Local Government Energy Audit Report

Victor Mravlag School

July 31, 2019

Prepared for:

Elizabeth Public Schools
132 Shelley Avenue
Elizabeth, New Jersey 07208

Prepared by:

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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 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.

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

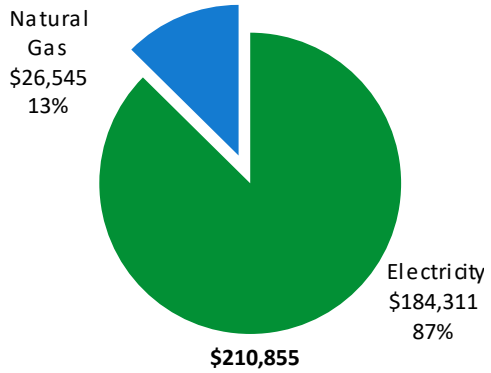
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Victor Mravlag School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC conducted this study as part of a comprehensive effort to assist New Jersey school districts and local governments in controlling their energy costs and to help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $210,855 Electricity: 1,417,017 kWh Natural Gas: 27,368 Therms	
ENERGY STAR® Benchmarking Score	5 *(1-100 scale)*	This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

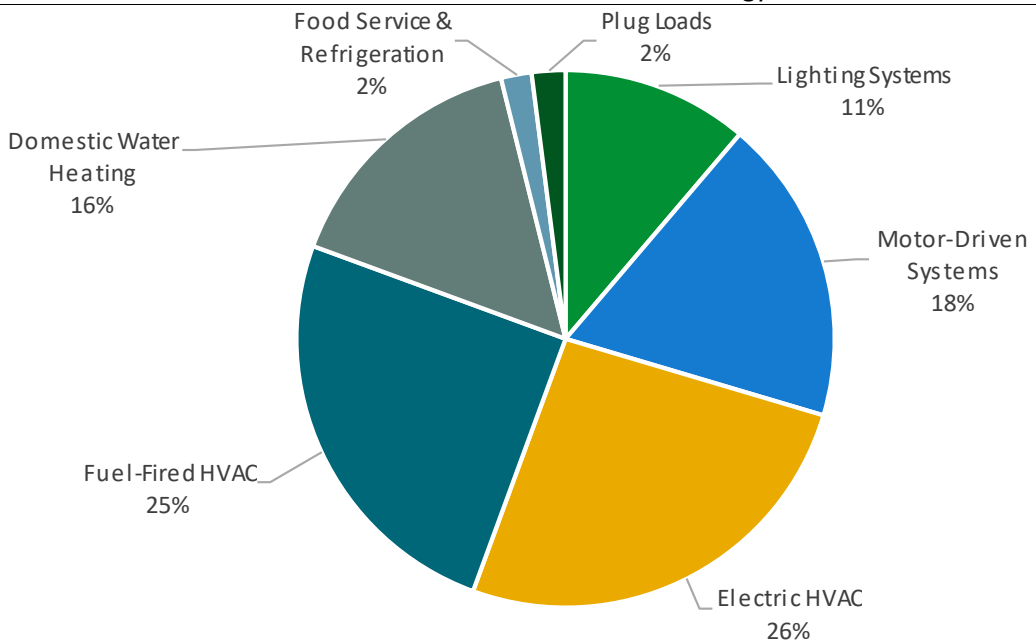


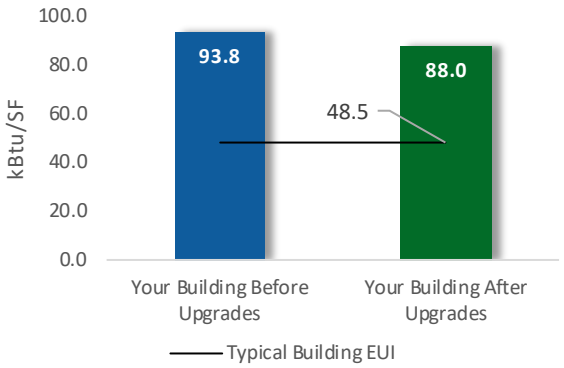
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

This energy audit considered a range of potential energy improvements in your building. Costs and savings will vary between improvements. Presented below are two potential scopes of work for your consideration.

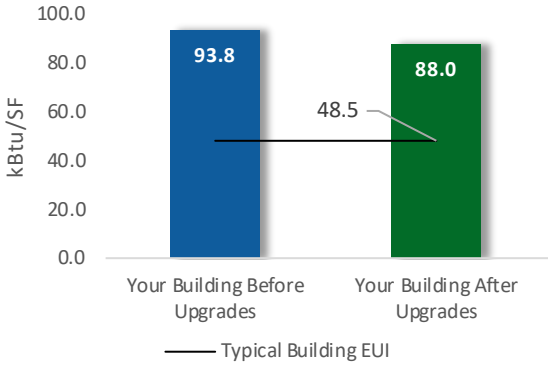
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$68,591
Potential Rebates & Incentives[1]	$13,968
Annual Cost Savings	$18,641
Annual Energy Savings	Electricity: 145,529 kWh
Greenhouse Gas Emission Savings	72 Tons
Simple Payback	2.9 Years
Site Energy Savings (all utilities)	6%



Scenario 2: Cost Effective Package[2]

Installation Cost	$68,591
Potential Rebates & Incentives	$13,968
Annual Cost Savings	$18,641
Annual Energy Savings	Electricity: 145,529 kWh
Greenhouse Gas Emission Savings	72 Tons
Simple Payback	2.9 Years
Site Energy Savings (all utilities)	6%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on current SmartStart Prescriptive incentives. Other Program incentives may apply.

[2] A cost-effective measure is defined as one where the simple payback does not exceed two-thirds of the expected proposed equipment useful life. Simple payback is based on the net measure cost after potential incentives.

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**124,006**	**32.7**	**-25**	**$15,884**	**$238,256**	**$52,189**	**$12,505**	**$39,684**	**2.5**	**121,907**
ECM 1	Retrofit Fixtures with LED Lamps	124,006	32.7	-25	$15,884	$238,256	$52,189	$12,505	$39,684	2.5	121,907
Lighting Control Measures		**20,908**	**4.7**	**-4**	**$2,677**	**$21,417**	**$15,795**	**$1,383**	**$14,413**	**5.4**	**20,542**
ECM 2	Install Occupancy Sensor Lighting Controls	17,843	4.0	-4	$2,285	$18,277	$11,745	$1,383	$10,363	4.5	17,531
ECM 3	Install High/Low Lighting Controls	3,065	0.7	-1	$392	$3,139	$4,050	$0	$4,050	10.3	3,011
Food Service & Refrigeration Measures		**615**	**0.0**	**0**	**$80**	**$1,200**	**$607**	**$80**	**$527**	**6.6**	**619**
ECM 4	Refrigerator/Freezer Case Electrically Commutated Motors	615	0.0	0	$80	$1,200	$607	$80	$527	6.6	619
TOTALS (COST EFFECTIVE MEASURES)		**145,529**	**37.4**	**-30**	**$18,641**	**$260,873**	**$68,591**	**$13,968**	**$54,623**	**2.9**	**143,068**
TOTALS (ALL MEASURES)		**145,529**	**37.4**	**-30**	**$18,641**	**$260,873**	**$68,591**	**$13,968**	**$54,623**	**2.9**	**143,068**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 2 – Evaluated Energy Improvements

For more detail on each evaluated energy improvement and a break out of cost-effective improvements, see **Section 4: Energy Conservation Measures**.

1.1 Planning Your Project

Careful planning makes for a successful energy project. When considering this scope of work, you will have some decisions to make, such as:

- How will the project be funded and/or financed?
- Is it best to pursue individual ECMs, groups of ECMs, or use a comprehensive approach where all ECMs are installed together?
- Are there other facility improvements that should happen at the same time?

Pick Your Installation Approach

New Jersey's Clean Energy Programs give you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives before purchasing materials or starting installation.

The potential ECMs identified for this building likely qualify for multiple incentive and funding programs. Based on current program rules and requirements, your measures are likely to qualify for the following programs:

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Retrofit Fixtures with LED Lamps	X		
ECM 2	Install Occupancy Sensor Lighting Controls	X		
ECM 3	Install High/Low Lighting Controls			
ECM 4	Refrigerator/Freezer Case Electrically Commutated Motors	X		

Figure 3 – Funding Options

New Jersey's Clean Energy Programs At-A-Glance

	SmartStart Flexibility to install at your own pace	**Direct Install** Turnkey installation	**Pay for Performance** Whole building upgrades
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified partner to develop your energy reduction plan and set your energy savings targets.

Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.

Individual Measures with SmartStart

For facilities wishing 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, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures. Direct Install contractors will assess and verify individual measure eligibility and, in most cases, they perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Whole Building Approach with Pay for Performance

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. 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.

More Options from Around the State

Financing and Planning Support with the Energy Savings Improvement Program (ESIP)

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the 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. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

Resiliency with Return on Investment through Combined Heat & Power (CHP)

The CHP program provides incentives for combined heat and power (aka cogeneration) and waste heat to power projects. Combined heat and power systems generate power on-site and recover heat from the generation system to meet on-site thermal loads. Waste heat to power systems use waste heat to generate power. You will work with a qualified developer who will design a system that meets your building's heating and cooling needs.

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces 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. By enabling commercial facilities to reduce electric demand 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 demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Victor Mravlag School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

2.1 Site Overview

On February 1, 2019, TRC performed an energy audit at Victor Mravlag School located in Elizabeth, New Jersey. TRC met with Julio Diaz to review the school operations and help focus our investigation on specific energy-using systems.

Victor Mravlag School is a two-story, 80,760 square foot building built in 2013. Spaces include: classrooms, a gymnasium, an auditorium, offices, a cafeteria, stairwells, a media room, a commercial kitchen, storage, restrooms, and mechanical space.

For a detailed list of the locations and recommended energy conservation measures for all inventoried equipment, see **Appendix A: Equipment Inventory & Recommendations**.

2.2 Building Occupancy

The school is occupied during school year from September through June. Typical weekday occupancy is 80 staff and 613 students. There is no summer occupancy at this school.

Building Name	Weekday/Weekend	Operating Schedule
Victor Mravlag School	Weekday	7:00 AM to 4:00 PM
	Weekend	No Occupancy

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block and brick facade. The roof is flat and covered with black membrane and it is in fair condition.

