Local Government Energy Audit Report

Hannah Caldwell Elementary School

April 19, 2019

Prepared for:
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Disclaimer

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

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

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

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

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

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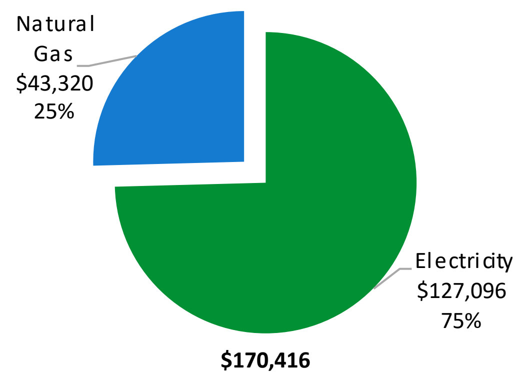
1 Executive Summary

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Hannah Caldwell Elementary School. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help make changes in your facility. TRC Energy Services (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 help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $170,416 Electricity: 809,348 kWh Natural Gas: 37,955 Therms	
ENERGY STAR® Benchmarking Score	32 *(1-100 scale)*	This building performs at below the national average. This report contains suggestions about how to improve building performance and reduce energy costs.

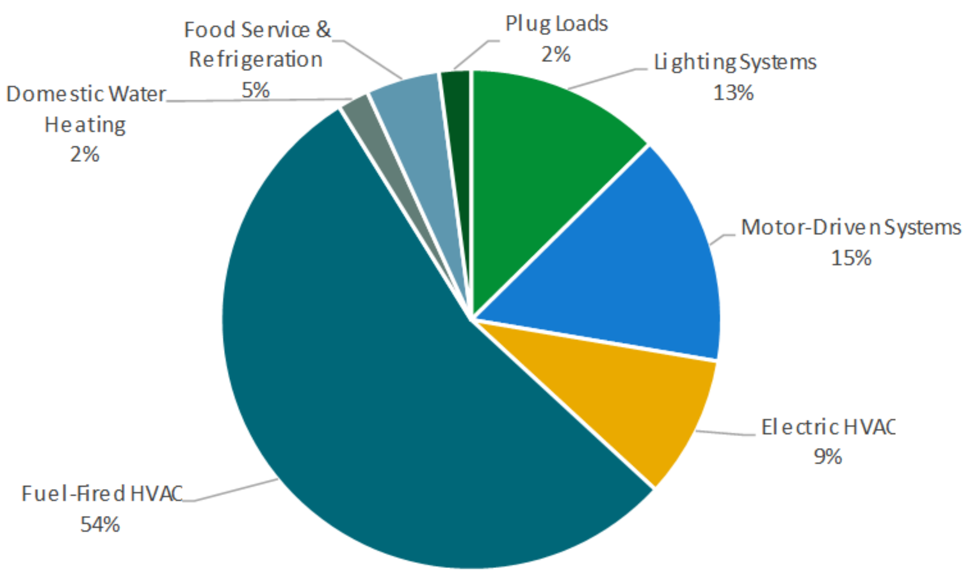


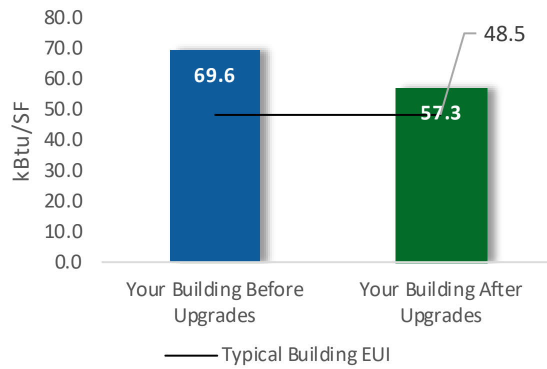
Figure 1 - Energy Use by System

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.

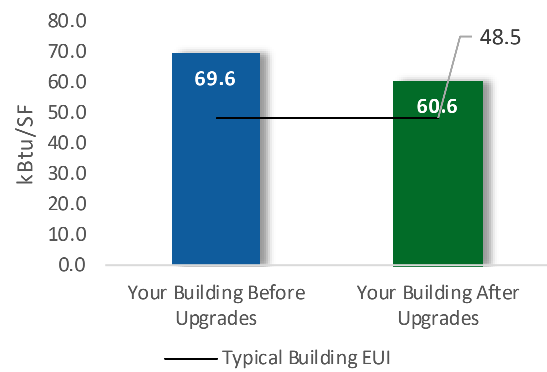
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$583,184
Potential Rebates & Incentives[1]	$30,084
Annual Cost Savings	$47,429
Annual Energy Savings	Electricity: 290,143 kWh Natural Gas: 1,635 Therms
Greenhouse Gas Emission Savings	156 Tons
Simple Payback	11.7 Years
Site Energy Savings (all utilities)	18%



Scenario 2: Cost Effective Package[2]

Installation Cost	$184,970
Potential Rebates & Incentives	$20,685
Annual Cost Savings	$39,835
Annual Energy Savings	Electricity: 255,867 kWh
Greenhouse Gas Emission Savings	127 Tons
Simple Payback	4.1 Years
Site Energy Savings (all utilities)	13%



