Local Government Energy Audit Report

Burlington Township High School - Hopkins Building

August 29, 2019

Prepared for:

Burlington Township Board of Education
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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 Companies Inc. (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.

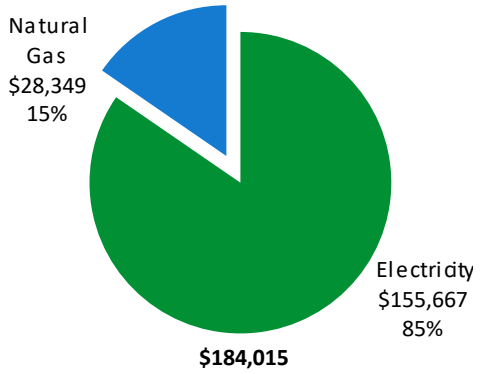
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Burlington Township High School - Hopkins Building. 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 Companies Inc. (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: $184,015 Electricity: 936,580 kWh Natural Gas: 39,056 Therms	
ENERGY STAR® Benchmarking Score	22 *(1-100 scale)*	This building performs below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

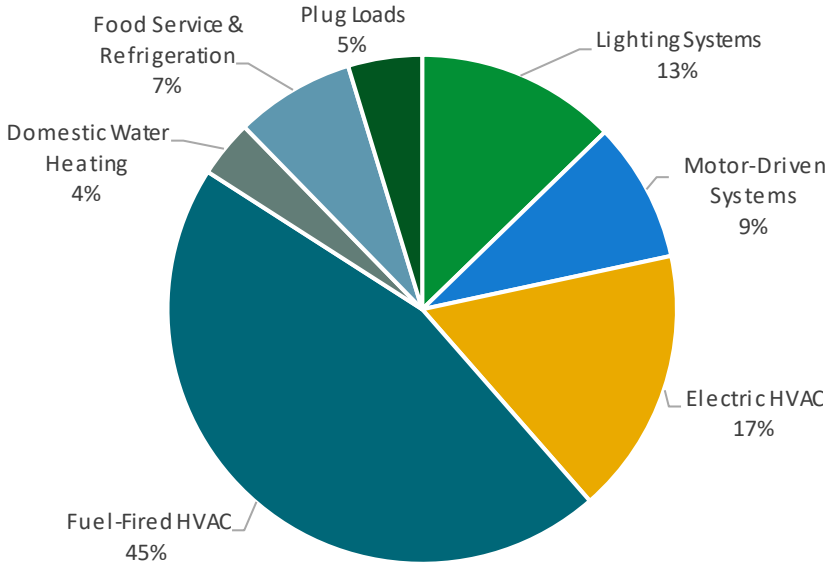


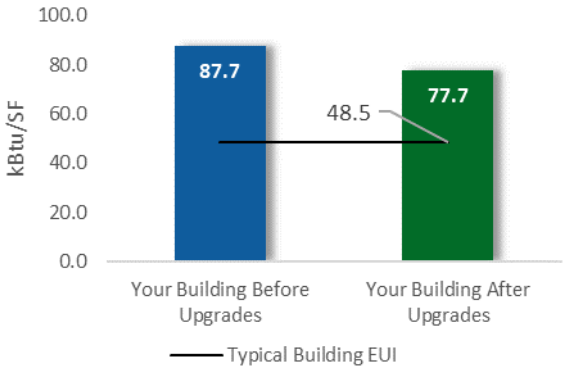
Figure 1 - Energy Use by System

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.

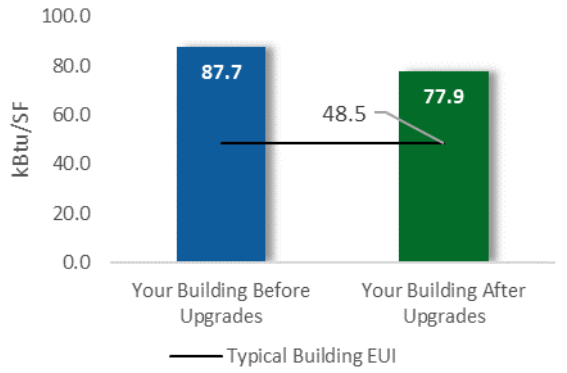
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$106,667
Potential Rebates & Incentives[1]	$14,004
Annual Cost Savings	$37,425
Annual Energy Savings	Electricity: 223,233 kWh Natural Gas: 444 Therms
Greenhouse Gas Emission Savings	115 Tons
Simple Payback	2.9 Years
Site Energy Savings (all utilities)	11%



Scenario 2: Cost Effective Package[2]

Installation Cost	$98,386
Potential Rebates & Incentives	$13,620
Annual Cost Savings	$36,747
Annual Energy Savings	Electricity: 219,151 kWh Natural Gas: 444 Therms
Greenhouse Gas Emission Savings	113 Tons
Simple Payback	2.7 Years
Site Energy Savings (all utilities)	11%



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		**152,978**	**25.4**	**-29**	**$25,217**	**$378,257**	**$45,571**	**$9,681**	**$35,890**	**1.4**	**150,676**
ECM 1	Install LED Fixtures	13,907	1.6	0	$2,312	$34,673	$9,688	$120	$9,568	4.1	14,005
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	292	0.1	0	$48	$721	$194	$18	$176	3.7	287
ECM 3	Retrofit Fixtures with LED Lamps	138,779	23.8	-29	$22,858	$342,863	$35,690	$9,543	$26,147	1.1	136,385
Lighting Control Measures		**32,587**	**5.5**	**-7**	**$5,367**	**$42,934**	**$29,231**	**$3,030**	**$26,201**	**4.9**	**32,017**
ECM 4	Install Occupancy Sensor Lighting Controls	28,837	4.9	-6	$4,749	$37,993	$24,956	$3,030	$21,926	4.6	28,332
ECM 5	Install High/Low Lighting Controls	3,751	0.6	-1	$618	$4,941	$4,275	$0	$4,275	6.9	3,685
Motor Upgrades		**2,499**	**0.5**	**0**	**$415**	**$6,231**	**$6,452**	**$0**	**$6,452**	**15.5**	**2,517**
ECM 6	Premium Efficiency Motors	2,499	0.5	0	$415	$6,231	$6,452	$0	$6,452	15.5	2,517
Variable Frequency Drive (VFD) Measures		**7,597**	**1.7**	**0**	**$1,263**	**$18,941**	**$12,542**	**$480**	**$12,062**	**9.6**	**7,650**
ECM 7	Install VFDs on Constant Volume (CV) Fans	7,597	1.7	0	$1,263	$18,941	$12,542	$480	$12,062	9.6	7,650
Electric Unitary HVAC Measures		**2,299**	**0.5**	**0**	**$382**	**$5,732**	**$5,921**	**$253**	**$5,668**	**14.8**	**2,315**
ECM 8	Install High Efficiency Air Conditioning Units	857	0.2	0	$142	$2,137	$1,122	$69	$1,053	7.4	863
ECM 9	Install High Efficiency Heat Pumps	1,442	0.3	0	$240	$3,595	$4,798	$184	$4,614	19.3	1,452
HVAC System Improvements		**17,010**	**0.0**	**80**	**$3,408**	**$51,118**	**$14,954**	**$0**	**$14,954**	**4.4**	**26,496**
ECM 10	Implement Demand Control Ventilation (DCV)	17,010	0.0	80	$3,408	$51,118	$14,954	$0	$14,954	4.4	26,496
Food Service & Refrigeration Measures		**8,262**	**0.7**	**0**	**$1,373**	**$12,999**	**$6,000**	**$560**	**$5,440**	**4.0**	**8,319**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	786	0.1	0	$131	$1,961	$1,213	$160	$1,053	8.1	792
ECM 12	Refrigeration Controls	2,640	0.0	0	$439	$7,020	$3,867	$200	$3,667	8.4	2,658
ECM 13	Vending Machine Control	4,836	0.6	0	$804	$4,019	$920	$200	$720	0.9	4,869
TOTALS (COST EFFECTIVE MEASURES)		**219,151**	**34.1**	**44**	**$36,747**	**$505,597**	**$112,006**	**$13,620**	**$98,386**	**2.7**	**225,880**
TOTALS (ALL MEASURES)		**223,233**	**34.4**	**44**	**$37,425**	**$516,212**	**$120,671**	**$14,004**	**$106,667**	**2.9**	**229,991**

* - All incentives presented in this table are based on NJ SmartStart equipment incentives and assume proposed equipment meets minimum performance

** - 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 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	Install LED Fixtures	X		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X		
ECM 3	Retrofit Fixtures with LED Lamps	X		
ECM 4	Install Occupancy Sensor Lighting Controls	X		
ECM 5	Install High/Low Lighting Controls			
ECM 6	Premium Efficiency Motors			
ECM 7	Install VFDs on Constant Volume (CV) HVAC	X		
ECM 8	Install VFDs on Hot Water Pumps			
ECM 9	Install High Efficiency Electric AC	X		
ECM 10	Install High Efficiency Heat Pumps	X		
ECM 11	Implement Demand Control Ventilation			
ECM 12	Refrigerator/Freezer Case Electrically Commutated Motors			
ECM 13	Refrigeration Controls	X		
ECM 14	Vending Machine Control	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 (ESIP) 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 Burlington Township High School - Hopkins Building. 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 April 3, 2019, TRC performed an energy audit at Burlington Township High School - Hopkins Building located in Burlington, New Jersey. TRC met with facility staff to review the facility operations and help focus our investigation on specific energy-using systems.

