Local Government Energy Audit:
Energy Audit Report

Seaview Elementary School

2319 Wabash Ave

Linwood, New Jersey 08221

Linwood City School District

March 29, 2019

Final Report by:

TRC Energy Services

Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual 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.

The New Jersey 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. Please review all available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

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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 Seaview Elementary School.

The goal of a 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 local governments in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Seaview Elementary School is a 72,019 square foot facility comprised of various space types within a single building. This a two-story structure with the second floor limited to mezzanines with mechanical equipment and storage spaces. The building includes classrooms, offices, a gymnasium, a cafetorium, kitchen and special purpose rooms. This is a brick concrete block structure with a brick veneer with a slab on grade floor. The steel framed flat roof is covered with a membrane roofing material and appears to be in good condition.

Lighting at Seaview Elementary School consists primarily of linear 4-foot T8 fixtures with electronic ballasts. The building is cooled by an air cooled chiller serving unit ventilators and heated with high efficiency hot water boilers.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC Energy Services evaluated seven measures and recommends four measures which together represent an opportunity for Seaview Elementary School to reduce annual energy costs by roughly $21,523 and annual greenhouse gas emissions by 161,095 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 3.2 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 Seaview Elementary School's annual energy use by 11%.

Figure 1 – Previous 12 Month Utility Costs

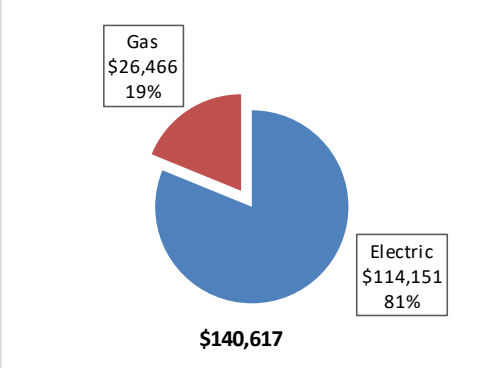
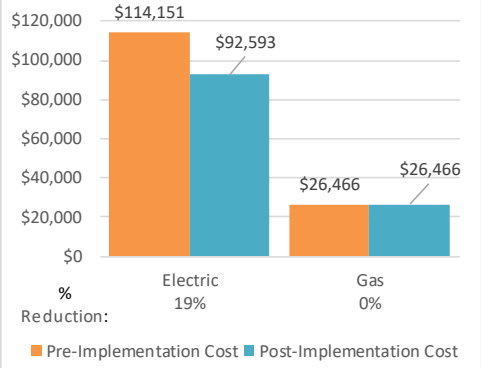


Figure 2 – Potential Post-Implementation Costs



A detailed description of Seaview 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 Natural Gas Savings (MMBtu)	Annual N/A Savings (MMBtu)	Annual N/A Savings (MMBtu)	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			**135,170**	**27.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$18,185.83**	**$79,896.79**	**$16,390.00**	**$63,506.79**	**3.5**	**136,115**
ECM 1	Install LED Fixtures	Yes	25,814	4.3	0.0	0.0	0.0	0.0	$3,473.03	$25,033.56	$4,950.00	$20,083.56	5.8	25,994
ECM 2	Retrofit Fixtures with LED Lamps	Yes	109,084	22.7	0.0	0.0	0.0	0.0	$14,676.27	$52,618.35	$11,440.00	$41,178.35	2.8	109,847
	Install LED Exit Signs	No	272	0.0	0.0	0.0	0.0	0.0	$36.54	$2,244.88	$0.00	$2,244.88	61.4	273
Lighting Control Measures			**23,124**	**4.7**	**0.0**	**0.0**	**0.0**	**0.0**	**$3,111.05**	**$7,766.00**	**$1,135.00**	**$6,631.00**	**2.1**	**23,285**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	23,124	4.7	0.0	0.0	0.0	0.0	$3,111.05	$7,766.00	$1,135.00	$6,631.00	2.1	23,285
Motor Upgrades			**1,320**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**$177.56**	**$3,405.24**	**$0.00**	**$3,405.24**	**19.2**	**1,329**
	Premium Efficiency Motors	No	1,320	0.5	0.0	0.0	0.0	0.0	$177.56	$3,405.24	$0.00	$3,405.24	19.2	1,329
Electric Unitary HVAC Measures			**1,613**	**0.9**	**0.0**	**0.0**	**0.0**	**0.0**	**$216.97**	**$9,722.11**	**$438.00**	**$9,284.11**	**42.8**	**1,624**
	Install High Efficiency Electric AC	No	1,613	0.9	0.0	0.0	0.0	0.0	$216.97	$9,722.11	$438.00	$9,284.11	42.8	1,624
Plug Load Equipment Control - Vending Machine			**1,954**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$262.94**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,968**
ECM 4	Vending Machine Control	Yes	1,954	0.0	0.0	0.0	0.0	0.0	$262.94	$460.00	$0.00	$460.00	1.7	1,968
TOTALS FOR HIGH PRIORITY MEASURES			**159,976**	**31.7**	**0.0**	**0.0**	**0.0**	**0.0**	**$21,523.29**	**$85,877.91**	**$17,525.00**	**$68,352.91**	**3.2**	**161,095**
TOTALS FOR ALL EVALUATED MEASURES			**163,180**	**33.1**	**0.0**	**0.0**	**0.0**	**0.0**	**$21,954.35**	**$101,250.14**	**$17,963.00**	**$83,287.14**	**3.8**	**164,321**

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

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

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

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

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

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

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

Energy Efficient Practices

TRC also identified 10 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 Seaview Elementary School include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Economizers are Functioning Properly
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- 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 Seaview 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	200	kW DC STC
Electric Generation	150,489	kWh/yr
Displaced Cost	$13,090	/yr
Installed Cost	$520,000	

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
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

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

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

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 or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Teri Weeks	School Business Administrator	teriweeks@linwoodschools.org	609-926-6700
Patrick Childs	Supervisor of Facilties and Security	patrickchilds@linwoodschools.org	609-926-6717
TRC Energy Services			
Robert Grindrod	Auditor	rgrindrod@trcsolutions.com	(518) 416-7202

2.2 General Site Information

On July 24, 2018, TRC performed an energy audit at Seaview Elementary School located in Linwood, New Jersey. TRC's team met with Patrick Childs to review the facility operations and help focus our investigation on specific energy-using systems.

Seaview Elementary School is a 72,019 square foot facility constructed in 1969 and underwent a significant renovation with an expansion in 1995. The building is comprised of various space types within a single building. This a two-story structure with the second floor limited to mezzanines with mechanical equipment and storage spaces. The building includes classrooms, offices, a gymnasium, a cafetorium, kitchen and special purpose rooms. The building surrounds a large courtyard used for outdoor instruction and day light to classrooms.

