Local Government Energy Audit:
Energy Audit Report

Charles Seabrook School

Upper Deerfield Township School District

1373 Highway 77
Seabrook, New Jersey 08302

April 1, 2019

Final Report by:

TRC Energy Services

Disclaimer

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

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

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

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

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1 EXECUTIVE SUMMARY

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

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

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey 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

Charles Seabrook School is a 74,000 square foot facility comprised of a one-story building and includes classrooms, administrative offices, indoor gymnasium, locker rooms, kitchen, auditorium, cafeteria, dining rooms, conference room, storage and mechanical rooms.

Lighting at Charles Seabrook School consists of inefficient lighting and some HVAC equipment in need of replacement. Heating is supplied by natural gas-fired hot water boilers and natural gas-fired furnaces located inside rooftop air handling units (RTUs). The majority of the building is served by the RTUs, air handling units (AHUs), split system air conditioners (ACs) and heat pumps for comfort cooling and heating. Most of the air handling units are served by DX cooling coils, however, air-cooled water chillers provide the cooling source for the air handling units serving the gym and auditorium. 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 15 measures and recommends 13 measures which together represent an opportunity for Charles Seabrook School to reduce annual energy costs by $37,900 and annual greenhouse gas emissions by 280,537 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 7.2 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Charles Seabrook School's annual energy use by 16%.

Figure 1 - Previous 12 Month Utility Costs

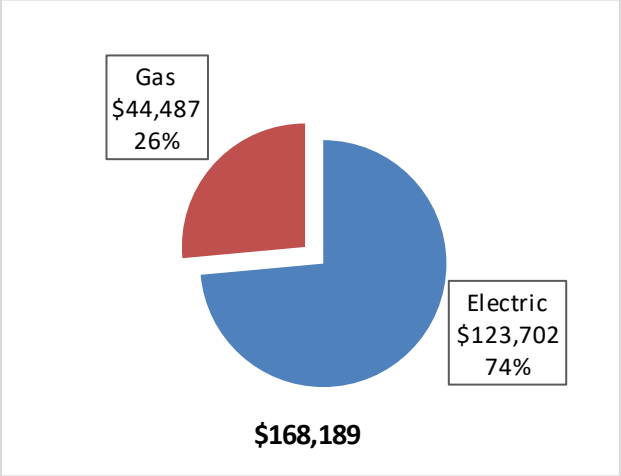
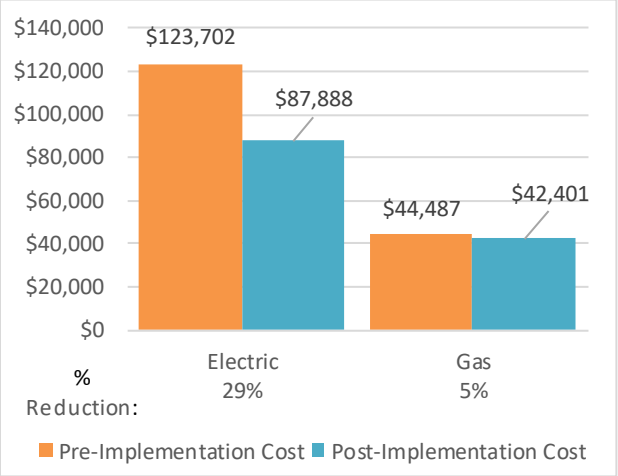


Figure 2 - Potential Post-Implementation Costs



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

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

Figure 3 – Summary of Energy Reduction Opportunities

	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**159,630**	**28.6**	**0.0**	**$22,102.03**	**$111,186.49**	**$19,845.00**	**$91,341.49**	**4.1**	**160,747**
ECM 1	Install LED Fixtures	Yes	46,604	7.2	0.0	$6,452.73	$69,592.17	$9,500.00	$60,092.17	9.3	46,930
ECM 2	Retrofit Fixtures with LED Lamps	Yes	113,026	21.5	0.0	$15,649.30	$41,594.32	$10,345.00	$31,249.32	2.0	113,816
Lighting Control Measures			**30,975**	**5.7**	**0.0**	**$4,288.70**	**$24,030.00**	**$2,100.00**	**$21,930.00**	**5.1**	**31,191**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	26,552	4.9	0.0	$3,676.32	$16,200.00	$2,100.00	$14,100.00	3.8	26,738
ECM 4	Install High/Low Lighitng Controls	Yes	4,423	0.9	0.0	$612.37	$7,830.00	$0.00	$7,830.00	12.8	4,454
Variable Frequency Drive (VFD) Measures			**30,162**	**3.8**	**0.0**	**$4,176.17**	**$19,655.10**	**$0.00**	**$19,655.10**	**4.7**	**30,373**
ECM 5	Install VFDs on Chilled Water Pumps	Yes	9,682	1.2	0.0	$1,340.60	$6,551.70	$0.00	$6,551.70	4.9	9,750
ECM 6	Install VFDs on Hot Water Pumps	Yes	20,480	2.6	0.0	$2,835.57	$13,103.40	$0.00	$13,103.40	4.6	20,623
Electric Unitary HVAC Measures			**1,061**	**0.9**	**0.0**	**$146.83**	**$43,285.98**	**$1,910.00**	**$41,375.98**	**281.8**	**1,068**
	Install High Efficiency Electric AC	No	1,061	0.9	0.0	$146.83	$43,285.98	$1,910.00	$41,375.98	281.8	1,068
Electric Chiller Replacement			**33,697**	**22.6**	**0.0**	**$4,665.55**	**$81,369.71**	**$7,200.00**	**$74,169.71**	**15.9**	**33,932**
ECM 7	Install High Efficiency Chillers	Yes	33,697	22.6	0.0	$4,665.55	$81,369.71	$7,200.00	$74,169.71	15.9	33,932
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**169.6**	**$2,064.54**	**$72,332.51**	**$7,769.88**	**$64,562.63**	**31.3**	**19,861**
ECM 8	Install High Efficiency Hot Water Boilers	Yes	0	0.0	148.6	$1,808.30	$65,716.57	$6,169.88	$59,546.69	32.9	17,396
	Install High Efficiency Furnaces	No	0	0.0	21.1	$256.24	$6,615.94	$1,600.00	$5,015.94	19.6	2,465
HVAC System Improvements			**605**	**0.0**	**19.4**	**$320.11**	**$3,023.34**	**$0.00**	**$3,023.34**	**9.4**	**2,883**
ECM 9	Implement Demand Control Ventilation	Yes	605	0.0	9.0	$193.28	$2,718.84	$0.00	$2,718.84	14.1	1,663
ECM 10	Install Pipe Insulation	Yes	0	0.0	10.4	$126.82	$304.50	$0.00	$304.50	2.4	1,220
Domestic Water Heating Upgrade			**0**	**0.0**	**3.4**	**$41.06**	**$28.68**	**$0.00**	**$28.68**	**0.7**	**395**
ECM 11	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	3.4	$41.06	$28.68	$0.00	$28.68	0.7	395
Food Service Equipment & Refrigeration Measures			**1,640**	**0.1**	**0.0**	**$227.10**	**$1,213.20**	**$160.00**	**$1,053.20**	**4.6**	**1,652**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	1,640	0.1	0.0	$227.10	$1,213.20	$160.00	$1,053.20	4.6	1,652
Plug Load Equipment Control - Vending Machine			**1,954**	**0.0**	**0.0**	**$270.60**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,968**
ECM 13	Vending Machine Control	Yes	1,954	0.0	0.0	$270.60	$460.00	$0.00	$460.00	1.7	1,968
TOTALS FOR HIGH PRIORITY MEASURES			**258,663**	**60.9**	**171.4**	**$37,899.61**	**$306,683.09**	**$35,474.88**	**$271,208.21**	**7.2**	**280,537**
TOTALS FOR ALL EVALUATED MEASURES			**259,724**	**61.8**	**192.4**	**$38,302.68**	**$356,585.02**	**$38,984.88**	**$317,600.14**	**8.3**	**284,070**

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

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

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

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

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

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

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

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

HVAC System Improvements generally involve the installation of automated controls to reduce heating and cooling demand during periods of reduced demand. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperature conditions. These measures save energy by reducing the demand on HVAC systems and the amount of time systems operate.

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

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

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

Energy Efficient Practices

TRC also identified eight 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 Charles Seabrook School include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Ensure Economizers are Functioning Properly
- Clean Evaporator/Condenser Coils on AC Systems
- Perform Proper Boiler Maintenance
- Perform Proper Furnace 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 the Charles Seabrook 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	206	kW DC STC
Electric Generation	245,422	kWh/yr
Displaced Cost	$21,350	/yr
Installed Cost	$589,200	

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Pay for Performance – Existing Buildings (P4P EB)
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

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

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

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 - Project Contacts

Name	Role	E-Mail	Phone #
Customer			
William Widen	Supervisor of B&G	WidenB@UDTS.org	856-455-2267 X4234
Designated Representative			
Ron Day	Maintenance		856-455-2267 X4234
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	732-855-0033

2.2 General Site Information

On July 30, 2018, TRC performed an energy audit at Charles Seabrook School located in Seabrook, New Jersey. TRC's auditor met with Ron Day, Maintenance to review the facility operations and help focus our investigation on specific energy-using systems.