Burlington Township High School - Hopkins Building is a one-story, 81,000 square foot building built in 1970 with an addition in 2008. Spaces include: classrooms, cafeteria, gymnasium, faculty offices, administration offices, kitchen and a library.

Recent improvements include: all CRT monitors have been replaced with efficient flat panel LCD monitors and/or laptops. The gymnasium, five restrooms, and about half of the offices have been retrofit with LED lighting fixtures.

2.2 Building Occupancy

The facility is occupied year-round, with most activities taking place from September through June. Typical weekday occupancy during the school year is 50 staff and 300 students. The facility is in operation from 5:30 AM to 11:30 PM Monday through Friday for school, after school programs, and custodial services. The school hours of operation are typical for a high school, from 7:00 AM to 3:30 PM. The gymnasium and auditorium are used after hours for sports and other events. The facility is closed on the weekends.

Part of the facility remains open year-round including summer months for various social programs and activities in the building including School Board Meetings.

Building Name	Weekday/Weekend	Operating Schedule
High School - Hopkins Building	Weekday	5:30 AM - 11:30 PM
	Weekend	Closed

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

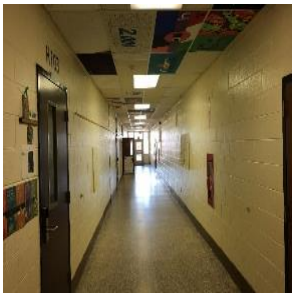
Building walls are concrete block over structural steel with a stone façade with insulation assumed to be typical of the era. The roof is flat and covered with black membrane and is in poor condition.

The walls are made of concrete masonry units (CMUs) with a brick veneer and a combination of gypsum drywall and painted CMU interior finish.

The flat built up EPDM roof is supported with steel trusses with an insulated layer and a covering of light gray gravel.

Most of the windows are single glazed and have aluminum frames. The glass-to-frame seals are in fair condition. Exterior doors have aluminum frames and are in good condition. Degraded window and door seals increase drafts and outside air infiltration.

Building envelope



Interior painted CMU walls

Typical windows

Flat roof

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also a few 40-Watt T12 fixtures in two restrooms and a custodian closet. Additionally, there are some LED fixtures located throughout the facility, including some LED tube lamp replacements. Incandescent lamps are mainly used for theatrical lighting. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Recessed and surface mounted 2-lamp, 4-foot fixtures are the most common type.

The gymnasium, Superintendent Offices, team room office, Business Administration (BA) office, and five restrooms are lit with new efficient LED fixtures. Lighting in these restrooms, BA office, and gymnasium are controlled with occupancy sensors while the lighting in the rest of these spaces are manually controlled. The source is obscured, but all exit signs appear to be LED.

Most fixtures are in good condition. Interior lighting levels were generally sufficient.

Typical recessed linear fluorescent fixtures

Typical surface mounted linear fluorescent fixtures

2x4 LED panel

Gymnasium high-bay LED fixtures

Most lighting fixtures are controlled manually and the remainder, about 8% of the fixtures, by occupancy sensors.

Ceiling mounted occupancy sensor

Wall mounted occupancy sensor

Exterior fixtures include wall packs, flood lights, and pole mounted fixtures using either high-pressure sodium, incandescent, metal halide, or LED lamps. The pole mounted flood fixtures have LED lamps.

Exterior light fixtures are controlled by a time clock or photocell, depending on the fixture.

Time clock

Pole mounted LED fixture

Metal halide wall pack

LED wall pack

2.5 Air Handling Systems

Unit Ventilators

Unit ventilators provide conditioning to perimeter classrooms and offices. The unit ventilators have supply fan motors, pneumatically controlled outside air dampers, and fan coils that operate with a pneumatic control system. This system is original to the building and appears to be in fair operating condition.

Packaged Units

The server room is cooled by a split system air conditioning (AC) unit with an estimated efficiency of 8.4 EER. The BA office is conditioned with a ductless mini-split heat pump rated at 2 tons cooling and an efficiency of 12.5 EER. These units are in good condition.

There are two split system AC units providing space conditioning to the cafeteria. The condensing units are 30 tons each with an EER of 9.5.

Air Handling Units (AHU)

There are two multi-zone air handling units (AHU) serving offices, hallways, media room, and some of the classrooms. Both AHUs have chilled water and hot water coils with 5 hp supply fan motors and 3 hp return fan motors.

Four AHUs provide conditioning to the gymnasium. These units are equipped with chilled water coils for cooling and heating hot water coils for heating that are served by the air-cooled chiller and the condensing boilers.

Refer to Appendix A for detailed information about each unit.

Cafeteria AHU

BA office Mini-split HP system outside unit

Multi-zone AHU

Multi-zone AHU nameplate

2.6 Heating Hot Water Systems

Two Aerco BMK 2.0 gas-fired condensing boilers, each with capacity of 2,000 MBH and an efficiency range of 86% to 94%, provide heating hot water to the air handling units and the unit ventilators serving the building heating load.

The boilers serve a primary only distribution system with two constant speed 15 hp heating hot water pumps operating in lead/lag fashion.

Aerco Benchmark 2.0 condensing boilers

Aerco Benchmark 2.0 control panel

HHW pumps

HHW pump motor nameplate

2.7 Chilled Water Systems

There is a single 190 ton air-cooled rotary scroll chiller with R-410a refrigerant. The chiller provides chilled water to the two multi-zone AHUs and the unit ventilators to meet the building's cooling load. The chilled water is supplied by a dedicated 15 hp constant flow primary pump.

The chiller was installed around 2007 and appears well maintained.

Carrier rotary scroll air-cooled chiller

Chiller nameplate

2.8 Domestic Hot Water

Hot water is produced by a 1,000 MBh A.O. Smith natural gas-fired hot water boiler with a 125-gallon storage tank. The boiler has a rated efficiency of 84.5%. At the time of the site visit, the domestic water heaters were set at 142°F.

Two 1/8 hp circulation pumps distribute water to end uses. The circulation pumps operate continuously. The domestic hot water pipes are mostly insulated, and the insulation is in good condition.

Domestic water heater

Circulation pump

2.9 Food Service Equipment

The kitchen has a mix of gas and electric equipment that is used to prepare meals for students and staff. Most cooking is done using a gas-fired convection oven and a six-burner range. Bulk prepared foods are held in several electric holding cabinets. Equipment is in good condition.

The dishwasher is a non- ENERGY STAR® high temperature, rack type unit with a 15kW electric booster heater.

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

Gas-fired convection oven

Gas-fired range

Electric warming oven

Electric heated dishwasher

2.10 Refrigeration

The kitchen has one stand-up refrigerator with a solid door. There is also a stand-up solid door freezer. All equipment is standard efficiency and in fair to good condition.

The walk-in refrigerator has an estimated 1-ton compressor and fan evaporators. The walk-in freezer has an estimated 2-ton compressor and fan evaporators.

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

Walk-in cooler

Walk-in freezer

Double door upright freezer

Single door upright freezer

2.11 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 5% of total building energy use. This is higher than a typical building.

You may wish to consider paying particular attention to minimizing your plug load usage. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are 213 computer work stations throughout the facility. Plug loads throughout the building include office and general breakroom/kitchen equipment. There are classroom typical loads such as projectors and fans.

There are several residential style refrigerators throughout the building that are used to store perishables and beverages. These vary in condition and efficiency.

There is a single refrigerated beverage vending machine and three refrigerated glass front continuously illuminated beverage refrigerators. These machines are not equipped with occupancy-based controls.

Computer work stations and projector

Photocopier

Microwave, toaster oven, and refrigerator

Faculty room vending machine

2.12 Water-Using Systems

There are 15 restrooms with toilets, urinals, and sinks. The urinals are rated at 1.0 gallons per flush (gpf). There are also sinks located in the kitchen, faculty room, and break room; and three drinking fountains.

Breakroom sink

Bathroom sinks

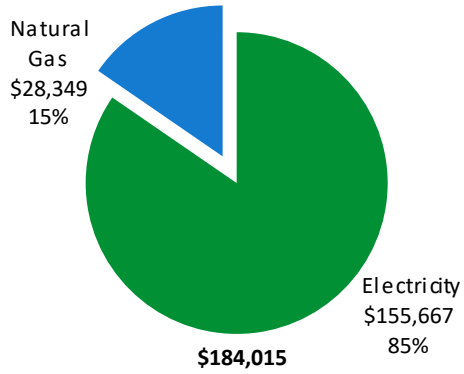
New style student bathroom sink

Urinals with auto flushers

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	936,580 kWh	$155,667
Natural Gas	39,056 Therms	$28,349
Total		**$184,015**



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.