2.3 Building Occupancy

The school building is open Monday through Friday as well as on Saturdays. The typical schedule is presented in the table below. During a typical day, the facility is occupied by approximately 100 staff and 450 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Seaview Elementary	Weekday	7:30 AM - 4:30 PM
Seaview Elementary	Weekend	7:30 AM - 4:30 PM

2.4 Building Envelope

This is a brick concrete block structure with a brick veneer with a slab on grade floor. The steel framed flat roof is covered with a membrane roofing material and appears to be in good condition. The windows are aluminum framed double-glazed commercial grade widows in good condition.

Figure 7 - South Entrance

Figure 8 - Cornerstone in brick veneer

2.5 On-Site Generation

Seaview 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 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-, 3- or 4-lamp 4-foot long troffers with diffusers as well a number of 2-foot troffers with 32-Watt T8 "U-bend" lamps.

CFLs provide accent lighting in the vestibules, north hallway atrium, at the various fire doors in the hallways and the C-wing bathrooms.

The building's exterior lighting includes efficient 100-Watt high pressure sodium (HPS) wall pack fixtures and 250-Watt metal halide flood lights for the playground and the parking lot lights.

Interior lighting control in most spaces is provided by wall switches. Exterior and parking lot fixtures are controlled with timers.

Figure 9 – Lighting in the library

Figure 10 – Indirect lighting in the north corridor

Chilled Water System

The facility is served by a single a York 223-ton, R-134a, variable speed, two-compressor, air-cooled screw chiller mounted on the roof. The chiller comes with standard electric freeze protection and heat trace is used to protect the insulated water pipes to the building in cold weather. The chillers are configured in distribution loop with two 15 hp variable flow pumps (CW1 & 2). The chiller plant supplies chilled water to the class room unit ventilators and the constant speed air handlers serving the hallways, cafeteria and gymnasium.

Figure 11 – York air cooled chiller

Figure 12 – 15 hp Chilled water pump

Hot Water Heating System

The hot water system consists of two Aerco 1,900 kBtu/hr. output, boilers. The boilers have a rated combustion efficiency of 96%. During design conditions (on colder days), depending on the return water temperature, the efficiency may drop into the 80-90% range. Each boiler is served by a dedicated 1/2 hp pump. The system is controlled with an Aerco outdoor air reset system. The boilers operate in a lead/lag configuration. Both boilers may be required during cold weather. The lead boiler is rotated weekly. The boilers are in good condition and well maintained.

Figure 13 – Aerco high efficiency boiler

Figure 14 – Heating hot water circulating pumps

Air Handling Systems

There are three constant speed air handling units (AHUs) with 1, 1.5 and 5 hp fans and two larger AHUs with 10 hp fans and energy recovery ventilation units (ERV) located in the mezzanine in the newer section of the building. The AHUs condition areas not fully served by unit ventilators – corridors, offices, the library, the cafetorium, gym and band room. The AHUs with the ERVs serve the gymnasium.

Figure 15 –AHU "HV1 "

Figure 16 – AHUs "HVAC 3" and "HVAC 4"

Figure 17 – Energy recovery ventilator

Figure 18 – ERV grills in the gym

Direct Expansion Air Conditioning System (DX)

There are two Trane roof mounted 6-ton split system condensers, serving AHU's with DX evaporator coils. The older unit has a SEER of 10 and serves the media center. The newer unit has a SEER of 13 and serves the media center. The CST office has a 1-ton ductless mini-split heat pump with a SEER of 16 and a COP of 2.7. An older 1-ton ductless mini-split air conditioning (AC) unit with a SEER of 11.2 is used to condition the IT server room.

Domestic Hot Water Heating System

The domestic hot water heating system for most of the facility is located in the ground floor mechanical room and consists of two Bradford White gas fired condensing hot water heaters with an input rating of 150 kBtu/hr. each and a nominal efficiency of 92%. Each water heater has a 100-gallon storage tank. One 1/8 hp recirculation pumps distribute 120°F water to the building. The recirculation pump operates continuously.

There is also a 4.5 kW input Bradford White electric 65-gallon tank heater located in the mezzanine serving the kitchen.

Figure 19 – High Efficiency Domestic Hot Water Heater

Figure 20 – Domestic Hot Water Circulator

Figure 21 – Electric Domestic Hot Water Heater

Food Service & Laundry Equipment

The school has a kitchen used to serve lunches for students. Food is prepared at a remote site and served from heated serving trays and refrigerators. There is also a conveyer dishwasher.

Refrigeration

The kitchen has two 44 cubic foot non-ENERGY STAR® commercial grade refrigerators and a 22 cubic foot non- ENERGY STAR® commercial grade freezer. There is also a refrigerator chest used as a milk cooler.

Building Plug Load

There are roughly 53 computer work stations throughout the facility, all being desktop units with LCD monitors. There is no centralized PC power management software installed. The computer lab has 26 Mac computers. There are 41 projectors, 26 smart boards and a number of small desktop printers. There are six stand-alone copier/printers including a large high volume unit in the office.

There one server closet in the facility cooled with a ductless mini-split AC.

The facility has a number of residential grade refrigerators, both stand-up 18-20 cubic foot models and smaller countertop units. There is one refrigerated beverage vending machine and one non-refrigerated snack vending machine with no energy saving controls.

The art classroom has a 10kW kiln that is used fairly infrequently.

Of note, there are 12 dehumidifiers in various parts of the building or various makes and models. Most of these are non- ENERGY STAR® units. Some of the classrooms have wall mounted circulation 1/4 hp fans that are used fairly infrequently.

2.7 Water-Using Systems

There are 22 restrooms at this facility, including 18 single toilet restrooms in classrooms, the office, the nurse's office, and kitchen as well as the communal staff rest rooms. Four communal pupil restrooms serve the rest of the building. A sampling of restrooms found that the faucets are rated for 2.0 gallons per minute (gpm), the toilets are rated at 1.6 gallons per flush (gpf) and the urinals are rated at 2 gpf.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

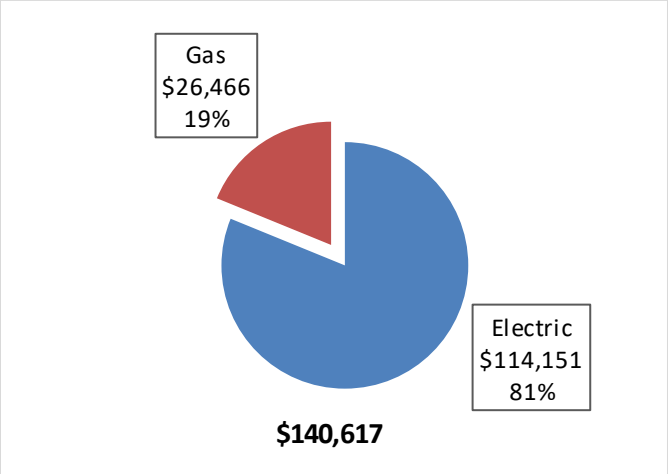
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 22 - Utility Summary

Utility Summary for Seaview Elementary School		
Fuel	**Usage**	**Cost**
Electricity	848,449 kWh	$114,151
Natural Gas	22,951 Therms	$26,466
Total		**$140,617**

The current annual energy cost for this facility is $140,617 as shown in the chart below.