The walls are made of concrete masonry units (CMUs) with painted CMU interior finish.

The flat roof is supported with steel trusses and reinforced concrete deck and finished with an insulated layer and a covering of modified bitumen.

The roof encloses conditioned space. The thermal barrier is between this space and the conditioned space below the roof.

Most of the windows are double-pane and glazed with aluminum thermal break frames. The glass-to-frame seals are in good condition. The operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors have metal frames and are in good condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

Flat Roof Covering

Exterior Brick Facade

Aluminum Framed Doors and Windows

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps and some U-shape T8 lamps. There are some compact fluorescent lamps (CFL) and halogen incandescent sources are used as general-purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts.

Fixture types include 2-, 3-, or, 4-lamp, 4-foot long surface-mounted fixtures and 2-foot fixtures with U-bend tube lamps. Most fixtures are in good condition. Gymnasium fixtures have high bay CFL lamps and are manually controlled. All exit signs are LED units.

Interior lighting levels were generally sufficient.

Most lighting fixtures are controlled manually; however, some classrooms and faculty spaces are controlled by occupancy sensors.

Exterior fixtures include wall packs with CFL flood lamps. Exterior fixtures are photocell-controlled.

Gym High Bay CFL Fixtures

Surface Mount Linear Fluorescent T8 Fixtures

Exterior Wall Pack CFL Fixtures

Interior CFL Lamp Fixtures

2.5 Air Handling Systems

Packaged Units

Several building areas are served by a total of seven packaged terminal air-source heat pump units that are controlled by room thermostats. Their heating and cooling capacities range in size; the table below provides greater detail.

The gymnasium and auditorium are served by four DX cooled packaged roof top units (RTUs)–two in each area. Each has a gas-fired burner unit ranging in size from 146 to 219 MBh. These units are equipped with economizers and heat recovery wheels that are in good condition. These units are controlled by the school's main Honeywell BMS system.

Conditioned air is provided via four heat recovery units (HRUs) through air to air heat exchangers. They are equipped with DX cooling and hot water coils from the boiler heating hot water loop. These units are also equipped with heat recovery wheels and deliver ventilation air to fan coil units (FCU) located in the zones. FCUs are served by the chilled water and heating hot water loops.

Additionally, three make up air units and exhaust fans provide conditioned air to kitchen, gym lockers and washroom. The air temperature from these units are also controlled by the main BMS.

Unit	Area Served	Size	Efficiency
RTU 1 & 2	Gymnasium	10 ton	12 EER
RTU 3 & 4	Auditorium	8 ton	12 EER
HRU 1, 2 & 3	Various	14 ton	12 EER
HRU 4	Various	19 ton	12 EER
Split System Air-Source Heat Pumps (3)	Classrooms	2 ton / 27.6 MBh	12 EER / COP of 1
Split System Air-Source Heat Pumps (2)	Classrooms	1.5 ton / 21.6 MBh	12 EER / COP of 1
Split System Air-Source Heat Pumps (1)	Classrooms	2.5 ton / 32 MBh	12 EER / COP of 1
Split System Air-Source Heat Pumps (1)	Classrooms	.75 ton / 12 MBh	12 EER / COP of 1

Split System Air-Source Heat Pump

Heat Recovery Unit

Package Rooftop Unit

Rooftop Units

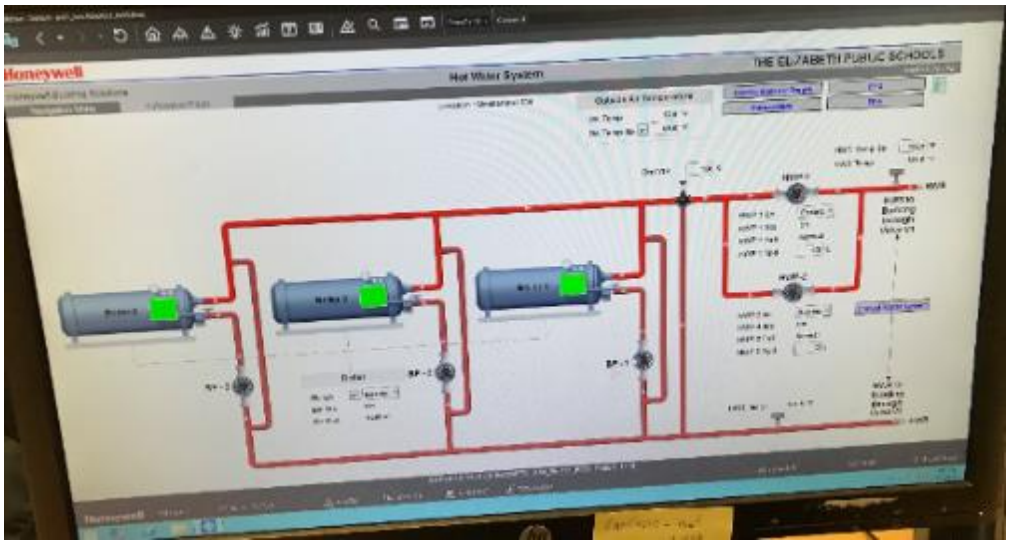
2.6 Heating Hot Water Systems

Three LAARS 1,020 MBh hot water boilers serve the building heating load. The burners are non-modulating with a nominal efficiency of 85%. The boilers are configured in an automated control scheme. All boilers are required under high load conditions. Installed in 2008, they are in good condition. There is a service contract in place.

The boilers are configured in a variable flow primary distribution with two 5 hp variable frequency drive (VFD)-controlled hot water pumps operating with an automated control scheme. The boilers provide hot water to makeup air units and other terminal heating units throughout the building.

Hot water is supplied at 192.5°F when the outside air temperature is low, and the setpoint is adjusted linearly to 144.8°F when the outside air is above 65°F. The hot water return temperature is typically 141°F.

LAARS Boilers



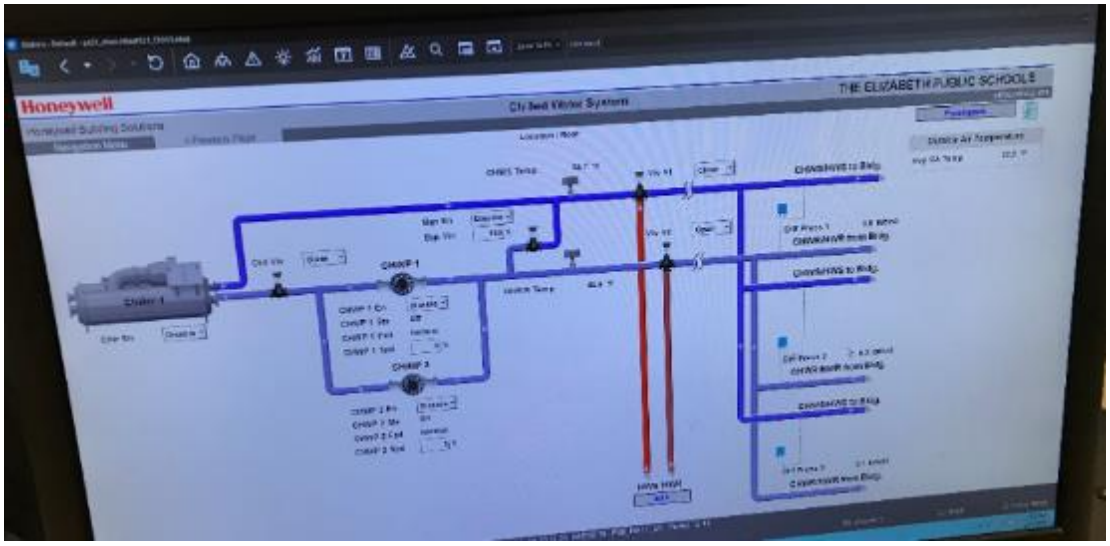
BMS Boiler Control Schematic

2.7 Chilled Water Systems

The chiller plant consists of a 155-ton Trane R-134a reciprocating chiller. The chiller is configured in a primary variable flow with two 15 hp variable speed chilled water pumps. The chiller is air cooled with ten 1.25 hp evaporator fans. Chilled water is provided to terminal zone fan coil units.

The chilled water supply temperature is reset based on outside air temperature. Chilled water is distributed at 54°F.

Air-Cooled Chiller

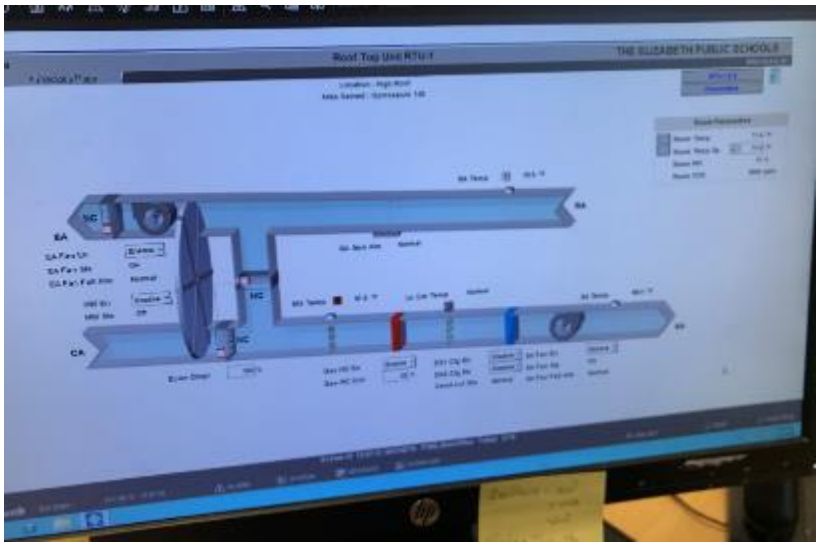


Chiller BMS Control Schematic

2.8 Building Energy Management Systems (EMS)

A Honeywell EMS controls the HVAC equipment, the boilers, the chiller, and the package units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, heating water loop temperatures and chilled water loop temperatures.

BMS Main Screen



RTU Control Screen Schematic

2.9 Domestic Hot Water

There are two water heaters providing domestic hot water to the school. Hot water is produced with a 350 gallon 750 MBh gas-fired and a 200 gallon 500 MBh gas-fired storage water heater, each with an 88% efficiency. Two 0.2 hp circulation pumps distribute water to end uses. The circulation pumps operate continuously.

