Local Government Energy Audit:
Energy Audit Report

Sea Girt Elementary School

Sea Girt Borough School District

451 Bell Place
Sea Girt, NJ 08750

May 11, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

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

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

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

1.1 Facility Summary

Sea Girt Elementary School is a 35,060 square foot public school in the Borough of Sea Girt, New Jersey. It is a one-story building originally built in 1970, with an addition constructed in 2009. The building is comprised of classrooms, administrative offices, gymnasium, locker rooms, a media center, a small kitchen, an auditorium, mechanical, and storage spaces. The building also houses the Sea Girt Board of Education offices. The school is open 10 months per year and there are approximately 180 student and staff. The entire building is cooled through the summer months for the administrative staff.

Interior lighting at Sea Girt Elementary School consists of mostly of 4-foot T8 and two PIN compact fluorescent lamps. Lighting is controlled throughout the building by occupancy sensors. Exterior lighting system around the building perimeter consists of 50-Watt, 70-Watt and 175-Watt metal halide lamps which are controlled by timers.

Heating is provided by two Thermal Solutions gas fired hot water boilers. The boilers provide perimeter heating to classroom unit ventilators and hot water to building's air handling units and rooftop units. The cooling system consists of one 110 ton air cooled scroll chiller.

There are two McQuay air handlers, five AAON energy recovery units (ERUs) and four rooftop units (RTUs). The heating and cooling systems were part of a major mechanical upgrade implemented in 2003.

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

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated seven energy conservation measures (ECMs). Five were recommended for implementation, which means that they would likely pay for themselves in energy savings alone over the rated useful lifetime of the new equipment. These five measures together represent an opportunity for Sea Girt Elementary School to reduce its annual energy costs by $11,336 and annual greenhouse gas emissions by 75,478 lbs CO2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in roughly 4.3 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 Sea Girt Borough School District's annual energy use by 14%.

Figure 1 – Previous 12 Month Utility Costs

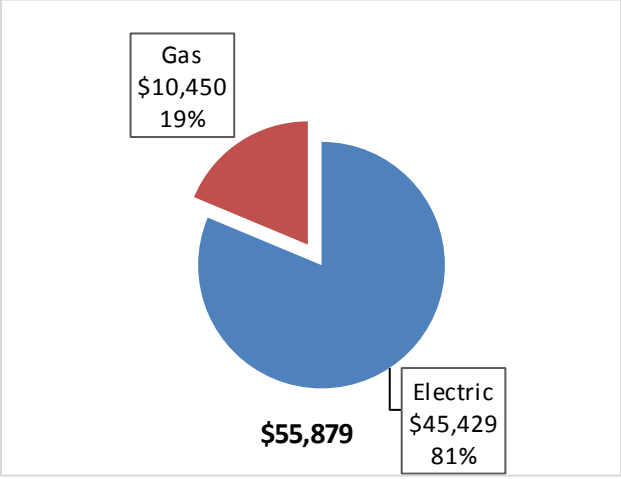
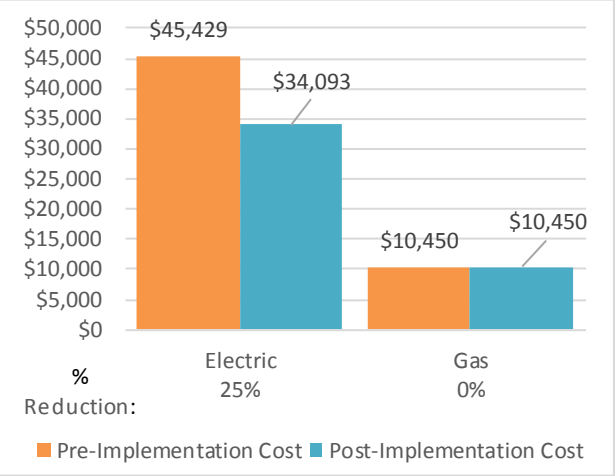


Figure 2 – Potential Post-Implementation Costs



A detailed description of Sea Girt 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 Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**71,045**	**17.6**	**$10,744.83**	**$58,327.51**	**$9,735.00**	**$48,592.51**	**4.5**	**71,542**
ECM 1	Install LED Fixtures	Yes	20,989	3.6	$3,174.45	$25,027.08	$4,705.00	$20,322.08	6.4	21,136
ECM 2	Retrofit Fixtures with LED Lamps	Yes	48,967	13.9	$7,405.83	$31,364.44	$5,030.00	$26,334.44	3.6	49,310
ECM 3	Install LED Exit Signs	Yes	1,088	0.1	$164.55	$1,935.99	$0.00	$1,935.99	11.8	1,096
Variable Frequency Drive (VFD) Measures			**5,523**	**3.1**	**$835.36**	**$13,765.30**	**$0.00**	**$13,765.30**	**16.5**	**5,562**
	Install VFDs on Chilled Water Pumps	No	3,185	1.8	$481.69	$7,213.60	$0.00	$7,213.60	15.0	3,207
	Install VFDs on Hot Water Pumps	No	2,338	1.2	$353.67	$6,551.70	$0.00	$6,551.70	18.5	2,355
Domestic Water Heating Upgrade			**2,297**	**0.0**	**$347.46**	**$43.02**	**$0.00**	**$43.02**	**0.1**	**2,313**
ECM 4	Install Low-Flow Domestic Hot Water Devices	Yes	2,297	0.0	$347.46	$43.02	$0.00	$43.02	0.1	2,313
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**$243.78**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 5	Vending Machine Control	Yes	1,612	0.0	$243.78	$230.00	$0.00	$230.00	0.9	1,623
TOTALS FOR All RECOMMENDED MEASURES			**74,954**	**17.6**	**$11,336.07**	**$58,600.53**	**$9,735.00**	**$48,865.53**	**4.3**	**75,478**
TOTALS FOR ALL EVALUATED MEASURES			**80,477**	**20.7**	**$12,171.43**	**$72,365.83**	**$9,735.00**	**$62,630.83**	**5.1**	**81,040**

* - 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.

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

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

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

Energy Efficient Practices

TRC also identified 11 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Sea Girt Elementary School include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- 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 Sea Girt 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	103	kW DC STC
Electric Generation	122,712	kWh/yr
Displaced Cost	$10,680	/yr
Installed Cost	$267,800	

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install
- Energy Savings Improvement Program (ESIP)

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

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

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			
Carly Fanslau	Supervisor of Student Services	cfanslau@seagirt.k12.nj.us	732-449-3422 x 107
Designated Representative			
Rich Guibord	IT Services Manager	rguibord@seagirt.k12.nj.us	732-449-3422 x 107
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 2, 2018, TRC Energy Services performed an energy audit at Sea Girt Elementary School located in Sea Girt, New Jersey. TRC's auditor met with Rich Guibord to review the facility operations and help focus our investigation on specific energy-using systems.