Figure 23 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.135/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 24 - Electric Usage & Demand

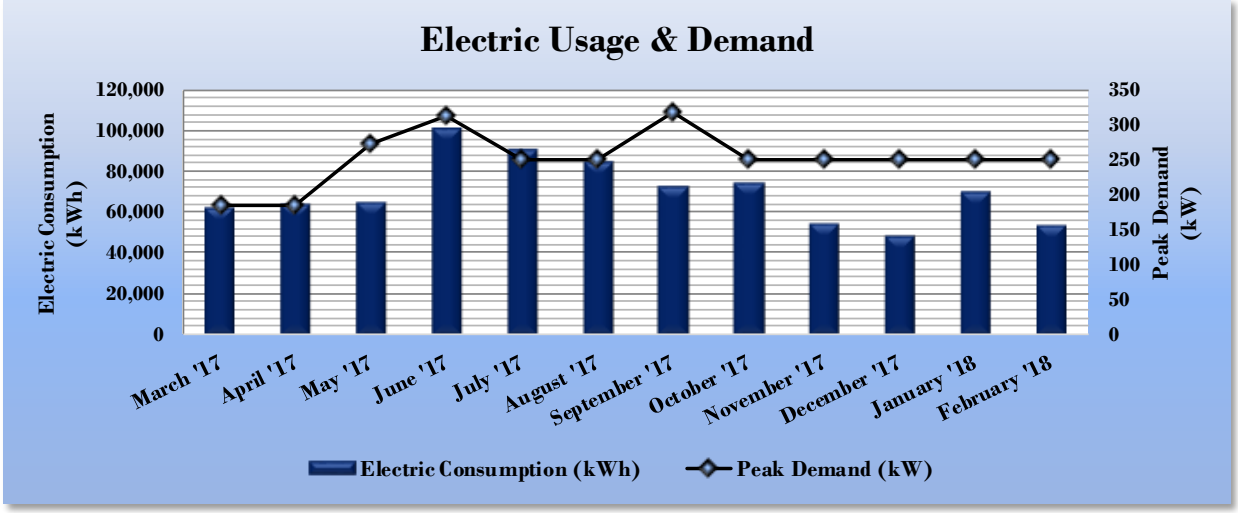


Figure 25 - Electric Usage & Demand

Electric Billing Data for Seaview Elementary School						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/31/17	29	62,800	186	$1,637	$9,150	No
5/1/17	31	64,000	186	$1,637	$9,325	Yes
5/31/17	30	65,200	273	$2,434	$9,398	No
7/3/17	33	101,400	312	$3,027	$12,740	No
8/1/17	29	91,000	250	$2,128	$10,915	No
8/31/17	30	85,200	250	$2,201	$10,417	No
9/29/17	29	72,400	318	$2,711	$9,817	No
10/31/17	32	74,400	250	$2,593	$9,746	No
11/30/17	30	54,800	250	$2,439	$7,680	No
12/29/17	29	48,400	250	$2,357	$6,978	No
1/31/18	33	70,200	250	$2,677	$9,676	No
2/28/18	28	54,000	250	$2,271	$7,683	No
Totals	**363**	**843,800**	**318**	**$28,114**	**$113,525**	1
Annual	**365**	**848,449**	**318**	**$28,269**	**$114,151**	

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.153/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 26 - Natural Gas Usage

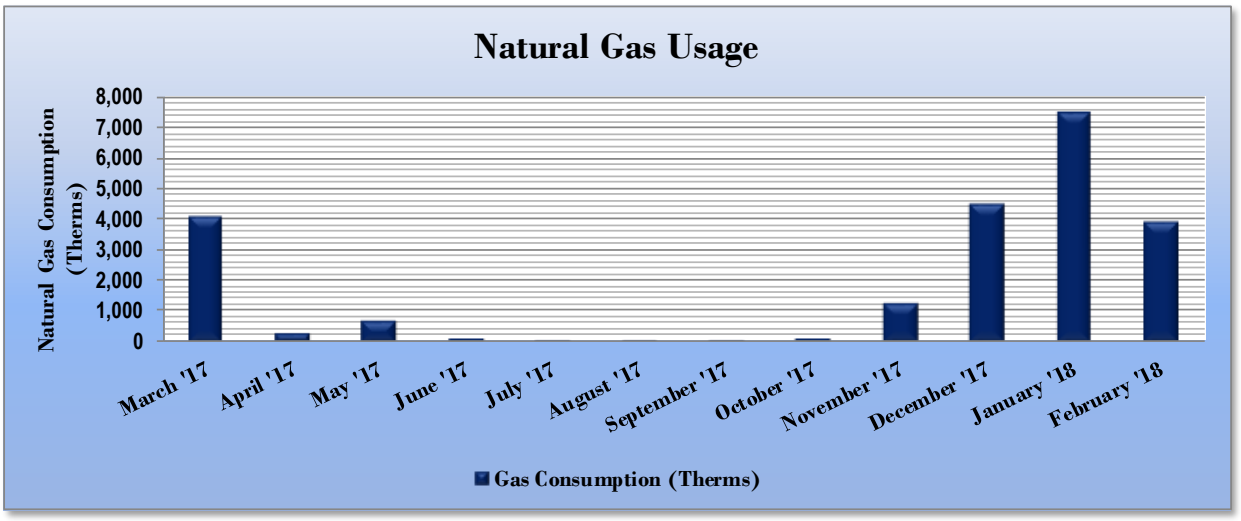


Figure 27 - Natural Gas Usage

Gas Billing Data for Seaview Elementary School				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
3/31/17	29	4,108	$4,071	No
5/1/17	31	311	$351	No
5/31/17	30	726	$692	No
7/3/17	33	104	$128	No
8/1/17	29	83	$114	No
8/31/17	30	83	$114	No
9/29/17	29	93	$124	No
10/31/17	32	105	$139	Yes
11/30/17	30	1,283	$1,532	No
12/29/17	29	4,526	$5,488	No
1/31/18	33	7,489	$8,865	No
2/28/18	28	3,914	$4,705	No
Totals	**363**	**22,825**	**$26,321**	
Annual	**365**	**22,951**	**$26,466**	

3.4 Benchmarking

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

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

Figure 28 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Seaview Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	159.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	72.1	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 29 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Seaview Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	135.8	141.4
Site Energy Use Intensity (kBtu/ft^2)	64.5	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 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 45.