Charles Seabrook School is a 74,000 square foot facility comprised of a one-story building and includes classrooms, offices, indoor gymnasium, locker rooms, kitchen, auditorium and cafeteria.

The building was constructed in 1955.

2.3 Building Occupancy

The school building is open Monday through Friday. The typical schedule is presented in the table below. During a typical day, the facility is occupied by 475 occupants including staff and students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Charles Seabrook School	Weekday	6:30 AM - 8:00 PM
Charles Seabrook School	Weekend	N/A

2.4 Building Envelope

The building is constructed of concrete block and structural steel with a brick facade. The building has a combination of gable and flat roof sections, the gable section of which is covered with metal roofing sheets and the flat section with white roofing membrane. The building has clear glass windows with vinyl frames which are in good condition and show little sign of excessive infiltration. The exterior doors are a combination of glass and metal and are in good condition.

Image 1: The Facility Aerial View

2.5 On-Site Generation

Charles Seabrook School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at the facility is provided mostly by linear fluorescent T8 lamps with electronic ballasts as well as by some compact fluorescent lamps (CFL), U-bend fluorescent T8 lamps, LED fixtures and LED linear tubes and exterior high intensity discharge (HID) lighting. Most of the fluorescent fixtures are 4-lamp or 8-foot long troffers with diffusers. The few LED fixtures in the facility are located in restrooms and exterior of the building. All exit signs in the building are LED.

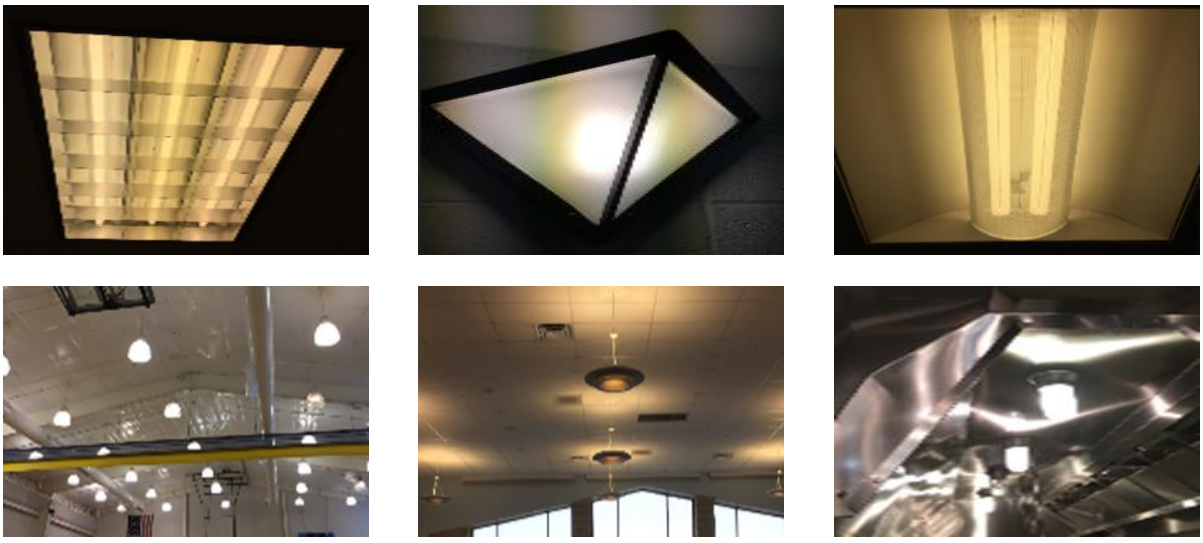


Image 2: Typical Interior Lighting System

Lighting is controlled by wall switches in most spaces and is turned on during operating hours of the building.

The building's exterior lighting is minimal and consists primarily of wall mount metal halide fixtures and a few parking lot pole mount metal halide fixtures. The exterior lighting is controlled by the building energy management system (BEMS) and has a fixed schedule.

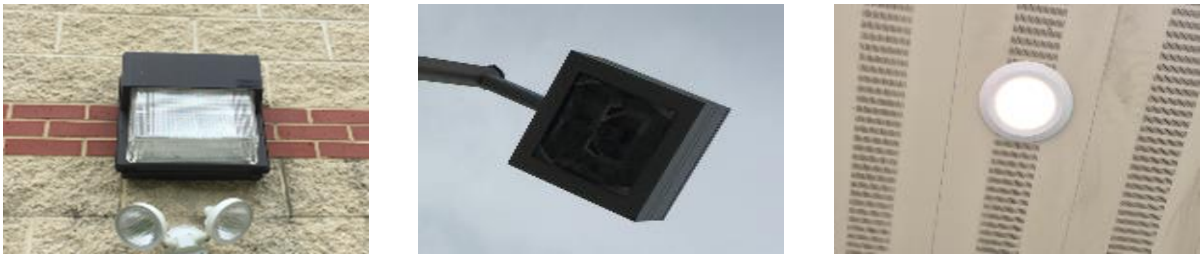


Image 3: Exterior HID Lighting

Chilled Water System

The facility is served by two air cooled reciprocating chillers that serve two air handling units (AHUs 1 & 2). One chiller is a 26-ton Aaon reciprocating chiller which is ten years old and the second chiller is an older 80-ton Daikin McQuay reciprocating chiller. The chillers are configured in a primary distribution loop with one constant flow 5 hp chilled water pump serving each chiller. Chilled water is distributed at 55°F. The chilled water system is controlled via the BEMS.

The chiller plant supplies chilled water to AHUs 1 & 2 which supply cooling to the cafeteria and auditorium.

Image 4: Chillers

Hot Water Heating System

The hot water system consists of four Weil McLane non-condensing hot water boilers, two of which are rated at 947.7 MBh output capacity and the other two are rated at 421.2 MBh output capacity. The boilers have an estimated nominal combustion efficiency of 81%. The hot water is distributed throughout the building in two loops. One loop supplies heating hot water to the gym, kitchen, music room and art room via two 5 hp constant speed hot water pumps and the other loop supplies heating hot water to the new addition (Pre-K) using two 3 hp constant speed hot water pumps. The boilers provide hot water to air handlers, unit ventilators and radiators throughout the school.

The boilers operate in a lead/lag configuration. All boilers may be required during cold weather. The lead boiler is rotated weekly. The heating hot water system is controlled via the BEMS.

The boilers are nearing their end of useful life and the site is interested in replacing them.

Image 5: Typical Hot Water Boiler

Direct Expansion Air Conditioning System (DX)

The majority of the building is mechanically cooled. Apart from the chilled water system, the facility is also served by packaged rooftop units (RTUs), direct-expansion (DX) cooling split-system air conditioners (ACs) and split-system heat pumps. There are 27 RTUs with built-in DX units and natural gas furnaces throughout the building. Most of the units are located on the roof and serve various building spaces which include offices, classrooms and a few single zone rooms. The unit size varies from 2 to 7-tons of cooling capacity. A few of these units are nearing end of useful life and the site is looking into replacing them.

There is a 6-ton split-system AC and a 2-ton split system air source heat pump that serve main office and server room. All units are controlled by the central BEMS.

Image 6: RTUs

Building Energy Management System (BEMS)

The HVAC and exterior lighting systems include a web control (WebCTRL®) Building Automation System made by Delta Technologies. The system includes electronic controls for actuators and control valves. The front-end controller has the capability to monitor and control all schedules, thermostat temperatures and set points. The control system automates the on / off control and temperature setbacks based on outside air temperature.

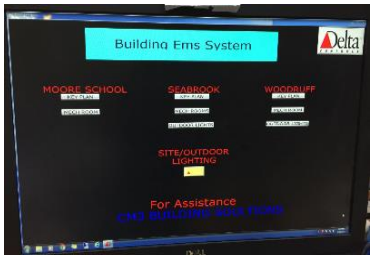


Image 7: The School District BEMS Homepage

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of one Bradford White gas-fired storage tank hot water heater with an input rating of 400 kBtu/hr and a nominal efficiency of 90% and four Bradford White electric storage tank hot water heaters with varying input capacity (one 5 kW and three 4.5 kW). The natural gas water heater has a storage tank of 65-gallon capacity and the electric heaters have varying tank capacities. The natural gas water heater serves the kitchen and the electric water heaters serve the rest of the facility.

Image 8: DHW water heaters

Food Service Equipment

The facility has a full commercial kitchen that is used to prepare breakfast and lunch for the employees and students. The ovens, range tops and steamers are all gas fired. There is a conveyor dishwasher with an electric water heater that provides 145°F rinse water.

Image 9: Gas cooking line/ovens, steamers and dishwasher

Refrigeration

The kitchen has one walk-in refrigerator and one walk-in freezer with estimated capacities of 1.5-ton and 1-ton, respectively. They are used to store food prepared for school lunches. The walk-in freezer is maintained at a space temperature of -15°F and the walk-in refrigerator is maintained at a space temperature of 35°F. The kitchen also has a few free-standing, commercial-size freezers and refrigerator chests.