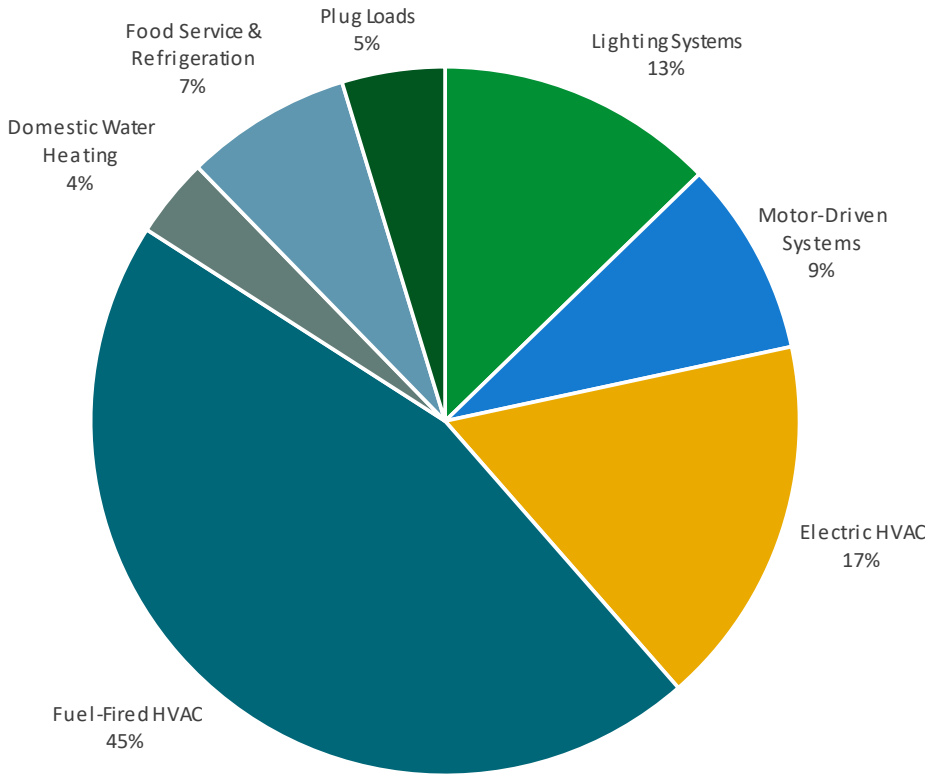
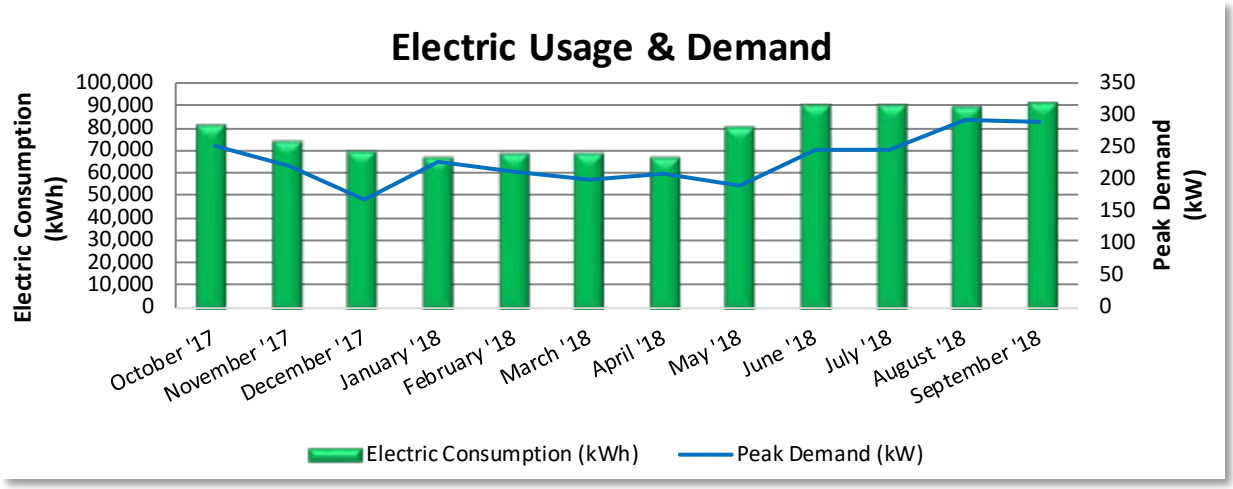


Figure 5 - Energy Balance

3.1 Electricity

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



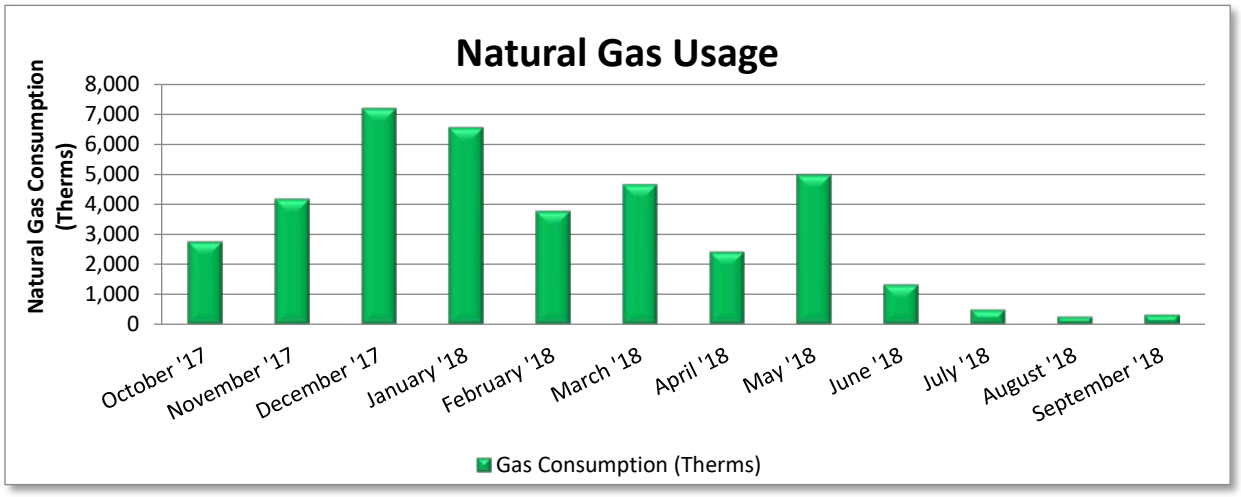
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
11/3/17	28	81,073	253	$970	$8,781	No
12/6/17	33	73,487	222	$939	$8,053	No
1/8/18	33	69,387	170	$649	$7,383	No
2/6/18	29	66,730	229	$873	$7,390	No
3/8/18	30	68,266	213	$816	$7,440	No
4/9/18	32	68,394	199	$750	$7,395	No
5/8/18	29	66,722	210	$751	$7,856	No
6/7/18	30	80,455	191	$2,305	$10,797	No
7/9/18	32	89,810	246	$2,974	$19,095	No
8/7/18	29	89,831	246	$5,553	$30,834	No
9/6/18	30	89,027	293	$3,540	$12,902	No
10/5/18	29	90,832	291	$1,039	$27,313	No
Totals	**364**	**934,014**	**293**	**$21,159**	**$155,240**	
Annual	**365**	**936,580**	**293**	**$21,217**	**$155,667**	

Notes:

- Peak demand of 293 kW occurred in August 2018.
- The average electric cost over the past 12 months was $0.166/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

PSE&G delivers natural gas under rate class LVG, with natural gas supply provided by Direct Energy Business, LLC, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
11/3/17	28	2,759	$2,187
12/6/17	33	4,180	$3,174
1/8/18	33	7,190	$5,684
2/6/18	29	6,555	$5,162
3/8/18	30	3,774	$3,363
4/10/18	33	4,666	$2,592
5/8/18	28	2,425	$1,393
6/7/18	30	4,985	$2,750
7/9/18	32	1,332	$814
8/7/18	29	499	$627
9/6/18	30	259	$244
10/5/18	29	325	$280
Totals	**364**	**38,949**	**$28,271**
Annual	**365**	**39,056**	**$28,349**

Notes:

- The average gas cost for the past 12 months is $0.726/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 country, 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	22

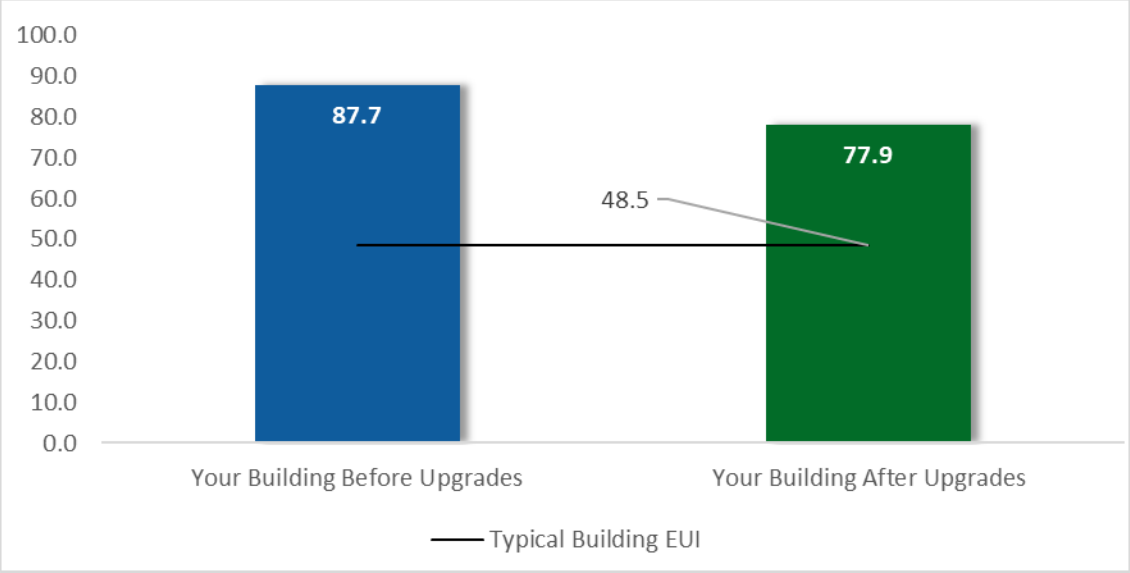


Figure 6 - Energy Use Intensity Comparison

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 a 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 the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. 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.