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

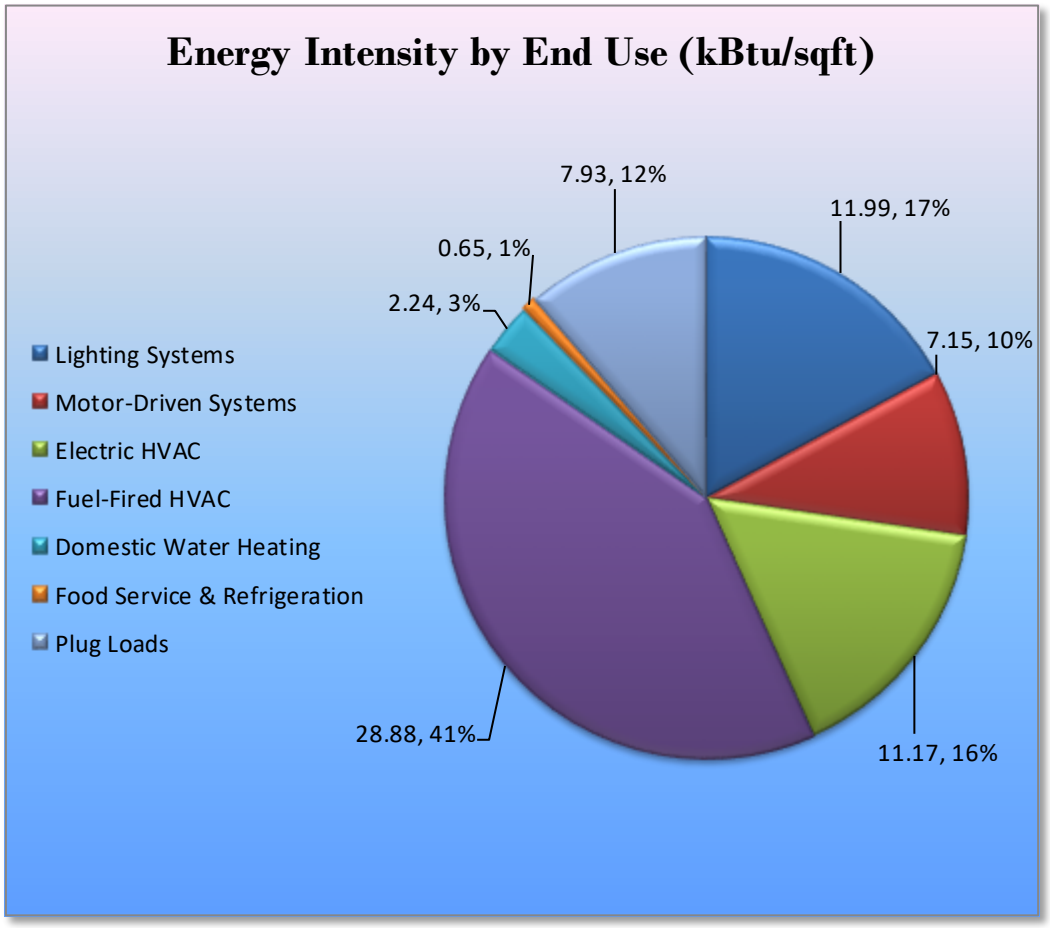
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

Figure 30 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Seaview 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 31 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**134,898**	**27.0**	**0.0**	**$18,149.30**	**$77,651.91**	**$16,390.00**	**$61,261.91**	**3.4**	**135,842**
ECM 1	Install LED Fixtures	25,814	4.3	0.0	$3,473.03	$25,033.56	$4,950.00	$20,083.56	5.8	25,994
ECM 2	Retrofit Fixtures with LED Lamps	109,084	22.7	0.0	$14,676.27	$52,618.35	$11,440.00	$41,178.35	2.8	109,847
Lighting Control Measures		**23,124**	**4.7**	**0.0**	**$3,111.05**	**$7,766.00**	**$1,135.00**	**$6,631.00**	**2.1**	**23,285**
ECM 3	Install Occupancy Sensor Lighting Controls	23,124	4.7	0.0	$3,111.05	$7,766.00	$1,135.00	$6,631.00	2.1	23,285
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$262.94**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,968**
ECM 4	Vending Machine Control	1,954	0.0	0.0	$262.94	$460.00	$0.00	$460.00	1.7	1,968
TOTALS		**159,976**	**31.7**	**0.0**	**$21,523.29**	**$85,877.91**	**$17,525.00**	**$68,352.91**	**3.2**	**161,095**

* - 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 32 below.

Figure 32 – 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		**134,898**	**27.0**	**0.0**	**$18,149.30**	**$77,651.91**	**$16,390.00**	**$61,261.91**	**3.4**	**135,842**
ECM 1	Install LED Fixtures	25,814	4.3	0.0	$3,473.03	$25,033.56	$4,950.00	$20,083.56	5.8	25,994
ECM 2	Retrofit Fixtures with LED Lamps	109,084	22.7	0.0	$14,676.27	$52,618.35	$11,440.00	$41,178.35	2.8	109,847

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	10,437	2.1	0.0	$1,404.24	$11,258.48	$2,700.00	$8,558.48	6.1	10,510
Exterior	15,377	2.2	0.0	$2,068.78	$13,775.08	$2,250.00	$11,525.08	5.6	15,484

Measure Description

We recommend replacing existing 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 significantly longer than HID or fluorescent lamps.

The fixtures affected are the gymnasium HID fixtures, the parking lot pole mounted fixtures, playground flood lights, and exterior HID wall pack fixtures.

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	108,502	22.6	0.0	$14,597.95	$52,256.05	$11,440.00	$40,816.05	2.8	109,261
Exterior	582	0.1	0.0	$78.33	$362.30	$0.00	$362.30	4.6	586

Measure Description

We recommend retrofitting existing T8 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. Fixtures affected are all of the linear fluorescent fixtures in Seaview Elementary.

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

This measure includes replacing all T8 fluorescent lamps in all fixtures including the “U”-bend 2-foot fixture in the building. This also includes replacing the pin based CFL lamps in the recessed accent fixtures in the atrium, hallways and other locations in the building.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures are summarized in Figure 33 below.

Figure 33 – 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		**23,124**	**4.7**	**0.0**	**$3,111.05**	**$7,766.00**	**$1,135.00**	**$6,631.00**	**2.1**	**23,285**
ECM 3	Install Occupancy Sensor Lighting Controls	23,124	4.7	0.0	$3,111.05	$7,766.00	$1,135.00	$6,631.00	2.1	23,285

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)
23,124	4.7	0.0	$3,111.05	$7,766.00	$1,135.00	$6,631.00	2.1	23,285

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in all restrooms, storage rooms, classrooms, and offices areas. 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.

4.1.3 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 34 below.