Image 10: Refrigeration System

Building Plug Load

There are 109 computer work stations throughout the facility. Ninety percent of the computers are desktop units with LCD monitors. There is no centralized PC power management software installed. The plug loads in the building also consist of refrigerators, microwaves, TVs, copy machines, printers and coffee machines. The facility has one refrigerated vending machine and one non-refrigerated vending machine.

2.7 Water-Using Systems

There are 23 restrooms at this facility. A sampling of restrooms found that a few of the faucets are rated for 2.2 gallons per minute (gpm) or higher.

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

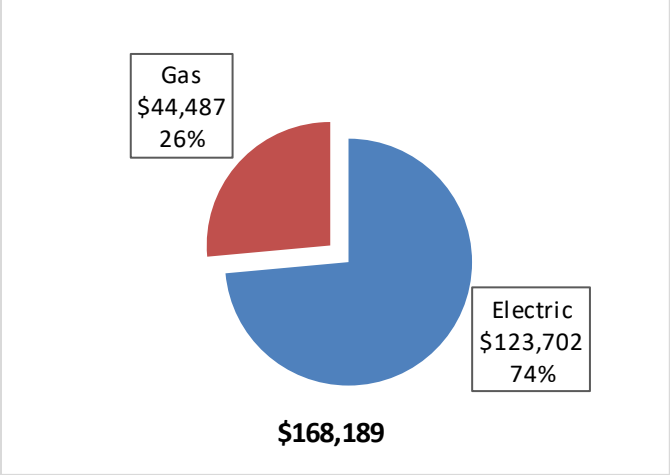
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Charles Seabrook School		
Fuel	**Usage**	**Cost**
Electricity	893,429 kWh	$123,702
Natural Gas	36,550 Therms	$44,487
Total		**$168,189**

The current annual energy cost for this facility is $168,189 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.138/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below. The electricity use profile reflects high cooling loads in the summer months.

Figure 9 – Electric Usage & Demand

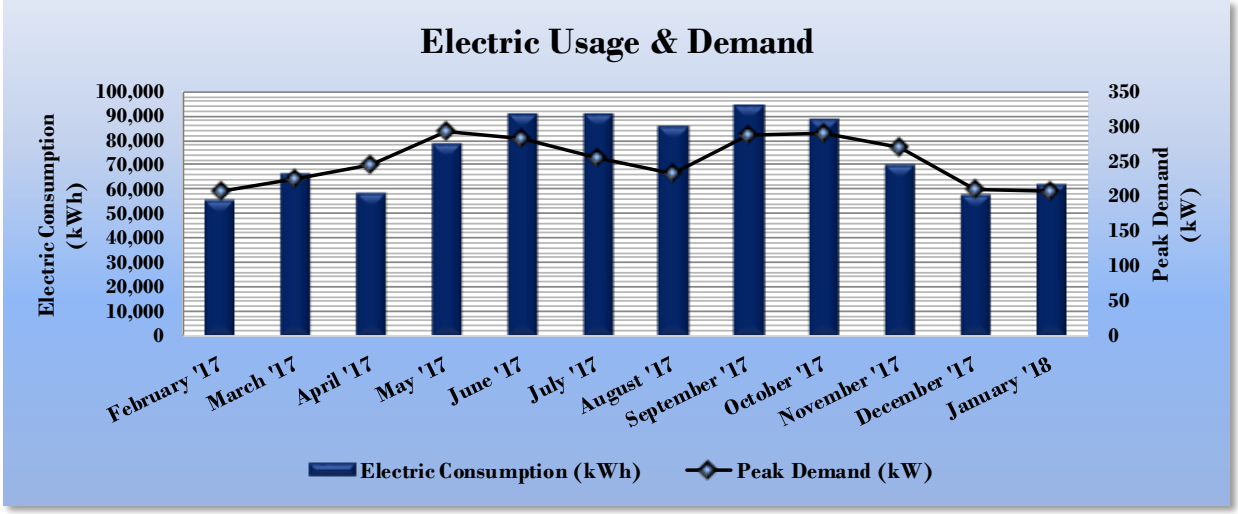


Figure 10 - Electric Usage & Demand

Electric Billing Data for Charles Seabrook School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
2/24/17	27	55,564	207	$0	$8,793
3/28/17	32	66,120	224	$0	$10,297
4/27/17	30	58,473	245	$0	$9,326
5/26/17	29	78,539	292	$0	$12,080
6/28/17	33	90,487	282	$0	$11,558
7/27/17	29	91,153	254	$0	$11,206
8/29/17	33	85,654	231	$0	$10,743
9/27/17	29	94,304	289	$0	$11,973
10/27/17	30	88,623	289	$0	$7,158
11/29/17	33	70,273	270	$0	$14,154
12/28/17	29	57,411	211	$0	$8,202
1/30/18	33	61,724	206	$0	$8,891
Totals	**367**	**898,325**	**292.22**	**$0**	**$124,380**
Annual	**365**	**893,429**	**292.22**	**$0**	**$123,702**

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.217/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Natural Gas Usage

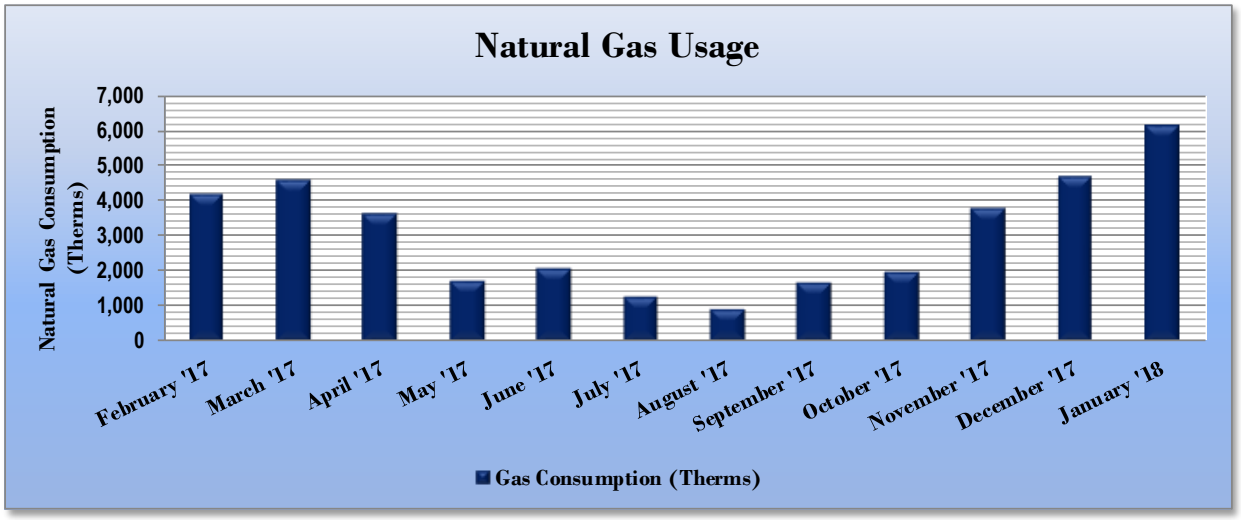


Figure 12 - Natural Gas Usage

Gas Billing Data for Charles Seabrook School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
2/24/17	27	4,215	$5,181
3/28/17	32	4,618	$5,633
4/27/17	30	3,653	$3,740
5/26/17	29	1,721	$2,002
6/28/17	33	2,061	$1,999
7/27/17	29	1,279	$1,398
8/29/17	33	936	$1,330
9/27/17	29	1,664	$2,082
10/27/17	30	1,973	$2,379
11/29/17	33	3,810	$4,470
12/28/17	29	4,686	$5,704
1/30/18	33	6,136	$8,813
Totals	**367**	**36,751**	**$44,730**
Annual	**365**	**36,550**	**$44,487**

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		
	Charles Seabrook School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	181.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	90.6	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		
	Charles Seabrook School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	141.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	76.3	58.2