2.3 Building Occupancy

Sea Girt Elementary School operates on a 10 month schedule and is open Monday through Friday, although there is some facility usage on the weekends. The typical schedule is presented in the table below. During a typical day, the school has approximately 180 occupants including students, teachers and staff members. The entire administrative offices are used year round.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Sea Girt Elementary School	Weekday	7:30 AM - 3:30 PM
Sea Girt Elementary School	Weekend	8:00 AM - 4:30 PM

2.4 Building Envelope

The building has a concrete foundation and exterior walls are constructed of brick masonry. The building has a flat roof. The original section of the building has a buildup roof with light stone covering that was last renovated in 1996. It is in fair condition. The addition has a black rubber roof membrane that is in good condition. The windows throughout the facility are double paned with aluminum frames. Exterior doors are constructed of glass with aluminum frames as well. The windows and exterior doors were all upgraded in 2003 and 2004. The window and door seals throughout the building were observed to be in good condition. No excessive air infiltration was noted around any windows or doors.

Image 1: Building Envelope

2.5 On-Site Generation

Sea Girt 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

Interior lighting at Sea Girt Elementary School is provided mostly by 32-Watt linear fluorescent T8 and 3-Watt 2-PIN compact fluorescent lamps (CFL) with electronic ballasts. Most of the linear fluorescent fixtures are 2-lamps, 4-foot long troffers. The 31-Watt compact fluorescent lamps are found mainly in the corridors and the offices. The auditorium is illuminated with halogen incandescent lamps with a 90-Watt lamp per fixture while its stage lighting uses 100-Watt incandescent lamps. A small number of 14-Watt and 26-Watt CFLs are found in corridors and restrooms. Lighting is controlled throughout the building by occupancy sensors. Exit signs are illuminated with fluorescent lamps. The exterior lighting system around the building perimeter consists of 50-Watt, 70-Watt and 175-Watt metal halide lamps which are controlled by timers.

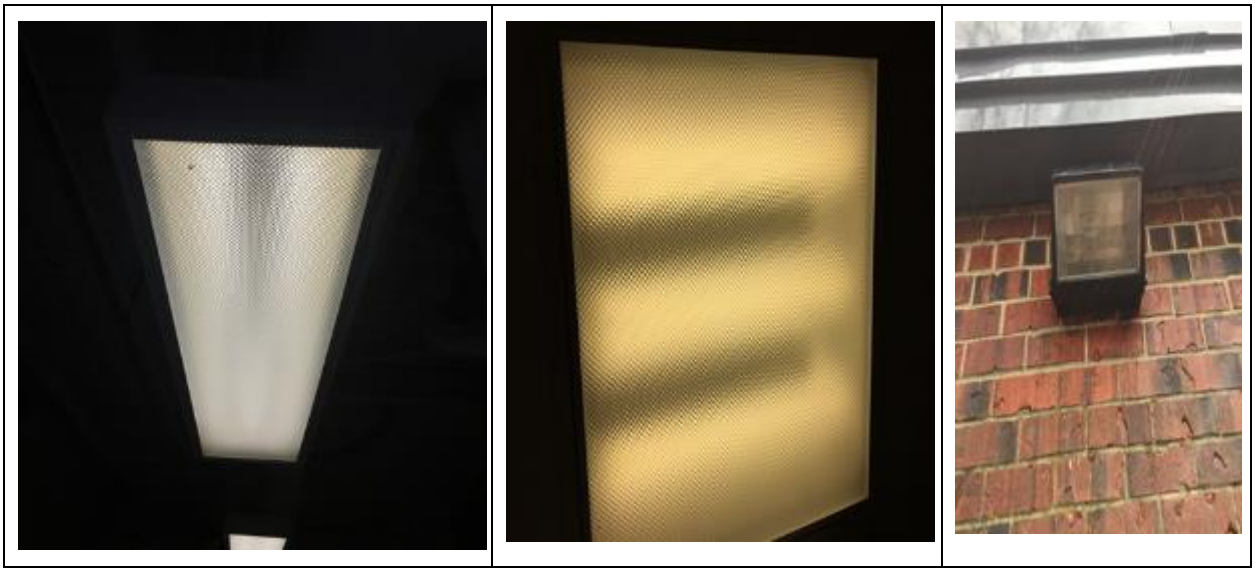


Image 2: Interior & Exterior Lighting

Hot Water Heating System

Heating hot water for the building is provided by two condensing Thermal Solutions hot water boilers that were installed in 2003 as part of a major mechanical upgrade. Each boiler has an output capacity of 1,320 MBh and a nominal combustion efficiency of 88%. Two 5 HP hot water supply pumps and two 1.5 hp hot water return pumps distribute the heating hot water to end devices in the space. The pumps operate lead/lag and run at constant speed. The end devices include classrooms, McQuay vertical unit ventilators, and heating coils located in air handling units and rooftop units. The heating hot water system is controlled via a Metasys energy management system and the typical temperature space set points are 70°F during occupied and 65°F during the unoccupied heating period. All classrooms unit ventilators are equipped with hot water coils for heating and direct expansion coils for cooling and dehumidification with a local thermostat attached to them. The boilers are in good condition and well maintained.