Appendix A: Equipment Inventory & Recommendations provides a detailed list of the locations and recommended upgrades for each energy conservation measure.

#	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		**152,978**	**25.4**	**-29**	**$25,217**	**$378,257**	**$45,571**	**$9,681**	**$35,890**	**1.4**	**150,676**
ECM 1	Install LED Fixtures	13,907	1.6	0	$2,312	$34,673	$9,688	$120	$9,568	4.1	14,005
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	292	0.1	0	$48	$721	$194	$18	$176	3.7	287
ECM 3	Retrofit Fixtures with LED Lamps	138,779	23.8	-29	$22,858	$342,863	$35,690	$9,543	$26,147	1.1	136,385
Lighting Control Measures		**32,587**	**5.5**	**-7**	**$5,367**	**$42,934**	**$29,231**	**$3,030**	**$26,201**	**4.9**	**32,017**
ECM 4	Install Occupancy Sensor Lighting Controls	28,837	4.9	-6	$4,749	$37,993	$24,956	$3,030	$21,926	4.6	28,332
ECM 5	Install High/Low Lighting Controls	3,751	0.6	-1	$618	$4,941	$4,275	$0	$4,275	6.9	3,685
Motor Upgrades		**2,499**	**0.5**	**0**	**$415**	**$6,231**	**$6,452**	**$0**	**$6,452**	**15.5**	**2,517**
ECM 6	Premium Efficiency Motors	2,499	0.5	0	$415	$6,231	$6,452	$0	$6,452	15.5	2,517
Variable Frequency Drive (VFD) Measures		**7,597**	**1.7**	**0**	**$1,263**	**$18,941**	**$12,542**	**$480**	**$12,062**	**9.6**	**7,650**
ECM 7	Install VFDs on Constant Volume (CV) Fans	7,597	1.7	0	$1,263	$18,941	$12,542	$480	$12,062	9.6	7,650
Electric Unitary HVAC Measures		**2,299**	**0.5**	**0**	**$382**	**$5,732**	**$5,921**	**$253**	**$5,668**	**14.8**	**2,315**
ECM 8	Install High Efficiency Air Conditioning Units	857	0.2	0	$142	$2,137	$1,122	$69	$1,053	7.4	863
ECM 9	Install High Efficiency Heat Pumps	1,442	0.3	0	$240	$3,595	$4,798	$184	$4,614	19.3	1,452
HVAC System Improvements		**17,010**	**0.0**	**80**	**$3,408**	**$51,118**	**$14,954**	**$0**	**$14,954**	**4.4**	**26,496**
ECM 10	Implement Demand Control Ventilation (DCV)	17,010	0.0	80	$3,408	$51,118	$14,954	$0	$14,954	4.4	26,496
Food Service & Refrigeration Measures		**8,262**	**0.7**	**0**	**$1,373**	**$12,999**	**$6,000**	**$560**	**$5,440**	**4.0**	**8,319**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	786	0.1	0	$131	$1,961	$1,213	$160	$1,053	8.1	792
ECM 12	Refrigeration Controls	2,640	0.0	0	$439	$7,020	$3,867	$200	$3,667	8.4	2,658
ECM 13	Vending Machine Control	4,836	0.6	0	$804	$4,019	$920	$200	$720	0.9	4,869
TOTALS (ALL MEASURES)		**223,233**	**34.4**	**44**	**$37,425**	**$516,212**	**$120,671**	**$14,004**	**$106,667**	**2.9**	**229,991**

* - 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 ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**152,978**	**25.4**	**-29**	**$25,217**	**$378,257**	**$45,571**	**$9,681**	**$35,890**	**1.4**	**150,676**
ECM 1	Install LED Fixtures	13,907	1.6	0	$2,312	$34,673	$9,688	$120	$9,568	4.1	14,005
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	292	0.1	0	$48	$721	$194	$18	$176	3.7	287
ECM 3	Retrofit Fixtures with LED Lamps	138,779	23.8	-29	$22,858	$342,863	$35,690	$9,543	$26,147	1.1	136,385
Lighting Control Measures		**32,587**	**5.5**	**-7**	**$5,367**	**$42,934**	**$29,231**	**$3,030**	**$26,201**	**4.9**	**32,017**
ECM 4	Install Occupancy Sensor Lighting Controls	28,837	4.9	-6	$4,749	$37,993	$24,956	$3,030	$21,926	4.6	28,332
ECM 5	Install High/Low Lighting Controls	3,751	0.6	-1	$618	$4,941	$4,275	$0	$4,275	6.9	3,685
Motor Upgrades		**2,499**	**0.5**	**0**	**$415**	**$6,231**	**$6,452**	**$0**	**$6,452**	**15.5**	**2,517**
ECM 6	Premium Efficiency Motors	2,499	0.5	0	$415	$6,231	$6,452	$0	$6,452	15.5	2,517
Variable Frequency Drive (VFD) Measures		**7,597**	**1.7**	**0**	**$1,263**	**$18,941**	**$12,542**	**$480**	**$12,062**	**9.6**	**7,650**
ECM 7	Install VFDs on Constant Volume (CV) Fans	7,597	1.7	0	$1,263	$18,941	$12,542	$480	$12,062	9.6	7,650
Electric Unitary HVAC Measures		**2,299**	**0.5**	**0**	**$382**	**$5,732**	**$5,921**	**$253**	**$5,668**	**14.8**	**2,315**
ECM 8	Install High Efficiency Air Conditioning Units	857	0.2	0	$142	$2,137	$1,122	$69	$1,053	7.4	863
HVAC System Improvements		**17,010**	**0.0**	**80**	**$3,408**	**$51,118**	**$14,954**	**$0**	**$14,954**	**4.4**	**26,496**
ECM 10	Implement Demand Control Ventilation (DCV)	17,010	0.0	80	$3,408	$51,118	$14,954	$0	$14,954	4.4	26,496
Food Service & Refrigeration Measures		**8,262**	**0.7**	**0**	**$1,373**	**$12,999**	**$6,000**	**$560**	**$5,440**	**4.0**	**8,319**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	786	0.1	0	$131	$1,961	$1,213	$160	$1,053	8.1	792
ECM 13	Vending Machine Control	4,836	0.6	0	$804	$4,019	$920	$200	$720	0.9	4,869
TOTALS		**219,151**	**34.1**	**44**	**$36,747**	**$505,597**	**$112,006**	**$13,620**	**$98,386**	**2.7**	**225,880**

* - 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		**152,978**	**25.4**	**-29**	**$25,217**	**$45,571**	**$9,681**	**$35,890**	**1.4**	**150,676**
ECM 1	Install LED Fixtures	13,907	1.6	0	$2,312	$9,688	$120	$9,568	4.1	14,005
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	292	0.1	0	$48	$194	$18	$176	3.7	287
ECM 3	Retrofit Fixtures with LED Lamps	138,779	23.8	-29	$22,858	$35,690	$9,543	$26,147	1.1	136,385

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 are proposed, we suggest converting all of a specific lighting type (e.g., linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

Replace existing fixtures containing HID, lamps with new LED light fixtures. This measure saves energy by installing LEDs, which use less power than other technologies with a comparable light output.

In some cases, HID fixtures can be retrofit with screw-based LED lamps. Replacing an existing HID fixture with a new LED fixture will generally provide better overall lighting optics; however, replacing the HID lamp with a LED screw-in lamp is typically a less expensive retrofit. We recommend you work with your lighting contractor to determine which retrofit solution is best suited to your needs and will be compatible with the existing fixture(s).

Maintenance savings may also be achieved since LED lamps last longer than other light sources and therefore do not need to be replaced as often.

Affected building areas: all exterior high-pressure sodium and metal halide fixtures.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures by removing the fluorescent tubes and ballasts and replacing them with LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures.

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology, which use less power than other lighting technologies but provides equivalent lighting output. Maintenance savings may also be achieved since LED tubes last longer than fluorescent tubes and therefore do not need to be replaced as often.

Affected building areas: boys' restroom, girls' restroom, and custodian closet with fluorescent fixtures with T12 tubes.

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent 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 a direct replacement for most other lighting technologies.