On-site Generation Potential

Photovoltaic	Medium
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		**137,496**	**34.2**	**-25**	**$21,303**	**$319,549**	**$64,444**	**$12,635**	**$51,809**	**2.4**	**135,498**
ECM 1	Install LED Fixtures	18,391	2.5	0	$2,884	$43,256	$21,858	$2,005	$19,853	6.9	18,476
ECM 2	Retrofit Fixtures with LED Lamps	119,105	31.6	-25	$18,420	$276,293	$42,586	$10,630	$31,956	1.7	117,022
Lighting Control Measures		**23,760**	**6.0**	**-5**	**$3,674**	**$29,395**	**$19,980**	**$2,350**	**$17,630**	**4.8**	**23,344**
ECM 3	Install Occupancy Sensor Lighting Controls	21,097	5.3	-4	$3,263	$26,101	$16,980	$2,350	$14,630	4.5	20,728
ECM 4	Install High/Low Lighting Controls	2,663	0.7	-1	$412	$3,295	$3,000	$0	$3,000	7.3	2,616
Motor Upgrades		**3,610**	**1.2**	**0**	**$567**	**$8,503**	**$23,668**	**$0**	**$23,668**	**41.8**	**3,635**
ECM 5	Premium Efficiency Motors	3,610	1.2	0	$567	$8,503	$23,668	$0	$23,668	41.8	3,635
Variable Frequency Drive (VFD) Measures		**89,047**	**24.5**	**0**	**$13,984**	**$209,753**	**$76,418**	**$5,700**	**$70,718**	**5.1**	**89,670**
ECM 6	Install VFDs on Constant Volume (CV) Fans	49,480	15.0	0	$7,770	$116,552	$30,069	$4,200	$25,869	3.3	49,826
ECM 7	Install VFDs on Chilled Water Pumps	23,737	8.2	0	$3,728	$55,913	$25,243	$0	$25,243	6.8	23,903
ECM 8	Install VFDs on Heating Water Pumps	8,580	1.9	0	$1,347	$20,211	$13,103	$0	$13,103	9.7	8,640
ECM 9	Install VFDs on Cooling Tower Fans	7,250	-0.6	0	$1,139	$17,078	$8,003	$1,500	$6,503	5.7	7,301
Electric Unitary HVAC Measures		**3,986**	**5.1**	**0**	**$626**	**$9,388**	**$57,043**	**$2,524**	**$54,519**	**87.1**	**4,013**
	Install High Efficiency Air Conditioning Units	3,986	5.1	0	$626	$9,388	$57,043	$2,524	$54,519	87.1	4,013
Electric Chiller Replacement		**22,176**	**37.1**	**0**	**$3,482**	**$69,648**	**$153,573**	**$5,400**	**$148,173**	**42.5**	**22,331**
	Install High Efficiency Chillers	22,176	37.1	0	$3,482	$69,648	$153,573	$5,400	$148,173	42.5	22,331
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**194**	**$2,212**	**$44,235**	**$169,730**	**$400**	**$169,330**	**76.6**	**22,690**
	Install High Efficiency Hot Water Boilers	0	0.0	194	$2,212	$44,235	$169,730	$400	$169,330	76.6	22,690
HVAC System Improvements		**255**	**0.0**	**0**	**$40**	**$601**	**$1,359**	**$0**	**$1,359**	**33.9**	**257**
	Implement Demand Control Ventilation (DCV)	255	0.0	0	$40	$601	$1,359	$0	$1,359	33.9	257
Food Service & Refrigeration Measures		**9,814**	**1.1**	**0**	**$1,541**	**$16,345**	**$16,969**	**$1,075**	**$15,894**	**10.3**	**9,882**
	Replace Refrigeration Equipment	7,859	0.9	0	$1,234	$14,810	$16,509	$1,075	$15,434	12.5	7,914
ECM 10	Vending Machine Control	1,954	0.2	0	$307	$1,535	$460	$0	$460	1.5	1,968
TOTALS		**290,143**	**109.2**	**164**	**$47,429**	**$707,417**	**$583,184**	**$30,084**	**$553,100**	**11.7**	**311,320**

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

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

Figure 2 – Evaluated Energy Improvements

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	x	x	
ECM 2	Retrofit Fixtures with LED Lamps	x	x	
ECM 3	Install Occupancy Sensor Lighting Controls	x	x	
ECM 4	Install High/Low Lighting Controls		x	
ECM 5	Premium Efficiency Motors		x	
ECM 6	Install VFDs on Constant Volume (CV) HVAC	x	x	
ECM 7	Install VFDs on Chilled Water Pumps		x	
ECM 8	Install VFDs on Hot Water Pumps		x	
ECM 9	Install VFDs on Cooling Tower Fans	x	x	
ECM 10	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 that 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 their 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 Hannah Caldwell Elementary School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

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

2.1 Site Overview

On August 29, 2018, TRC performed an energy audit at Hannah Caldwell Elementary School located in Union, NJ. TRC met with Donald Booker to review the facility operations and help focus our investigation on specific energy-using systems.

Hannah Caldwell Elementary School is a 2-story, 94,271 square foot building built in 1996. Spaces include: classrooms, boiler room and storage rooms, gymnasium, library, auditorium, offices, cafeteria, corridors, stairwells, warehouse, offices, and a commercial kitchen.

The building went through some renovations in 2001.

Facility concerns include that the window frames are in poor condition and need replacement and that the electric chiller is beyond its expected life and in poor condition.

Auditorium

2.2 Building Occupancy

The building is in operation 10 months out of the year. General operation is 6:30 AM to 10:00 PM Monday through Friday. The school is cleaned after hours between 6:00 PM and 10:00 PM. The building is occupied by 582 students and about 92 staff. The typical schedule is presented in the table below.

Building Occupancy Schedule		
Building Name	**Weekday/Weekend**	**Operating Schedule**
Hanna Caldwell Elementary	Weekday	6:30 AM to 10:00 PM
	Weekend	Closed

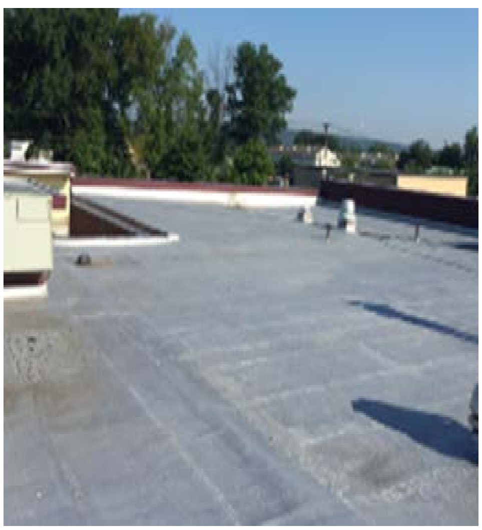
Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are constructed of concrete masonry units (CMUs) over structural steel with a stone and brick façade. Other parts of the building have metal membrane as exterior walls and ceiling. The roof is flat and covered with PVC membrane and it is in fair condition. The interior walls have a decorative CMU veneer and painted CMU interior finish.

Steel trusses support a pitched roof with a metal deck covered with slate shingles. The roof encloses conditioned space. The thermal barrier is between this space and the conditioned space below at the roof.

Most of the windows are double pane glazed and have vinyl frames. The glass-to-frame seals are in fair condition. The operable window weather seals are in poor condition, showing evidence of excessive wear.