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

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

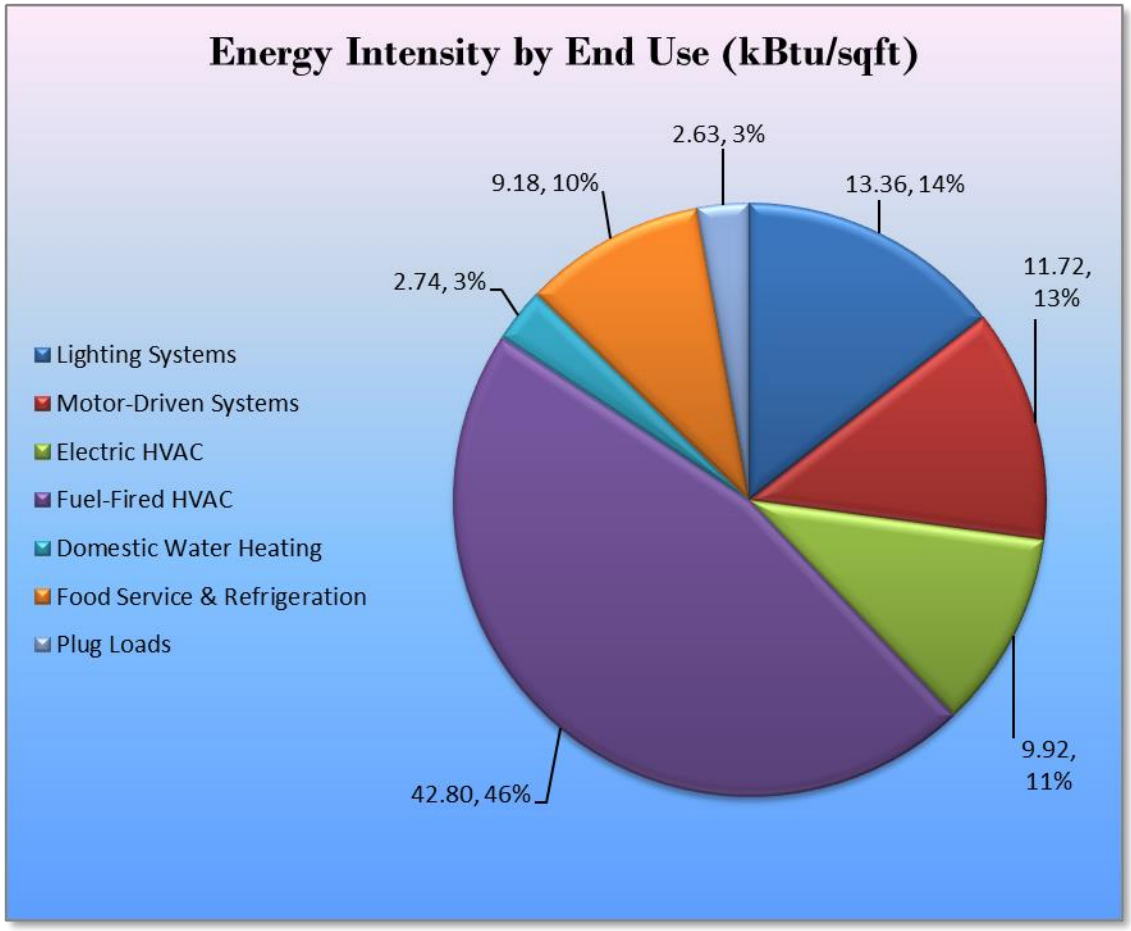
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

Figure 15 - Energy Balance (% 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 Charles Seabrook 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		**159,630**	**28.6**	**0.0**	**$22,102.03**	**$111,186.49**	**$19,845.00**	**$91,341.49**	**4.1**	**160,747**
ECM 1	Install LED Fixtures	46,604	7.2	0.0	$6,452.73	$69,592.17	$9,500.00	$60,092.17	9.3	46,930
ECM 2	Retrofit Fixtures with LED Lamps	113,026	21.5	0.0	$15,649.30	$41,594.32	$10,345.00	$31,249.32	2.0	113,816
Lighting Control Measures		**30,975**	**5.7**	**0.0**	**$4,288.70**	**$24,030.00**	**$2,100.00**	**$21,930.00**	**5.1**	**31,191**
ECM 3	Install Occupancy Sensor Lighting Controls	26,552	4.9	0.0	$3,676.32	$16,200.00	$2,100.00	$14,100.00	3.8	26,738
ECM 4	Install High/Low Lighitng Controls	4,423	0.9	0.0	$612.37	$7,830.00	$0.00	$7,830.00	12.8	4,454
Variable Frequency Drive (VFD) Measures		**30,162**	**3.8**	**0.0**	**$4,176.17**	**$19,655.10**	**$0.00**	**$19,655.10**	**4.7**	**30,373**
ECM 5	Install VFDs on Chilled Water Pumps	9,682	1.2	0.0	$1,340.60	$6,551.70	$0.00	$6,551.70	4.9	9,750
ECM 6	Install VFDs on Hot Water Pumps	20,480	2.6	0.0	$2,835.57	$13,103.40	$0.00	$13,103.40	4.6	20,623
Electric Chiller Replacement		**33,697**	**22.6**	**0.0**	**$4,665.55**	**$81,369.71**	**$7,200.00**	**$74,169.71**	**15.9**	**33,932**
ECM 7	Install High Efficiency Chillers	33,697	22.6	0.0	$4,665.55	$81,369.71	$7,200.00	$74,169.71	15.9	33,932
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**148.6**	**$1,808.30**	**$65,716.57**	**$6,169.88**	**$59,546.69**	**32.9**	**17,396**
ECM 8	Install High Efficiency Hot Water Boilers	0	0.0	148.6	$1,808.30	$65,716.57	$6,169.88	$59,546.69	32.9	17,396
HVAC System Improvements		**605**	**0.0**	**19.4**	**$320.11**	**$3,023.34**	**$0.00**	**$3,023.34**	**9.4**	**2,883**
ECM 9	Implement Demand Control Ventilation	605	0.0	9.0	$193.28	$2,718.84	$0.00	$2,718.84	14.1	1,663
ECM 10	Install Pipe Insulation	0	0.0	10.4	$126.82	$304.50	$0.00	$304.50	2.4	1,220
Domestic Water Heating Upgrade		**0**	**0.0**	**3.4**	**$41.06**	**$28.68**	**$0.00**	**$28.68**	**0.7**	**395**
ECM 11	Install Low-Flow Domestic Hot Water Devices	0	0.0	3.4	$41.06	$28.68	$0.00	$28.68	0.7	395
Food Service Equipment & Refrigeration Measures		**1,640**	**0.1**	**0.0**	**$227.10**	**$1,213.20**	**$160.00**	**$1,053.20**	**4.6**	**1,652**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	1,640	0.1	0.0	$227.10	$1,213.20	$160.00	$1,053.20	4.6	1,652
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$270.60**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,968**
ECM 13	Vending Machine Control	1,954	0.0	0.0	$270.60	$460.00	$0.00	$460.00	1.7	1,968
TOTALS		**258,663**	**60.9**	**171.4**	**$37,899.61**	**$306,683.09**	**$35,474.88**	**$271,208.21**	**7.2**	**280,537**

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 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		**159,630**	**28.6**	**0.0**	**$22,102.03**	**$111,186.49**	**$19,845.00**	**$91,341.49**	**4.1**	**160,747**
ECM 1	Install LED Fixtures	46,604	7.2	0.0	$6,452.73	$69,592.17	$9,500.00	$60,092.17	9.3	46,930
ECM 2	Retrofit Fixtures with LED Lamps	113,026	21.5	0.0	$15,649.30	$41,594.32	$10,345.00	$31,249.32	2.0	113,816

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	7,949	1.7	0.0	$1,100.57	$24,758.21	$4,800.00	$19,958.21	18.1	8,004
Exterior	38,656	5.5	0.0	$5,352.16	$44,833.96	$4,700.00	$40,133.96	7.5	38,926

Measure Description

We recommend replacing existing fixtures containing fluorescent and HID lamps with new high-performance LED light fixtures. The interior fixture replacement includes "Sportlite" type compact fluorescent fixtures located in the gym, and the exterior fixture replacement includes existing metal halide wall pack and pole light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

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

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	113,026	21.5	0.0	$15,649.30	$41,594.32	$10,345.00	$31,249.32	2.0	113,816
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

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

4.1.2 Lighting Control Measures

Our recommendations for upgrades to existing lighting control measures are summarized in Figure 18 below.

Figure 18 - Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**30,975**	**5.7**	**0.0**	**$4,288.70**	**$24,030.00**	**$2,100.00**	**$21,930.00**	**5.1**	**31,191**
ECM 3	Install Occupancy Sensor Lighting Controls	26,552	4.9	0.0	$3,676.32	$16,200.00	$2,100.00	$14,100.00	3.8	26,738
ECM 4	Install High/Low Lighitng Controls	4,423	0.9	0.0	$612.37	$7,830.00	$0.00	$7,830.00	12.8	4,454

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

ECM 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
26,552	4.9	0.0	$3,676.32	$16,200.00	$2,100.00	$14,100.00	3.8	26,738

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in many restrooms, storage rooms, classrooms, as well as in the gym, library, cafeteria and offices areas. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

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

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,423	0.9	0.0	$612.37	$7,830.00	$0.00	$7,830.00	12.8	4,454

Measure Description

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

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

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage needs to be provided to ensure that lights turn on in each area as an occupant approaches.

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Variable Frequency Drive Measures

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

Figure 19 - Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**30,162**	**3.8**	**0.0**	**$4,176.17**	**$19,655.10**	**$0.00**	**$19,655.10**	**4.7**	**30,373**
ECM 5	Install VFDs on Chilled Water Pumps	9,682	1.2	0.0	$1,340.60	$6,551.70	$0.00	$6,551.70	4.9	9,750
ECM 6	Install VFDs on Hot Water Pumps	20,480	2.6	0.0	$2,835.57	$13,103.40	$0.00	$13,103.40	4.6	20,623

ECM 5: 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)
9,682	1.2	0.0	$1,340.60	$6,551.70	$0.00	$6,551.70	4.9	9,750

Measure Description

We recommend installing a variable frequency drives (VFD) to control the chilled water pumps. This measure requires that chilled water coils be served by two-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.