Image 3: Hot Water Heating System

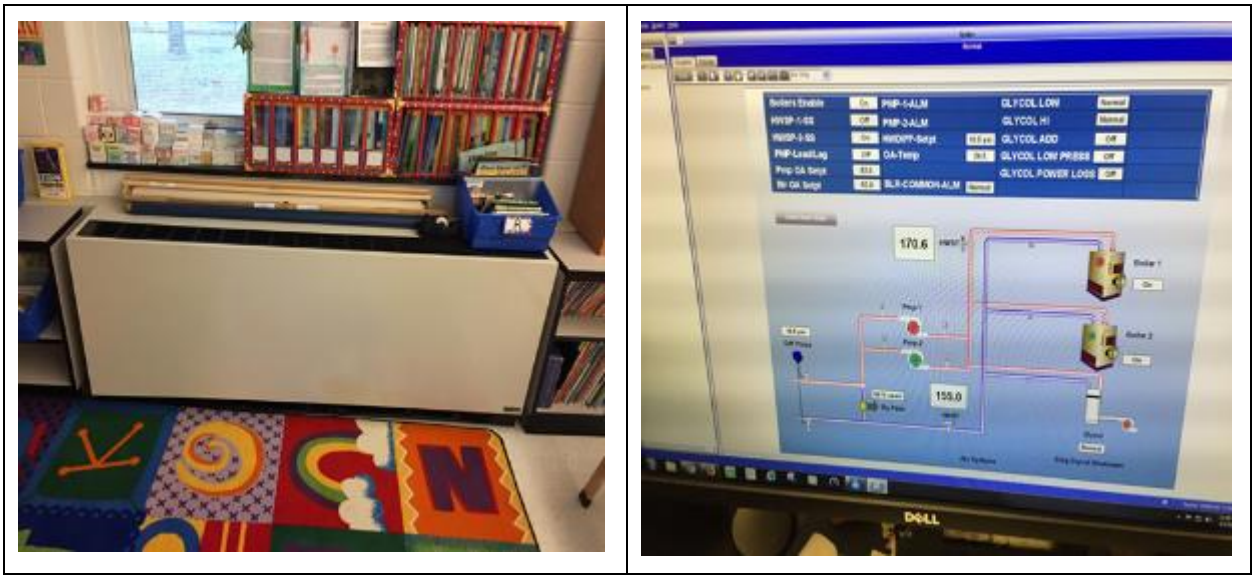


Image 4: Classroom Univents & Metasys Hot Water Control System

Chilled Water Air Conditioning System (CHW)

The cooling plant consists of one 110 ton McQuay air-cooled chiller located at the roof level. The chiller utilizes environmentally acceptable R-410A refrigerant and meets the performance requirements of ASHRAE Standard 90.1 for efficiency. It was installed in 2003 as part of a school major mechanical upgrade. The chiller is in good condition. The chilled water for the facility is pumped to the air-handling and rooftop units' chilled water coils via two 7.5 hp motors that run at constant speed. The chilled water temperature setpoint is reset based on outdoor air temperature (OSA). The chiller is controlled via a Metasys energy management system. Its OSA enable setpoint is 67°F.

There are two McQuay air handlers, five AAON energy recovery units (ERUs) and four rooftop units (RTUs) equipped with hot and chiller water coils. They provide heating and cooling to various spaces.

Image 5: Chilled Water System

Image 6: AAON RTU & Metasys Chilled Water Control System

Direct Expansion Air Conditioning System (DX)

The facility server room is cooled by a 1.5 ton Daikin split air conditioner. The unit utilizes a scroll compressor and a direct-expansion (DX) coil. It is controlled with programmable thermostat. The unit is 13 years old and appears in good condition.

Building Energy Management System (BEMS)

The HVAC system includes a Johnson Controls Metasys Building Automation System. The system provides control for a majority of building conditioning equipment including boilers, pumps, air handling units, rooftop units and the unit ventilators. The system includes electronic controls for actuators and control valves. The frontend controller has the capability to monitor and control all schedules, thermostat temperatures and set points.

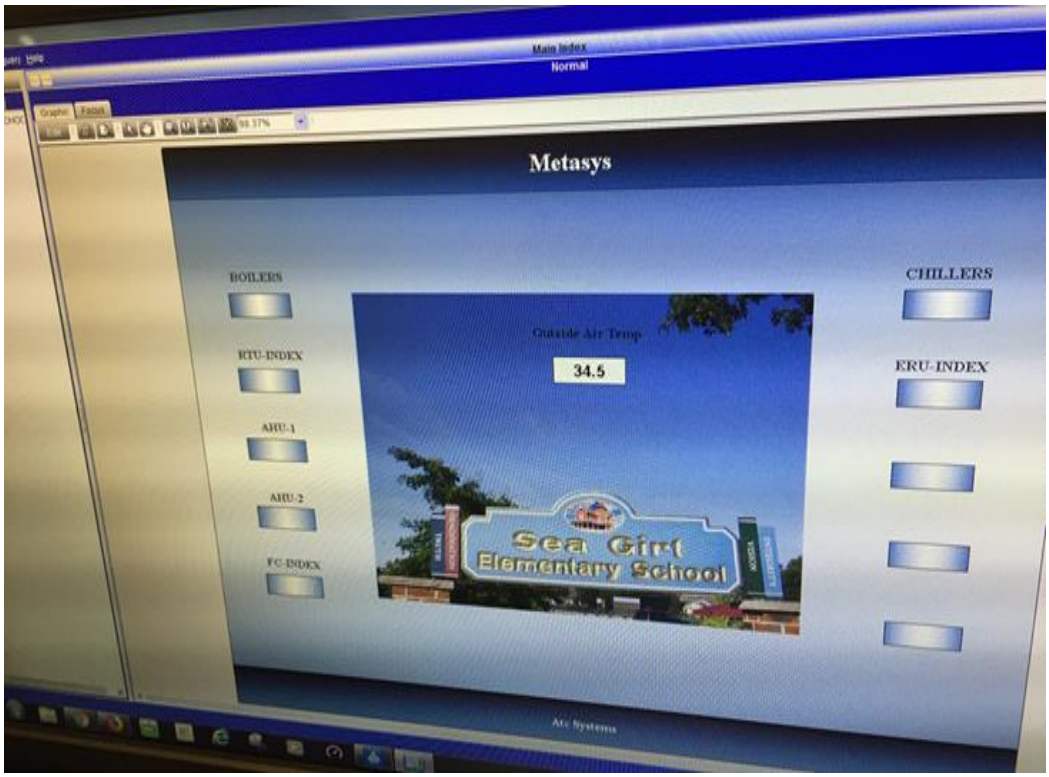


Image 7: Metasys BEMS System

Domestic Water Heating System

The domestic water heating system for the facility consists of two A. O. Smith electric water heaters with input rating of 4.5 kW each. One serves the original section of the building and is located in the book room. It has a 50 gallon storage tank. The other unit serves the new section and has an 80 gallon storage tank and is located in the gymnasium closet. The heaters are two and thirteen years old respectively and appear in good condition.

Image 8: Domestic Water Heating System

Building Plug Load

There are approximately 56 computer work stations throughout the facility and they are mostly desktop units with LCD monitors. There is no centralized PC power management software installed. There is one vending machine located in the faculty room.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 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

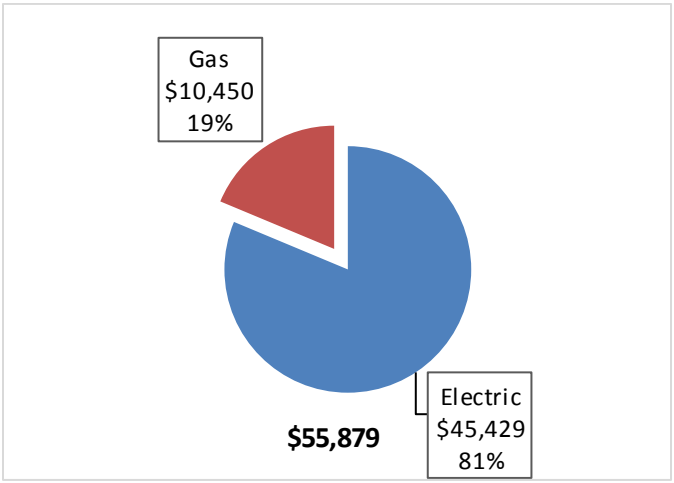
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Sea Girt Elementary School		
Fuel	**Usage**	**Cost**
Electricity	300,378 kWh	$45,429
Natural Gas	8,469 Therms	$10,450
Total		**$55,879**

The current annual energy cost for this facility is $55,879 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.151/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below. The electricity use profile reflects high occupancy in the summer months.