Figure 34 - Summary of Plug Load Equipment 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)
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$262.94**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,968**
ECM 4	Vending Machine Control	1,954	0.0	0.0	$262.94	$460.00	$0.00	$460.00	1.7	1,968

ECM 4: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,954	0.0	0.0	$262.94	$460.00	$0.00	$460.00	1.7	1,968

Measure Description

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

4.2 ECMs Evaluated but Not Recommended

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

Figure 35 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades	**272**	**0.0**	**0.0**	**$36.54**	**$2,244.88**	**$0.00**	**$2,244.88**	**61.4**	**273**
Install LED Exit Signs	272	0.0	0.0	$36.54	$2,244.88	$0.00	$2,244.88	61.4	273
Motor Upgrades	**1,320**	**0.5**	**0.0**	**$177.56**	**$3,405.24**	**$0.00**	**$3,405.24**	**19.2**	**1,329**
Premium Efficiency Motors	1,320	0.5	0.0	$177.56	$3,405.24	$0.00	$3,405.24	19.2	1,329
Electric Unitary HVAC Measures	**1,613**	**0.9**	**0.0**	**$216.97**	**$9,722.11**	**$438.00**	**$9,284.11**	**42.8**	**1,624**
Install High Efficiency Electric AC	1,613	0.9	0.0	$216.97	$9,722.11	$438.00	$9,284.11	42.8	1,624
TOTALS	**3,204**	**1.4**	**0.0**	**$431.06**	**$15,372.23**	**$438.00**	**$14,934.23**	**34.6**	**3,226**

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

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

Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	272	0.0	0.0	$36.54	$2,244.88	$0.00	$2,244.88	61.4	273
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

Reasons for not Recommending

Due to a longer simple payback for this measure the replacement would not be cost effective based on energy savings alone. The facility may choose to upgrade for other reasons such as a compressive facility-wide retrofit or additional O&M savings.

Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,320	0.5	0.0	$177.56	$3,405.24	$0.00	$3,405.24	19.2	1,329

Measure Description

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

Reasons for not Recommending

Due to a longer simple payback for this measure the replacement would not be cost effective based on energy savings alone. The facility may choose to upgrade for other reasons such as a compressive facility-wide retrofit or additional O&M savings.

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,613	0.9	0.0	$216.97	$9,722.11	$438.00	$9,284.11	42.8	1,624

Measure Description

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

Reasons for not Recommending

Due to a longer simple payback for this measure the replacement would not be cost effective based on energy savings alone. The facility may choose to upgrade for other reasons such as a compressive facility-wide retrofit or additional O&M savings.

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. Based on the information collected during the audit, many or all of these practices are routinely being done and listed for reference purposes.

Lighting Maintenance

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

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.

Economizers

Economizers, when properly configured, can be used to significantly reduce mechanical cooling. However, if the outdoor thermostat or enthalpy control is malfunctioning or the damper is stuck or improperly adjusted, benefits from the economizer may not be fully realized. As such, periodic inspection and maintenance is required to ensure proper operation. This maintenance should be scheduled with maintenance of the facility's air conditioning system and should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position. A malfunctioning economizer can significantly increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air.

Chillers

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

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.

HVAC Filters

Air filters work to reduce the amount of indoor air pollution and increase occupant comfort. Over time, filters become less and less effective as particulate buildup increases. In addition to health concerns related to clogged filters, filters that have reached saturation also restrict air flow through the facility's air conditioning or heat pump system, increasing the load on the distribution fans and decreasing occupant comfort levels. Filters should be checked monthly and cleaned or replaced when appropriate.

Boiler Maintenance

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

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.

Plug Load Controls

There are a variety of ways to limit the energy use of plug loads including increasing occupant awareness, removing under-utilized equipment, installing hardware controls, and using software controls. Some control steps to take are to enable the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips. For additional information refer to "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

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 gpf and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

6 On-Site Generation Measures

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

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

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before deciding 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.

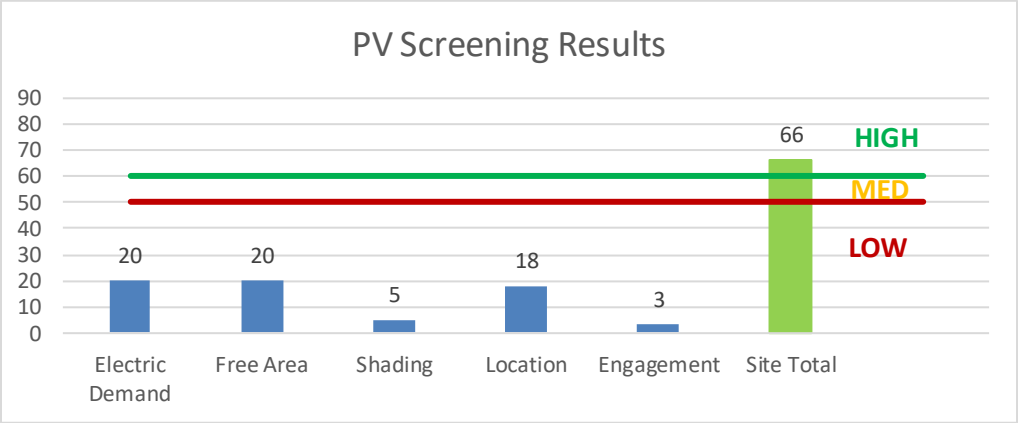
6.1 Photovoltaic

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 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 Seaview Elementary School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 36 - Photovoltaic Screening



Potential	High	
System Potential	200	kW DC STC
Electric Generation	150,489	kWh/yr
Displaced Cost	$13,090	/yr
Installed Cost	$520,000	

Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (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 developed new solar projects and insight into future SREC pricing. Refer to Section 8.2 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) involves the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

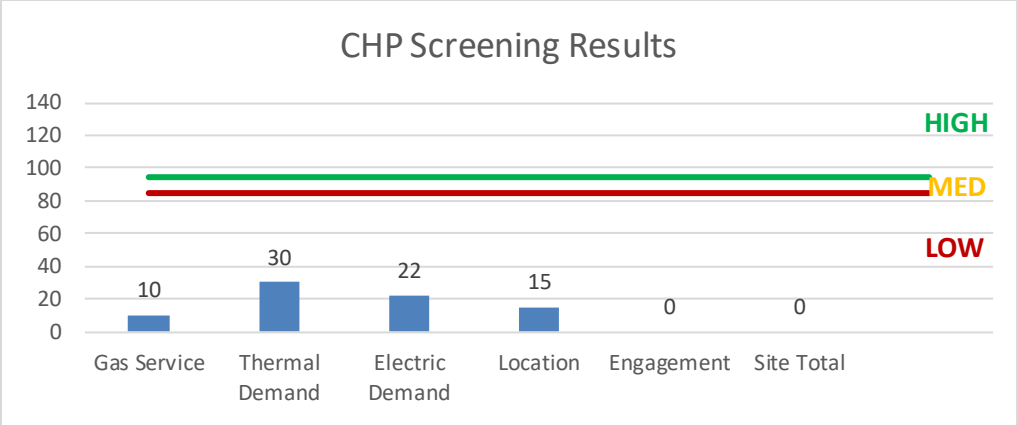
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

Low or infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the 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 37 - 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 38 for a list of the eligible programs identified for each recommended ECM.