It is to be noted that all three-way chilled water valves need to be converted to two-way valves in order for the VFDs to effectively function.

ECM 6: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
20,480	2.6	0.0	$2,835.57	$13,103.40	$0.00	$13,103.40	4.6	20,623

Measure Description

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

4.1.4 Electric Chiller Replacement

Our recommendation for electric chiller replacement is summarized in Figure 20 below.

Figure 20 - Summary of Electric Chiller Replacement 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)
Electric Chiller Replacement		**33,697**	**22.6**	**0.0**	**$4,665.55**	**$81,369.71**	**$7,200.00**	**$74,169.71**	**15.9**	**33,932**
ECM 7	Install High Efficiency Chillers	33,697	22.6	0.0	$4,665.55	$81,369.71	$7,200.00	$74,169.71	15.9	33,932

ECM 7: Install High Efficiency Chillers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
33,697	22.6	0.0	$4,665.55	$81,369.71	$7,200.00	$74,169.71	15.9	33,932

Measure Description

We recommend replacing the older inefficient 80-ton electric Daikin McQuay chiller with a new high efficiency chiller. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile. Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity. Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles. Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water. In any given size range variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

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

4.1.5 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacement is summarized in Figure 21 below.

Figure 21 - Summary of Gas-Fired Heating Replacement 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)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**148.6**	**$1,808.30**	**$65,716.57**	**$6,169.88**	**$59,546.69**	**32.9**	**17,396**
ECM 8	Install High Efficiency Hot Water Boilers	0	0.0	148.6	$1,808.30	$65,716.57	$6,169.88	$59,546.69	32.9	17,396

ECM 8: Install High Efficiency Hot Water Boilers

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)
0	0.0	148.6	$1,808.30	$65,716.57	$6,169.88	$59,546.69	32.9	17,396

Measure Description

The existing hot water boilers serving the two heating hot water loops were built in 2002 and are nearing their end of useful life. It is recommended to replace them with more efficient condensing hot water boilers. For the purposes of this analysis, we evaluated the replacement of boilers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your design team to select boilers that are sized appropriately for the heating load at this facility. In many cases installing multiple modular boilers rather than one or two large boilers will result in higher overall plant efficiency while providing additional system redundancy.

Replacing the boiler has a long payback based on energy savings and may not be justifiable based simply on energy considerations. Typically, the marginal cost of purchasing high efficiency boilers can be justified by the marginal savings from the improved efficiency.

Additionally, the site indicated an interest in replacing the boilers. Therefore, we recommend that the facility staff consider purchasing a boiler that exceeds the code required efficiency when the boiler is replaced.

4.1.6 HVAC System Upgrades

Our recommendations for HVAC system upgrades are summarized in Figure 22 below.

Figure 22 - Summary of HVAC System Improvement 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)
HVAC System Improvements		**605**	**0.0**	**19.4**	**$320.11**	**$3,023.34**	**$0.00**	**$3,023.34**	**9.4**	**2,883**
ECM 9	Implement Demand Control Ventilation	605	0.0	9.0	$193.28	$2,718.84	$0.00	$2,718.84	14.1	1,663
ECM 10	Install Pipe Insulation	0	0.0	10.4	$126.82	$304.50	$0.00	$304.50	2.4	1,220

ECM 9: Implement Demand Control Ventilation (DCV)

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)
605	0.0	9.0	$193.28	$2,718.84	$0.00	$2,718.84	14.1	1,663

Measure Description

Demand control ventilation (DCV) is an operational sequence that monitors indoor air CO_2 content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation. In order to ensure adequate air quality, standard ventilation systems often provide outside air based on a space's estimated maximum occupancy. However, during low occupancy periods, the space may be over ventilated. This procedure wastes energy through excessive fan more usage and additional cost to heat and cool the excessive air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels, saving significant amounts of energy. DCV is most suited for facilities where occupancy levels vary significantly hour to hour and day to day.

Energy savings associated with DCV are based on hours of operation, space occupancy, system air flow, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning.

The project economics presented represent our estimate of cost and savings associated with implementing DCV in the library.

ECM 10: Install Pipe Insulation

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)
0	0.0	10.4	$126.82	$304.50	$0.00	$304.50	2.4	1,220

Measure Description

We recommend installing insulation on heating system piping. Distribution system losses are dependent on heating water system temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced.

This measure saves energy by reducing heat losses from the heating distribution system.

4.1.7 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 23 below.

Figure 23 - 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		**0**	**0.0**	**3.4**	**$41.06**	**$28.68**	**$0.00**	**$28.68**	**0.7**	**395**
ECM 11	Install Low-Flow Domestic Hot Water Devices	0	0.0	3.4	$41.06	$28.68	$0.00	$28.68	0.7	395

ECM 11: 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)
0	0.0	3.4	$41.06	$28.68	$0.00	$28.68	0.7	395

Measure Description

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

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

4.1.8 Food Service Equipment & Refrigeration Measures

Our recommendations for food service and refrigeration measures are summarized in Figure 24 below.

Figure 24 - Summary of Food Service Equipment & Refrigeration ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Food Service Equipment & Refrigeration Measures		**1,640**	**0.1**	**0.0**	**$227.10**	**$1,213.20**	**$160.00**	**$1,053.20**	**4.6**	**1,652**
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	1,640	0.1	0.0	$227.10	$1,213.20	$160.00	$1,053.20	4.6	1,652

ECM 12: Refrigerator/Freezer Case Electrically Commutated Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,640	0.1	0.0	$227.10	$1,213.20	$160.00	$1,053.20	4.6	1,652

Measure Description

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

4.1.9 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 25 below.

Figure 25 - Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**1,954**	**0.0**	**0.0**	**$270.60**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,968**
ECM 13	Vending Machine Control	1,954	0.0	0.0	$270.60	$460.00	$0.00	$460.00	1.7	1,968

ECM 13:Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,954	0.0	0.0	$270.60	$460.00	$0.00	$460.00	1.7	1,968

Measure Description

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

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 26 - Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures	**1,061**	**0.9**	**0.0**	**$146.83**	**$43,285.98**	**$1,910.00**	**$41,375.98**	**281.8**	**1,068**
Install High Efficiency Electric AC	1,061	0.9	0.0	$146.83	$43,285.98	$1,910.00	$41,375.98	281.8	1,068
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**21.1**	**$256.24**	**$6,615.94**	**$1,600.00**	**$5,015.94**	**19.6**	**2,465**
Install High Efficiency Furnaces	0	0.0	21.1	$256.24	$6,615.94	$1,600.00	$5,015.94	19.6	2,465
TOTALS	**1,061**	**0.9**	**21.1**	**$403.07**	**$49,901.92**	**$3,510.00**	**$46,391.92**	**115.1**	**3,533**

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

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

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,061	0.9	0.0	$146.83	$43,285.98	$1,910.00	$41,375.98	281.8	1,068

Measure Description

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

Reasons for not Recommending

This measure was considered for all RTUs that are nearing end of useful life. But due to the long payback period it is not recommended on the basis of energy savings alone. We recommend that high efficiency units be considered when unit replacement is being considered. Packaged AC units at this site are equipped with gas fired furnaces, therefore, this measure and the following can be instituted concurrently, potentially at a lower overall cost than has been conservatively estimated.

Install High Efficiency Furnaces

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)
0	0.0	21.1	$256.24	$6,615.94	$1,600.00	$5,015.94	19.6	2,465

Measure Description

We recommend replacing existing standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Reasons for not Recommending

Although the school showed interest in implementing this measure, due to the long payback period, it is not recommended on the basis of energy savings alone.

5 Energy Efficient Practices

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

Close Doors and Windows

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

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.

Ensure Economizers are Functioning Properly

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

Clean Evaporator/Condenser Coils on AC Systems

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

Perform Proper 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 Furnace Maintenance

Preventative furnace maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should include tasks such as checking for gas/carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

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

Refer to Section 4.1.7 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.

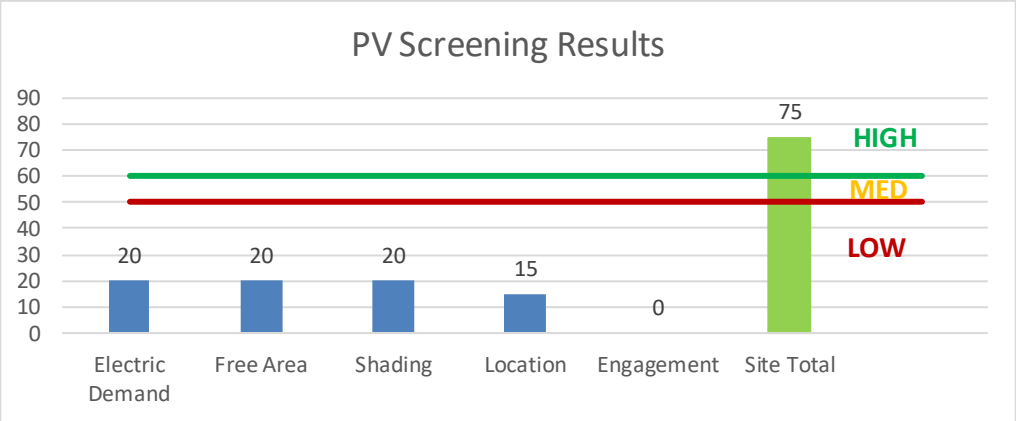
6.1 Photovoltaic

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 is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential for PV at the site. A PV array located on the roof of the building may be feasible. If Charles Seabrook School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 27 - Photovoltaic Screening



Potential	High	
System Potential	206	kW DC STC
Electric Generation	245,422	kWh/yr
Displaced Cost	$21,350	/yr
Installed Cost	$589,200	

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.