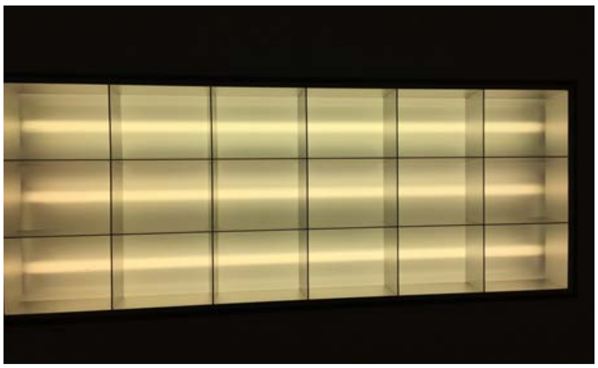
Building Envelope

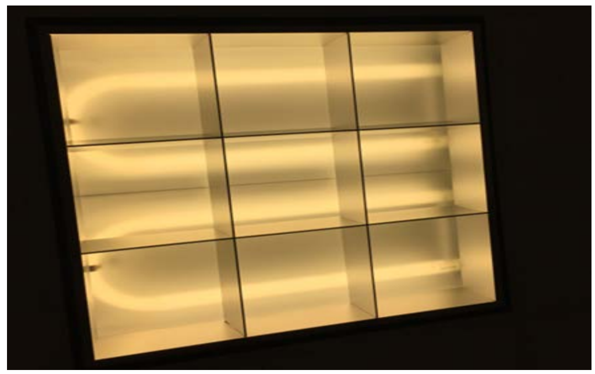
2.4 Lighting Systems

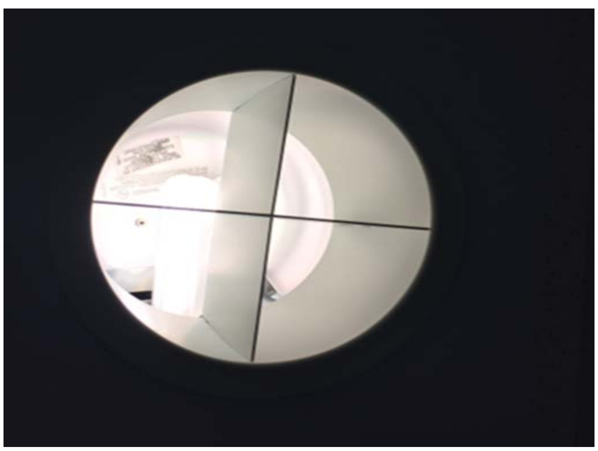
The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several U-bend 32-Watt T8 fixtures. Additionally, there are some compact fluorescent lamps (CFL), HID and LED general purpose lamps. Typically T8 fluorescent lamps use electronic ballasts. Fixture types include 2- 3- or 4-lamp, 2 4-foot long troffers, surface mounted fixtures, and 2-foot fixtures with U-bend lamps.

Most fixtures are in good condition. Gymnasium fixtures have high bay LED lamps and are manually controlled. All exit signs are LED units. Interior lighting levels were generally sufficient. All the interior lighting fixtures are controlled manually by wall switches.

Exterior fixtures include wall packs and a few flood lights. High Pressure sodium (HPS), Metal Halide (MH) and LED light sources are used. The pole mounted flood fixtures contain LED sources. Exterior light fixtures are controlled by a time clock or a switch.







Typical Interior Lighting System

Exterior Lights

2.5 Air Handling Systems

Unit Ventilators

The facility has 32 unit ventilators with supply fan motors, pneumatically controlled outside air dampers, and fan coil valves that operate with a pneumatic control system to provide heat. This system seems to be original to the building and appears to be in fair operating condition.

Air Handling Units (AHU)

There are four AHU units serving the auditorium (2 AHU), gymnasium and the cafeteria. The units have supply fan motors, pneumatically controlled outside air dampers and zone valves that operate with a pneumatic control system. These units provide cooling and heating via the heating and cooling coils that are supplied by the chiller and hot water boiler.

AHUs with Chilled & Hot Water Coils

Direct Expansion (DX) System

The cooling and heating to the building is provided by variety of roof top units consisting of packaged AC and split system units that provide cooling only as well as packaged units providing both cooling and heating, where the heating is based of electric resistance heating and gas fired furnace heating. Additional classrooms and offices are also served by packaged roof top units (RTUs). All units are found to be in fair condition. These units are not equipped with economizers. Some classrooms are also served by a variety of 2.5 ton to 3.5 ton split-system AC units. The units are controlled via programmable thermostats.

Please refer to table below for a list of RTUs throughout this facility:

Unit	Area Served	Cooling Capacity (tons)	Heating Capacity (MBh)	Efficiency (EER)	Efficiency (Heating) % or COP
Packaged AC with Elec Heat	Teacher Lounge & Room 127	4	78.5	10	COP 0f 1
Packaged AC	Office Area	2	N/A	16.5	N/A
Packaged AC with Elec Heat	Room 161	5	78.5	10	COP 0f 1
Packaged AC with Elec Heat	Library	10	122	10	COP 0f 1
Packaged AC with Gas Heat	Room 192	9	125	10	80
Packaged AC with Gas Heat	Various Areas	7	146	10	80
Packaged AC with Gas Heat	Room 195	7	146	10	80
Packaged AC with Gas Heat	Room 196	7	146	10	80
Packaged AC with Gas Heat	Room 198	3	56	10	80
Packaged AC with Gas Heat	Recreation Room	5	100	10	80

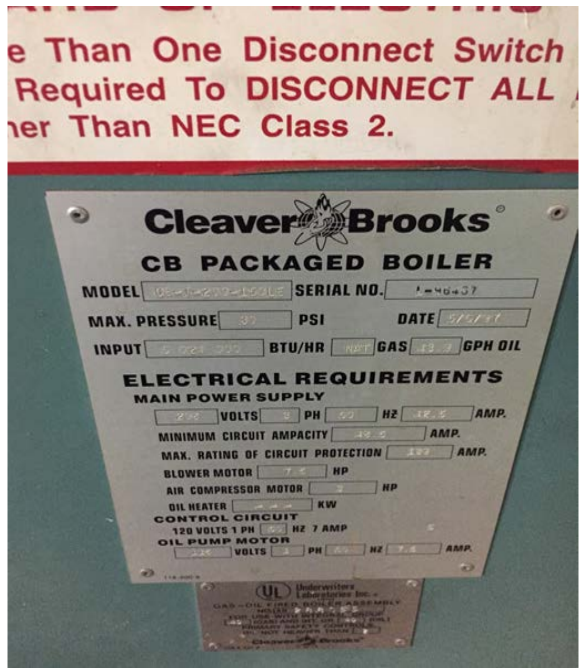
Direct Expansion Cooling & Heating System

2.6 Heating Hot Water Systems

Two Cleaver Brooks 6,000 MBh hot water non-condensing boilers as well an A.O Smith 413 hot water boiler serve the building heating load. The burners are non-modulating with a nominal combustion efficiency of 80%. The boilers are configured in a lead-lag control scheme. Only one boiler is required under high load conditions. All three boilers were installed in 1997, they are in fair condition. There is a service contract in place. The hydronic distribution system is a 4- pipe heating only system.