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space. 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: all areas with fluorescent fixtures with T8 tubes and screw-based LED lamps to replace incandescent lamps in the kitchen and some exterior locations.

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		**32,587**	**5.5**	**-7**	**$5,367**	**$29,231**	**$3,030**	**$26,201**	**4.9**	**32,017**
ECM 4	Install Occupancy Sensor Lighting Controls	28,837	4.9	-6	$4,749	$24,956	$3,030	$21,926	4.6	28,332
ECM 5	Install High/Low Lighting Controls	3,751	0.6	-1	$618	$4,275	$0	$4,275	6.9	3,685

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 4: 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 that 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, mounted 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: offices, conference rooms, classrooms, media center, cafeteria, restrooms, and storage rooms.

ECM 5: 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 levels 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 control 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 as an occupant approach each area.

4.3 Motors

#	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)
Motor Upgrades		**2,499**	**0.5**	**0**	**$415**	**$6,452**	**$0**	**$6,452**	**15.5**	**2,517**
ECM 6	Premium Efficiency Motors	2,499	0.5	0	$415	$6,452	$0	$6,452	15.5	2,517

ECM 6: Premium Efficiency Motors

Replace standard efficiency motors with IHP 2014 efficiency motors. This evaluation assumes that existing motors will be replaced with motors of equivalent size and type. In some cases, additional savings may be possible by downsizing motors to better meet the motor's current load requirements.

Affected motors:

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Boiler Room	Unit heater	1	Supply Fan	1.0	
Roof	Main office area AHU	1	Supply Fan	5.0	MZ-2 Annexair
Roof	Main office area AHU	1	Return Fan	3.0	MZ-2 Annexair
Roof	Inner classrooms AHU	1	Supply Fan	7.5	MZ-1 Annexair
Roof	Inner classrooms AHU	1	Exhaust Fan	3.0	MZ-1 Annexair
Board office	Board office AHU	1	Supply Fan	3.0	
Board office RR	Team room	1	Supply Fan	3.0	

Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours. The base case motor energy consumption is estimated using the efficiencies found on nameplates or estimated based on the age of the motor and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the current *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*.

4.4 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**7,597**	**1.7**	**0**	**$1,263**	**$12,542**	**$480**	**$12,062**	**9.6**	**7,650**
ECM 7	Install VFDs on Constant Volume (CV) Fans	7,597	1.7	0	$1,263	$12,542	$480	$12,062	9.6	7,650

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new motor to conservatively account for the cost of an inverter duty rated motor.

ECM 7: Install VFDs on Constant Volume (CV) Fans

Install VFDs to control constant volume fan motor speeds. This converts a constant-volume, single-zone air handling system into a variable-air-volume (VAV) system. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor, if the air handler has one.

Zone thermostats signal the VFD to adjust fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating. Prior to implementation, verify minimum fan speed in cooling mode with the manufacturer. Note that savings will vary depending on the operating characteristics of each AHU.

Energy savings result from reducing the fan speed (and power) when conditions allow for reduced air flow.

Affected air handlers: cafeteria split-systems.

4.5 Electric Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**2,299**	**0.5**	**0**	**$382**	**$5,921**	**$253**	**$5,668**	**14.8**	**2,315**
ECM 8	Install High Efficiency Air Conditioning Units	857	0.2	0	$142	$1,122	$69	$1,053	7.4	863
ECM 9	Install High Efficiency Heat Pumps	1,442	0.3	0	$240	$4,798	$184	$4,614	19.3	1,452

Replacing the unitary HVAC units has a long payback period and may not be justifiable based simply on energy considerations. However, most of the units at this facility are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high efficiency unit can be justified by the marginal savings from the improved efficiency. When the ductless mini-split heat pump serving the BA office is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 8: Install High Efficiency Air Conditioning Units

Replace standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

ECM 9: Install High Efficiency Heat Pumps

Replace standard efficiency heat pumps with high efficiency heat pumps. A higher EER or SEER rating indicates a more efficient cooling system and a higher HSPF rating indicates more efficient heating mode. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average heating and cooling loads, and the estimated annual operating hours.

4.6 HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**17,010**	**0.0**	**80**	**$3,408**	**$14,954**	**$0**	**$14,954**	**4.4**	**26,496**
ECM 10	Implement Demand Control Ventilation (DCV)	17,010	0.0	80	$3,408	$14,954	$0	$14,954	4.4	26,496

ECM 10: Implement Demand Control Ventilation (DCV)

Demand control ventilation (DCV) monitors the indoor air's carbon dioxide (CO_2) content to measure room occupancy. This data is used to regulate the amount of outdoor air provided to the space for ventilation.

Standard ventilation systems often provide outside air based on a space's estimated maximum occupancy but not actual occupancy. During low occupancy periods, the space may then be over ventilated. This wastes energy through heating and cooling the excess outside air flow. DCV reduces unnecessary outdoor air intake by regulating ventilation based on actual occupancy levels. DCV is most suited for facilities where occupancy levels vary significantly from hour to hour and day to day.

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

Affected building areas: cafeteria, main office, interior classrooms, and board office.

4.7 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		**8,262**	**0.7**	**0**	**$1,373**	**$6,000**	**$560**	**$5,440**	**4.0**	**8,319**
ECM 11	Refrigerator/Freezer Case Electrically Commutated Motors	786	0.1	0	$131	$1,213	$160	$1,053	8.1	792
ECM 12	Refrigeration Controls	2,640	0.0	0	$439	$3,867	$200	$3,667	8.4	2,658
ECM 13	Vending Machine Control	4,836	0.6	0	$804	$920	$200	$720	0.9	4,869

ECM 11: Refrigerator/Freezer Case Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in. 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.

ECM 12: Refrigeration Controls

Install additional controls to optimize the operation of walk-in coolers and freezers.

Many walk-in coolers and freezers have continuously operating electric heaters on the doors to prevent condensation formation. This measure adds a control system feature to shut off the door heaters when the humidity level is low enough that condensation will not occur if the heaters are off. This is done by measuring the ambient humidity and temperature of the store, comparing that to the dewpoint, and using pulse width modulation to control the anti-sweat door heaters.

Defrost controllers can be used to override defrost of evaporator fans when the defrost operation is not necessary, which reduces annual energy consumption. This measure is applicable to existing evaporator fans with a traditional electric defrost mechanism.

Many walk-in coolers and freezers have evaporator fans that run continuously. The measure adds a control system feature to automatically shut off evaporator fans when not needed.

Energy savings for each of the control measures account for reduction in compressor and fan operating hours as well as reduction in the refrigeration heat load as appropriate.

ECM 13: Vending Machine Control

Vending machines operate continuously, even during unoccupied hours. Install occupancy sensor controls to reduce energy use. These controls power down vending machines when the vending machine area has been vacant for some time, and power up the machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

4.8 Additional Measures for Future Consideration

Retro-Commissioning Study & HVAC Improvements

An upgrade of the Energy Management System (EMS) would likely increase the efficiency of the building HVAC system operation. Retro-commissioning is a common practice recommended by the American Society of Heating Refrigeration and Energy (ASHRAE) to be revisited every couple of years.

Due to the complexity and integrated nature of your HVAC systems and controls, it is likely for systems to be operating incorrectly or not as efficiently as they could be. Retro-commissioning studies reveal hidden deficiencies and highlight operational & maintenance (O & M) issues while they expose hidden control system problems. There are valuable benefits to retro-commissioning in existing buildings.

Retro-commissioning is a detailed and specialized process that reviews how an HVAC system is controlled and designed to operate. Applying retro-commissioning to existing facilities includes planning, discovering root causes of inefficiencies, development of a cost-effective project delivery and a focus on optimizing value to the building owner. The study typically includes functional system testing and data collection in various modes, including heating vs. cooling, occupied vs. unoccupied, and under varying outside air and space temperatures. This is a systematic process to ensure that the building energy systems perform interactively according to the original design intent and the current operational needs of the facility.

We recommend that an engineering firm who specializes in energy control systems and retro-commissioning be contacted to obtain pricing for a detailed evaluation and implementation. Facility operations personnel typically work with the engineers to develop goals and objectives. During on site testing, the qualified personnel conducting the study often makes any no/low-cost improvements as identified. Corrective actions or EMS hardware improvement which require the purchase of material are evaluated for cost effectiveness and presented to facility personnel along with an implementation plan.

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.

Lighting Controls

As part of a lighting maintenance schedule, test lighting controls to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight and photocell sensors, maintenance involves cleaning sensor lenses and confirming that setpoints and sensitivity are configured properly.

Motor Maintenance

Motors have many moving parts. As these parts degrade over time, the efficiency of the motor is reduced. Routine maintenance prevents damage to motor components. Routine maintenance should include cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

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

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.

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.

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.

Compressed Air System Maintenance

Compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan for compressed air systems should include:

- Inspection, cleaning, and replacement of inlet filter cartridges
- Cleaning of drain traps
- Daily inspection of lubricant levels to reduce unwanted friction

- Inspection of belt condition and tension
- Check for leaks and adjust loose connections
- Overall system cleaning

Contact a qualified technician for help with setting up periodic maintenance schedule.