The domestic hot water pipes are partially insulated, and the insulation is in good condition.

Water Heater and Storage Tank

Water Heater

2.10 Food Service Equipment

The kitchen has electric equipment that is used to prepare meals for students and staff. Most cooking is done using electric ovens and steamers. Bulk prepared foods are held in several electric holding cabinets. Equipment is high-efficiency and is in good condition.

Our analysis determined that this building's food service equipment accounts for a relatively high proportion of overall energy use. While cost-effective opportunities to replace equipment are limited at this time, we recommend that you work with your food service equipment suppliers to maintain equipment in a way that minimizes energy use. This may include cleaning air intakes and exhausts or other methods of keeping your existing equipment operating in top shape. When food service equipment is eventually replaced, consider installing high-efficiency or ENERGY STAR® labeled equipment.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high-efficiency food service equipment.

Steamer Cabinets

Kitchen Supplies

2.11 Refrigeration

The kitchen has several stand-up refrigerators with solid doors. There are two chest refrigerators. Equipment are standard-efficiency and in good condition.

The walk-in medium temperature refrigerator has two 1.5-ton compressor located on the roof and a two-fan evaporator.

Our analysis determined that this building's refrigeration equipment accounts for a relatively high proportion of overall energy use. While cost effective opportunities to replace equipment are limited at this time, we recommend that you work with your refrigeration suppliers to maintain equipment in a way that minimizes energy use. When refrigeration equipment does need to be replaced consider installing high-efficiency or ENERGY STAR® labeled equipment.

Visit https://www.energystar.gov/products/commercial_food_service_equipment for the latest information on high-efficiency food service equipment.

Chest Cooler

Commercial Freezer with Solid Door

Walk-in Cooler

2.12 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 2% percent of total building energy use. This is lower than a typical building.

The staff seems to already be doing a great job managing the electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are approximately 110 computer work stations throughout the school. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as Smart Boards, projectors and TV. There are several residential-style refrigerators throughout the building that are used to store food and other items. These vary in condition and efficiency.

Microwave and residential size refrigerator

Printer and copier

2.13 Water-Using Systems

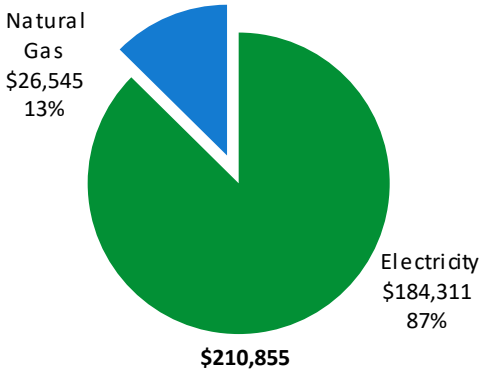
There are 13 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. Toilets are rated at 2.5 gallons per flush (gpf) and urinals are rated at 1.5 gpf.

Restroom Faucets

3 ENERGY USE AND COSTS

Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	1,417,017 kWh	$184,311
Natural Gas	27,368 Therms	$26,545
Total		**$210,855**



An energy balance identifies and quantifies energy use in your various building systems. This can highlight areas with the most potential for improvement. This energy balance was developed using calculated energy use for each of the end uses noted in the figure.

The energy auditor collects information regarding equipment operating hours, capacity, efficiency and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated energy use is then compared to the historical energy use and the initial inputs are revised, as necessary, to balance the calculated energy use to the historical energy use.

Please note that TRC's analysis of utility bills for this site point to higher than expected energy use. We have used available building and energy information data to make informed assumptions about equipment load and runtime. Higher than typical operating hours were required to balance the calculated energy use to the historical energy use.

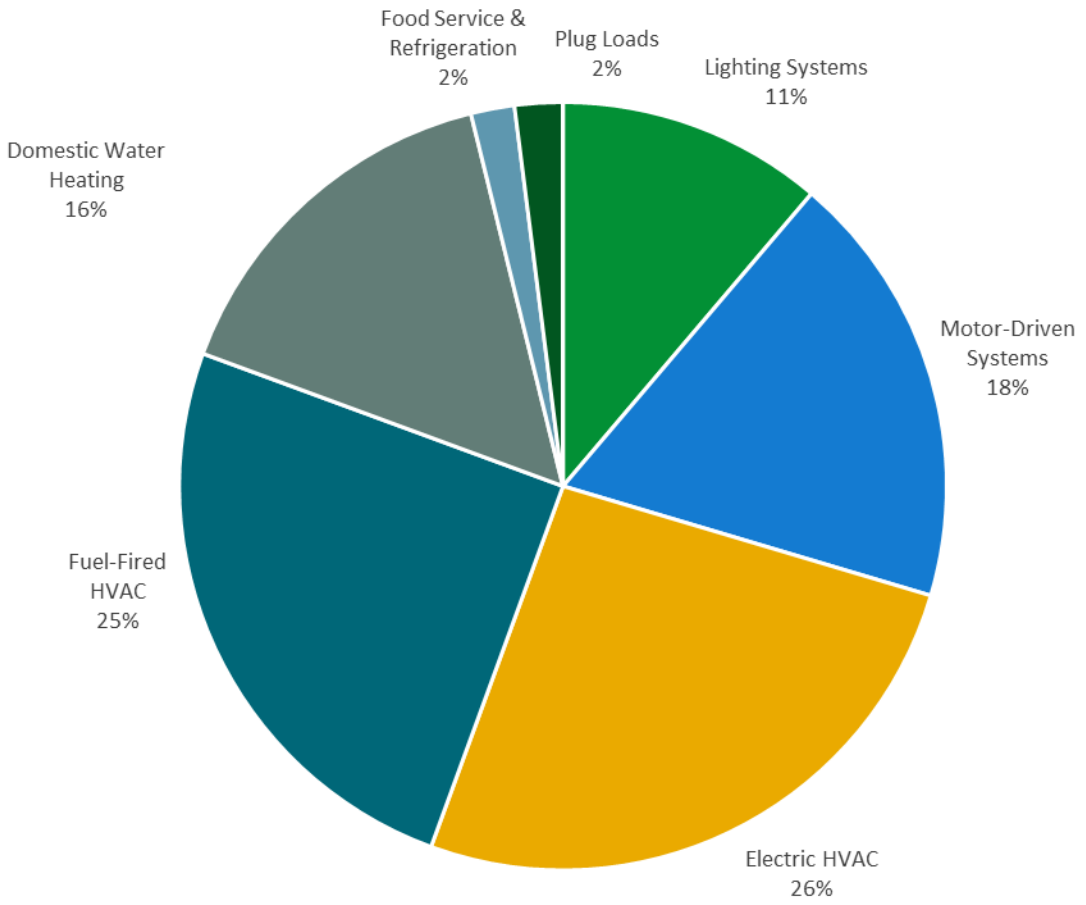
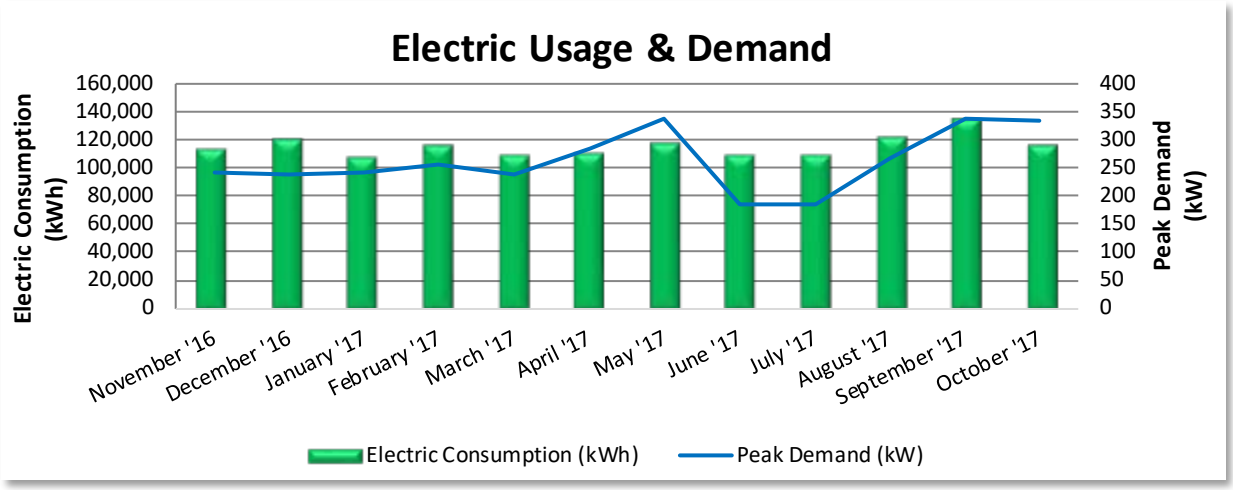


Figure 5 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class LPLS, with electric production provided by a third-party supplier.