The Cleaver Brooks boilers are configured in a constant flow primary only distribution with four 5 hp constant speed hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to fan coil units and AHUs throughout the building. Additional 2 hp booster pumps provide hot water to the Auditorium AHU. There is a 7.5 hp heating hot water pump.

Heating hot water temperature is controlled based on the outside air temperatures. Local thermostats are used to control the temperature in spaces by a pneumatic control system.



Hot Water Heating System

2.7 Chilled Water Systems

The chiller plant consists of a 180-ton York R-123, centrifugal chiller. The chiller is a primary only distribution loop with three constant flow 5 hp chilled water supply pumps serving chilled water to the library wing, to the left wing, and to the right wing. There is also a 7.5 hp chilled water supply pump that operates both during summer and winter serving the cafeteria, gym, and the auditorium. Additionally, there is a 3 hp chilled water supply pump that is operational only during the summer period.

The chilled water supply temperature is reset based on outside air temperature and is controlled by the chillers pre-programmed control panel. The operating schedule and temperatures of the chiller could not be verified at the time of site visit.

The condenser water system consists of a one-cell cooling tower. Water is circulated to the tower. The tower has a 25 hp fan motor. Condenser water is supplied to the chiller by a 15 hp, 300 gpm constant flow condenser water pump. The chiller has passed its normal useful life and appears in poor condition.

Chilled Water System

2.8 Domestic Hot Water

The building is supplied domestic hot water by an A. O. Smith gas-fired water heater with 300 MBh, output capacity. The heater is 21 years old and is of standard efficiency and in good condition. It is located in the boiler room and has a separate 100-gallon storage tank. The water heater serves the kitchen and the restrooms. A fractional recirculation pump distributes hot water to the facility.

Domestic Hot Water System

2.9 Food Service Equipment

The kitchen has mixed gas and electric equipment that is used to prepare meals for students and staff. Most cooking is done using a gas-fired oven as well as the electric griddle. Bulk prepared foods are held in several electric holding cabinets. Equipment is not high efficiency and is in good condition.

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

Kitchen Equipment

2.10 Refrigeration

The kitchen has several stand-up refrigerators with solid doors. There are also two stand-up solid door freezers. There are three refrigerator chests. All equipment is standard and in good condition.

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

Refrigeration System

2.11 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 2.04% percent of total building energy use. This is lower than a typical building.

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

There are approximately 152 computer work stations throughout the facility. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as printers, copy machines, projectors, and fans.

There is one refrigerated beverage vending machine and one non-refrigerated vending machine. Vending machines are not equipped with occupancy-based controls.

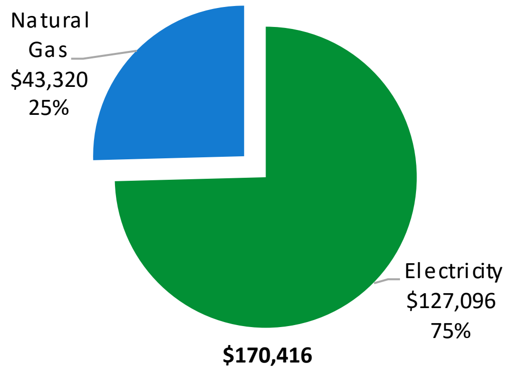
2.12 Water-Using Systems

There are several restrooms at the school with faucets rated as low flow.

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	809,348 kWh	$127,096
Natural Gas	37,955 Therms	$43,320
Total		**$170,416**



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.

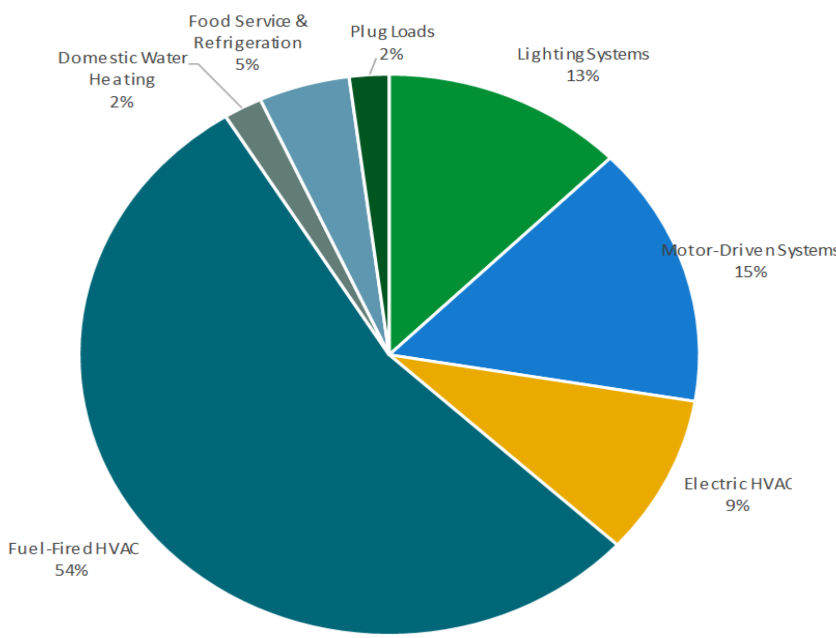
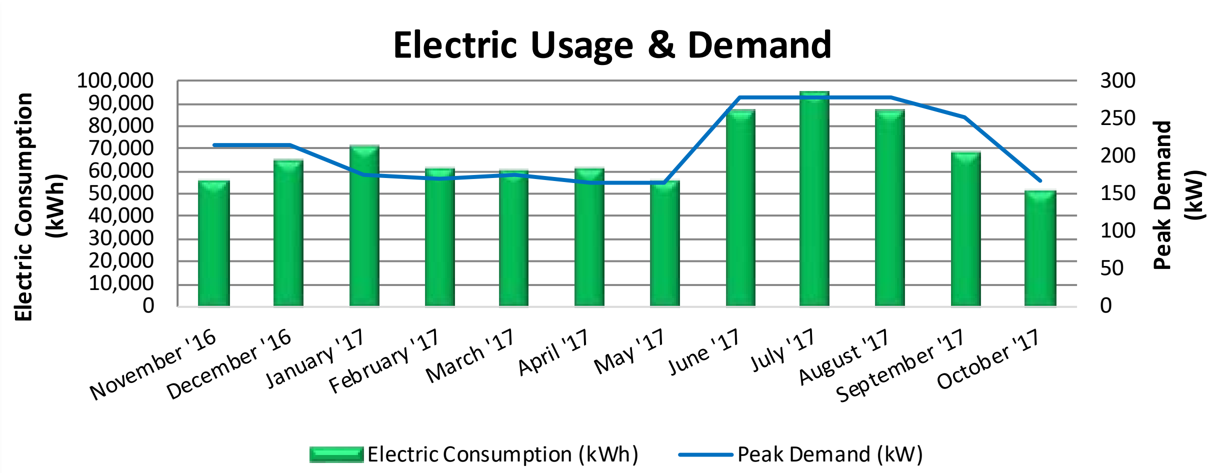