Computer Monitor Replacement

ENERGY STAR® labeled computer monitors can be up to 25% more efficient than standard monitors. ENERGY STAR® rated monitors have power consumption requirements for different operating modes such as on, idle, and sleep.

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 gallons per flush (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 facility 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 facility'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 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 facility'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, 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.

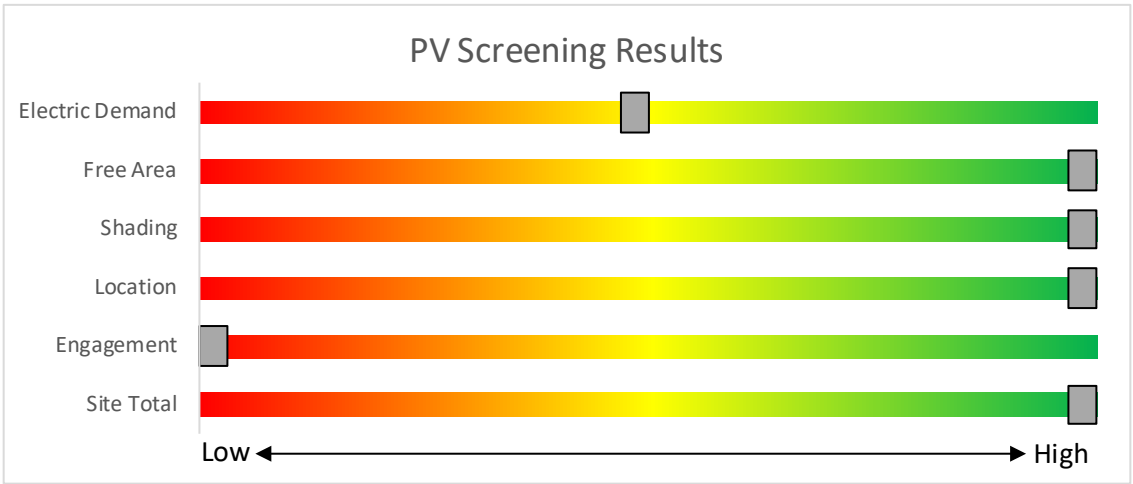


Figure 9 - Photovoltaic Screening

Potential	High	
System Potential	230	kW DC STC
Electric Generation	274,015	kWh/yr
Displaced Cost	$45,540	/yr
Installed Cost	$598,000	

Solar Renewable Energy Certificate (SREC) Registration Program (SRP)

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 NJ**: www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ 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) generates electricity at the facility 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.

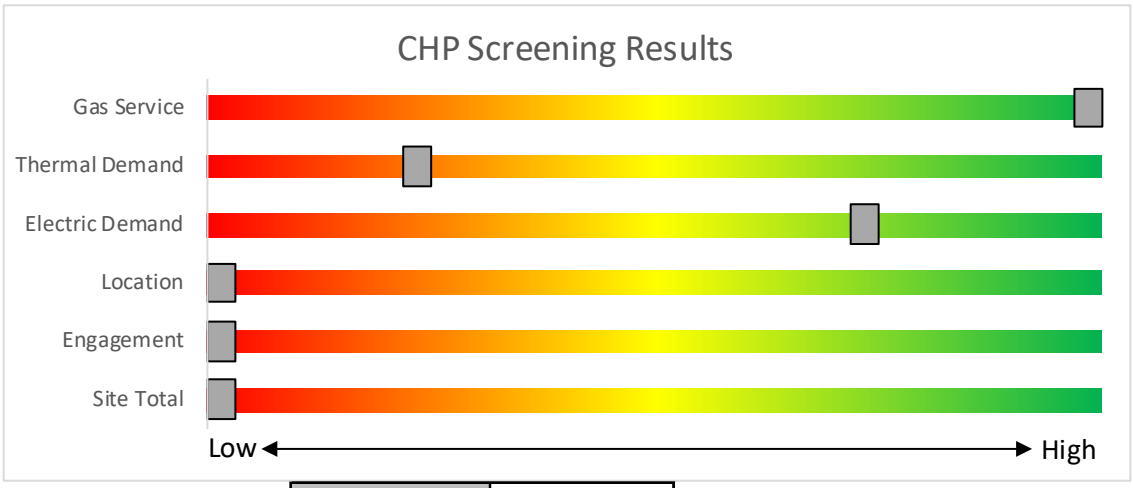
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be 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 facility'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 facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The 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.



Potential	None	
System Type	None	
System Potential	70	kW
Electric Generation	139,490	kWh/yr
Thermal Generation	858,400	MBtu/yr
Displaced Cost	$18,123	/yr
Installed Cost	$259,000	

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? New Jersey's Clean Energy Programs can help. Pick the program that works best for you. Incentive programs that may apply to this facility are identified in the Executive Summary. This section provides an overview of currently available from 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 efficient 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 into 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 (Solar Renewable Energy Certificate) Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects 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. SRECs are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

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

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar 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
H100	33	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	33	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	1.0	5,899	-1	$971	$2,015	$435	1.6
H101	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.6	3,575	-1	$589	$1,270	$270	1.7
H102	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	3,218	-1	$530	$1,197	$250	1.8
H103	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.6	3,754	-1	$618	$1,307	$280	1.7
H103 prep room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	358	0	$59	$343	$20	5.5
H104	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.8	4,826	-1	$795	$1,526	$340	1.5
H104	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
Boys RR	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Occupancy Sensor	S	50	2,670	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,670	0.0	97	0	$16	$65	$6	3.7
Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,670	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,670	0.1	291	0	$48	$110	$30	1.7
Custodians closet	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Wall Switch	S	40	3,870	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	98	0	$16	$65	$6	3.6
Girls RR	1	Linear Fluorescent - T12: 2' T12 (20W) - 2L	Occupancy Sensor	S	50	2,670	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,670	0.0	97	0	$16	$65	$6	3.7
Girls RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	2,670	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,670	0.1	291	0	$48	$110	$30	1.7
Conference room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	715	0	$118	$416	$75	2.9
H105	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H106	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	3,218	-1	$530	$1,197	$250	1.8
H107	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H109	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.2	1,073	0	$177	$489	$95	2.2
H108	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.4	2,519	-1	$415	$854	$195	1.6
H111	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H113	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
Media Center	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.6	3,754	-1	$618	$1,307	$280	1.7
Media Center	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
Ben's office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.1	630	0	$104	$416	$75	3.3
Ben's office storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	358	0	$59	$189	$40	2.5
Media center closet	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	715	0	$118	$416	$40	3.2

	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
H115	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H117	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.2	1,073	0	$177	$489	$95	2.2
H110	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H112	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H119	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H121	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H123	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H125	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H127	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H116	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H118	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H120	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.4	2,145	0	$353	$708	$155	1.6
Faculty room	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,860	-1	$471	$1,124	$230	1.9
Faculty room women's RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,670	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.0	194	0	$32	$73	$20	1.7
Faculty room men's RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,670	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.0	194	0	$32	$73	$20	1.7
H129	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H131	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
H133	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,670	0.2	1,073	0	$177	$489	$95	2.2
Girls coach office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	715	0	$118	$416	$75	2.9
Girls coach office RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	3,870	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,870	0.0	57	0	$9	$16	$3	1.4
Girls locker hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Girls locker hall	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
Girls locker room	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.4	2,324	0	$383	$1,015	$200	2.1
Girls locker 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
Gym	24	LED - Fixtures: High-Bay	Occupancy Sensor	S	13	2,670		None	No	24	LED - Fixtures: High-Bay	Occupancy Sensor	13	2,670	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
Gym	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gym storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,670	0.1	375	0	$62	$343	$20	5.2
Boys locker hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Boys locker hall	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
Boys coach office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	715	0	$118	$416	$75	2.9
Boys coach office RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	3,870	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	3,870	0.0	57	0	$9	$16	$3	1.4
Boys locker room	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.4	2,503	-1	$412	$1,051	$210	2.0
Boys locker room	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Board office	19	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	19	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	1.0	5,984	-1	$985	$1,928	$450	1.5
Board office	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
Office 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,670	3	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.1	329	0	$54	$146	$40	2.0
Office 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,670	3	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.2	658	0	$108	$292	$80	2.0
Office 2	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
BA office	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,670		None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.0	0	0	$0	$0	$0	0.0
Break room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.2	1,260	0	$207	$832	$150	3.3
Break 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
Superintendents office	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,870		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	0	0	$0	$0	$0	0.0
Superintendents office	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	S	29	3,870		None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	0	0	$0	$0	$0	0.0
Superintendents office 1	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,870		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	0	0	$0	$0	$0	0.0
Superintendents office 2	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,870		None	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	0	0	$0	$0	$0	0.0
Superintendents office 3	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,870		None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	0	0	$0	$0	$0	0.0
Superintendents office 4	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,870		None	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	0	0	$0	$0	$0	0.0
Superintendents office 4	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
Copy room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,670	3	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.2	658	0	$108	$292	$80	2.0
Copy room RR	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,670		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,670	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
Conference room RR	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.6	3,779	-1	$622	$1,416	$310	1.8
Conference room RR	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
Board office RR	2	LED - Fixtures: Downlight Recessed	Wall Switch	S	9	3,870		None	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	9	3,870	0.0	0	0	$0	$0	$0	0.0
Center for education office	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,670	3	Relamp	No	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.2	987	0	$163	$438	$120	2.0
Center for education office	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
Superintendents office	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,670		None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.0	0	0	$0	$0	$0	0.0
Superintendents office	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,870		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	0	0	$0	$0	$0	0.0
CFE office	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.4	2,205	0	$363	$781	$175	1.7
CFE office	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
CFE office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	281	0	$46	$73	$20	1.1
Entry hall	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,870	0.0	238	0	$39	$73	$20	1.4
Entry hall	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
CFE RR	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	S	17	3,870		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	0	0	$0	$0	$0	0.0
CST break room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,670	3	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.2	658	0	$108	$292	$80	2.0
CST offices	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,670	3	Relamp	No	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.2	987	0	$163	$438	$120	2.0
CST offices	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
Office 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.1	630	0	$104	$416	$75	3.3
Office/conference room	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	0.3	1,890	0	$311	$708	$155	1.8
Nurse's office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.2	1,073	0	$177	$489	$95	2.2
Exam room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	358	0	$59	$343	$20	5.5
Bedroom 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Bedroom 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Bedroom RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	68	0	$11	$33	$6	2.4
Main office	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.5	2,681	-1	$442	$1,088	$220	2.0
Main office server room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	358	0	$59	$343	$20	5.5