Figure 9 - Electric Usage & Demand

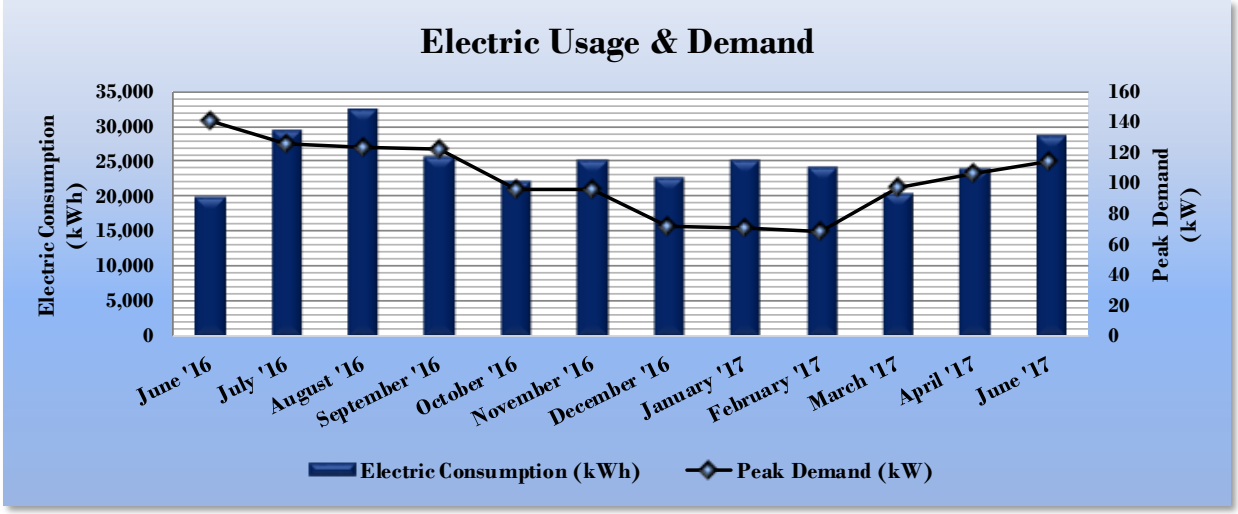


Figure 10 - Electric Usage & Demand

Electric Billing Data for Sea Girt Elementary School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
7/12/16	31	19,840	141	$3,295	No
8/9/16	31	29,601	126	$3,849	No
9/7/16	31	32,493	124	$4,172	No
10/6/16	30	25,644	122	$3,432	No
11/4/16	31	22,299	96	$2,934	No
12/8/16	31	25,355	96	$3,256	No
1/10/17	30	22,623	71	$2,889	No
2/8/17	28	25,149	70	$3,215	No
3/10/17	31	24,251	69	$5,283	No
4/10/17	30	20,376	97	$4,512	No
5/10/17	31	24,056	107	$5,039	No
6/20/17	30	28,691	115	$3,553	No
Totals	**365**	**300,378**	**140.6**	**$45,429**	0
Annual	**365**	**300,378**	**140.6**	**$45,429**	

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average gas cost for the past 12 months is $1.234/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The gas use profile is typical for a facility with a significant heating load relative to other end uses.

Figure 11 - Natural Gas Usage

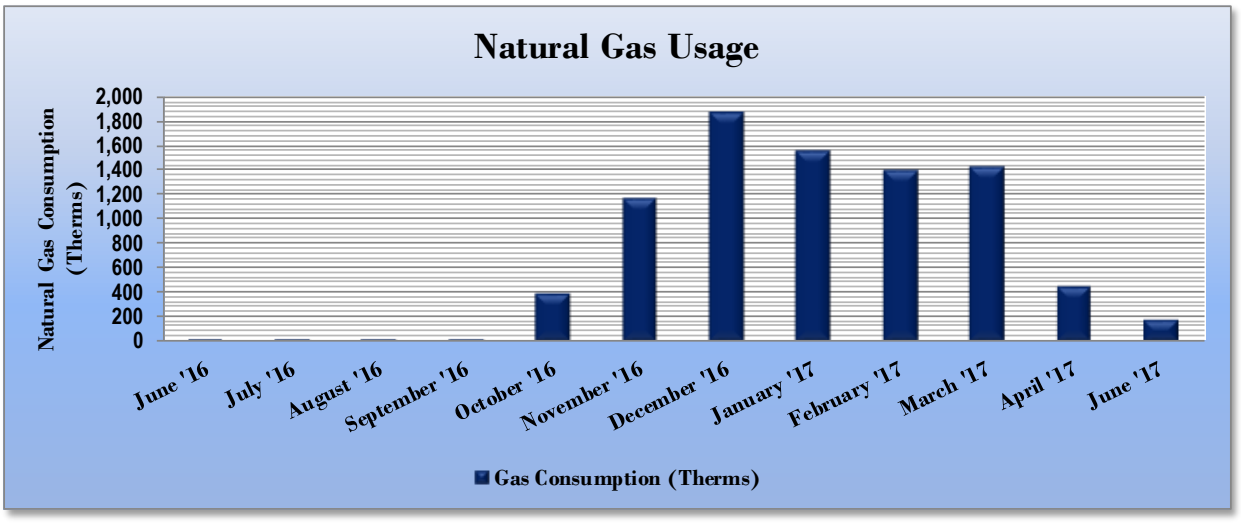


Figure 12 - Natural Gas Usage

Gas Billing Data for Sea Girt Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
7/12/16	31	1	$171
8/9/16	31	1	$171
9/7/16	31	1	$171
10/6/16	30	1	$180
11/4/16	31	387	$560
12/8/16	31	1,174	$1,267
1/10/17	30	1,872	$2,060
2/8/17	28	1,562	$1,854
3/10/17	31	1,406	$1,586
4/10/17	30	1,429	$1,430
5/10/17	31	456	$623
6/20/17	30	180	$376
Totals	**365**	**8,469**	**$10,450**
Annual	**365**	**8,469**	**$10,450**

3.4 Benchmarking

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

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Sea Girt Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	117.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	53.4	58.2

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Sea Girt Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	94.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	46.1	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 76.