Figure 5 - Energy Balance

3.1 Electricity

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



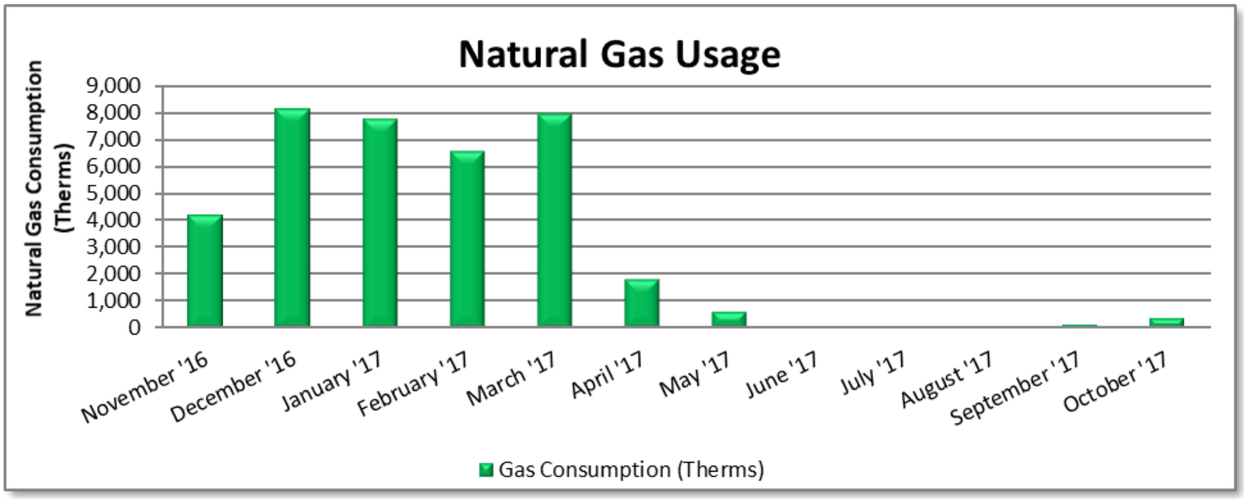
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
11/14/16	32	55,680	215	$800	$8,798	No
12/14/16	29	64,320	215	$800	$10,163	No
1/17/17	33	70,800	175	$652	$10,907	No
2/14/17	27	60,960	170	$634	$9,515	Yes
3/16/17	29	60,000	175	$656	$9,632	Yes
4/16/17	30	60,960	166	$624	$9,782	No
5/16/17	29	55,440	166	$624	$8,896	No
6/20/17	34	86,540	278	$1,049	$13,634	No
7/25/17	34	95,000	278	$1,049	$14,967	No
8/29/17	34	86,540	278	$1,049	$13,634	No
9/28/17	29	68,640	252	$964	$11,440	No
10/27/17	28	51,120	168	$622	$6,775	No
Totals	**368**	**816,000**	**278**	**$9,521**	**$128,141**	
Annual	**365**	**809,348**	**278**	**$9,444**	**$127,096**	

Notes:

- Peak demand of 278 kW occurred in July '17.
- The average electric cost over the past 12 months was $0.157/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

Elizabethtown Gas delivers natural gas under rate class 231, with natural gas supply provided by Hudson Energy, a third-party supplier.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
11/30/16	30	4,225	$6,841
12/30/16	30	8,112	$10,482
1/30/17	31	7,744	$6,210
2/28/17	29	6,548	$7,907
3/29/17	29	7,920	$6,439
4/28/17	30	1,847	$1,762
5/31/17	33	656	$889
6/29/17	29	139	$512
7/31/17	32	93	$518
8/30/17	30	91	$493
9/30/17	31	167	$548
10/31/17	31	414	$718
Totals	**365**	**37,955**	**$43,320**
Annual	**365**	**37,955**	**$43,320**

Notes:

- The average gas cost for the past 12 months is $1.141/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	32