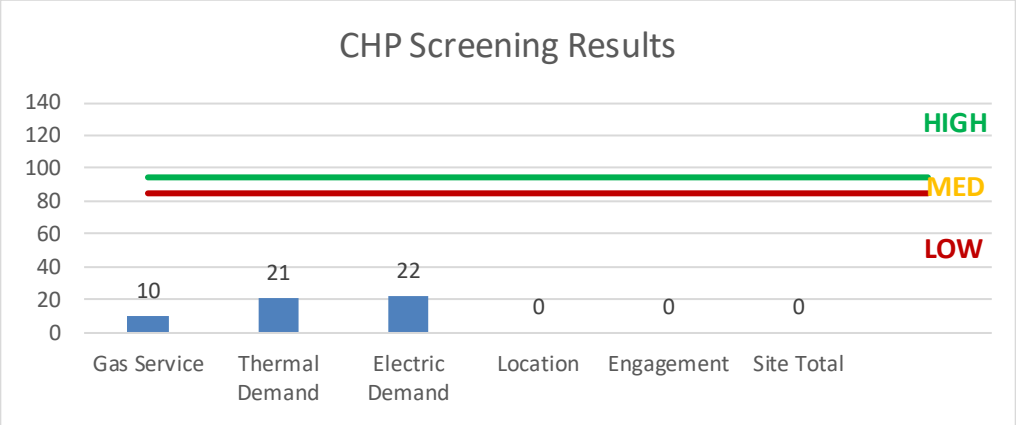
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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 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 28 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

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

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

In our opinion, the facility is not a good candidate for DR.

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

Figure 29 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	X					
ECM 2	Retrofit Fixtures with LED Lamps	X					
ECM 3	Install Occupancy Sensor Lighting Controls	X					
ECM 4	Install High/Low Lighitng Controls						
ECM 5	Install VFDs on Chilled Water Pumps						
ECM 6	Install VFDs on Hot Water Pumps						
ECM 7	Install High Efficiency Chillers	X					
ECM 8	Install High Efficiency Hot Water Boilers	X					
ECM 9	Implement Demand Control Ventilation						
ECM 10	Install Pipe Insulation						
ECM 11	Install Low-Flow Domestic Hot Water Devices						
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors	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
Variable Frequency Drives
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment

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

Incentives

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

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

How to Participate

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

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

8.2 Pay for Performance - Existing Buildings

Overview

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

Incentives

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

How to Participate

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

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

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

Please note that, based on the current identified measures, this project does not qualify for the P4P program, but it may qualify if additional measures are identified.

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. SRECs are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

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

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

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

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

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
Mech Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.09	535	0.0	$74.02	$182.58	$50.00	1.79
Boiler Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.08	466	0.0	$64.54	$379.55	$65.00	4.87
Kindergarten Hallway	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.37	2,098	0.0	$290.42	$1,032.95	$135.00	3.09
Kindergarten Hallway	5	Compact Fluorescent: (1) 23W CFL Screw-In	Wall Switch	23	3,240	Relamp	Yes	5	LED Screw-In Lamps: (1) 16W LED Screw-In	High/Low Control	16	2,268	0.04	219	0.0	$30.26	$445.90	$25.00	13.91
Kindergarten Hallway	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
3rd Grade Hallway	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
3rd Grade Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.45	2,564	0.0	$354.96	$1,142.50	$165.00	2.75
3rd Grade Hallway	1	Halogen Incandescent: (1) 250W Spot Light	Wall Switch	250	270	Relamp	Yes	1	LED Screw-In Lamps: (1) 38W LED Screw-In	High/Low Control	38	189	0.15	69	0.0	$9.62	$305.18	$5.00	31.21
1st Grade Hallway	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.29	1,631	0.0	$225.88	$653.41	$105.00	2.43
1st Grade Hallway	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Hallway	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.82	4,661	0.0	$645.38	$2,175.45	$300.00	2.91
Main Hallway	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entrance	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.12	699	0.0	$96.81	$434.32	$45.00	4.02
Main Entrance	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entrance	1	Incandescent: (1) 60W Incandescent Screw-In	Wall Switch	60	270	Relamp	Yes	1	LED Screw-In Lamps: (1) 9W LED Screw-In	High/Low Control	9	189	0.04	17	0.0	$2.31	$35.18	$5.00	13.07
Main Hallway	20	Compact Fluorescent: (1) 40W CFL 4-Pin	Wall Switch	40	3,240	Relamp	Yes	20	LED Screw-In Lamps: (1) 28W LED 4-Pin	High/Low Control	28	2,268	0.27	1,520	0.0	$210.48	$1,623.60	$0.00	7.71
Main Hallway	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	2,268	0.05	290	0.0	$40.14	$414.92	$0.00	10.34
Main Hallway	12	Halogen Incandescent: (1) 250W Spot Light	Wall Switch	250	3,240	Relamp	Yes	12	LED Screw-In Lamps: (1) 38W LED Screw-In	High/Low Control	38	2,268	1.76	10,004	0.0	$1,385.17	$1,384.32	$120.00	0.91
Main Hallway	2	Compact Fluorescent: (1) 34W CFL Screw-In'	Wall Switch	34	3,240	Relamp	Yes	2	LED Screw-In Lamps: (1) 24W LED Screw-In	High/Low Control	24	2,268	0.02	129	0.0	$17.89	$340.36	$10.00	18.46
Pre-School Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.45	2,564	0.0	$354.96	$1,142.50	$165.00	2.75
Pre-School Hallway	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Grade Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.45	2,564	0.0	$354.96	$1,142.50	$165.00	2.75
2nd Grade Hallway	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pole Lighting	16	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,015	Fixture Replacement	No	16	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	137	4,015	3.36	23,685	0.0	$3,279.32	$14,889.03	$1,600.00	4.05
Sprinkler Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	270	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	270	0.04	20	0.0	$2.84	$73.03	$20.00	18.69

	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
Exterior Recessed	2	LED - Fixtures: Downlight Recessed	Daylight Dimming	21	4,015	None	No	2	LED - Fixtures: Downlight Recessed	Daylight Dimming	21	4,015	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Wallpacks	25	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,015	Fixture Replacement	No	25	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	57	4,015	2.18	15,352	0.0	$2,125.65	$24,149.14	$2,500.00	10.18
Exterior From Entrance	2	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,015	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	137	4,015	0.42	2,961	0.0	$409.91	$1,931.93	$200.00	4.23
Gym	32	Compact Fluorescent: Sportlite (252W)	Wall Switch	252	2,700	Fixture Replacement	Yes	32	LED - Fixtures: High-Bay (Prismatic Reflector)	Occupancy Sensor	160	1,890	2.94	13,910	0.0	$1,926.00	$26,378.21	$5,010.00	11.09
Gym	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,890	0.08	388	0.0	$53.78	$379.55	$65.00	5.85
Gym Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	270	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	189	0.08	39	0.0	$5.38	$379.55	$30.00	64.99
Gym Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.08	466	0.0	$64.54	$379.55	$30.00	5.42
Gym Hallway	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	270	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	270	0.06	31	0.0	$4.26	$109.55	$30.00	18.69
Music Room	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.98	5,593	0.0	$774.46	$1,854.54	$430.00	1.84
Boys Restroom	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	24	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.98	5,593	0.0	$774.46	$1,854.54	$430.00	1.84
Boys Restroom	6	Compact Fluorescent: (1) 40W CFL 4-Pin	Wall Switch	40	3,240	Relamp	Yes	6	LED Screw-In Lamps: (1) 28W LED 4-Pin	Occupancy Sensor	28	2,268	0.08	456	0.0	$63.15	$433.08	$35.00	6.30
Girls Restroom	6	Compact Fluorescent: (1) 40W CFL 4-Pin	Wall Switch	40	3,240	Relamp	Yes	6	LED Screw-In Lamps: (1) 28W LED 4-Pin	Occupancy Sensor	28	2,268	0.08	456	0.0	$63.15	$433.08	$35.00	6.30
Art Room	18	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	18	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.74	4,195	0.0	$580.84	$1,255.91	$305.00	1.64
Art Room	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,268	0.10	580	0.0	$80.27	$289.84	$35.00	3.17
Art Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,268	0.08	466	0.0	$64.54	$379.55	$30.00	5.42
Teachers Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Teachers Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.16	932	0.0	$129.08	$489.09	$95.00	3.05
Kitchen	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	20	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.65	3,689	0.0	$510.73	$1,095.45	$300.00	1.56
Kitchen	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Day Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	270	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	189	0.16	78	0.0	$10.76	$489.09	$60.00	39.89
Staff Locker Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	270	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	189	0.12	58	0.0	$8.07	$434.32	$80.00	43.92
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	270	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	270	0.03	15	0.0	$2.13	$54.77	$15.00	18.69