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

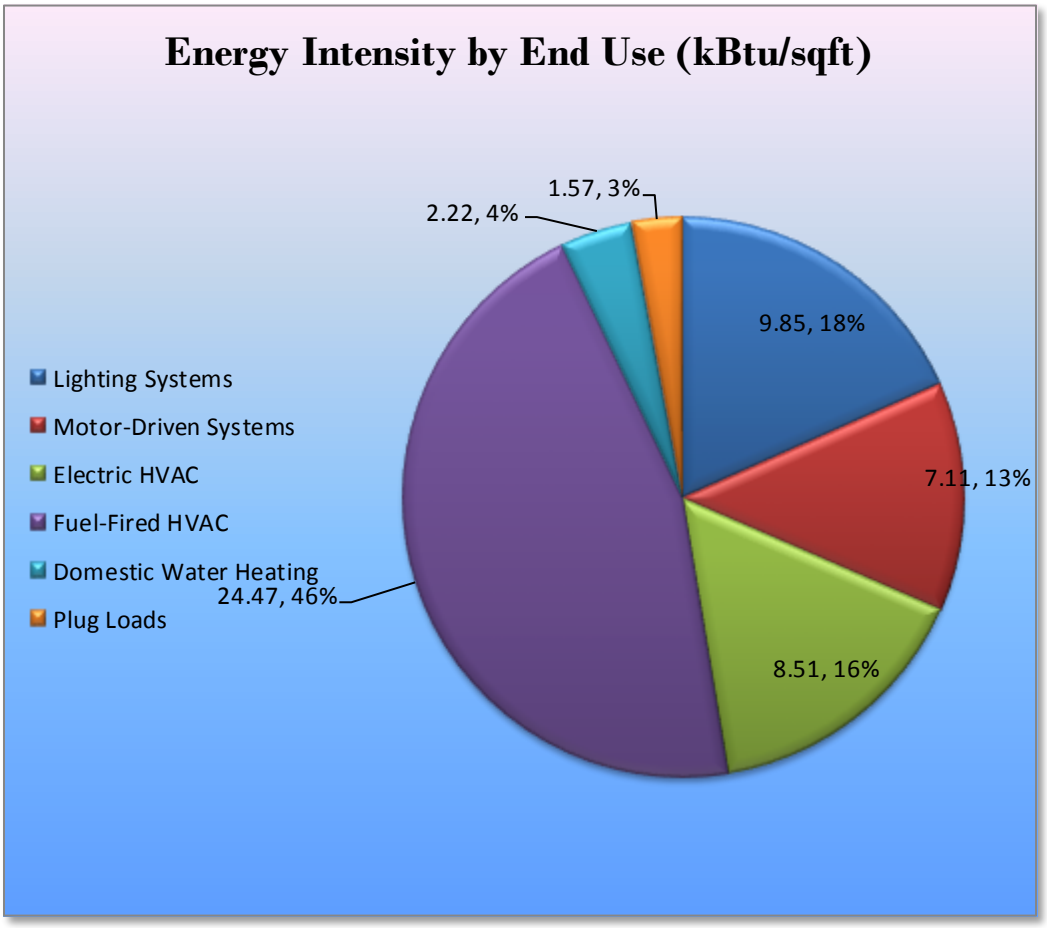
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Sea Girt 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 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**71,045**	**17.6**	**0.0**	**$10,744.83**	**$58,327.51**	**$9,735.00**	**$48,592.51**	**4.5**	**71,542**
ECM 1	Install LED Fixtures	20,989	3.6	0.0	$3,174.45	$25,027.08	$4,705.00	$20,322.08	6.4	21,136
ECM 2	Retrofit Fixtures with LED Lamps	48,967	13.9	0.0	$7,405.83	$31,364.44	$5,030.00	$26,334.44	3.6	49,310
ECM 3	Install LED Exit Signs	1,088	0.1	0.0	$164.55	$1,935.99	$0.00	$1,935.99	11.8	1,096
Domestic Water Heating Upgrade		**2,297**	**0.0**	**0.0**	**$347.46**	**$43.02**	**$0.00**	**$43.02**	**0.1**	**2,313**
ECM 4	Install Low-Flow Domestic Hot Water Devices	2,297	0.0	0.0	$347.46	$43.02	$0.00	$43.02	0.1	2,313
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$243.78**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 5	Vending Machine Control	1,612	0.0	0.0	$243.78	$230.00	$0.00	$230.00	0.9	1,623
TOTALS		**74,954**	**17.6**	**0.0**	**$11,336.07**	**$58,600.53**	**$9,735.00**	**$48,865.53**	**4.3**	**75,478**

* - 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 recommended upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**71,045**	**17.6**	**0.0**	**$10,744.83**	**$58,327.51**	**$9,735.00**	**$48,592.51**	**4.5**	**71,542**
ECM 1	Install LED Fixtures	20,989	3.6	0.0	$3,174.45	$25,027.08	$4,705.00	$20,322.08	6.4	21,136
ECM 2	Retrofit Fixtures with LED Lamps	48,967	13.9	0.0	$7,405.83	$31,364.44	$5,030.00	$26,334.44	3.6	49,310
ECM 3	Install LED Exit Signs	1,088	0.1	0.0	$164.55	$1,935.99	$0.00	$1,935.99	11.8	1,096

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	4,662	1.3	0.0	$705.10	$9,400.00	$705.00	$8,695.00	12.3	4,695
Exterior	16,327	2.2	0.0	$2,469.35	$15,627.08	$4,000.00	$11,627.08	4.7	16,442

Measure Description

We recommend replacing existing interior fixtures containing compact fluorescent (31-Watt 2 pin) and exterior fixtures with 50-Watt, 70-Watt, 175-Watt metal halide lamps with new high performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

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

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	48,967	13.9	0.0	$7,405.83	$31,364.44	$5,030.00	$26,334.44	3.6	49,310
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing linear fluorescent T8 lamps, incandescent, halogen and other small CFL with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tubes and more than 10 times longer than many incandescent lamps.

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,088	0.1	0.0	$164.55	$1,935.99	$0.00	$1,935.99	11.8	1,096
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

4.1.2 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 18 below.

Figure 18 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**2,297**	**0.0**	**0.0**	**$347.46**	**$43.02**	**$0.00**	**$43.02**	**0.1**	**2,313**
ECM 4	Install Low-Flow Domestic Hot Water Devices	2,297	0.0	0.0	$347.46	$43.02	$0.00	$43.02	0.1	2,313

ECM 4: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,297	0.0	0.0	$347.46	$43.02	$0.00	$43.02	0.1	2,313

Measure Description

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

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

4.1.3 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment controls are summarized in Figure 19 below.