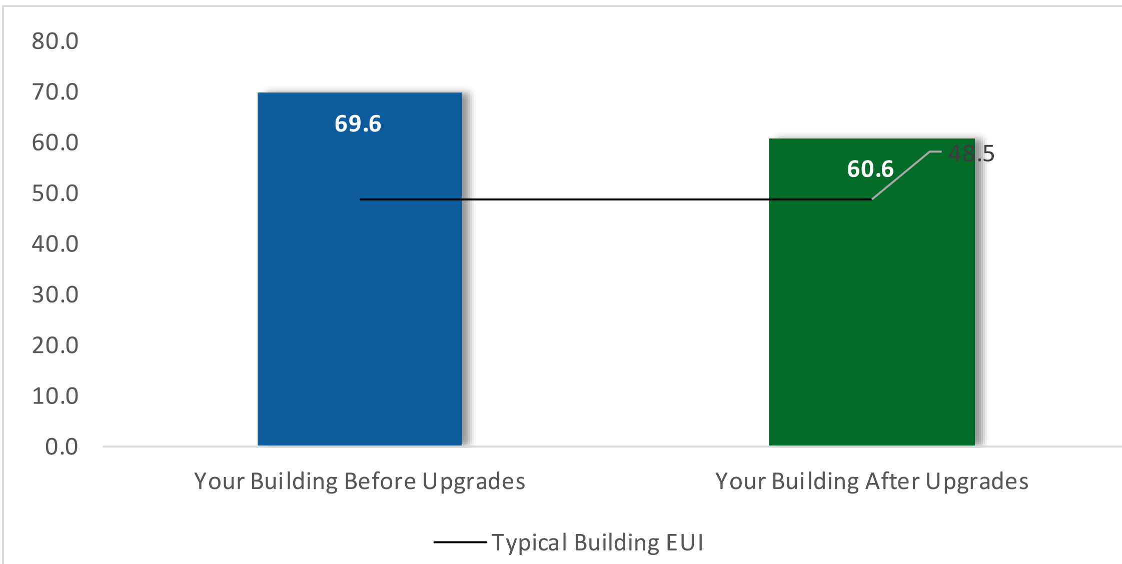


Figure 6 - Energy Use Intensity Comparison

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 ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**137,496**	**34.2**	**-25**	**$21,303**	**$64,444**	**$12,635**	**$51,809**	**2.4**	**135,498**
ECM 1	Install LED Fixtures	18,391	2.5	0	$2,884	$21,858	$2,005	$19,853	6.9	18,476
ECM 2	Retrofit Fixtures with LED Lamps	119,105	31.6	-25	$18,420	$42,586	$10,630	$31,956	1.7	117,022
Lighting Control Measures		**23,760**	**6.0**	**-5**	**$3,674**	**$19,980**	**$2,350**	**$17,630**	**4.8**	**23,344**
ECM 3	Install Occupancy Sensor Lighting Controls	21,097	5.3	-4	$3,263	$16,980	$2,350	$14,630	4.5	20,728
ECM 4	Install High/Low Lighting Controls	2,663	0.7	-1	$412	$3,000	$0	$3,000	7.3	2,616
Motor Upgrades		**3,610**	**1.2**	**0**	**$567**	**$23,668**	**$0**	**$23,668**	**41.8**	**3,635**
ECM 5	Premium Efficiency Motors	3,610	1.2	0	$567	$23,668	$0	$23,668	41.8	3,635
Variable Frequency Drive (VFD) Measures		**89,047**	**24.5**	**0**	**$13,984**	**$76,418**	**$5,700**	**$70,718**	**5.1**	**89,670**
ECM 6	Install VFDs on Constant Volume (CV) Fans	49,480	15.0	0	$7,770	$30,069	$4,200	$25,869	3.3	49,826
ECM 7	Install VFDs on Chilled Water Pumps	23,737	8.2	0	$3,728	$25,243	$0	$25,243	6.8	23,903
ECM 8	Install VFDs on Heating Water Pumps	8,580	1.9	0	$1,347	$13,103	$0	$13,103	9.7	8,640
ECM 9	Install VFDs on Cooling Tower Fans	7,250	-0.6	0	$1,139	$8,003	$1,500	$6,503	5.7	7,301
Electric Unitary HVAC Measures		**3,986**	**5.1**	**0**	**$626**	**$57,043**	**$2,524**	**$54,519**	**87.1**	**4,013**
	Install High Efficiency Air Conditioning Units	3,986	5.1	0	$626	$57,043	$2,524	$54,519	87.1	4,013
Electric Chiller Replacement		**22,176**	**37.1**	**0**	**$3,482**	**$153,573**	**$5,400**	**$148,173**	**42.5**	**22,331**
	Install High Efficiency Chillers	22,176	37.1	0	$3,482	$153,573	$5,400	$148,173	42.5	22,331
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**194**	**$2,212**	**$169,730**	**$400**	**$169,330**	**76.6**	**22,690**
	Install High Efficiency Hot Water Boilers	0	0.0	194	$2,212	$169,730	$400	$169,330	76.6	22,690
HVAC System Improvements		**255**	**0.0**	**0**	**$40**	**$1,359**	**$0**	**$1,359**	**33.9**	**257**
	Implement Demand Control Ventilation (DCV)	255	0.0	0	$40	$1,359	$0	$1,359	33.9	257
Food Service & Refrigeration Measures		**9,814**	**1.1**	**0**	**$1,541**	**$16,969**	**$1,075**	**$15,894**	**10.3**	**9,882**
	Replace Refrigeration Equipment	7,859	0.9	0	$1,234	$16,509	$1,075	$15,434	12.5	7,914
ECM 10	Vending Machine Control	1,954	0.2	0	$307	$460	$0	$460	1.5	1,968
TOTALS		**290,143**	**109.2**	**164**	**$47,429**	**$583,184**	**$30,084**	**$553,100**	**11.7**	**311,320**

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**137,496**	**34.2**	**-25**	**$21,303**	**$64,444**	**$12,635**	**$51,809**	**2.4**	**135,498**
ECM 1	Install LED Fixtures	18,391	2.5	0	$2,884	$21,858	$2,005	$19,853	6.9	18,476
ECM 2	Retrofit Fixtures with LED Lamps	119,105	31.6	-25	$18,420	$42,586	$10,630	$31,956	1.7	117,022
Lighting Control Measures		**23,760**	**6.0**	**-5**	**$3,674**	**$19,980**	**$2,350**	**$17,630**	**4.8**	**23,344**
ECM 3	Install Occupancy Sensor Lighting Controls	21,097	5.3	-4	$3,263	$16,980	$2,350	$14,630	4.5	20,728
ECM 4	Install High/Low Lighting Controls	2,663	0.7	-1	$412	$3,000	$0	$3,000	7.3	2,616
Motor Upgrades		**3,610**	**1.2**	**0**	**$567**	**$23,668**	**$0**	**$23,668**	**41.8**	**3,635**
ECM 5	Premium Efficiency Motors	3,610	1.2	0	$567	$23,668	$0	$23,668	41.8	3,635
Variable Frequency Drive (VFD) Measures		**89,047**	**24.5**	**0**	**$13,984**	**$76,418**	**$5,700**	**$70,718**	**5.1**	**89,670**
ECM 6	Install VFDs on Constant Volume (CV) Fans	49,480	15.0	0	$7,770	$30,069	$4,200	$25,869	3.3	49,826
ECM 7	Install VFDs on Chilled Water Pumps	23,737	8.2	0	$3,728	$25,243	$0	$25,243	6.8	23,903
ECM 8	Install VFDs on Heating Water Pumps	8,580	1.9	0	$1,347	$13,103	$0	$13,103	9.7	8,640
ECM 9	Install VFDs on Cooling Tower Fans	7,250	-0.6	0	$1,139	$8,003	$1,500	$6,503	5.7	7,301
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$307**	**$460**	**$0**	**$460**	**1.5**	**1,968**
ECM 10	Vending Machine Control	1,954	0.2	0	$307	$460	$0	$460	1.5	1,968
TOTALS		**255,867**	**66.1**	**-30**	**$39,835**	**$184,970**	**$20,685**	**$164,285**	**4.1**	**254,114**

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

** - 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		**137,496**	**34.2**	**-25**	**$21,303**	**$64,444**	**$12,635**	**$51,809**	**2.4**	**135,498**
ECM 1	Install LED Fixtures	18,391	2.5	0	$2,884	$21,858	$2,005	$19,853	6.9	18,476
ECM 2	Retrofit Fixtures with LED Lamps	119,105	31.6	-25	$18,420	$42,586	$10,630	$31,956	1.7	117,022

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 such as Metal Halide (MH) and High Pressure Sodium (HSP) 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: Boiler room, warehouse, and exterior fixtures

ECM 2: Retrofit Fixtures with LED Lamps

Replace fluorescent T8, CFL and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as 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 containing T8 tubes, many CFL, and incandescent lamps throughout

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		**23,760**	**6.0**	**-5**	**$3,674**	**$19,980**	**$2,350**	**$17,630**	**4.8**	**23,344**
ECM 3	Install Occupancy Sensor Lighting Controls	21,097	5.3	-4	$3,263	$16,980	$2,350	$14,630	4.5	20,728
ECM 4	Install High/Low Lighting Controls	2,663	0.7	-1	$412	$3,000	$0	$3,000	7.3	2,616

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 3: 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, classrooms, gymnasium, library, and restrooms

ECM 4: Install High/Low Lighting Controls

Install occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons.