	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
Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,700	0.03	154	0.0	$21.28	$54.77	$15.00	1.87
Dishwasher	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,700	0.10	461	0.0	$63.84	$164.32	$45.00	1.87
Kitchen Hood	8	Incandescent: (1) 60W Incandescent Screw-In	Wall Switch	60	270	Relamp	No	8	LED Screw-In Lamps: (1) 9W LED Screw-In	Wall Switch	9	270	0.27	127	0.0	$17.54	$281.44	$40.00	13.76
DHW Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.02	123	0.0	$17.02	$36.52	$10.00	1.56
Multipurpose Room	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Multipurpose Room	16	Compact Fluorescent: (1) 26W CFL 4-Pin	Wall Switch	26	3,240	Relamp	Yes	16	LED Screw-In Lamps: (1) 18W LED 4-Pin	Occupancy Sensor	18	2,268	0.14	791	0.0	$109.45	$704.88	$35.00	6.12
Multipurpose Room	48	Compact Fluorescent: (1) 32W CFLScrew-In	Wall Switch	32	3,240	Relamp	Yes	48	LED Screw-In Lamps: (1) 24W LED Screw-In	Occupancy Sensor	22	2,268	0.51	2,919	0.0	$404.13	$2,498.64	$345.00	5.33
Stage	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	270	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	270	0.26	123	0.0	$17.02	$438.18	$120.00	18.69
Multipurpose Room	2	Halogen Incandescent: (1) 250W Spot Light	Wall Switch	250	3,240	Relamp	Yes	2	LED Screw-In Lamps: (1) 38W LED Screw-In	Occupancy Sensor	38	2,268	0.29	1,667	0.0	$230.86	$340.36	$45.00	1.28
Storage Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	270	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	189	0.16	78	0.0	$10.76	$489.09	$60.00	39.89
Teachers Dining Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.33	1,864	0.0	$258.15	$708.18	$155.00	2.14
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.08	466	0.0	$64.54	$379.55	$65.00	4.87
Main Office	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.62	3,496	0.0	$484.04	$1,091.59	$260.00	1.72
Principal Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,890	0.16	777	0.0	$107.56	$489.09	$95.00	3.66
CER Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,890	0.16	777	0.0	$107.56	$489.09	$95.00	3.66
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.04	246	0.0	$34.05	$73.03	$20.00	1.56
Room 8	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 8	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Staff Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.08	466	0.0	$64.54	$379.55	$65.00	4.87
ESL	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.04	246	0.0	$34.05	$73.03	$20.00	1.56
Room 7	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 7	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room 6	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42

	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
IT Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,240	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,268	0.19	1,094	0.0	$151.47	$562.12	$115.00	2.95
Mech Room	4	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	110	270	Relamp	No	4	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	270	0.10	47	0.0	$6.53	$354.06	$0.00	54.18
Mech Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	270	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	270	0.02	10	0.0	$1.42	$36.52	$10.00	18.69
Mech Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 5	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Custodian Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	270	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	270	0.02	10	0.0	$1.42	$36.52	$10.00	18.69
Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,240	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,268	0.14	820	0.0	$113.60	$489.09	$95.00	3.47
Room 3	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Storage Room	3	Compact Fluorescent: (1) 23W CFL Screw-In	Wall Switch	23	270	Relamp	No	3	LED Screw-In Lamps: (1) 16W LED Screw-In	Wall Switch	16	270	0.01	6	0.0	$0.89	$105.54	$15.00	101.74
Guidance Room	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,890	0.45	2,136	0.0	$295.80	$872.50	$200.00	2.27
Girls Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.04	246	0.0	$34.05	$73.03	$20.00	1.56
Teachers Lounge	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,890	0.37	1,748	0.0	$242.02	$762.95	$170.00	2.45
Restroom	2	Compact Fluorescent: (1) 23W CFL Screw-In	Wall Switch	23	3,240	Relamp	No	2	LED Screw-In Lamps: (1) 16W LED Screw-In	Wall Switch	16	3,240	0.01	51	0.0	$7.12	$70.36	$10.00	8.48
Library	47	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	47	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	1.93	10,954	0.0	$1,516.65	$3,384.31	$810.00	1.70
Electrical Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	270	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	270	0.13	61	0.0	$8.51	$219.09	$60.00	18.69
Conference Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.12	699	0.0	$96.81	$434.32	$80.00	3.66
Work Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.37	2,098	0.0	$290.42	$762.95	$170.00	2.04
Work Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Related Services	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,700	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,890	0.25	1,165	0.0	$161.35	$598.64	$125.00	2.94
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,700	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,700	0.04	205	0.0	$28.37	$73.03	$20.00	1.87
Maintenance Room	1	Incandescent: (1) 75W Incandescent Screw-In	Wall Switch	75	270	Relamp	Yes	1	LED Screw-In Lamps: (1) 11W LED Screw-In	Occupancy Sensor	11	189	0.04	21	0.0	$2.89	$305.18	$40.00	91.89
Maintenance Room	1	Incandescent: (1) 200W Incandescent Screw-In	Wall Switch	200	270	Relamp	Yes	1	LED Screw-In Lamps: (1) 30W LED Screw-In	Occupancy Sensor	30	189	0.12	56	0.0	$7.70	$305.18	$40.00	34.46
Nurse Office	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.45	2,564	0.0	$354.96	$872.50	$200.00	1.89

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Nurse Storage	1	Compact Fluorescent: (1) 23W CFL Screw-In	Wall Switch	23	270	Relamp	No	1	LED Screw-In Lamps: (1) 16W LED Screw-In	Wall Switch	16	270	0.00	2	0.0	$0.30	$35.18	$5.00	101.74
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 14	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.04	246	0.0	$34.05	$73.03	$20.00	1.56
Staff Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Custodian Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.04	246	0.0	$34.05	$73.03	$20.00	1.56
Room 15	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.66	3,729	0.0	$516.31	$1,146.36	$275.00	1.69
Room 15 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 15 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 16	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.82	4,661	0.0	$645.38	$1,365.45	$335.00	1.60
Room 16 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 16 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Mech Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	270	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	270	0.04	20	0.0	$2.84	$73.03	$20.00	18.69
Room 17	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.62	3,496	0.0	$484.04	$1,091.59	$260.00	1.72
Room 17 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 17 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 18	20	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	20	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.82	4,661	0.0	$645.38	$1,365.45	$335.00	1.60
Room 18 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 18 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 19	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.62	3,496	0.0	$484.04	$1,091.59	$260.00	1.72
Room 19 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 19 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 20	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.62	3,496	0.0	$484.04	$1,091.59	$260.00	1.72
Room 20 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 20 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 21	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.53	3,030	0.0	$419.50	$982.04	$230.00	1.79

	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 21 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 21 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Staff	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 22	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.53	3,030	0.0	$419.50	$982.04	$230.00	1.79
Room 22	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room 22 Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 21	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 21	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room 21	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 24	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.53	3,030	0.0	$419.50	$982.04	$230.00	1.79
Room 24	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room 24 Restroom	1	Compact Fluorescent: (1) 23W CFL Screw-In	Wall Switch	23	3,240	Relamp	No	1	LED Screw-In Lamps: (1) 16W LED Screw-In	Wall Switch	16	3,240	0.00	26	0.0	$3.56	$35.18	$5.00	8.48
Room 25	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 25	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room 25 Restroom	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,240	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 26	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 26	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room 26 Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 26 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,240	0.03	184	0.0	$25.54	$54.77	$15.00	1.56
Room 27	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,240	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,268	0.49	2,797	0.0	$387.23	$927.27	$215.00	1.84
Room 27	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Room 27	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,240	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,268	0.05	311	0.0	$43.03	$73.03	$55.00	0.42
Custodian Office	1	Compact Fluorescent: (1) 23W CFL Screw-In	Wall Switch	23	3,240	Relamp	No	1	LED Screw-In Lamps: (1) 16W LED Screw-In	Wall Switch	16	3,240	0.00	26	0.0	$3.56	$35.18	$5.00	8.48
DHW Room	1	Compact Fluorescent: (1) 23W CFL Screw-In	Wall Switch	23	270	Relamp	No	1	LED Screw-In Lamps: (1) 16W LED Screw-In	Wall Switch	16	270	0.00	2	0.0	$0.30	$35.18	$5.00	101.74
Courtyard	4	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,015	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	57	4,015	0.35	2,456	0.0	$340.10	$3,863.86	$400.00	10.18

