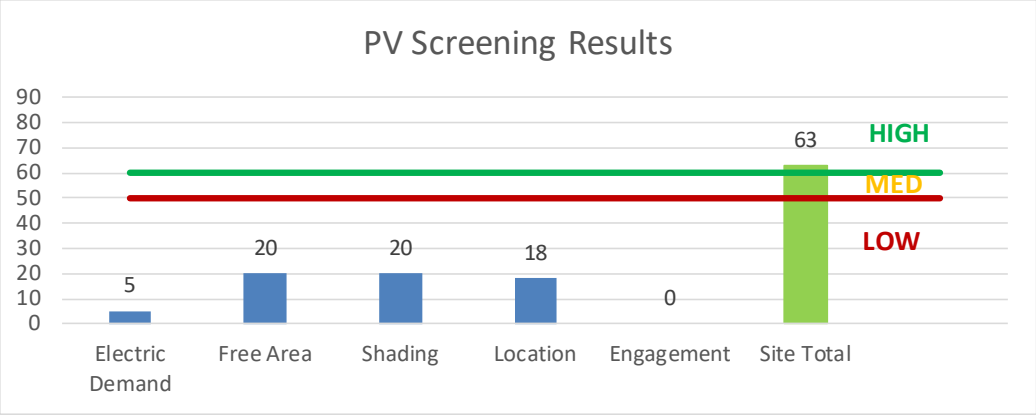
6.1 Photovoltaic

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.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential for PV at the site. A PV array located on the roof of the main building/ground next to the building/over the main parking lot may be feasible. If Collings Lakes Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 28 - Photovoltaic Screening



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.

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.

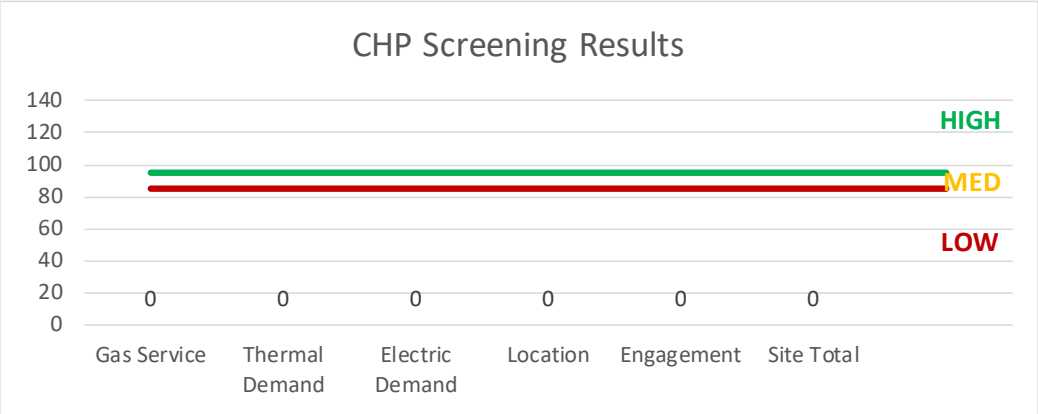
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

Lack of gas service, low or infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the 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 29 - 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 30 for a list of the eligible programs identified for each recommended ECM.

Figure 30 - 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 Fixtures with LED Lamps	x		x			
ECM 3	Install Occupancy Sensor Lighting Controls	x		x			
ECM 4	Install Low-Flow Domestic Hot Water Devices	x		x			
ECM 5	Refrigerator/Freezer Case Electrically Commutated Motors	x		x			
ECM 6	Vending Machine Control	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 Direct Install

Overview

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

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. SRECs 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 SRECs 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 description and application can be found at: www.njcleanenergy.com/ESIP.

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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.

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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
Main Office	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conference Room	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Principals Office	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
"Eddy's" Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.04	101	0.0	$16.79	$117.00	$20.00	5.78
Boys RR	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boys RR	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 207	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 209	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Closet	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	62	933	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	62	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 211	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 211	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	62	933	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	62	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	10	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	10	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 213	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 213 Storage	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 210	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exit	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR 210	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway Exit	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 208	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 208 RR	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 206	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 204	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
202 Mech	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.06	152	0.0	$25.19	$175.50	$30.00	5.78