Figure 19-Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**0.0**	**0.0**	**$243.78**	**$230.00**	**$0.00**	**$230.00**	**0.9**	**1,623**
ECM 5	Vending Machine Control	1,612	0.0	0.0	0.0	0.0	$243.78	$230.00	$0.00	$230.00	0.9	1,623

ECM 5: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,612	0.0	0.0	$243.78	$230.00	$0.00	$230.00	0.9	1,623

Measure Description

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

4.2 ECMs Evaluated but Not Recommended

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

Figure 20 – Summary of Measures Evaluated, but Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures	**5,523**	**3.1**	**0.0**	**$835.36**	**$13,765.30**	**$0.00**	**$13,765.30**	**16.5**	**5,562**
Install VFDs on Chilled Water Pumps	3,185	1.8	0.0	$481.69	$7,213.60	$0.00	$7,213.60	15.0	3,207
Install VFDs on Hot Water Pumps	2,338	1.2	0.0	$353.67	$6,551.70	$0.00	$6,551.70	18.5	2,355
TOTALS	**5,523**	**3.1**	**0.0**	**$835.36**	**$13,765.30**	**$0.00**	**$13,765.30**	**16.5**	**5,562**

* - 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 VFDs on Chilled Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
3,185	1.8	0.0	$481.69	$7,213.60	$0.00	$7,213.60	15.0	3,207

Measure Description

We evaluated installing variable frequency drives (VFD) to control the two 7.5 hp chilled water pumps. This measure requires that chilled water coils be served by 2-way valves and that a differential pressure sensor be installed in the chilled water loop. As the chilled water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

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

Reasons for not Recommending

This measure is not recommended for implementation because it would not likely pay for itself in energy savings alone over the rated useful lifetime of the new control equipment.

Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,338	1.2	0.0	$353.67	$6,551.70	$0.00	$6,551.70	18.5	2,355

Measure Description

We evaluated installing variable frequency drives (VFD) to control the two 5 hp hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

Reasons for not Recommending

This measure is not recommended for implementation because it would not likely pay for itself in energy savings alone over the rated useful lifetime of the new control equipment.

5 ENERGY EFFICIENT PRACTICES

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Perform Routine Motor Maintenance

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

Assess Chillers & Request Tune-Ups

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace 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.

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

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

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

6 On-Site Generation Measures

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

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

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

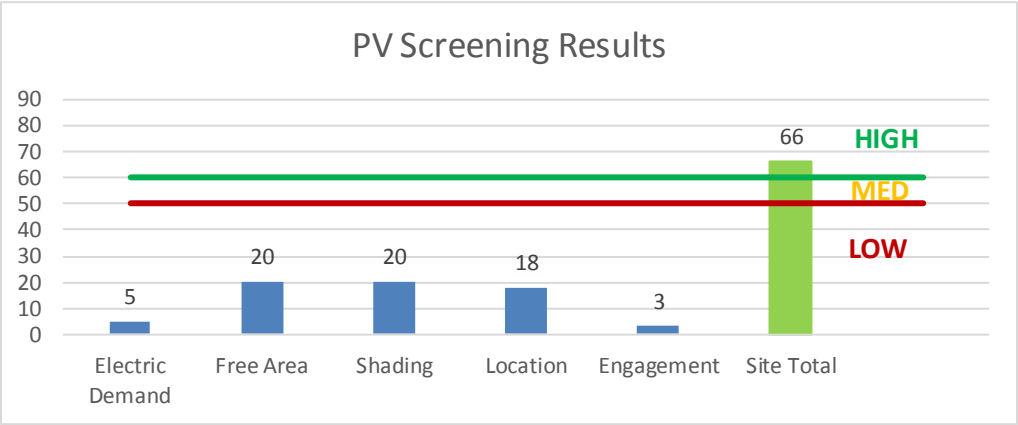
6.1 Photovoltaic

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

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

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded space on which to place the PV panels. In our opinion, the facility does appear meet these minimum criteria for cost-effective PV installation.

Figure 21 - Photovoltaic Screening



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 8.3 for additional information.

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

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

6.2 Combined Heat and Power

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

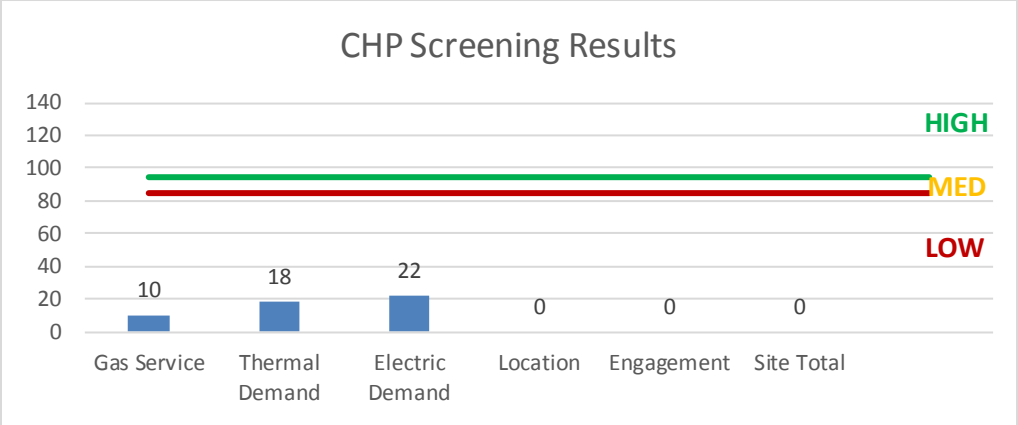
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

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

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

Figure 22 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

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

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

This facility has a low potential for DR curtailment.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 23 for a list of the eligible programs identified for each recommended ECM.

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X		X			
ECM 2	Retrofit Fixtures with LED Lamps	X		X			
ECM 3	Install LED Exit Signs			X			
ECM 4	Install Low-Flow Domestic Hot Water Devices			X			
ECM 5	Vending Machine Control			X			

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Direct Install participants will also be held to a fiscal year cap of $250,000 per entity.

How to Participate

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

Since Direct Install offers a free assessment of eligible measures, Direct Install is also available to small businesses and other commercial facilities too that may not be eligible for the more detailed facility audits provided by LGEA.

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

8.3 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.