Figure 38 - 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					
ECM 2	Retrofit Fixtures with LED Lamps	X					
ECM 3	Install Occupancy Sensor Lighting Controls	X					
ECM 4	Vending Machine Control						

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 SREC Registration Program

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

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

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

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

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

8.3 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
A Hall, Entry Hall	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	185	0.0	$24.93	$73.03	$20.00	2.13
Music Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,808	0.39	1,918	0.0	$258.07	$657.27	$180.00	1.85
Music Room Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.33	1,616	0.0	$217.40	$554.18	$140.00	1.91
Stage Hall	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.09	426	0.0	$57.35	$146.06	$40.00	1.85
Play Ground Hall	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.11	533	0.0	$71.69	$182.58	$50.00	1.85
Play Ground Hall Vestibule	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.04	187	0.0	$25.20	$144.92	$0.00	5.75
Play Ground Hall	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	2,808	Relamp	No	12	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,808	0.14	678	0.0	$91.24	$219.09	$60.00	1.74
Cafeteria/Stage Hall	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
Stage Lift	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
Kitchen	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	No	13	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,808	0.42	2,078	0.0	$279.57	$712.04	$195.00	1.85
Kitchen Rest Rooms	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,808	0.06	320	0.0	$43.01	$109.55	$30.00	1.85
Janitor	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
Receiving	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
Office	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.33	1,616	0.0	$217.40	$554.18	$140.00	1.91
Office Hall	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
Office Conference room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.09	426	0.0	$57.35	$146.06	$40.00	1.85
Office Conference room	6	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	6	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.07	368	0.0	$49.53	$150.00	$0.00	3.03
Office Copy Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
Tansin	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	6	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.11	562	0.0	$75.60	$434.76	$0.00	5.75
Principal	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	6	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.11	562	0.0	$75.60	$434.76	$0.00	5.75
Break room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
Office Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
Main Vestibules	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.08	375	0.0	$50.40	$289.84	$0.00	5.75
Vestibule/foyer	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.08	375	0.0	$50.40	$289.84	$0.00	5.75
Vestibule/foyer	8	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.10	491	0.0	$66.04	$200.00	$0.00	3.03

	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
Foyer at Cafetorium	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.08	375	0.0	$50.40	$289.84	$0.00	5.75
Reception	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.15	749	0.0	$100.79	$579.68	$0.00	5.75
Hall at A wing	8	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.10	491	0.0	$66.04	$200.00	$0.00	3.03
Hall - Atrium	16	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	16	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.30	1,498	0.0	$201.59	$1,159.36	$0.00	5.75
Atrium	8	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.10	491	0.0	$66.04	$200.00	$0.00	3.03
Atrium	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.15	749	0.0	$100.79	$579.68	$0.00	5.75
Hall at Gym	8	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.10	491	0.0	$66.04	$200.00	$0.00	3.03
Hall at Gym	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.15	749	0.0	$100.79	$579.68	$0.00	5.75
Hall At C wing	8	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.10	491	0.0	$66.04	$200.00	$0.00	3.03
Hall At C wing	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.08	375	0.0	$50.40	$289.84	$0.00	5.75
C Wing Hall	6	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	6	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.07	368	0.0	$49.53	$150.00	$0.00	3.03
C Wing Hall	9	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	9	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.17	843	0.0	$113.39	$652.14	$0.00	5.75
C Wing Hall	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.39	1,918	0.0	$258.07	$657.27	$180.00	1.85
B Hall Vestibule	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.04	187	0.0	$25.20	$144.92	$0.00	5.75
B Wing Hall	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.35	1,705	0.0	$229.39	$584.24	$160.00	1.85
B Wing Hall Entry	2	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.02	123	0.0	$16.51	$50.00	$0.00	3.03
A Wing Hall	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	27	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.58	2,877	0.0	$387.10	$985.91	$270.00	1.85
A Wing Hall	2	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.02	123	0.0	$16.51	$50.00	$0.00	3.03
A Hall Side Foyer	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.11	533	0.0	$71.69	$182.58	$50.00	1.85
Connector Hall	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.13	639	0.0	$86.02	$219.09	$60.00	1.85
Connector Hall	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,808	None	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,808	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine Mechanical Rm	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	17	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.37	387	0.0	$52.08	$620.76	$170.00	8.66
Gym	18	Metal Halide: (1) 250W Lamp	Wall Switch	295	2,808	Fixture Replacement	Yes	18	LED - Fixtures: Low-Bay	Occupancy Sensor	89	1,966	2.75	13,546	0.0	$1,822.51	$11,798.48	$2,770.00	4.95
Gym Storage (x2)	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.13	137	0.0	$18.38	$219.09	$60.00	8.66
Girl's Locker	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.10	468	0.0	$63.00	$362.30	$0.00	5.75

	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
Boy's Locker	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.10	468	0.0	$63.00	$362.30	$0.00	5.75
Gym Office	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	Yes	6	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,966	0.15	754	0.0	$101.40	$550.76	$20.00	5.23
Nurse	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.41	2,020	0.0	$271.75	$663.73	$170.00	1.82
Nurse Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,808	0.07	362	0.0	$48.66	$146.06	$40.00	2.18
Nurse Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.16	808	0.0	$108.70	$335.09	$80.00	2.35
Nurse Rest Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
A1	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,966	0.30	1,481	0.0	$199.29	$517.67	$130.00	1.95
A1 Rest Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,966	0.03	126	0.0	$16.90	$188.46	$0.00	11.15
A2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.26	1,279	0.0	$172.05	$438.18	$120.00	1.85
A3	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.38	1,896	0.0	$255.11	$700.24	$180.00	2.04
A4	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.16	808	0.0	$108.70	$335.09	$80.00	2.35
A4 antiroom	1	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.01	61	0.0	$8.25	$25.00	$0.00	3.03
A4 antiroom entry	1	Compact Fluorescent: 26W pin based 1L	Wall Switch	30	2,808	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.01	61	0.0	$8.25	$25.00	$0.00	3.03
A5	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.38	1,896	0.0	$255.11	$700.24	$180.00	2.04
A6 testing	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.16	808	0.0	$108.70	$335.09	$80.00	2.35
A7	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.29	1,422	0.0	$191.34	$554.18	$140.00	2.16
A8	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.16	808	0.0	$108.70	$335.09	$80.00	2.35
Server Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.19	948	0.0	$127.56	$408.12	$100.00	2.42
Computer Lab	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.48	2,370	0.0	$318.89	$846.30	$220.00	1.96
Computer Lab Vestibule	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.10	474	0.0	$63.78	$262.06	$60.00	3.17
Library	40	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	Yes	40	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,966	1.09	5,386	0.0	$724.68	$2,540.60	$540.00	2.76
Library	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.52	2,558	0.0	$344.09	$876.36	$240.00	1.85
Library	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	4	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.08	375	0.0	$50.40	$289.84	$0.00	5.75
Library Office	6	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	6	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.11	562	0.0	$75.60	$434.76	$0.00	5.75
A-9	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	38	2,808	None	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	38	1,966	0.06	295	0.0	$39.62	$270.00	$35.00	5.93