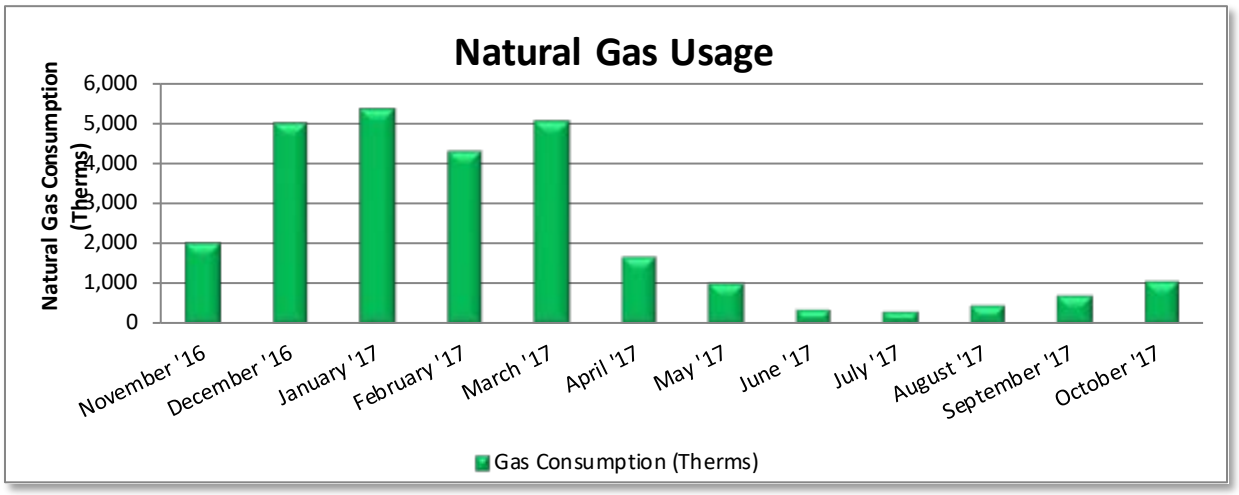
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
12/7/16	32	111,895	242	$902	$11,168
1/9/17	33	119,015	239	$890	$11,954
2/7/17	29	106,788	242	$901	$11,736
3/9/17	30	115,926	255	$952	$12,399
4/7/17	29	107,810	239	$900	$12,108
5/9/17	32	109,946	285	$1,074	$12,752
6/8/17	30	116,343	339	$1,279	$18,517
6/27/17	19	108,901	185	$1,136	$17,084
7/27/17	30	108,900	185	$1,136	$17,084
8/25/17	29	120,418	268	$1,011	$18,097
9/26/17	32	133,567	337	$1,287	$20,601
10/25/17	29	114,803	335	$1,280	$15,255
Totals	**354**	**1,374,312**	**339**	**$12,749**	**$178,756**
Annual	**365**	**1,417,017**	**339**	**$13,145**	**$184,311**

Notes:

- Peak demand of 339 kW occurred in May 2017.
- The average electric cost over the past 12 months was $0.130/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

Elizabethtown Gas delivers natural gas under rate class 202, with natural gas supply provided by UGI Energy, a third-party supplier.



Gas Billing Data				
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**	**TRC Estimated Usage?**
12/1/16	29	2,031	$2,045	No
1/1/17	31	4,980	$4,088	No
2/1/17	31	5,325	$4,302	No
3/1/17	28	4,256	$3,569	No
4/1/17	31	5,050	$4,113	No
5/1/17	30	1,689	$1,809	No
6/1/17	31	1,036	$1,209	Yes
7/1/17	30	382	$913	No
8/1/17	31	320	$876	No
9/1/17	31	454	$965	Yes
10/1/17	30	697	$1,183	Yes
11/1/17	31	1,074	$1,398	No
Totals	**364**	**27,293**	**$26,472**	
Annual	**365**	**27,368**	**$26,545**	

Notes:

- The average gas cost for the past 12 months is $0.970/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's (EPA) *Portfolio Manager®* software. Benchmarking compares your building's energy use to that of similar buildings across the county, while neutralizing variations due to location, occupancy and operating hours. Some building types can be scored with a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average and a score of 100 is best.

This ENERGY STAR® benchmarking score provides a comprehensive snapshot of your building's energy performance. It assesses the building's physical assets, operations, and occupant behavior, which is compiled into a quick and easy-to-understand score.

Benchmarking Score	**5**

This report contains suggestions about how to improve building performance and reduce energy costs.

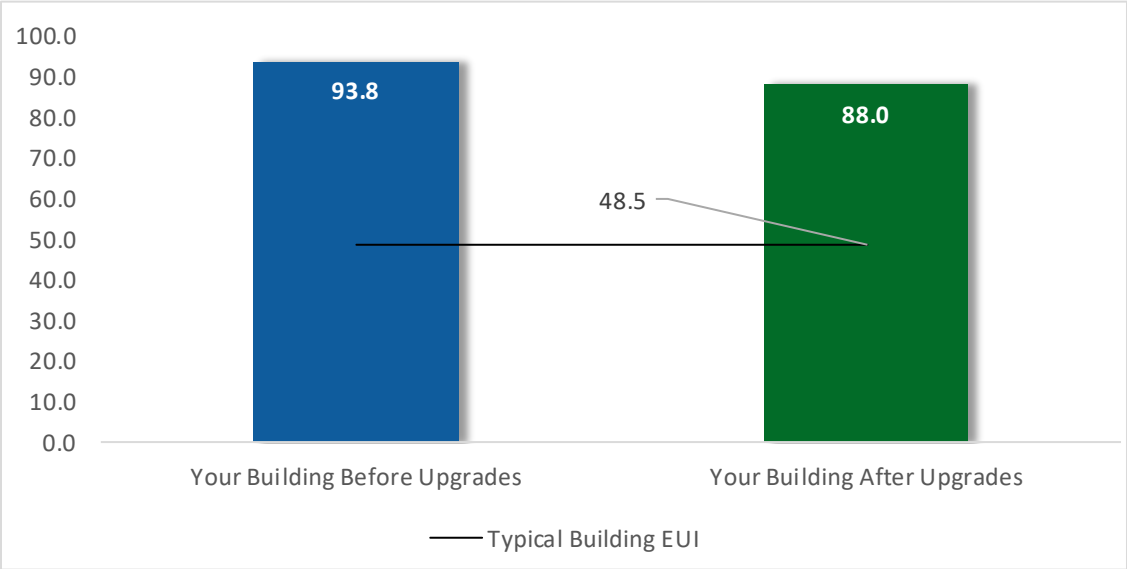


Figure 6 - Energy Use Intensity Comparison

This building performs below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. A number of factors can cause as building to vary from the "typical" energy usage. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and occupant behavior all contribute to a building's energy use and the benchmarking score.

Tracking Your Energy Performance

Keeping track of your energy use on a monthly basis is one of the best ways to keep energy costs in check. Update your utility information in Portfolio Manager® regularly, so that you can keep track of your building's performance.

We have created a Portfolio Manager® account for your facility and we have already entered the monthly utility data shown above for you. Account login information for your account will be sent via email.

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.

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[3].

[3] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1

4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify and evaluate potential energy efficiency improvements, provide information about the cost effectiveness of those improvements, and recognize potential financial incentives from NJBPU. Most energy conservation measures have received preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

Calculations of energy use and savings are based on the current version of *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is 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.

Operation and maintenance costs for the proposed new equipment will generally be lower than the current costs for the existing equipment—especially if the existing equipment is at or past its normal useful life. We have conservatively assumed there to be no impact on overall maintenance costs over the life of the equipment.

Financial incentives are based on the current NJCEP prescriptive SmartStart program. A higher level of investigation may be necessary to support any SmartStart Custom, Pay for Performance, or Direct Install incentive applications. Some measures and proposed upgrades may be eligible for higher incentives than those shown below through other NJCEP programs described in a following section of this report.

#	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		**124,006**	**32.7**	**-25**	**$15,884**	**$52,189**	**$12,505**	**$39,684**	**2.5**	**121,907**
ECM 1	Retrofit Fixtures with LED Lamps	124,006	32.7	-25	$15,884	$52,189	$12,505	$39,684	2.5	121,907
Lighting Control Measures		**20,908**	**4.7**	**-4**	**$2,677**	**$15,795**	**$1,383**	**$14,413**	**5.4**	**20,542**
ECM 2	Install Occupancy Sensor Lighting Controls	17,843	4.0	-4	$2,285	$11,745	$1,383	$10,363	4.5	17,531
ECM 3	Install High/Low Lighting Controls	3,065	0.7	-1	$392	$4,050	$0	$4,050	10.3	3,011
Food Service & Refrigeration Measures		**615**	**0.0**	**0**	**$80**	**$607**	**$80**	**$527**	**6.6**	**619**
ECM 4	Refrigerator/Freezer Case Electrically Commutated Motors	615	0.0	0	$80	$607	$80	$527	6.6	619
TOTALS		**145,529**	**37.4**	**-30**	**$18,641**	**$68,591**	**$13,968**	**$54,623**	**2.9**	**143,068**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 7 – All Evaluated 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		**124,006**	**32.7**	**-25**	**$15,884**	**$52,189**	**$12,505**	**$39,684**	**2.5**	**121,907**
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TOTALS		**145,529**	**37.4**	**-30**	**$18,641**	**$68,591**	**$13,968**	**$54,623**	**2.9**	**143,068**

* - All incentives presented in this table are based on NJ SmartStart 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).

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	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		**124,006**	**32.7**	**-25**	**$15,884**	**$52,189**	**$12,505**	**$39,684**	**2.5**	**121,907**
ECM 1	Retrofit Fixtures with LED Lamps	124,006	32.7	-25	$15,884	$52,189	$12,505	$39,684	2.5	121,907

When considering lighting upgrades, we suggest using a comprehensive design approach that simultaneously upgrades lighting fixtures and controls to maximize energy savings and improve occupant lighting. Comprehensive design will also consider appropriate lighting levels for different space types to make sure that the right amount of light is delivered where needed. If conversion to LED light sources is proposed, we suggest converting all fixtures of a specific lighting type (e.g. linear fluorescent) to LED lamps to minimize the number of lamp types in use at the school, which should help reduce future maintenance costs.

ECM 1: Retrofit Fixtures with LED Lamps

Replace fluorescent and CFL lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as direct replacements 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. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected building areas: classrooms, hallways, restrooms, storage, laboratories, offices, and exterior lighting.

4.2 Lighting Controls

#	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		**20,908**	**4.7**	**-4**	**$2,677**	**$15,795**	**$1,383**	**$14,413**	**5.4**	**20,542**
ECM 2	Install Occupancy Sensor Lighting Controls	17,843	4.0	-4	$2,285	$11,745	$1,383	$10,363	4.5	17,531
ECM 3	Install High/Low Lighting Controls	3,065	0.7	-1	$392	$4,050	$0	$4,050	10.3	3,011

Lighting controls reduce energy use by turning off or lowering lighting fixture power levels when not in use. A comprehensive approach to lighting design should upgrade the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 2: Install Occupancy Sensor Lighting Controls

Install occupancy sensors to control lighting fixtures in areas that are frequently unoccupied, even for short periods. For most spaces, we recommend lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

Occupancy sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Most occupancy sensor lighting controls allow users to manually turn fixtures on/off as needed. Some controls can also provide dimming options.