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

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

Affected building areas: Hallways

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

4.3 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		**3,610**	**1.2**	**0**	**$567**	**$23,668**	**$0**	**$23,668**	**41.8**	**3,635**
ECM 5	Premium Efficiency Motors	3,610	1.2	0	$567	$23,668	$0	$23,668	41.8	3,635

ECM 5: 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
Audotorium	Auditorium AHU	2	Supply Fan	10.0	
Boiler Room	Hot Water	4	Heating Hot Water Pump	5.0	
Boiler Room	Hot Water	1	Heating Hot Water Pump	7.5	
Boiler Room	Chilled Water Supply	1	Chilled Water Pump	7.5	
Boiler Room	Chilled Water Supply	1	Chilled Water Pump	3.0	
Boiler Room	Chilled Water Supply	1	Chilled Water Pump	15.0	
Boiler Room	Chilled Water Supply	3	Chilled Water Pump	5.0	
Mezzanine	AHU2	1	Supply Fan	10.0	
Mezzanine	AHU1	1	Supply Fan	7.5	
Roof	Cooling Tower	1	Cooling Tower Fan	25.0	
Roof	PAC-Unit	1	Supply Fan	3.0	

Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Additional Motor Description
Roof	PAC-Unit	1	Supply Fan	3.0	
Roof	PAC-Unit	1	Supply Fan	3.0	
Roof	PAC-Unit	1	Supply Fan	3.0	
Roof	PAC-Unit	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		**89,047**	**24.5**	**0**	**$13,984**	**$76,418**	**$5,700**	**$70,718**	**5.1**	**89,670**
ECM 6	Install VFDs on Constant Volume (CV) Fans	49,480	15.0	0	$7,770	$30,069	$4,200	$25,869	3.3	49,826
ECM 7	Install VFDs on Chilled Water Pumps	23,737	8.2	0	$3,728	$25,243	$0	$25,243	6.8	23,903
ECM 8	Install VFDs on Heating Water Pumps	8,580	1.9	0	$1,347	$13,103	$0	$13,103	9.7	8,640
ECM 9	Install VFDs on Cooling Tower Fans	7,250	-0.6	0	$1,139	$8,003	$1,500	$6,503	5.7	7,301

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 — unless the existing motor meets or exceeds IHP 2014 standards — to conservatively account for the cost of an inverter duty rated motor. The savings and cost associated with the new motor are presented with the Premium Efficiency Motor measures. If the proposed VFD measure is not selected for implementation the motor replacement should be reevaluated.

ECM 6: 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.

VAV system controls should not raise the supply air temperature at the expense of the fan power. A common mistake is to reset the supply air temperature to achieve chiller energy savings, which can lead to additional air flow requirements. Supply air temperature should be kept low (e.g. 55°F) until the minimum fan speed (typically about 50%) is met. At this point, it is efficient to raise the supply air temperature as the load decreases, but not such that additional air flow and thus fan energy is required.

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.

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

Affected air handlers: Auditorium, gymnasium, and cafeteria

ECM 7: Install VFDs on Chilled Water Pumps

Install VFDs to control chilled water pumps. Two-way valves must serve the chilled water coils being served and the chilled water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the chilled water distribution they will need to be modified when this measure is implemented. As the chilled water valves close, the differential pressure increases, and the VFD modulates the pump speed to maintain a differential pressure setpoint.

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

Energy savings result from reducing the pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

Affected pumps: All chilled water pumps

ECM 8: Install VFDs on Heating Water Pumps

Install variable frequency drives (VFD) to control heating water pumps. Two-way valves must serve the hot water coils and the hot water loop must have a differential pressure sensor installed. If three-way valves or a bypass leg are used in the hot water distribution they will need to be modified when this measure is implemented. As the hot water valves close, the differential pressure increases and the VFD modulates the pump speed to maintain a differential pressure setpoint.

Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

Affected pumps: Heating hot water pumps

ECM 9: Install VFDs on Cooling Tower Fans

Install a VFD to control the cooling tower fan motor. The VFD will allow the cooling tower fan to operate at the minimum speed necessary to maintain the temperature of the condenser water returning to the chiller.

Energy savings result from reducing fan speed (and power) when there is a reduced load on the chiller and outside air wet bulb temperatures are depressed. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

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		**3,986**	**5.1**	**0**	**$626**	**$57,043**	**$2,524**	**$54,519**	**87.1**	**4,013**
	Install High Efficiency Air Conditioning Units	3,986	5.1	0	$626	$57,043	$2,524	$54,519	87.1	4,013

Install High Efficiency Air Conditioning Units

We evaluated replacing standard efficiency split system and packaged air conditioning units with high efficiency split system and 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.

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 split system and packaged ACs are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

4.6 Electric Chillers

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Chiller Replacement		**22,176**	**37.1**	**0**	**$3,482**	**$153,573**	**$5,400**	**$148,173**	**42.5**	**22,331**
	Install High Efficiency Chillers	22,176	37.1	0	$3,482	$153,573	$5,400	$148,173	42.5	22,331

Install High Efficiency Chillers

We evaluated replacing older inefficient electric chiller with new high efficiency chiller. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile, for example:

- Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity.
- Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles.
- Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water.
- In any given size range, variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

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

For the purposes of this analysis, we evaluated the replacement of chillers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your design team to select chillers that are sized appropriately for the cooling load at this facility. In some cases, the plant energy use can be reduced by selecting multiple chillers that match the facility load profile rather than one or two large chillers. This can also improve the chiller plant reliability through increased redundancy. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

Replacing the chiller has a long payback based on energy savings and may not be justifiable based simply on energy considerations. However, the chiller has reached the end of its normal useful life. Typically, the marginal cost of purchasing a high efficiency chiller can be justified by the marginal savings from the improved efficiency. When the chiller is eventually replaced, consider purchasing equipment that exceed the minimum efficiency required by building codes.