	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
A Hall Storage	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,966	0.22	1,077	0.0	$144.94	$408.12	$80.00	2.26
A-10	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.38	1,896	0.0	$255.11	$700.24	$180.00	2.04
A-11	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.38	1,896	0.0	$255.11	$700.24	$180.00	2.04
A-12	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.38	1,896	0.0	$255.11	$700.24	$180.00	2.04
A-14	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.38	1,896	0.0	$255.11	$700.24	$180.00	2.04
A-16	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.38	1,896	0.0	$255.11	$700.24	$180.00	2.04
Staff Rest Rooms	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
Girl's Rest Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,966	0.08	404	0.0	$54.35	$225.55	$30.00	3.60
Girl's Rest Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
Boy's Rest Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,966	0.08	404	0.0	$54.35	$225.55	$30.00	3.60
Boy's Rest Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
A Wing Janitor	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
B1	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.66	3,232	0.0	$434.81	$992.36	$260.00	1.68
B1 Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.04	46	0.0	$6.13	$73.03	$20.00	8.66
B2	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.66	3,232	0.0	$434.81	$992.36	$260.00	1.68
B2 Closet	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.06	68	0.0	$9.19	$109.55	$30.00	8.66
B3	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.77	3,792	0.0	$510.23	$1,284.48	$340.00	1.85
B3 Observation	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
B4	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.66	3,232	0.0	$434.81	$992.36	$260.00	1.68
B4 Closet	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.06	68	0.0	$9.19	$109.55	$30.00	8.66
Entry at B5	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
B5	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.33	1,616	0.0	$217.40	$554.18	$140.00	1.91
B4 Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	600	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	420	0.08	86	0.0	$11.61	$225.55	$30.00	16.84
B1, B2, B4 Rest Rooms	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.06	281	0.0	$37.80	$217.38	$0.00	5.75
Art Room	19	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	19	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.91	4,503	0.0	$605.90	$1,503.57	$400.00	1.82

	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
Art Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
Kiln Room	2	Incandescent: Wall Mounted Jar 1L	Wall Switch	60	2,808	Relamp	No	2	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	20	2,808	0.05	258	0.0	$34.76	$34.45	$10.00	0.70
C1	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.29	1,422	0.0	$191.34	$554.18	$140.00	2.16
C2	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.34	1,659	0.0	$223.22	$627.21	$160.00	2.09
C2 Observation	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.02	94	0.0	$12.60	$72.46	$0.00	5.75
C3	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.77	3,792	0.0	$510.23	$1,284.48	$340.00	1.85
C4	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.77	3,792	0.0	$510.23	$1,284.48	$340.00	1.85
C5	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.58	2,844	0.0	$382.67	$992.36	$260.00	1.91
C6	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.77	3,792	0.0	$510.23	$1,284.48	$340.00	1.85
C7	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.58	2,844	0.0	$382.67	$992.36	$260.00	1.91
C8	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.77	3,792	0.0	$510.23	$1,284.48	$340.00	1.85
C9	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.62	3,030	0.0	$407.63	$937.59	$245.00	1.70
C10	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.58	2,844	0.0	$382.67	$992.36	$260.00	1.91
C12	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.58	2,844	0.0	$382.67	$992.36	$260.00	1.91
C14	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.58	2,844	0.0	$382.67	$992.36	$260.00	1.91
C16	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	0.58	2,844	0.0	$382.67	$992.36	$260.00	1.91
C18	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.62	3,030	0.0	$407.63	$937.59	$245.00	1.70
CWing Class Rest Rooms	8	Compact Fluorescent: CFL Globe 1L	Wall Switch	30	2,808	Relamp	No	8	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	11	2,808	0.10	491	0.0	$66.04	$200.00	$0.00	3.03
CWing Classroom Alcoves	5	Incandescent: Recessed 1L	Wall Switch	60	2,808	Relamp	No	5	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	20	2,808	0.13	646	0.0	$86.89	$86.13	$25.00	0.70
Cafetorium	48	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,808	Relamp	Yes	48	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,966	2.31	11,377	0.0	$1,530.68	$4,315.44	$1,065.00	2.12
Cafetorium storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	600	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.06	68	0.0	$9.19	$109.55	$30.00	8.66
Cafetorium stage	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.17	853	0.0	$114.70	$292.12	$80.00	1.85
Faculty Lounge	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	No	14	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,808	0.45	2,238	0.0	$301.08	$766.82	$210.00	1.85
Faculty Lounge Work Area	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,808	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,966	0.16	808	0.0	$108.70	$335.09	$80.00	2.35
Staff Rest Rooms	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,808	0.04	187	0.0	$25.20	$144.92	$0.00	5.75

	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
Faculty Lounge Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,808	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,808	0.04	213	0.0	$28.67	$73.03	$20.00	1.85
Wall Packs	18	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,015	Fixture Replacement	No	18	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	45	4,015	1.69	11,885	0.0	$1,598.99	$5,400.00	$1,800.00	2.25
Exterior Enrty Soffits	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,015	Relamp	No	5	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,015	0.10	670	0.0	$90.08	$362.30	$0.00	4.02
Play Ground Flood Lights	2	Metal Halide: (1) 200W Lamp	Wall Switch	232	4,015	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Wall Switch	70	4,015	0.21	1,500	0.0	$201.77	$1,861.13	$100.00	8.73
Flag Pole Spot Light	1	Metal Halide: (1) 100W Lamp	Wall Switch	128	4,015	None	No	1	Metal Halide: (1) 100W Lamp	Wall Switch	128	4,015	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Parking lot pole lights	7	Metal Halide: (1) 150W Lamp	Wall Switch	190	4,015	Fixture Replacement	No	7	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Wall Switch	57	4,015	0.61	4,299	0.0	$578.34	$6,513.95	$350.00	10.66
Exit Signs	31	Exit Signs: Fluorescent	None	7	8,760	Fixture Replacement	No	31	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	312	0.0	$42.02	$2,244.88	$0.00	53.43

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
MER	ERV	2	Supply Fan	10.0	93.0%	Yes	3,569	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
MER	ERV wheel	2	Other	0.5	70.0%	No	3,569	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
MER	HVAC2	1	Supply Fan	5.0	87.5%	Yes	3,569	Yes	89.5%	No		0.05	255	0.0	$34.30	$800.37	$0.00	23.33
MER	HVAC3	1	Supply Fan	1.0	87.5%	No	3,569	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
MER	HVAC 4	1	Supply Fan	1.5	84.0%	No	3,569	Yes	86.5%	No		0.02	103	0.0	$13.86	$758.15	$0.00	54.69
MER	CW Pump1	1	Chilled Water Pump	15.0	93.0%	No	1,696	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
MER	CW Pump2	1	Chilled Water Pump	15.0	87.5%	No	1,696	Yes	93.0%	No		0.42	962	0.0	$129.39	$1,846.72	$0.00	14.27
Roof	Ventilation Fans	12	Exhaust Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Whole Building	1	Process Pump	0.1	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Whole Building	2	Heating Hot Water Pump	0.5	75.0%	No	1,373	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Classrooms	38	Supply Fan	0.3	70.0%	No	3,569	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Various	10	Supply Fan	0.3	70.0%	No	3,569	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Various	9	Supply Fan	0.3	70.0%	No	3,569	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Various	Various	5	Supply Fan	0.3	70.0%	No	3,569	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Office	1	Split-System AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Over A Wing	1	Split-System AC	6.00		Yes	1	Split-System AC	6.00		11.50		No	0.63	1,127	0.0	$151.62	$6,982.62	$438.00	43.16
Roof	Over B Wing	1	Ductless Mini-Split AC	1.00		Yes	1	Ductless Mini-Split AC	1.00		18.00		No	0.22	400	0.0	$53.82	$2,739.49	$0.00	50.90
Ground in court yard	CST	1	Ductless Mini-Split HP	1.00	13.60	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Entire Building	1	Air-Cooled Screw Chiller	223.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Whole Building	2	Condensing Hot Water Boiler	2,000.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Whole School	2	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mezzanine	Locker rooms	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