Occupancy sensors can be mounted on the wall at existing switch locations, on the ceiling, or in remote locations. In general, wall switch replacement sensors are best suited to single occupant offices and other small rooms. Ceiling-mounted or remote-mounted sensors are used in large spaces, locations without local switching, and where wall switches are not in the line-of-sight of the main work area.

This measure provides energy savings by reducing the lighting operating hours.

Affected building areas: classrooms, some restrooms, seminar room, medical room, locker room, cafeteria, kitchen area, and some offices.

ECM 3: Install High/Low Lighting Controls

Install 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.

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. When an occupant enters the space, the lighting fixtures switch to full lighting levels. Fixtures automatically switch back to low level after a predefined period of vacancy. In parking lots and parking garages with significant ambient lighting, this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylight.

The controller lowers the light level by dimming the fixture output. Therefore, the controlled fixtures need to have a dimmable ballast or driver. This will need to be taken into account when selecting retrofit lamps and bulbs for the areas proposed for high/low control.

This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected building areas: hallways.

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

4.3 Food Service & Refrigeration Measures

#	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 & Refrigeration Measures		**615**	**0.0**	**0**	**$80**	**$607**	**$80**	**$527**	**6.6**	**619**
ECM 4	Refrigerator/Freezer Case Electrically Commutated Motors	615	0.0	0	$80	$607	$80	$527	6.6	619

ECM 4: Refrigerator/Freezer Case Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in cooler. Fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors–particularly at low speeds or partial load. By using variable-speed technology, EC motors can optimize fan usage. Because these motors are brushless and use DC power, losses due to friction and phase shifting are eliminated.

Savings for this measure consider both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

5 ENERGY EFFICIENT BEST PRACTICES

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs. You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions.[4] Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Lighting Maintenance

Clean lamps, reflectors and lenses of dirt, dust, oil, and smoke buildup every six to twelve months. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust. Together, this can reduce total light output by up to 60% while still drawing full power.

In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a lighting technician or contractor, decreasing the overall cost of maintenance.

Economizer Maintenance

Economizers can significantly reduce cooling system load. A malfunctioning economizer can increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air. Common economizer malfunctions include broken outdoor thermostat or enthalpy control, or dampers that are stuck or improperly adjusted.

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it 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.

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save five to ten percent of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

[4] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

AC System Evaporator/Condenser Coil Cleaning

Dirty evaporator and condenser coils restrict air flow and restrict heat transfer. This increases the loads on the evaporator and condenser fan, and decreases overall cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

HVAC Filter Cleaning and Replacement

Air filters should be checked regularly (often monthly) and cleaned or replaced when appropriate. Air filters reduce indoor air pollution, increase occupant comfort, and help keep equipment operating efficiently. If the building has a building management system, consider installing a differential pressure switch across filters to send an alarm about premature fouling or overdue filter replacement. Over time, filters become less and less effective as particulate buildup increases. Dirty filters also restrict air flow through the air conditioning or heat pump system, which increases the load on the distribution fans.

Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the water side or fire side of the boiler.

Furnace Maintenance

Preventative 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: check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

Water Heater Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. At least once a year, follow manufacturer instructions to drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Annual checks should include checks for:

- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional.
- For electric water heaters, look for signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank.
- For water heaters more than three years old, have a technician inspect the sacrificial anode annually.

Water Conservation

Installing dual flush or low-flow toilets and low-flow/waterless urinals are ways to reduce water use. The EPA WaterSense™ ratings for urinals is 0.5 gpf and for flush valve toilets is 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

For more information regarding water conservation go to the EPA's WaterSense™ website[5] or download a copy of EPA's "WaterSense™ at Work: Best Management Practices for Commercial and Institutional Facilities"[6] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. 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.

If the facility has detached buildings with a master water meter for the entire campus, check for unnatural wet areas in the lawn or water seeping in the foundation at water pipe penetrations through the foundation. Periodically check overnight meter readings when the school is unoccupied, and there is no other scheduled water usage.

Manage irrigation systems to use water more effectively outside the building. Adjust spray patterns so that water lands on intended lawns and plantings and not on pavement and walls. Consider installing an evapotranspiration irrigation controller that will prevent over-watering.

Procurement Strategies

Purchasing efficient products reduces energy costs without compromising quality. Consider modifying your procurement policies and language to require ENERGY STAR® or WaterSense™ products where available.

[5] https://www.epa.gov/watersense

[6] https://www.epa.gov/watersense/watersense-work-0

6 On-site Generation

You don't have to look far in New Jersey to see one of the thousands of solar electric systems providing clean power to homes, businesses, schools, and government buildings. On-site generation includes both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) technologies that generate power to meet all or a portion of the school's electric energy needs. Also referred to as distributed generation, these systems contribute to greenhouse gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, which results in improved electric grid reliability through better use of transmission and distribution systems.

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze 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.

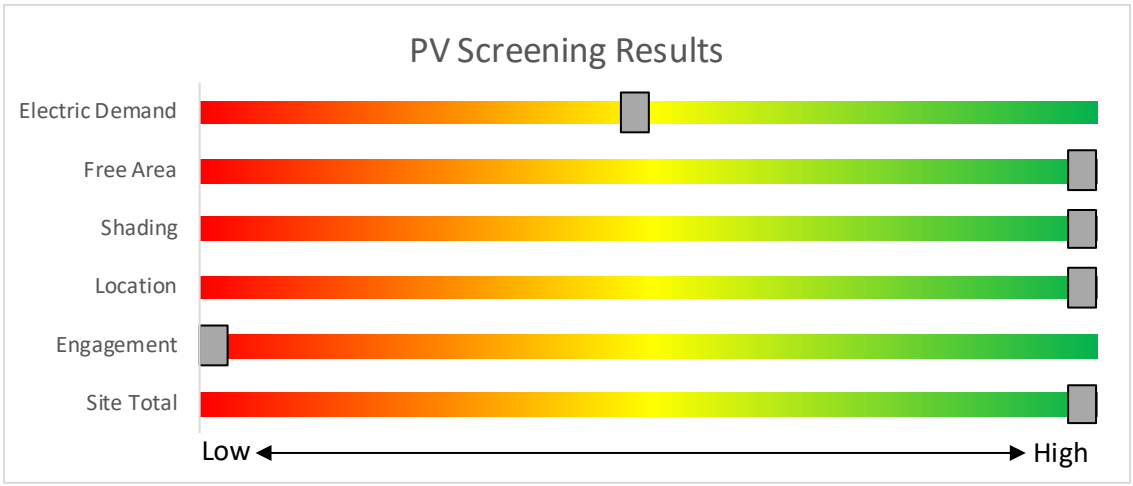
6.1 Solar Photovoltaic

Photovoltaic (PV) panels convert sunlight into electricity. Individual panels are combined into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is then connected to the building's electrical distribution system.

A preliminary screening based on the school's electric demand, size and location of free area, and shading elements shows that the facility has 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. A PV array located on the roof may be feasible. If you are interested in pursuing the installation of PV, we recommend conducting a full feasibility study.

The graphic below displays the results of the PV potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.



Potential	High	
System Potential	129	kW DC STC
Electric Generation	153,687	kWh/yr
Displaced Cost	$19,990	/yr
Installed Cost	$335,400	

Figure 9 - Photovoltaic Screening

Solar Renewable Energy Credit (SREC) Registration Program

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program before starting construction. Once your PV system is up and running, you periodically earn credits, which can then be sold on the open market for up to 15 years.

If you are considering installing solar photovoltaics on your building, visit www.njcleanenergy.com/srec for more information about the SREC Registration Program.

Get more information about solar power in New Jersey or find a qualified solar installer who can help you decide if solar is right for your building:

- **Basic Info on Solar PV in New Jersey**: www.njcleanenergy.com/whysolar
- **New Jersey Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the New Jersey Market**: 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) generate electricity at the school and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for space cooling.

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the school's ability to use the recovered heat. Facilities with a continuous need 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 no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the school does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

The graphic below displays the results of the CHP potential screening conducted as a part of this audit. The position of each slider indicates the potential (potential increases to the right) that each factor contributes to the overall site potential.

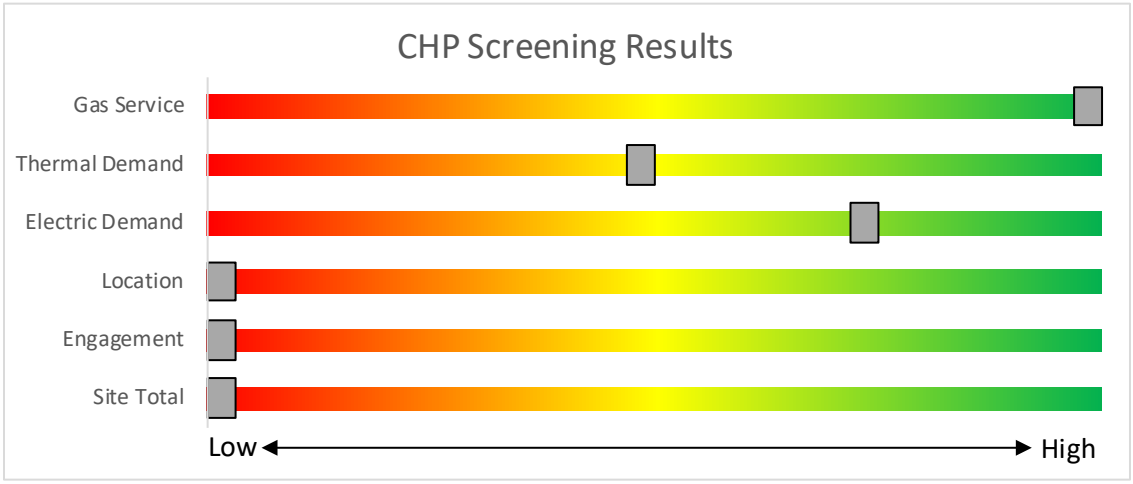


Figure 10 - Combined Heat and Power Screening

Find a qualified firm that specializes in commercial CHP cost assessment and installation: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? Pick the program that works best for you. Incentive programs that may apply to the school are identified in the Executive Summary. This section provides an overview of currently available New Jersey's Clean Energy Programs.

	SmartStart *Flexibility to install at your own pace*	**Direct Install** *Turnkey installation*	**Pay for Performance** *Whole building upgrades*
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.
Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.			

7.1 SmartStart

SmartStart offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

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

Incentives

The SmartStart Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type.