	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
Main office server room RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	68	0	$11	$33	$6	2.4
Principal's office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	358	0	$59	$343	$20	5.5
Principal's office confernce room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	715	0	$118	$416	$75	2.9
Principal's office break room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	715	0	$118	$416	$75	2.9
Guidance office	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.3	1,609	0	$265	$599	$125	1.8
Guidance office 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Guidance office 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Guidance office 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Main office exterior entry	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	715	0	$118	$416	$75	2.9
Main office exterior entry	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
Cafeteria	24	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 4	Relamp	Yes	24	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,670	1.3	7,558	-2	$1,245	$2,293	$550	1.4
Cafeteria	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
Boiler room	5	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,870	3	Relamp	No	5	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,870	0.1	372	0	$61	$91	$25	1.1
Boiler 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
AHU room side stage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	281	0	$46	$73	$20	1.1
AHU room side stage	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
Stage	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,870	0.2	954	0	$157	$292	$80	1.4
Stage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.1	562	0	$93	$146	$40	1.1
Stage	50	Incandescent: Colored lights	Wall Switch	S	60	3,870	3	Relamp	No	50	LED Lamps: LED lamps	Wall Switch	9	3,870	1.8	10,855	-2	$1,788	$861	$50	0.5
AHU room side stage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	281	0	$46	$73	$20	1.1
AHU room side stage	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
Maintenance office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	536	0	$88	$380	$65	3.6
Maintenance office	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,870	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,670	0.0	94	0	$15	$18	$5	0.9
Maintenance office	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
Maintenance office RR	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,870	0.0	68	0	$11	$33	$6	2.4

	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
Kitchen	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.4	2,503	-1	$412	$1,051	$210	2.0
Kitchen	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
Kitchen office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Kitchen walkin freezer	1	Incandescent: incandescent	Wall Switch	S	60	3,870	3	Relamp	No	1	LED Lamps: LED lamps	Wall Switch	9	3,870	0.0	217	0	$36	$17	$1	0.5
Kitchen walkin cooler	1	Incandescent: incandescent	Wall Switch	S	60	3,870	3	Relamp	No	1	LED Lamps: LED lamps	Wall Switch	9	3,870	0.0	217	0	$36	$17	$1	0.5
Kitchen dishwasher area	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.1	536	0	$88	$380	$65	3.6
Kitchen locker/bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Kitchen locker/bathroom	1	Incandescent: incandescent	Wall Switch	S	60	3,870	3	Relamp	No	1	LED Lamps: LED lamps	Wall Switch	9	3,870	0.0	217	0	$36	$17	$1	0.5
Team room	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.7	4,290	-1	$707	$1,416	$310	1.6
Team 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
Team room office	3	LED Lamps: Screw-in	Wall Switch	S	9	3,870		None	No	3	LED Lamps: Screw-in	Wall Switch	9	3,870	0.0	0	0	$0	$0	$0	0.0
Team room office storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,870	0.0	140	0	$23	$37	$10	1.1
Gym hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 5	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,670	0.3	1,966	0	$324	$852	$110	2.3
Gym hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,870	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,670	0.1	536	0	$88	$335	$30	3.4
Gym hallway	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Men's RR	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,670		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,670	0.0	0	0	$0	$0	$0	0.0
Men's RR	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,670		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.0	0	0	$0	$0	$0	0.0
Women's RR	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	S	17	2,670		None	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,670	0.0	0	0	$0	$0	$0	0.0
Women's RR	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	S	29	2,670		None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,670	0.0	0	0	$0	$0	$0	0.0
Admin foyer	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,870	3, 5	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,670	0.1	630	0	$104	$371	$40	3.2
Admin foyer	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
Hallway	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 5	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,670	0.4	2,145	0	$353	$888	$120	2.2
Hall to eat	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
Hallway H107-H119	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 5	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,670	0.4	2,324	0	$383	$925	$130	2.1
Hallway H105-main office	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 5	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,670	0.3	1,609	0	$265	$779	$90	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
Hallway H105-main office	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
Hallway Display cabinets	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,870	3, 5	Relamp	Yes	3	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,670	0.0	281	0	$46	$280	$15	5.7
Hallway H116-main office	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
Hallway H116-main office	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 5	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,670	0.5	2,681	-1	$442	$1,223	$150	2.4
Hallway cafeteria	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,870	3, 5	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,670	0.2	1,341	0	$221	$499	$75	1.9
Hallway cafeteria	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
Hallway cafeteria	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 5	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,670	0.2	1,430	0	$236	$517	$80	1.9
Hallway cafeteria	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,870	3, 5	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,670	0.2	1,073	0	$177	$444	$60	2.2
Hallway 103-104	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,870	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,670	0.2	894	0	$147	$408	$50	2.4
Hallway 103-104	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	3,870	3, 5	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,670	0.1	536	0	$88	$335	$30	3.4
Hallway 103-104	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
Exterior	12	High-Pressure Sodium: (1) 150W Lamp	Timeclock		188	4,380	1	Fixture Replacement	No	12	LED - Fixtures: Outdoor Post-Mount	Timeclock	56	4,380	0.8	6,917	0	$1,150	$4,844	$60	4.2
Exterior	12	Metal Halide: (1) 150W Lamp	Timeclock		190	4,380	1	Fixture Replacement	No	12	LED - Fixtures: Outdoor Post-Mount	Timeclock	57	4,380	0.8	6,990	0	$1,162	$4,844	$60	4.1
Exterior	2	LED - Fixtures: Outdoor Porch Wall Mount	Photocell		20	4,380		None	No	2	LED - Fixtures: Outdoor Porch Wall Mount	Photocell	20	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior	6	Incandescent: Screw-in	Photocell		60	4,380	3	Relamp	No	6	LED Lamps: LED lamps	Photocell	9	4,380	0.2	1,340	0	$223	$103	$6	0.4
Exterior	5	LED - Fixtures: Downlight Recessed	Photocell		20	4,380		None	No	5	LED - Fixtures: Downlight Recessed	Photocell	20	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Memorial light	1	LED - Fixtures: Outdoor Post-Mount	Photocell		45	4,380		None	No	1	LED - Fixtures: Outdoor Post-Mount	Photocell	45	4,380	0.0	0	0	$0	$0	$0	0.0
Parking lot	11	LED - Fixtures: Outdoor Post-Mount	Photocell		45	4,380		None	No	11	LED - Fixtures: Outdoor Post-Mount	Photocell	45	4,380	0.0	0	0	$0	$0	$0	0.0