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
Roof	Room 8	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Boys Restroom	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Main Office	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Copy Room	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Restroom	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 24	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 22	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 23	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Hallways	2	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Restroom	1	Exhaust Fan	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outside Wall	Kitchen Exhaust	2	Kitchen Hood Exhaust Fan	3.0	82.5%	No	5,250	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Room	Heating System	2	Heating Hot Water Pump	5.0	92.0%	No	2,745	No	92.0%	Yes	2	1.22	9,682	0.0	$1,340.60	$6,551.70	$0.00	4.89
Mech Room	Cooling System	2	Chilled Water Pump	5.0	92.0%	No	2,745	No	92.0%	Yes	2	1.22	9,682	0.0	$1,340.60	$6,551.70	$0.00	4.89
Mech Room	AHU1	1	Supply Fan	10.0	89.5%	Yes	3,391	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Room	AHU2	1	Supply Fan	7.5	88.5%	Yes	3,391	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Room	AHU2	1	Return Fan	1.5	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Heating System	2	Heating Hot Water Pump	5.0	82.5%	No	2,745	No	82.5%	Yes	2	1.36	10,797	0.0	$1,494.97	$6,551.70	$0.00	4.38
Boiler Room	Boiler Recirculating Pumps	2	Heating Hot Water Pump	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Throughout Building	Unit Ventillators in Classrooms	22	Fan Coil Unit	0.1	60.0%	No	2,745	No	60.0%	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
Roof	Room 1, Room 2, Room 3, Room 5, Room 6, Room 7, Room 8, Room 9 (RTU 15), Room 12, Room 11, Room 14, Room 13, SGI, Teachers Lounge, Literature Coach, Room 26, Room 27, Room 25, Room 24, Room 22 & Room 23	21	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 1, Room 2, Room 3, Room 5, Room 6, Room 7, Room 8, Room 9 (RTU 15), Room 12, Room 11, Room 14, Room 13, SGI, Teachers Lounge, Literature Coach, Room 26, Room 27, Room 25, Room 24, Room 22 & Room 24	21	Other	0.3	71.4%	No	2,745	No	71.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 1, Room 2, Room 3, Room 5, Room 6, Room 7, Room 8, Room 9 (RTU 15), Room 12, Room 11, Room 14, Room 13, SGI, Teachers Lounge, Literature Coach, Room 26, Room 27, Room 25, Room 24, Room 22 & Room 25	21	Combustion Air Fan	0.1	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 1, Room 2, Room 3, Room 5, Room 6, Room 7, Room 8, Room 9 (RTU 15), Room 12, Room 11, Room 14, Room 13, SGI, Teachers Lounge, Literature Coach, Room 26, Room 27, Room 25, Room 24, Room 22 & Room 26	21	Ventilation Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CER	1	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CER	1	Other	0.2	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CER	1	Combustion Air Fan	0.1	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Nurse Office, BSI	2	Other	0.2	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Nurse Office, BSI	2	Supply Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Nurse Office, BSI	2	Combustion Air Fan	0.1	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Nurse Office, BSI	2	Ventilation Fan	1.0	82.5%	No	2,745	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	4	Other	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	2	Supply Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	2	Combustion Air Fan	0.1	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	2	Ventilation Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Server Room	1	Supply Fan	0.5	78.2%	No	2,745	No	78.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Server Room	1	Other	0.3	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Main Office Back Up	1	Other	0.5	78.2%	No	2,745	No	78.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Room 1	1	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		No	0.18	209	0.0	$28.91	$9,075.84	$368.00	301.21
Roof	Room 2	1	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		No	0.18	209	0.0	$28.91	$9,075.84	$368.00	301.21
Roof	Room 3	1	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		No	0.18	209	0.0	$28.91	$9,075.84	$368.00	301.21
Roof	Room 5	1	Packaged AC	4.00		Yes	1	Packaged AC	4.00		14.00		No	0.18	209	0.0	$28.91	$9,075.84	$368.00	301.21
Roof	Room 6	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 7	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CER	1	Packaged AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Server Room	1	Split-System Air-Source HP	2.00	24.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Server Room	1	Packaged AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 8	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Nurse Office	1	Packaged AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Main Office Back Up	1	Split-System AC	6.00		Yes	1	Split-System AC	6.00		11.50		No	0.19	225	0.0	$31.20	$6,982.62	$438.00	209.80
Roof	Room 9 (RTU 15)	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 12	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 11	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 14	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 13	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	2	Packaged AC	7.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	SGI	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Teachers Lounge	1	Packaged AC	4.00		No							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	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	Literature Coach	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	BSI	1	Packaged AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 26	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 27	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 25	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 24	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 22	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 23	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallways	Hallways	4	Electric Resistance Heat		1.36	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
Ground	AHUs 1,2 & 3	1	Air-Cooled Reciprocating Chiller	26.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ground	AHUs 1,2 & 3	1	Air-Cooled Reciprocating Chiller	80.00	Yes	1	Air-Cooled Reciprocating Chiller	Variable	80.00	1.24	0.74	22.58	33,697	0.0	$4,665.55	$81,369.71	$7,200.00	15.90

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
Mech Room	Gym, Kitchen, Music Room & Art Room	2	Non-Condensing Hot Water Boiler	947.70	Yes	2	Condensing Hot Water Boiler	947.70	91.00%	Et	0.00	0	102.9	$1,251.90	$45,496.09	$4,169.88	33.01
Boiler Room	New Addition (Pre-K)	2	Non-Condensing Hot Water Boiler	421.20	Yes	2	Condensing Hot Water Boiler	421.20	91.00%	Et	0.00	0	45.7	$556.40	$20,220.48	$2,000.00	32.75
Roof	BSI	1	Furnace	56.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	2	Furnace	146.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CER	1	Furnace	56.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Room 1, Room 2, Room 3 & Room 5	4	Furnace	73.00	Yes	4	Furnace	73.00	95.00%	AFUE	0.00	0	21.1	$256.24	$6,615.94	$1,600.00	19.58
Roof	Room 1, Room 2, Room 3, Room 5, Room 6, Room 7, Room 8, Room 9 (RTU 15), Room 12, Room 11, Room 14, Room 13, SGI, Teachers Lounge, Literature Coach, Room 26, Room 27, Room 25, Room 24, Room 22 & Room 23	17	Furnace	73.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Nurse Office, BSI	2	Furnace	56.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	CER	1	Furnace	56.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library	2	Furnace	146.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Demand Control Ventilation Recommendations

		Recommendation Inputs				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	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
Library	Library	2	14.00	0.00	292.00	0.00	605	9.0	$193.28	$2,718.84	$0.00	14.07

Pipe Insulation Recommendations

		Recommendation Inputs		Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	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
DHW lines	DHW Pipe	10	1.25	0.00	0	1.8	$21.48	$43.50	$0.00	2.02
DHW lines	DHW Pipe	20	1.50	0.00	0	4.6	$55.44	$87.00	$0.00	1.57
DHW lines	DHW PIpe	40	0.75	0.00	0	4.1	$49.90	$174.00	$0.00	3.49

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Staff Restroom	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	Kitchen	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Room	School	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mech Room	School	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
DHW Room	School	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
restroom sink	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	1.1	$13.69	$7.17	$0.00	0.52
kitchen sink	3	Faucet Aerator (Kitchen)	3.00	2.20	0.00	0	2.2	$27.37	$21.51	$0.00	0.79

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Medium Temp Freezer (0F to 30F)	Yes	No	No	0.06	820	0.0	$113.55	$606.60	$80.00	4.64
Kitchen	1	Cooler (35F to 55F)	Yes	No	No	0.06	820	0.0	$113.55	$606.60	$80.00	4.64

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	3	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Freezer, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	3	Refrigerator Chest	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Insulated Food Holding Cabinet (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Fryer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Gas Convection Oven (Full Size)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Gas Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Gas Steamer	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

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

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Throughout Building	109	PC's	150.0	Yes
Throughout Building	115	Chromebooks	40.0	Yes
Throughout Building	25	Printers	200.0	Yes
Throughout Building	3	Copiers	600.0	Yes
Throughout Building	5	Microwave	1,000.0	Yes
Throughout Building	4	Refrigerators	172.0	Yes
Throughout Building	3	Coffee Machine	900.0	Yes
Throughout Building	19	Wall TV (Flatscreen)	113.0	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
Teacher's Lounge	1	Refrigerated	Yes	0.00	1,612	0.0	$223.17	$230.00	$0.00	1.03
Teacher's Lounge	1	Non-Refrigerated	Yes	0.00	343	0.0	$47.42	$230.00	$0.00	4.85

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Charles Seabrook School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 74,000
Built: 1955

For Year Ending: December 31, 2017
Date Generated: September 17, 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
Charles Seabrook School 1373 Highway 77 Seabrook, New Jersey 08302	Upper Deerfield Township SD 1385 Highway 77 Seabrook, NJ 08302 (____)____-_____	William Widen 1385 Highway 77 Seabrook, NJ 08302 856-455-2267 X4234 WIDENW@UDTS.ORG

Property ID: 6334495

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
60.9 kBtu/ft²

Source EUI
136.3 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	3,061,660 (68%)
Natural Gas (kBtu)	1,442,990 (32%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	44.9
National Median Source EUI (kBtu/ft²)	100.7
% Diff from National Median Source EUI	35%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	387

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)