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are 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

Submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. You can work with your preferred contractor or use internal staff to install measures.

Visit www.njcleanenergy.com/SSB for a detailed program description, instructions for applying, and applications.

7.2 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. 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. Annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive for the life of the contract.

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 described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

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 used 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. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you can use NJCEP incentive programs to help further reduce costs when developing the energy savings plan. Refer to the ESIP guidelines at the link above for further information and guidance on next steps.

7.3 SREC Registration Program

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

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

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

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar Renewable Portfolio Standard. Purchasing SRECs can help them meet those requirements. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period fluctuates depending on supply and demand.

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

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

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 already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party electric suppliers is available at the NJBPU website[7].

8.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate monthly. 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 typically depends on whether a customer prefers 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 does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

A list of licensed third-party natural gas suppliers is available at the NJBPU website[8].

[7] www.state.nj.us/bpu/commercial/shopping.html.

[8] 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	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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 234	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.4	1,756	0	$225	$584	$160	1.9
Mech Room 234	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
100 Tech/Electric Eoom	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.2	1,098	0	$141	$365	$100	1.9
Stairs3	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.1	549	0	$70	$183	$50	1.9
Stairs3	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 126A	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,087	1	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,087	0.0	129	0	$16	$73	$20	3.2
Room 126A	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.2	838	0	$107	$489	$95	3.7
126 A - RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
233 Electric Room	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	13	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.3	1,427	0	$183	$475	$130	1.9
233 Electric 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	0.0	0	0	$0	$0	$0	0.0
Room 137/137a	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	559	0	$72	$416	$75	4.8
136 Outdoor Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	29	0	$4	$73	$20	14.3
138 Outdoor Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	29	0	$4	$73	$20	14.3
131A Electric	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	110	0	$14	$37	$10	1.9
124 Custodial	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
122 Piano Room	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.5	2,374	0	$304	$891	$205	2.3
128 Central Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	29	0	$4	$73	$20	14.3
140 - Faculty Dining	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.2	838	0	$107	$489	$95	3.7
112 Main Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.3	1,257	0	$161	$599	$125	2.9
RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	110	0	$14	$37	$10	1.9
Principal	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	629	0	$80	$434	$80	4.4
Conf. Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
Conf. Room	8	Compact Fluorescent: (2) 40W Biax Lamps	Wall Switch	S	80	3,024	1, 2	Relamp	Yes	8	LED Lamps: 28 Watt LED - 2L	Occupancy Sensor	56	2,087	0.2	1,101	0	$141	$546	$51	3.5
112 Break Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.2	838	0	$107	$489	$95	3.7
112 A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	419	0	$54	$380	$65	5.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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
110 IDF	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
108 Elev. Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	110	0	$14	$37	$10	1.9
133 Cafeteria	40	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,024	1, 2	Relamp	Yes	40	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,087	2.1	9,843	-2	$1,260	$3,596	$888	2.1
133 D Kitchen	8	Compact Fluorescent: (2) 40W Biax Lamps	Wall Switch	S	80	3,024	1, 2	Relamp	Yes	8	LED Lamps: 28 Watt LED - 2L	Occupancy Sensor	56	2,087	0.2	1,101	0	$141	$546	$51	3.5
133 D Kitchen	17	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	17	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.8	3,562	-1	$456	$1,201	$290	2.0
133 D 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	0.0	0	0	$0	$0	$0	0.0
Recycling	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	559	0	$72	$416	$75	4.8
Recycling	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
133 B Storage	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1, 2	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.6	370	0	$47	$1,270	$200	22.6
133 B Storage	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
133 H Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	15	0	$2	$37	$10	14.3
133 E K Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,024	0.0	165	0	$21	$55	$15	1.9
133 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	15	0	$2	$37	$10	14.3
133 Cafeteria	32	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	32	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
133 Cafeteria	13	Halogen Incandescent: 90 W - 1 Lamp	Wall Switch	s	90	3,024	1, 2	Relamp	Yes	13	LED Lamps: 13 Watt LED - 1L	Occupancy Sensor	13	2,087	0.8	3,504	-1	$449	$494	$48	1.0
133 Cafeteria	2	Compact Fluorescent: (2) 40W Biax Lamps	Wall Switch	S	80	3,024	1	Relamp	No	2	LED Lamps: 28 Watt LED - 2L	Wall Switch	56	3,024	0.0	160	0	$20	$69	$4	3.2
133A Café Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	29	0	$4	$73	$20	14.3
124 Custodial	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
135 Gym	25	Compact Fluorescent: U-type CFL - 50 Watt 8-Lamp	Wall Switch	s	400	3,024	1, 2	Relamp	Yes	25	LED Lamps: 35 Watt LED - 8L	Occupancy Sensor	280	2,087	3.7	17,197	-4	$2,202	$3,985	$270	1.7
135 D Gym Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	74	0	$9	$416	$40	39.7
135 Gym	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Girls Locker	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.4	1,676	0	$215	$708	$155	2.6
135E PE	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
135 RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
Boys Locker	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.4	1,676	0	$215	$708	$155	2.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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
135 A PE	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
135 A RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
130 Nurse	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.3	1,257	0	$161	$599	$125	2.9
130 C COT Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
130 C COT Room	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	151	0	$19	$73	$20	2.7
130A Exam Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,024	1, 2	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,087	0.1	492	0	$63	$416	$75	5.4
Room 132	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.6	1,818	0	$233	$876	$240	2.7
Room 132	3	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Occupancy Sensor	S	52	2,087	1	Relamp	No	3	LED Lamps: 18 Watt LED - 2L	Occupancy Sensor	36	2,087	0.0	110	0	$14	$103	$6	6.9
132A Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	29	0	$4	$73	$20	14.3
102 Music Room	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.6	1,818	0	$233	$876	$240	2.7
102 Music Room	2	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Occupancy Sensor	S	52	2,087	1	Relamp	No	2	LED Lamps: 18 Watt LED - 2L	Occupancy Sensor	36	2,087	0.0	73	0	$9	$69	$4	6.9
102 C Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
102 B Practice	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	419	0	$54	$380	$65	5.9
102 A Practice	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
Boys RR	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	419	0	$54	$380	$65	5.9
104 B Janitor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	110	0	$14	$37	$10	1.9
101 Classroom	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
101 Classroom	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,087	0.0	133	0	$17	$145	$20	7.3
103 Classroom	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
105 Classroom	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
Faculty Room Women	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
107 Classroom	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
Faculty Room Men	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
Girls RR	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	559	0	$72	$416	$75	4.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Girls RR	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
109 SCC1	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	341	0	$44	$164	$45	2.7
116 SCC1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
118 SCC1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
111 Classroom	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.3	909	0	$116	$438	$120	2.7
111 A Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	15	0	$2	$37	$10	14.3
113 Classroom	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	400	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	400	0.0	22	0	$3	$55	$15	14.3
115 Observation	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
117 Classroom	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,136	0	$145	$548	$150	2.7
117 Classroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,024	0.0	96	0	$12	$72	$10	5.1
RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
117 A Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	400	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	400	0.0	22	0	$3	$55	$15	14.3
120 Practive	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.3	1,023	0	$131	$493	$135	2.7
119 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
119 A Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	400	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	400	0.0	22	0	$3	$55	$15	14.3
121 Observation	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
123 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
127 Observation	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
129 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
125 Classroom	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
First Fl. Hall	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,087	0.4	1,676	0	$215	$978	$120	4.0
First Fl. Hall	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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
First Fl. Hall	12	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1, 3	Relamp	Yes	12	LED Lamps: 18 Watt LED - 2L	High/Low Control	36	2,087	0.2	1,084	0	$139	$953	$24	6.7
Vestibule	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.3	1,537	0	$197	$511	$140	1.9
Vestibule	2	Compact Fluorescent: T6 - 55 Watt 2-Lamp	Wall Switch	S	110	3,024	1	Relamp	No	2	LED Lamps: 38 Watt LED - 2L	Wall Switch	76	3,024	0.0	226	0	$29	$69	$4	2.2
Vestibule	3	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	3	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	160	0	$20	$103	$6	4.8
Vestibule	2	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	2	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	106	0	$14	$69	$4	4.8
Vestibule	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Fl. Hall	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,087	0.2	1,117	0	$143	$562	$80	3.4
1st Fl. Hall	4	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1, 3	Relamp	Yes	4	LED Lamps: 18 Watt LED - 2L	High/Low Control	36	2,087	0.1	361	0	$46	$408	$8	8.6
1st Fl. Hall	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Fl. Hall	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,087	0.4	1,955	0	$250	$1,051	$140	3.6
1st Fl. Hall	4	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1, 3	Relamp	Yes	4	LED Lamps: 18 Watt LED - 2L	High/Low Control	36	2,087	0.1	361	0	$46	$408	$8	8.6
Stair 1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.3	1,317	0	$169	$438	$120	1.9
Stair 1	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 201	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
Room 201	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor		62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,087	0.0	67	0	$9	$72	$10	7.3
252 Medical	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.7	3,352	-1	$429	$1,416	$310	2.6
252 Medical	8	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1, 2	Relamp	Yes	8	LED Lamps: 18 Watt LED - 2L	Occupancy Sensor	36	2,087	0.2	723	0	$93	$546	$51	5.3
252 Medical	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.7	3,352	-1	$429	$1,416	$310	2.6
Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	629	0	$80	$434	$80	4.4
222 B Seminar	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	279	0	$36	$343	$20	9.0
222 B Seminar	4	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1, 2	Relamp	Yes	4	LED Lamps: 18 Watt LED - 2L	Occupancy Sensor	36	2,087	0.1	361	0	$46	$408	$43	7.9
202C Reading	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	629	0	$80	$434	$80	4.4
202D Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.1	58	0	$7	$146	$40	14.3
202D Storage	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Trophycase	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boys 2nd Fl.	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	559	0	$72	$416	$75	4.8
Boys 2nd Fl.	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
Girls 2nd Fl	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	559	0	$72	$416	$75	4.8
204-3 Janitor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	110	0	$14	$37	$10	1.9
208 CST	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	419	0	$54	$380	$65	5.9
203 Science Lab	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
203 Science Lab	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,087	0.0	133	0	$17	$145	$20	7.3
Science Prep	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1, 2	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	629	0	$80	$434	$80	4.4
Chemial Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	400	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	400	0.1	44	0	$6	$110	$30	14.3
203 Lab	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Trophy Case2	1	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	S	48	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 3' Lamps	Wall Switch	21	3,024	0.0	90	0	$11	$37	$10	2.3
Faculty	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
Faculty 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
205 Faculty Workroom	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.2	682	0	$87	$329	$90	2.7
205A Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	400	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	400	0.0	15	0	$2	$37	$10	14.3
207 Art Lab	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.5	1,704	0	$218	$822	$225	2.7
207 Art Lab	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
207A Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	29	0	$4	$73	$20	14.3
210 Faculty Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.0	15	0	$2	$37	$10	14.3
Case 3	1	Linear Fluorescent - T8: 3' T8 (25W) - 2L	Wall Switch	S	48	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 3' Lamps	Wall Switch	21	3,024	0.0	90	0	$11	$37	$10	2.3
212 MDF	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.2	698	0	$89	$453	$85	4.1
ROOM 214	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,136	0	$145	$548	$150	2.7
Room 216	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,136	0	$145	$548	$150	2.7
218 Supply Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	400	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	400	0.1	44	0	$6	$110	$30	14.3
209 Room	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.6	1,818	0	$233	$876	$240	2.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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
209 Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	400	1	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	400	0.1	58	0	$7	$146	$40	14.3
209 Room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
209 Room	2	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Occupancy Sensor	S	52	2,087	1	Relamp	No	2	LED Lamps: 18 Watt LED - 2L	Occupancy Sensor	36	2,087	0.0	73	0	$9	$69	$4	6.9
209 Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.0	114	0	$15	$55	$15	2.7
220 Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
222 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	400	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	400	0.1	44	0	$6	$110	$30	14.3
224 SCCI	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,024	1	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,024	0.1	659	0	$84	$219	$60	1.9
226 Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
Room 228	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
Room 230	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	454	0	$58	$219	$60	2.7
Room 213	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
Room 211	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,250	0	$160	$602	$165	2.7
2ND Fl Hall	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,087	0.5	2,095	0	$268	$1,088	$150	3.5
2ND Fl Hall	11	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1, 3	Relamp	Yes	11	LED Lamps: 18 Watt LED - 2L	High/Low Control	36	2,087	0.2	994	0	$127	$919	$22	7.0
2ND Fl Hall	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stair 2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.3	1,317	0	$169	$438	$120	1.9
Stair 2	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 342	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
Room 340	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
Room 338	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
Room 336	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.0	114	0	$15	$55	$15	2.7
334 Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	400	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	400	0.0	29	0	$4	$73	$20	14.3
Room 332	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
Room 330	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
328 Book Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	400	1	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	400	0.1	65	0	$8	$164	$45	14.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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 326	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.0	114	0	$15	$55	$15	2.7
Room 322	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,363	0	$175	$657	$180	2.7
Room 324	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.4	1,136	0	$145	$548	$150	2.7
Room 320	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.1	419	0	$54	$380	$65	5.9
Girls 3rd Fl	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.2	838	0	$107	$489	$95	3.7
Girls 3rd Fl	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
Female Faculty	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
Male Faculty	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,087	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,087	0.0	76	0	$10	$37	$10	2.7
Boys 3rd Fl	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.1	549	0	$70	$183	$50	1.9
Boys 3rd Fl	1	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	1	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.0	53	0	$7	$34	$2	4.8
Room 314	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
302 SCC1	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
Room 310	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	227	0	$29	$110	$30	2.7
Room 316	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.3	1,023	0	$131	$493	$135	2.7
Attic	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.3	1,537	0	$197	$511	$140	1.9
312 Elec	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
318 SG1	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.1	454	0	$58	$219	$60	2.7
Room 308	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,087	1	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,087	0.3	1,023	0	$131	$493	$135	2.7
3rd Fl Hall	8	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Wall Switch	S	52	3,024	1	Relamp	No	8	LED Lamps: 18 Watt LED - 2L	Wall Switch	36	3,024	0.1	426	0	$55	$276	$16	4.8
3rd Fl Hall	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,087	0.5	2,095	0	$268	$1,088	$150	3.5
3rd Fl Hall	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Elevator	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	220	0	$28	$73	$20	1.9
304b Janitor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,024	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,024	0.0	110	0	$14	$37	$10	1.9
Exterior	4	Compact Fluorescent: 4-pin 42 Watt - 2Lamp	Photocell		84	4,380	1	Relamp	No	4	LED Lamps: 30 Watt LED - 2L	Photocell	60	4,380	0.0	420	0	$55	$138	$8	2.4
Exterior	2	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Photocell		52	4,380	1	Relamp	No	2	LED Lamps: 18 Watt LED - 2L	Photocell	36	4,380	0.0	140	0	$18	$69	$4	3.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	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	4	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Photocell		52	4,380	1	Relamp	No	4	LED Lamps: 18 Watt LED - 2L	Photocell	36	4,380	0.0	280	0	$36	$138	$8	3.6
Exterior	4	Compact Fluorescent: 4-pin 42 Watt - 2Lamp	Photocell		84	4,380	1	Relamp	No	4	LED Lamps: 30 Watt LED - 2L	Photocell	60	4,380	0.0	420	0	$55	$138	$8	2.4
Exterior	3	Compact Fluorescent: 4-pin 42 Watt - 2Lamp	Photocell		84	4,380	1	Relamp	No	3	LED Lamps: 30 Watt LED - 2L	Photocell	60	4,380	0.0	315	0	$41	$103	$6	2.4
Exterior	7	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Photocell		52	4,380	1	Relamp	No	7	LED Lamps: 18 Watt LED - 2L	Photocell	36	4,380	0.1	491	0	$64	$241	$14	3.6
Exterior	11	Compact Fluorescent: 4-pin 26 Watt - 2Lamp	Photocell		52	4,380	1	Relamp	No	11	LED Lamps: 18 Watt LED - 2L	Photocell	36	4,380	0.1	771	0	$100	$379	$22	3.6