	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
Nurse 105	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR 105	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	12	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway Exit	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office 111	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	7	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Break Room	6	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	6	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Cafeteria	35	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	35	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
cafeteria Storage	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	1,333	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,333	0.06	134	0.0	$22.26	$179.50	$25.00	6.94
Café	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	15	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	62	933	None	No	15	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	62	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
kitchen Storage	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	2	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	5	Incandescent: 100 Watt	Wall Switch	100	1,333	Relamp	No	5	LED Screw-In Lamps: Lamps over warmers	Wall Switch	15	1,333	0.28	651	0.0	$108.13	$133.75	$125.00	0.08
Kitchen walk-in	4	Incandescent: 60 Watt	Wall Switch	60	1,333	Relamp	No	4	LED Screw-In Lamps: Walk in lights	Wall Switch	9	1,333	0.13	313	0.0	$51.90	$62.00	$80.00	-0.35
RR	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	None	No	1	LED - Fixtures: Ambient 2x2 Fixture	Wall Switch	62	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	13	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	13	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exit	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office 117	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Library	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
301 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.04	101	0.0	$16.79	$117.00	$20.00	5.78
309 Janitor	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.19	455	0.0	$75.56	$526.50	$90.00	5.78
303 Faculty	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Conf Room 305	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 310	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 312	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 307	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
RR	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Faculty RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.02	51	0.0	$8.40	$58.50	$10.00	5.78
Conf Room 317	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
317 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.02	51	0.0	$8.40	$58.50	$10.00	5.78
Conf Room 319	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	9	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Conf Room 318	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
318 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.02	51	0.0	$8.40	$58.50	$10.00	5.78
RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.02	51	0.0	$8.40	$58.50	$10.00	5.78
Conf Room 316	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	None	No	14	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	40	933	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway	17	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	None	No	17	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	40	1,333	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exit	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
309 Mech	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.04	101	0.0	$16.79	$117.00	$20.00	5.78
319 Mech	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,333	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,333	0.04	101	0.0	$16.79	$117.00	$20.00	5.78
Wallpacks	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	59	4,380	None	No	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	59	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outdoors	1	Metal Halide: (1) 150W Lamp	None	190	4,380	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	30	4,380	0.10	806	0.0	$133.81	$390.68	$100.00	2.17
Pole Lights	9	Mercury Vapor: (1) 400W Lamp	None	455	4,380	LED Retrofit	No	9	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	146	4,380	1.82	14,008	0.0	$2,325.74	$17,576.94	$900.00	7.17
Outdoors	3	Metal Halide: (1) 250W Lamp	None	295	4,380	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	46	4,380	0.49	3,763	0.0	$624.71	$1,172.03	$300.00	1.40
Pole Lights	2	Mercury Vapor: (2) 400W Lamps	None	910	4,380	LED Retrofit	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	None	292	4,380	0.81	6,226	0.0	$1,033.66	$3,905.99	$200.00	3.59

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
Mechanical Room	Groundwater HP Supply/Return	2	Water-Source Heat Pump Circulation Pump	3.0	88.5%	No	1,950	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Groundwater HP Supply/Return	2	Water-Source Heat Pump Circulation Pump	5.0	87.5%	No	2,000	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Groundwater HP Supply/Return	2	Water-Source Heat Pump Circulation Pump	3.0	86.5%	No	2,000	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	All	14	Supply Fan	1.0	85.5%	No	2,000	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Multipurpose room	2	Supply Fan	2.0	86.5%	No	2,000	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Toilet and Storage	3	Exhaust Fan	0.2	82.5%	No	2,000	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Kitchen Hood	1	Exhaust Fan	1.0	85.5%	No	2,000	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Electric Room	1	Exhaust Fan	0.5	82.5%	No	2,000	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Toilet	1	Exhaust Fan	0.1	82.5%	No	2,000	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	All	3	Supply Fan	0.8	82.5%	No	2,000	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	All	1	Supply Fan	1.5	86.5%	No	2,000	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	All	2	Exhaust Fan	0.8	82.5%	No	2,000	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	All	2	Exhaust Fan	0.5	82.5%	No	2,000	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	All	1	Makeup Air Fan	0.5	82.5%	No	2,000	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	All	10	Supply Fan	0.5	85.5%	No	2,000	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	All	4	Other	0.2	82.5%	No	2,000	No	82.5%	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
Multiple	All	12	Groundwater Source HP	4.23	42.80	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Multipurpose Room	2	Split-System Air-Source HP	10.60	54.20	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	All	10	Groundwater Source HP	3.36	34.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	All	2	Groundwater Source HP	5.52	57.60	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	All	4	Electric Resistance Heat		10.24	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	All	4	Electric Resistance Heat		10.24	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multipurpose Room	Multipurpose Room	2	Electric Resistance Heat		119.01	No							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
Closet	All	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	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
Multiple	21	Faucet Aerator (Lavatory)	1.50	1.00	0.00	2,489	0.0	$413.17	$150.57	$0.00	0.36

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	Medium Temp Freezer (0F to 30F)	Yes	No	No	0.13	1,649	0.0	$273.78	$606.60	$0.00	2.22

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multiple	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Novelty Cooler Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Cooler Description	Install Automatic Shutoff 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	Milk Cooler	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	2	Electric Convection Oven (Full Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Electric Convection Oven (Full Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Electric Steamer	No	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	No	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?
Office	5	Printer	40.0	Yes
Office	3	Copier	2.7	Yes
Office	14	Overhead Projector	363.0	No
Office	2	Copier	425.0	Yes
Multiple	45	Desktops	100.0	No
Multiple	2	Microwave	700.0	No
Multiple	2	TV	60.0	No
All	1	Coffee maker	780.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
All	1	Refrigerated	Yes	0.00	1,612	0.0	$267.61	$230.00	$0.00	0.86

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Collings Lakes Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 32,766
Built: 1968

For Year Ending: April 30, 2017
Date Generated: May 23, 2018

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
Collings Lakes Elementary School 620 Cains Mill Road Williamstown, New Jersey 08094	Buena Regional School District 914 Main Avenue Richland, NJ 08350 (856) 697-0800	Joe Biluck, Jr. 914 Main Avenue Richland, NJ 08350 (856) 697-0800 jbiluck@buena.k12.nj.us

Property ID: 6358234

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
34.7 kBtu/ft²

Source EUI
109 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	1,137,039	(100%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	56.1
National Median Source EUI (kBtu/ft²)	176.2
% Diff from National Median Source EUI	-38%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	126

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)