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

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 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
Perimeter Wall Pack	29	Metal Halide: (1) 70W Lamp	Daylight Dimming	95	4,380	Fixture Replacement	No	29	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	21	4,380	1.41	10,809	0.0	$1,634.82	$11,329.63	$2,900.00	5.16
Perimeter Wall Pack	6	Metal Halide: (1) 175W Lamp	Daylight Dimming	215	4,380	Fixture Replacement	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	52	4,380	0.64	4,926	0.0	$745.04	$2,344.06	$600.00	2.34
Exterior Front Entrance	5	Metal Halide: (1) 50W Lamp	Daylight Dimming	72	1,806	Fixture Replacement	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	15	1,806	0.19	592	0.0	$89.50	$1,953.39	$500.00	16.24
Boiler Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.13	456	0.0	$68.91	$351.00	$60.00	4.22
Boiler Room	1	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	$9.14	$107.56	$0.00	11.77
Boiler Room - Corridor	4	Compact Fluorescent: CFL 4 PIN	Wall Switch	26	2,001	Relamp	No	4	LED Screw-In Lamps: LED Fixture	Wall Switch	15	2,001	0.03	101	0.0	$15.31	$176.20	$0.00	11.51
Boiler Room - Corridor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.02	76	0.0	$11.48	$58.50	$10.00	4.22
Main Corridor	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.41	1,443	0.0	$218.21	$1,111.50	$190.00	4.22
Main Corridor	9	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	62	2,001	Fixture Replacement	No	9	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.13	456	0.0	$68.91	$1,800.00	$135.00	24.16
Main Corridor	3	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	181	0.0	$27.42	$322.67	$0.00	11.77
Pre-School Corridor	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.13	456	0.0	$68.91	$351.00	$60.00	4.22
Pre-School Corridor	1	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	$9.14	$107.56	$0.00	11.77
IMC Corridor	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.13	456	0.0	$68.91	$351.00	$60.00	4.22
IMC Corridor	1	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	60	0.0	$9.14	$107.56	$0.00	11.77
Primary Grade Corridor	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	26	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.56	1,974	0.0	$298.61	$1,521.00	$260.00	4.22
Primary Grade Corridor	2	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	121	0.0	$18.28	$215.11	$0.00	11.77
New Wing Corridor	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.09	304	0.0	$45.94	$234.00	$40.00	4.22
New Wing Corridor	3	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	181	0.0	$27.42	$322.67	$0.00	11.77
Room B	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.09	304	0.0	$45.94	$234.00	$40.00	4.22
Room 4	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.22	759	0.0	$114.85	$585.00	$100.00	4.22
Room 4	4	Compact Fluorescent: CFL 4 PIN	Occupancy Sensor	16	2,001	Relamp	No	4	LED Screw-In Lamps: LED Fixture	Occupancy Sensor	11	2,001	0.01	46	0.0	$6.96	$176.20	$0.00	25.31
Lab	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.26	911	0.0	$137.82	$702.00	$120.00	4.22
Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.06	228	0.0	$34.45	$175.50	$30.00	4.22
Room 5	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Ressource Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.06	228	0.0	$34.45	$175.50	$30.00	4.22

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 6	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.02	76	0.0	$11.48	$58.50	$10.00	4.22
Room 7	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Room 7	1	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	62	2,001	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.01	51	0.0	$7.66	$200.00	$15.00	24.16
Room 6	1	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	62	2,001	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.01	51	0.0	$7.66	$200.00	$15.00	24.16
Room 5	1	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	62	2,001	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.01	51	0.0	$7.66	$200.00	$15.00	24.16
Room 4	1	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	62	2,001	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.01	51	0.0	$7.66	$200.00	$15.00	24.16
Room 8	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Room 8	1	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	62	2,001	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.01	51	0.0	$7.66	$200.00	$15.00	24.16
Restroom	2	Compact Fluorescent: CFL Screw in	Wall Switch	14	2,001	Relamp	No	2	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	9	2,001	0.01	23	0.0	$3.48	$107.51	$0.00	30.89
Room 9	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Room 9	1	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	62	2,001	Fixture Replacement	No	1	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.01	51	0.0	$7.66	$200.00	$15.00	24.16
Restroom	2	Compact Fluorescent: CFL Screw in	Wall Switch	14	2,001	Relamp	No	2	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	9	2,001	0.01	23	0.0	$3.48	$107.51	$0.00	30.89
Room 10	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Room 10	2	Compact Fluorescent: CFL Screw in	Wall Switch	14	2,001	Relamp	No	2	LED Screw-In Lamps: LED Screw-In Lamps	Wall Switch	9	2,001	0.01	23	0.0	$3.48	$107.51	$0.00	30.89
Room 11	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.52	1,823	0.0	$275.64	$1,404.00	$240.00	4.22
Kitchen	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.13	456	0.0	$68.91	$351.00	$60.00	4.22
Custodian Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.13	456	0.0	$68.91	$351.00	$60.00	4.22
Electrical Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Book Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Art Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Art Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Room 13	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Boys Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Room 1	29	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	29	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.63	2,202	0.0	$333.06	$1,696.50	$290.00	4.22
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Storage Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Room 2	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.39	1,367	0.0	$206.73	$1,053.00	$180.00	4.22
Room 3	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.37	1,291	0.0	$195.24	$994.50	$170.00	4.22
Guidance Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.02	76	0.0	$11.48	$58.50	$10.00	4.22
Ressource B	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Boys Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Media Center	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,001	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,001	0.19	683	0.0	$103.36	$451.20	$90.00	3.49
Media Center	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	30	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.65	2,278	0.0	$344.55	$1,755.00	$300.00	4.22
Gymnasium	12	LED - Fixtures: Ambient - 2' - Indirect Fixture	Occupancy Sensor	45	2,001	None	No	12	LED - Fixtures: Ambient - 2' - Indirect Fixture	Occupancy Sensor	45	2,001	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gymnasium	3	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	181	0.0	$27.42	$322.67	$0.00	11.77
Girls Locker Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.09	304	0.0	$45.94	$234.00	$40.00	4.22
Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.02	76	0.0	$11.48	$58.50	$10.00	4.22
Exposition Light	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Main Entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22
Main Office	9	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	93	2,001	Fixture Replacement	No	9	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.31	1,098	0.0	$166.01	$1,800.00	$135.00	10.03
Main Office	1	Compact Fluorescent: CFL Screw in	Occupancy Sensor	14	2,001	Relamp	No	1	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	9	2,001	0.00	12	0.0	$1.74	$53.75	$0.00	30.89
Kitchen Office	2	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	93	2,001	Fixture Replacement	No	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.07	244	0.0	$36.89	$400.00	$30.00	10.03
Superintendent Office	6	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	93	2,001	Fixture Replacement	No	6	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.21	732	0.0	$110.67	$1,200.00	$90.00	10.03
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,001	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,001	0.01	37	0.0	$5.57	$48.20	$10.00	6.86
Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,001	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,001	0.01	37	0.0	$5.57	$48.20	$10.00	6.86