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
Boiler Room	Heating water	2	Heating Hot Water Pump	15.0	93.0%	Yes	B	2,700		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Valve control	2	Air Compressor	0.7	78.5%	No	W	1,460		No	78.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	DHW supply and return	2	Heating Hot Water Pump	0.1	82.5%	No	W	2,745		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Unit heater	1	Supply Fan	1.0	82.5%	No	W	2,745	6	Yes	85.5%	No		0.0	65	0	$11	$474	$0	43.7
Boiler Room	DHW to storage tank	1	Process Pump	0.1	89.5%	No	W	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
AHU Side room storage	Cafeteria left	1	Supply Fan	2.0	86.5%	No	W	3,900	7	No	86.5%	Yes	1	0.6	2,523	0	$419	$3,261	$160	7.4
AHU Side room storage	Cafeteria right	1	Supply Fan	2.0	86.5%	No	W	3,900	7	No	86.5%	Yes	1	0.6	2,523	0	$419	$3,261	$160	7.4
AHU Side room storage	Cafeteria left	1	Return Fan	1.0	85.5%	No	W	3,900	7	No	85.5%	Yes	1	0.3	1,276	0	$212	$3,010	$80	13.8
AHU Side room storage	Cafeteria right	1	Return Fan	1.0	85.5%	No	W	3,900	7	No	85.5%	Yes	1	0.3	1,276	0	$212	$3,010	$80	13.8
Maintenance office	Unit heater	1	Supply Fan	1.0	85.5%	No	W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Main office area AHU	1	Supply Fan	5.0	87.5%	No	B	3,900	6	Yes	89.5%	No		0.1	279	0	$46	$1,341	$0	29.0
Roof	Main office area AHU	1	Return Fan	3.0	86.5%	No	B	3,900	6	Yes	89.5%	No		0.0	254	0	$42	$876	$0	20.8
Roof	Inner classrooms AHU	1	Supply Fan	7.5	88.5%	No	W	3,900	6	Yes	91.0%	No		0.1	508	0	$84	$1,131	$0	13.4
Roof	Inner classrooms AHU	1	Exhaust Fan	3.0	86.5%	No	W	3,900	6	Yes	89.5%	No		0.0	254	0	$42	$876	$0	20.8
Board office	Board office AHU	1	Supply Fan	3.0	82.0%	Yes	W	3,900	6	Yes	89.5%	No		0.1	669	0	$111	$876	$0	7.9
Board office RR	Team room	1	Supply Fan	3.0	82.0%	Yes	W	2,745	6	Yes	89.5%	No		0.1	471	0	$78	$876	$0	11.2
Office 2	Air curtain	1	Supply Fan	0.2	82.0%	No	W	2,745		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0
Rooms	Room	18	Supply Fan	0.3	65.0%	No	B	3,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Chilled water	1	Chilled Water Pump	15.0	89.0%	No		3,391		No	89.0%	No		0.0	0	0	$0	$0	$0	0.0
Gym	Gym	4	Supply Fan	2.0	86.5%	No		2,745		No	86.5%	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	BA Office	1	Ductless Mini-Split HP	2.00	24.00	W	10	Yes	1	Ductless Mini-Split HP	2.00	24.00	18.00	3.80	0.3	1,442	0	$240	$4,798	$184	19.3
Server Room	Server Room	1	Split-System AC	0.75		W	9	Yes	1	Split-System AC	0.75		14.00		0.2	857	0	$142	$1,122	$69	7.4

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
Roof	Whole Building	1	Air-Cooled Scroll Chiller	190.00	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
Boiler Room	Whole Building	2	Condensing Hot Water Boiler	######	W		No						0.0	0	0	$0	$0	$0	0.0

Demand Control Ventilation Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Number of Zones	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler room	AHU - Cafteria left	11	2.00	19.00		192.82	0.0	1,710	8	$344	$2,719	$0	7.9
Boiler room	AHU - Cafteria right	11	2.00	19.00		192.82	0.0	1,710	8	$344	$2,719	$0	7.9
Boiler room	AHU - Main office	11	2.00	49.00		482.05	0.0	4,410	21	$882	$2,719	$0	3.1
Boiler room	AHU - Inner classrooms	11	4.00	73.00		723.08	0.0	6,570	31	$1,315	$5,438	$0	4.1
Boiler room	AHU - Board office	11	1.00	29.00		289.23	0.0	2,610	12	$523	$1,359	$0	2.6

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
Boiler Room	Whole Building	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	Medium Temp Freezer (0F to 30F)	12, 13	Yes	Yes	Yes	0.1	2,335	0	$388	$2,799	$205	6.7
Kitchen	1	Cooler (35F to 55F)	12, 13	Yes	No	Yes	0.1	1,091	0	$181	$2,281	$155	11.7

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	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 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	Gas Convection Oven (Full Size)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Griddle (4 Feet Width)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Rack Oven (Single)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	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	Payback w/ Incentives in Years
Kitchen	1	Single Tank Conveyor (High Temp)	Electric	Electric	No		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

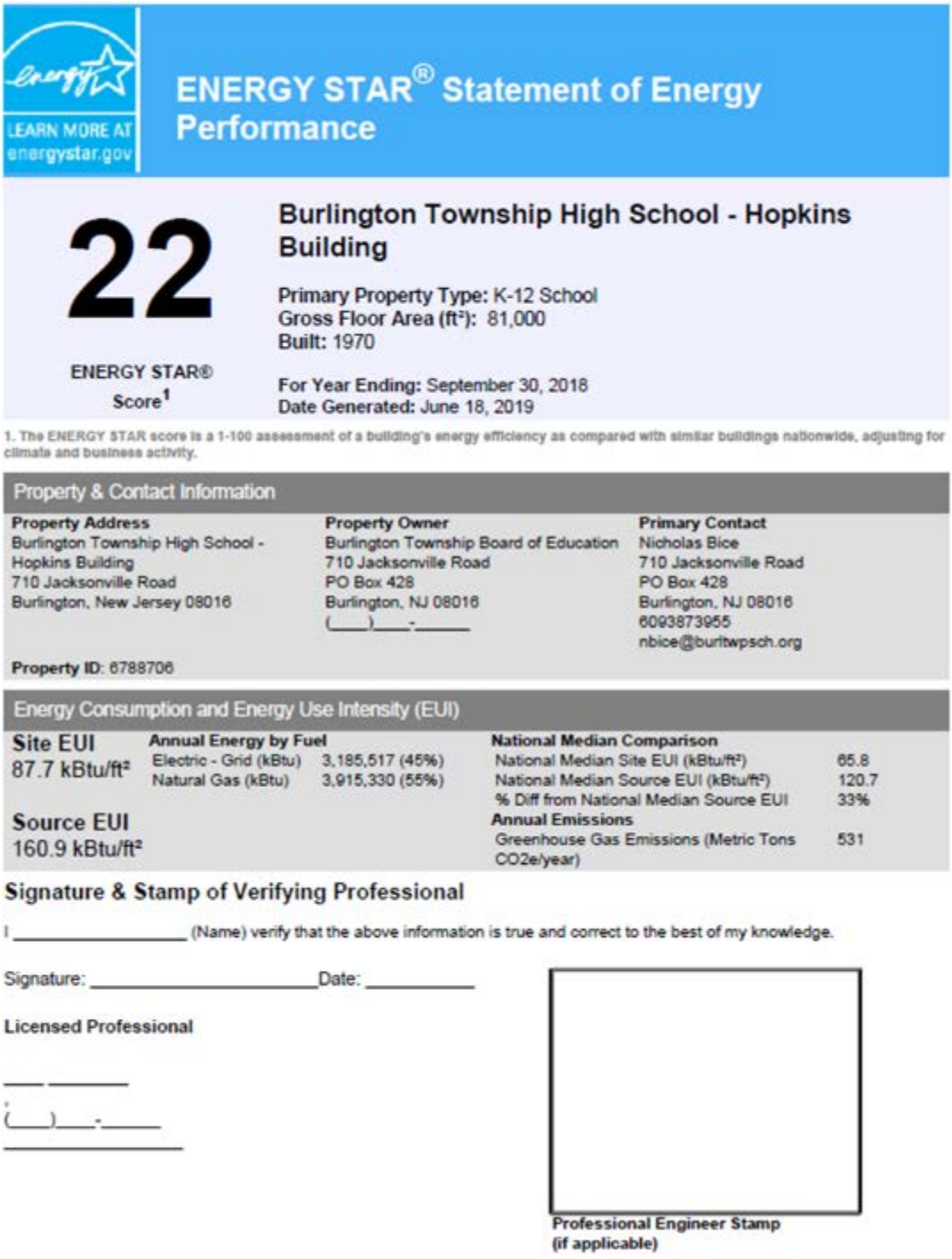
	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Faculty room	213	Desktops	150.0	No
Faculty room	101	Desk printers	20.0	No
Faculty room	38	Projectors	200.0	No
Faculty room	6	Photocopier	200.0	No
Faculty room	4	Mini fridge	153.0	No
Faculty room	9	Refrigerator	156.0	No
Faculty room	13	Microwave	1,000.0	No
Faculty room	5	Water cooler	92.0	No
Faculty room	3	Paper shredder	150.0	No
Faculty room	1	Big projector	200.0	No
Faculty room	3	Water fountain	92.0	No
Faculty room	1	Washer	900.0	No
Faculty room	1	Electric dryer	5,000.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty room	1	Glass Fronted Refrigerated	14	Yes	0.1	1,209	0	$201	$230	$50	0.9
Cafeteria	3	Glass Fronted Refrigerated	14	Yes	0.4	3,627	0	$603	$690	$150	0.9

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.



LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

22

ENERGY STAR® Score[1]

Burlington Township High School - Hopkins Building

Primary Property Type: K-12 School
Gross Floor Area (ft²): 81,000
Built: 1970

For Year Ending: September 30, 2018
Date Generated: June 18, 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
Burlington Township High School - Hopkins Building 710 Jacksonville Road Burlington, New Jersey 08016	Burlington Township Board of Education 710 Jacksonville Road PO Box 428 Burlington, NJ 08016 (____)____-_____	Nicholas Bice 710 Jacksonville Road PO Box 428 Burlington, NJ 08016 6093873955 nbice@burltwpsch.org

Property ID: 6788706

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
87.7 kBtu/ft²

Source EUI
160.9 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	3,185,517 (45%)
Natural Gas (kBtu)	3,915,330 (55%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	65.8
National Median Source EUI (kBtu/ft²)	120.7
% Diff from National Median Source EUI	33%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	531

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 gases:* 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.