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?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Chiller - CHWP1	1	Chilled Water Pump	15.0	93.0%	Yes	W	3,391		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Chiller - CHWP 2	1	Chilled Water Pump	15.0	93.0%	Yes	W	3,391		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Boiler	1	Heating Hot Water Pump	5.0	90.2%	Yes	W	2,745		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Boiler	1	Heating Hot Water Pump	5.0	90.2%	Yes	W	2,745		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	DHW Pump	1	Water-Source Heat Pump Circulation Pump	0.2	68.5%	No	W	2,745		No	68.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	DHW Pump	1	Water-Source Heat Pump Circulation Pump	0.2	68.5%	No	W	2,745		No	68.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	B-1	1	Boiler Feed Water Pump	0.5	81.8%	No	W	2,745		No	81.8%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	B-2	1	Boiler Feed Water Pump	0.5	81.8%	No	W	2,745		No	81.8%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room	B-3	1	Boiler Feed Water Pump	0.5	81.8%	No	W	2,745		No	81.8%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Kitchen Hood	1	Makeup Air Fan	5.0	90.2%	No	W	3,500		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Roof	DishWash Hood	1	Makeup Air Fan	1.0	85.5%	No	W	3,500		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-4	1	Supply Fan	7.5	91.0%	No	W	3,500		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-4	1	Exhaust Fan	5.0	90.2%	No	W	3,500		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-4	1	Process Fan	0.8	81.8%	No	W	3,500		No	81.8%	No		0.0	0	0	$0	$0	$0	0.0
Roof	MUA-2	1	Makeup Air Fan	0.8	81.8%	No	W	3,500		No	81.8%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-3	1	Supply Fan	7.5	91.0%	No	W	3,500		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-3	1	Exhaust Fan	5.0	90.2%	No	W	3,500		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-2	1	Supply Fan	7.5	91.0%	No	W	3,500		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-2	1	Exhaust Fan	7.5	91.0%	No	W	3,500		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	HRU-1	1	Supply Fan	10.0	91.7%	No	W	3,500		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0

		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?	Remaining Useful Life	Annual Operating Hours	ECM #	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	HRU-1	1	Exhaust Fan	7.5	91.0%	No	W	3,500		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-1	1	Supply Fan	3.0	89.5%	No	W	3,500		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2	1	Supply Fan	3.0	89.5%	No	W	3,500		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-3	1	Supply Fan	3.0	89.5%	No	W	3,500		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4	1	Supply Fan	3.0	89.5%	No	W	3,500		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-1	1	Return Fan	1.0	85.5%	No	W	3,500		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2	1	Return Fan	1.0	85.5%	No	W	3,500		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-3	1	Return Fan	2.0	86.5%	No	W	3,500		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4	1	Return Fan	2.0	86.5%	No	W	3,500		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	AC	1	Process Fan	7.5	91.0%	No	W	3,500		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	AC	10	Process Fan	1.3	83.8%	No	W	3,500		No	83.8%	No		0.0	0	0	$0	$0	$0	0.0
Rooms	Blower Coil Units	80	Supply Fan	0.5	78.0%	No	W	3,500		No	78.0%	No		0.0	0	0	$0	$0	$0	0.0

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 (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	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	Various	1	Split-System Air-Source HP	0.75	12.00	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	HRU-4	1	Packaged AC	14.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various HRU-3	1	Packaged AC	14.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various HRU-2	1	Packaged AC	14.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various HRU-1	1	Packaged AC	19.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU1- Gym	1	Packaged AC	10.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU2-Gym	1	Packaged AC	10.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU3-Auditorium	1	Packaged AC	8.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	RTU4-Auditorium	1	Packaged AC	8.00		W		No							0.0	0	0	$0	$0	$0	0.0
Indoor	Classroom	1	Electric Forced Air Furnace		17.00	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Packaged AC	80.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Split-System Air-Source HP	2.00	27.60	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Split-System Air-Source HP	2.00	27.60	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Split-System Air-Source HP	1.50	21.60	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Split-System Air-Source HP	2.00	27.60	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Split-System Air-Source HP	2.50	32.00	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Split-System Air-Source HP	1.50	21.60	W		No							0.0	0	0	$0	$0	$0	0.0
Halls	Halls	3	Electric Resistance Heat		13.65	W		No							0.0	0	0	$0	$0	$0	0.0

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)	Remaining Useful Life	ECM #	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
Boiler Room	Chiller	1	Air-Cooled Scroll Chiller	155.00	w		No							0.0	0	0	$0	$0	$0	0.0