	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
BOE Business Adm	7	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	93	2,001	Fixture Replacement	No	7	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.24	854	0.0	$129.12	$1,400.00	$105.00	10.03
BOE Office	2	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	93	2,001	Fixture Replacement	No	2	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.07	244	0.0	$36.89	$400.00	$30.00	10.03
School Superintendent	6	Compact Fluorescent: CFL 2 PIN (2x2) U Shape	Occupancy Sensor	93	2,001	Fixture Replacement	No	6	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	40	2,001	0.21	732	0.0	$110.67	$1,200.00	$90.00	10.03
Faculty Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,001	Relamp	No	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,001	0.23	797	0.0	$120.59	$526.40	$105.00	3.49
Restroom	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,001	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,001	0.02	74	0.0	$11.14	$96.40	$20.00	6.86
Closet	1	Incandescent: A Lamp	Wall Switch	65	2,001	Relamp	No	1	LED Screw-In Lamps: LED Screw in Lamp	Wall Switch	9	2,001	0.04	129	0.0	$19.49	$53.75	$5.00	2.50
Auditorium	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,001	Relamp	No	22	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,001	0.71	2,506	0.0	$379.00	$1,654.40	$330.00	3.49
Auditorium	4	Exit Signs: Fluorescent	None	12	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	242	0.0	$36.57	$430.22	$0.00	11.77
Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,001	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,001	0.02	76	0.0	$11.48	$58.50	$10.00	4.22
Stage	53	Incandescent: A Lamp	Wall Switch	100	2,001	Relamp	No	53	LED Screw-In Lamps: LED Screw in Lamp	Wall Switch	15	2,001	2.95	10,367	0.0	$1,567.86	$2,848.91	$265.00	1.65
Stage	8	Incandescent: A Lamp	Occupancy Sensor	100	2,001	Relamp	No	8	LED Screw-In Lamps: LED Screw in Lamp	Occupancy Sensor	15	2,001	0.45	1,565	0.0	$236.66	$430.02	$40.00	1.65
Office	1	Incandescent: A Lamp	Wall Switch	100	2,001	Relamp	No	1	LED Screw-In Lamps: LED Screw in Lamp	Wall Switch	15	2,001	0.06	196	0.0	$29.58	$53.75	$5.00	1.65
Auditorium	6	Halogen Incandescent: PAR90	Wall Switch	90	2,001	Relamp	No	6	LED Screw-In Lamps: LED Screw in Lamp	Wall Switch	13	2,001	0.30	1,063	0.0	$160.79	$322.52	$30.00	1.82
Server Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,001	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,001	0.04	152	0.0	$22.97	$117.00	$20.00	4.22

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
Boiler Room	Heating Hot Water System	2	Heating Hot Water Pump	5.0	90.2%	No	650	No	90.2%	Yes	2	1.25	2,338	0.0	$353.67	$6,551.70	$0.00	18.52
Boiler Room	Chilled Water System	2	Chilled Water Pump	7.5	91.7%	No	600	No	91.7%	Yes	2	1.84	3,185	0.0	$481.69	$7,213.60	$0.00	14.98
Boiler Room	Glycol	2	Process Pump	0.5	78.0%	No	920	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Heating Hot Water System	2	Heating Hot Water Pump	1.5	78.5%	No	650	No	78.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	School Building	4	Exhaust Fan	0.1	78.0%	No	1,610	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Restrooms	3	Exhaust Fan	0.3	78.0%	No	1,610	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Restrooms	1	Exhaust Fan	0.3	78.0%	No	1,610	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Restrooms	1	Exhaust Fan	0.3	78.0%	No	1,610	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	29	Supply Fan	0.2	78.0%	No	1,610	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	RTU1 - Music Room	1	Supply Fan	7.5	86.0%	No	1,500	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	RTU1 - Music Room	1	Return Fan	3.0	84.0%	No	1,500	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	RTU2, RTU3 - Media Center	2	Supply Fan	2.0	84.0%	No	1,500	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	RTU2, RTU3 - Media Center	2	Return Fan	1.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	RTU4 - Office	1	Supply Fan	1.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	RTU4 - Office	1	Return Fan	1.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU1 - Computer Room	1	Supply Fan	3.0	84.0%	No	1,500	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	AHU2 - Classroom	1	Supply Fan	1.5	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU1 - Rooms 5-11	1	Supply Fan	3.0	84.0%	No	1,500	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU1 - Rooms 5-12	1	Return Fan	1.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU2 - Rooms 11-12	1	Supply Fan	3.0	84.0%	No	1,500	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Rooftop	ERU2 - Rooms 11-13	1	Return Fan	1.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU3 - Rooms 1-4	1	Supply Fan	3.0	84.0%	No	1,500	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU3 - Rooms 1-5	1	Return Fan	1.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU4 - Gymnasium North	1	Supply Fan	7.5	86.0%	No	1,500	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU4 - Gymnasium North	1	Return Fan	2.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU5 - Gymnasium South	1	Supply Fan	7.5	86.0%	No	1,500	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	ERU5 - Gymnasium South	1	Return Fan	2.0	82.0%	No	1,500	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Server Room	Server Room	1	Split-System AC	1.50		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
Rooftop	School Building	1	Air-Cooled Scroll Chiller	110.00	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
Boiler Room	School Building	2	Condensing Hot Water Boiler	1,320.00	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
Book Room	School Building	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Closet	School Building	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
School	6	Faucet Aerator (Lavatory)	2.20	1.00	0.00	2,297	0.0	$347.46	$43.02	$0.00	0.12

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
School	56	Desktop with LCD Monitors	191.0	Yes
School	2	Copy Machine	800.0	Yes
School	8	Printer	56.0	Yes
Kitchen	2	Refrigerator	175.0	Yes
Kitchen	1	Microwave	1,000.0	No
Kitchen	1	Toaster	800.0	No
Kitchen	2	Coffee Machine	850.0	No
Break Room	1	Washing Machine	1,200.0	No
Break Room	1	Dryer	1,500.0	No
Room 1	1	Diswasher	135.0	No
School	8	TVs	124.0	Yes
Faculty Room	2	Microwave	1,000.0	No
Faculty Room	1	Toaster	800.0	No
Faculty Room	1	Small Freezer	85.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty	1	Refrigerated	Yes	0.00	1,612	0.0	$243.78	$230.00	$0.00	0.94

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Sea Girt Elementary

Primary Property Type: K-12 School
Gross Floor Area (ft²): 35,060
Built: 1970

For Year Ending: May 31, 2017
Date Generated: March 26, 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
Sea Girt Elementary 451 Bell Place Sea Girt, New Jersey 08750	Sea Girt Elementary School 451 Bell Place Sea Girt, NJ 08750 (____)____-_____	Carly Fanslau 451 Bell Place Sea Girt, NJ 08750 732-449-3422 x 107 cfanslau@seagirt.k12.nj.us

Property ID: 6258017

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
53.1 kBtu/ft²

Source EUI
116.6 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	841,879 (45%)
Electric - Grid (kBtu)	1,020,641 (55%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	68.2
National Median Source EUI (kBtu/ft²)	149.7
% Diff from National Median Source EUI	-22%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	158

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)