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

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Ice Making Head (<450 lbs/day), Batch	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	Multi-Tank Conveyor (High Temp)	Natural Gas	N/A	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

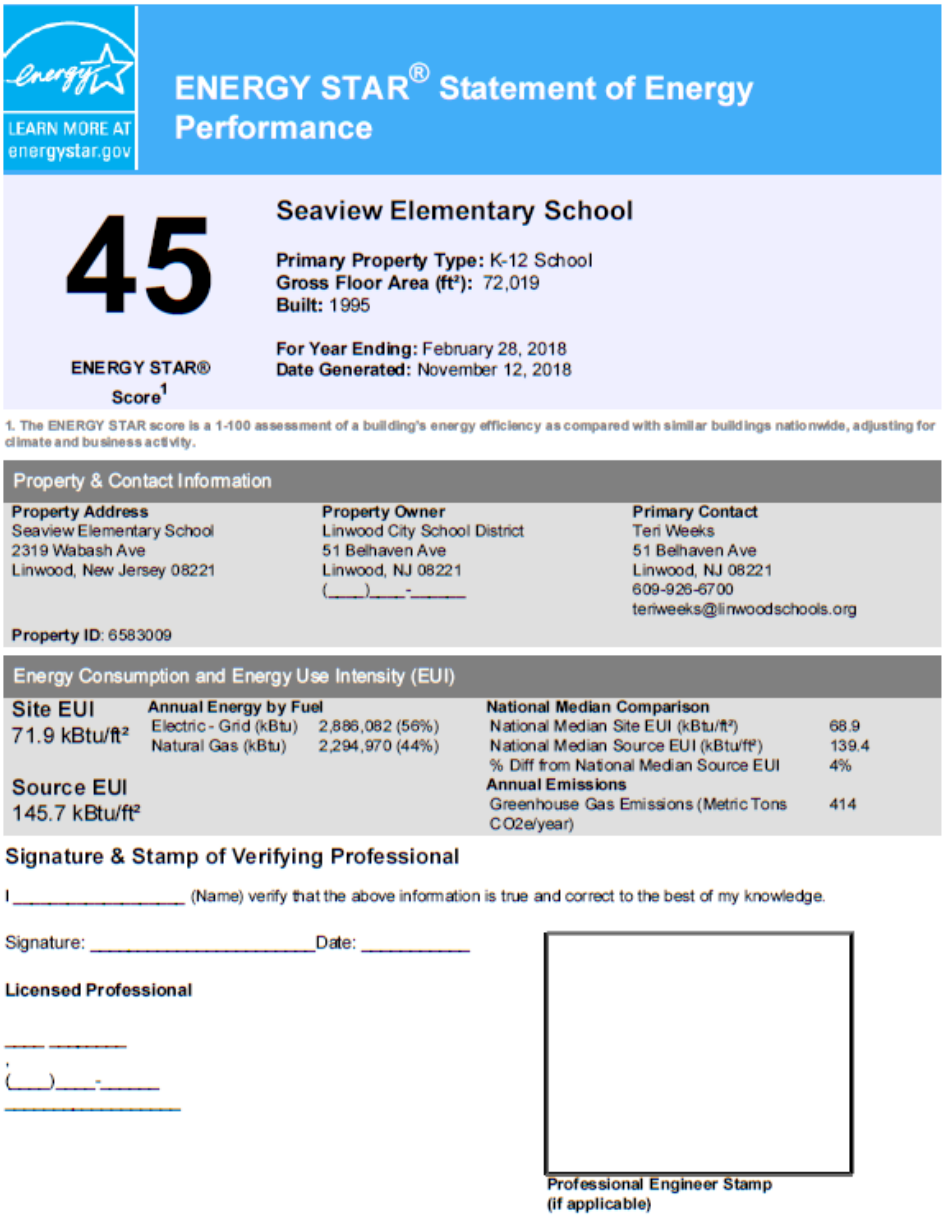
	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Various	53	Desk Top PCs	150.0	No
Various	54	LCD Monitors	85.0	No
Various	12	Small Printers	60.0	No
Various	6	Stand alone Copiers	250.0	No
Various	11	Microwave	1,200.0	No
Various	41	Projectors	300.0	No
Various	36	Smart Boards	150.0	No
Various	12	Dehumidifiers	205.0	No
Various	3	Lg Screen TV	300.0	No
Various	26	Mac Computers	150.0	No
Various	8	Circulation fans	150.0	No
Various	1	Kiln	10,000.0	No
Various	218	Chromebooks	16.0	No
Various	4	Laptops	85.0	No
Various	1	IT Racks	8,654.0	No
Various	10	Small refrigerators	187.0	No
Various	3	Household refrigerators	457.0	No
Chilled water pipe	1	Heat Trace	500.0	No
Various	6	Water Coolers	150.0	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
Faculty Lounge	1	Refrigerated	Yes	0.00	1,612	0.0	$216.86	$230.00	$0.00	1.06
Faculty Lounge	1	Non-Refrigerated	Yes	0.00	343	0.0	$46.08	$230.00	$0.00	4.99

Appendix B: ENERGY STAR® Statement of Energy Performance

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel (natural gas) 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. The ENERGY STAR® score is based on a comparison of similar buildings across the county, while neutralizing variations due to location, occupancy and operating hours. The fact that the building has had an addition affects the building's efficiency more than if the building were built all at one time, designed with a cohesive, integrated set of HVAC equipment.



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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Seaview Elementary School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 72,019
Built: 1995

For Year Ending: February 28, 2018
Date Generated: November 12, 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
Seaview Elementary School 2319 Wabash Ave Linwood, New Jersey 08221	Linwood City School District 51 Belhaven Ave Linwood, NJ 08221 (___)___-_____	Teri Weeks 51 Belhaven Ave Linwood, NJ 08221 609-926-6700 teriweeks@linwoodschools.org

Property ID: 6583009

Energy Consumption and Energy Use Intensity (EUI)

Site EUI	Annual Energy by Fuel		National Median Comparison	
71.9 kBtu/ft²	Electric - Grid (kBtu)	2,886,082 (56%)	National Median Site EUI (kBtu/ft²)	68.9
	Natural Gas (kBtu)	2,294,970 (44%)	National Median Source EUI (kBtu/ft²)	139.4
Source EUI			% Diff from National Median Source EUI	4%
145.7 kBtu/ft²			**Annual Emissions**	
			Greenhouse Gas Emissions (Metric Tons CO2e/year)	414

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)