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)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room	Boiler	1	Non-Condensing Hot Water Boiler	######	w		No						0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Boiler	1	Non-Condensing Hot Water Boiler	######	w		No						0.0	0	0	$0	$0	$0	0.0
Mechanical Room	Boiler	1	Non-Condensing Hot Water Boiler	######	w		No						0.0	0	0	$0	$0	$0	0.0
Roof	MUA-2	1	Warm Air Unit Heater	100.00	w		No						0.0	0	0	$0	$0	$0	0.0
Roof	RTU-2	1	Furnace	219.00	w		No						0.0	0	0	$0	$0	$0	0.0
Roof	RTU-4	1	Furnace	146.00	w		No						0.0	0	0	$0	$0	$0	0.0
Roof	RTU-3	1	Furnace	146.00	w		No						0.0	0	0	$0	$0	$0	0.0
Roof	RTU-1	1	Furnace	219.00	w		No						0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

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

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions				Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	ECM #	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Cooler (35F to 55F)	4	Yes	No	No	0.0	615	0	$80	$607	$80	6.6

Commercial Refrigerator/Freezer Inventory & Recommendations

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

Cooking Equipment Inventory & Recommendations

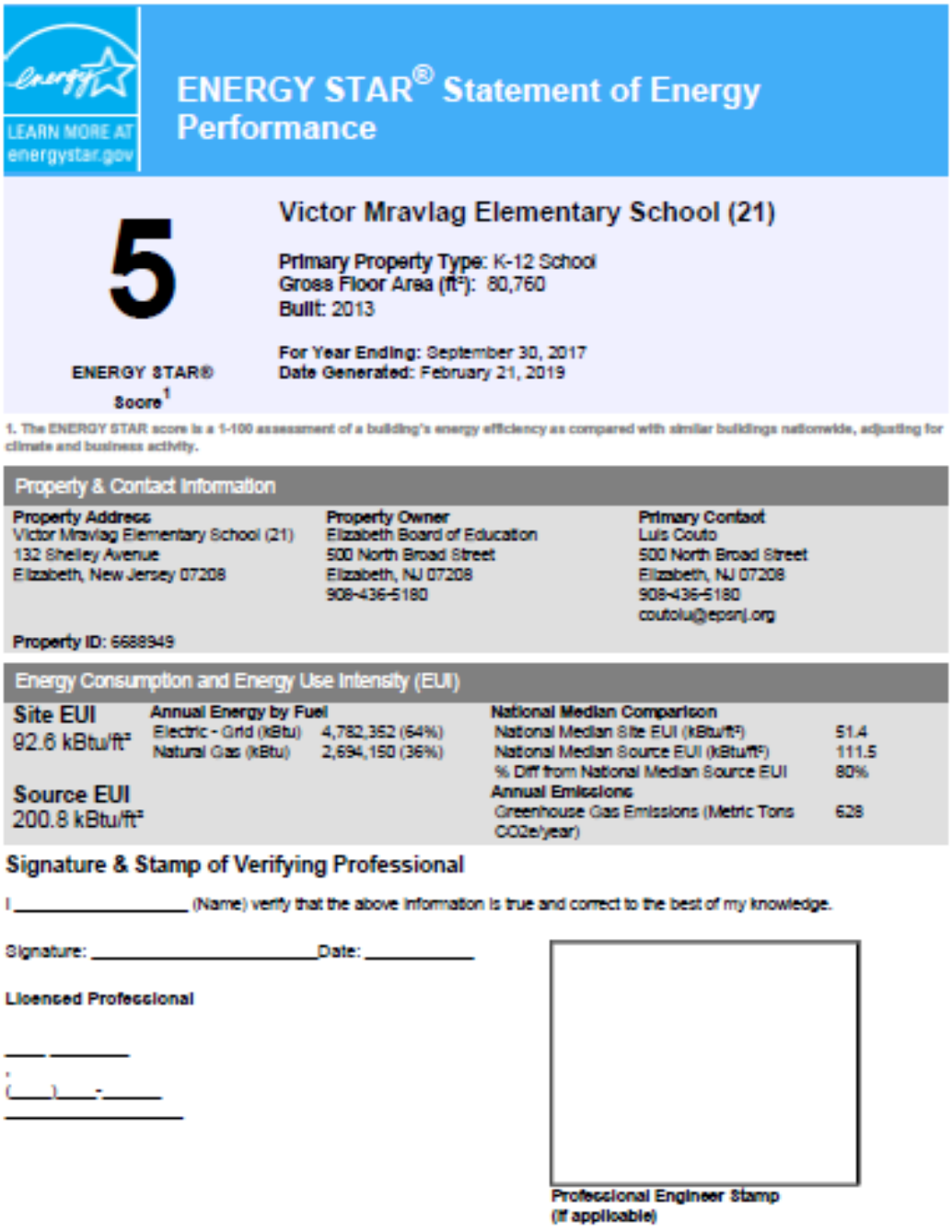
	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	2	Insulated Food Holding Cabinet (1/2 Size)	No		No	0.0	0	0	FALSE	$0	$0	#DIV/0!
Kitchen	1	Electric Convection Oven (Half Size)	Yes		No	0.0	0	0	FALSE	$0	$0	#DIV/0!
Kitchen	1	Electric Steamer	No		No	0.0	0	0	FALSE	$0	$0	#DIV/0!

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Various	110	Computer	120.0	No
Various	5	Medium Coppier/Printer	200.0	No
Various	4	Large Coppier/Printer	494.0	No
Various	22	Small Printer	192.0	No
Various	17	Projector	150.0	No
Various	7	Microwave	800.0	No
Various	1	Small Refrigerator	150.0	No
Various	3	Large Refrigerator with Freezer	300.0	No
Various	3	Medium Refrigerator	220.0	No
Various	8	Coffee Machine	300.0	No
Various	2	42'' LCD TV	150.0	No

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel 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.



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ENERGY STAR® Statement of Energy Performance

5

ENERGY STAR® Score[1]

Victor Mravlag Elementary School (21)

Primary Property Type: K-12 School
Gross Floor Area (ft²): 80,760
Built: 2013

For Year Ending: September 30, 2017
Date Generated: February 21, 2019

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
Victor Mravlag Elementary School (21) 132 Shelley Avenue Elizabeth, New Jersey 07208	Elizabeth Board of Education 500 North Broad Street Elizabeth, NJ 07208 908-436-5180	Luis Couto 500 North Broad Street Elizabeth, NJ 07208 908-436-5180 coutolu@epsnj.org

Property ID: 6688949

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
92.6 kBtu/ft²

Source EUI
200.8 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Electric - Grid (kBtu)	4,782,352 (64%)	National Median Site EUI (kBtu/ft²)	51.4
Natural Gas (kBtu)	2,694,150 (36%)	National Median Source EUI (kBtu/ft²)	111.5
		% Diff from National Median Source EUI	80%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	628

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)

APPENDIX C: GLOSSARY

TERM	DEFINITION
Blended Rate	Used to calculate fiscal savings associated with measures. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is $22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour.
Btu	*British thermal unit*: a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit.
CHP	*Combined heat and power*. Also referred to as cogeneration.
COP	*Coefficient of performance*: a measure of efficiency in terms of useful energy delivered divided by total energy input.
Demand Response	Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives.
DCV	*Demand control ventilation*: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need.
US DOE	*United States Department of Energy*
EC Motor	*Electronically commutated motor*
ECM	*Energy conservation measure*
EER	*Energy efficiency ratio*: a measure of efficiency in terms of cooling energy provided divided by electric input.
EUI	*Energy Use Intensity:* measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance.
Energy Efficiency	Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service.
ENERGY STAR®	ENERGY STAR® is the government-backed symbol for energy efficiency. The ENERGY STAR® program is managed by the EPA.
EPA	*United States Environmental Protection Agency*
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
GHG	*Greenhouse gas:* gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
gpf	*Gallons per flush*

gpm	*Gallon per minute*
HID	*High intensity discharge:* high-output lighting lamps such as high-pressure sodium, metal halide, and mercury vapor.
hp	*Horsepower*
HPS	*High-pressure sodium*: a type of HID lamp.
HSPF	*Heating seasonal performance factor:* a measure of efficiency typically applied to heat pumps. Heating energy provided divided by seasonal energy input.
HVAC	*Heating, ventilating, and air conditioning*
IHP 2014	US DOE Integral Horsepower rule. The current ruling regarding required electric motor efficiency.
IPLV	*Integrated part load value:* a measure of the part load efficiency usually applied to chillers.
kBtu	One thousand British thermal units
kW	*Kilowatt*: equal to 1,000 Watts.
kWh	*Kilowatt-hour*: 1,000 Watts of power expended over one hour.
LED	*Light emitting diode*: a high-efficiency source of light with a long lamp life.
LGEA	*Local Government Energy Audit*
Load	The total power a building or system is using at any given time.
Measure	A single activity, or installation of a single type of equipment, that is implemented in a building system to reduce total energy consumption.
MH	*Metal halide*: a type of HID lamp.
MBh	*Thousand Btu per hour*
MBtu	*One thousand British thermal units*
MMBtu	*One million British thermal units*
MV	*Mercury Vapor:* a type of HID lamp.
NJBPU	*New Jersey Board of Public Utilities*
NJCEP	*New Jersey's Clean Energy Program:* NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment.
psig	Pounds per square inch gauge
Plug Load	Refers to the amount of power used in a space by products that are powered by means of an ordinary AC plug.
PV	*Photovoltaic:* refers to an electronic device capable of converting incident light directly into electricity (direct current).

SEER	*Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input.
SEP	*Statement of energy performance:* a summary document from the ENERGY STAR® Portfolio Manager®.
Simple Payback	The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings.
SREC	*Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of 1/8th of an inch.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
therm	100,000 Btu. Typically used as a measure of natural gas consumption.
tons	A unit of cooling capacity equal to 12,000 Btu/hr.
Turnkey	Provision of a complete product or service that is ready for immediate use
VAV	*Variable air volume*
VFD	*Variable frequency drive*: a controller used to vary the speed of an electric motor.
WaterSense™	The symbol for water efficiency. The WaterSense™ program is managed by the EPA.
Watt (W)	Unit of power commonly used to measure electricity use.