4.7 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**194**	**$2,212**	**$169,730**	**$400**	**$169,330**	**76.6**	**22,690**
	Install High Efficiency Hot Water Boilers	0	0.0	194	$2,212	$169,730	$400	$169,330	76.6	22,690

Install High Efficiency Hot Water Boilers

Replace older inefficient hot water boilers with high efficiency hot water boilers. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

For the purposes of this analysis, we evaluated the replacement of boilers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your mechanical design team to select boilers that are sized appropriately for the heating load at this facility. In many cases installing multiple modular boilers rather than one or two large boilers will result in higher overall plant efficiency while providing additional system redundancy.

Replacing the boilers has a long payback and may not be justifiable based simply on energy considerations. However, the boilers have reached the end of their normal useful life. Typically, the marginal cost of purchasing high efficiency boilers can be justified by the marginal savings from the improved efficiency. When the boiler is eventually replaced, consider purchasing boilers that exceed the minimum efficiency required by building codes. We also recommend working with your mechanical design team to determine whether the heating system can operate with return water temperatures below 130°F, which would allow the use of condensing boilers.

4.8 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		**255**	**0.0**	**0**	**$40**	**$1,359**	**$0**	**$1,359**	**33.9**	**257**
	Implement Demand Control Ventilation (DCV)	255	0.0	0	$40	$1,359	$0	$1,359	33.9	257

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 excessive fan motor usage as well as 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, system air flow, outside air reduction, and other factors. Energy savings results from eliminating unnecessary ventilation and space conditioning.

Affected building areas: Library

4.9 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		**9,814**	**1.1**	**0**	**$1,541**	**$16,969**	**$1,075**	**$15,894**	**10.3**	**9,882**
	Replace Refrigeration Equipment	7,859	0.9	0	$1,234	$16,509	$1,075	$15,434	12.5	7,914
ECM 10	Vending Machine Control	1,954	0.2	0	$307	$460	$0	$460	1.5	1,968

Replace Refrigeration Equipment

Replace existing commercial refrigerator with new ENERGY STAR® rated equipment. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

ECM 10: 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, they 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.

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.

Doors and Windows

Close exterior doors and windows in heated and cooled areas. Leaving doors and windows open leads to a loss of heat during the winter and chilled air during the summer. Reducing air changes per hour (ACH) can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Window Treatments/Coverings

Use high-reflectivity films or cover windows with shades or shutters to reduce solar heat gain and reduce the load on cooling and heating systems. Older, single pane windows and east or west-facing windows are especially prone to solar heat gain. In addition, use shades or shutters at night during cold weather to reduce heat loss.

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

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

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.

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 reduction, which results in improved electric grid reliability through better use of transmission and distribution systems.

Preliminary screenings were performed to determine if an on-site generation measure could be a cost-effective solution for your facility. Before deciding to install an on-site generation system, we recommend conducting a feasibility study to analyze existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

6.1 Solar Photovoltaic

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

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to no potentials for solar installation at this site. 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.

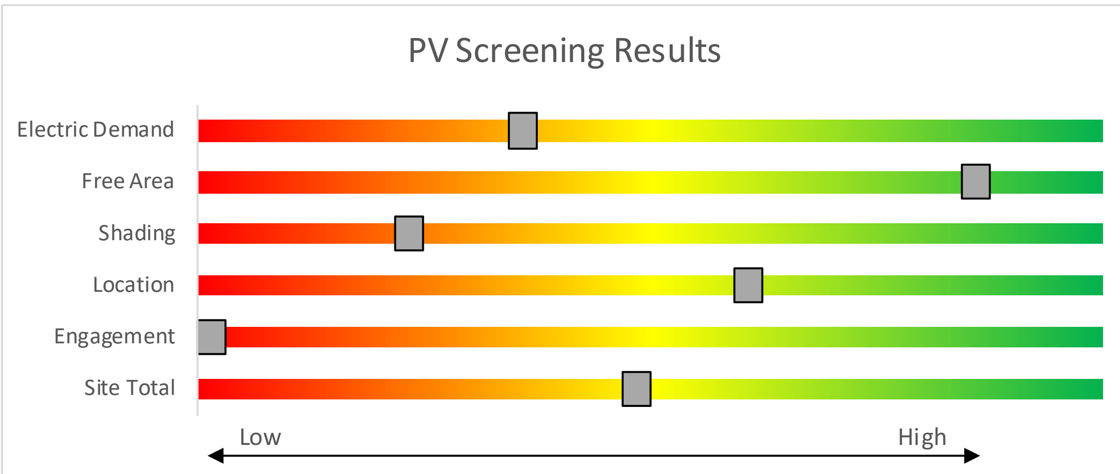


Figure 9 - Photovoltaic Screening

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 **low** 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 lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

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

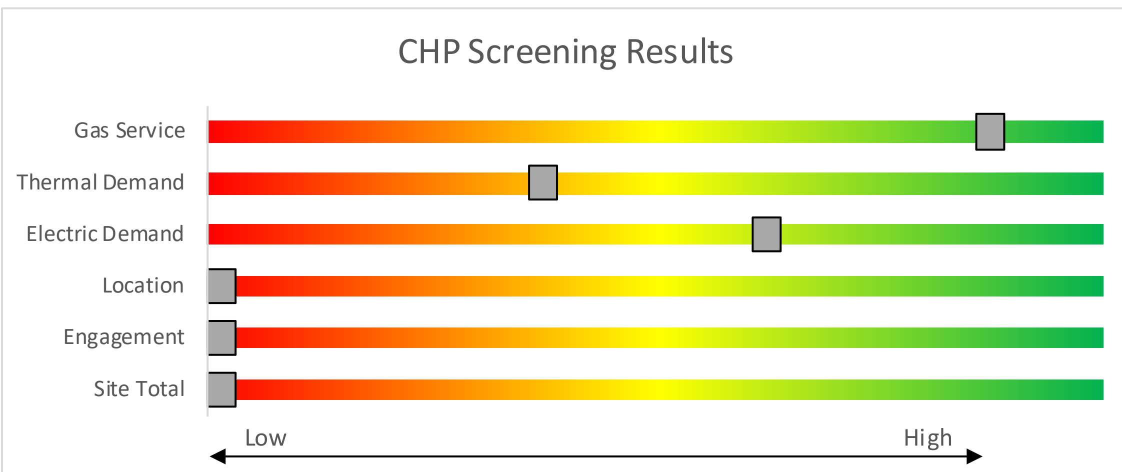


Figure 10 - Combined Heat and Power Screening

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

7 Project Funding and Incentives

Ready to improve your building's performance? 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 in 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 Direct Install

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

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

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

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

7.3 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive for the life of the contract.

ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs described above can also be used to help further reduce the total project cost of eligible measures.

How to Participate

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

(1) Use an energy services company or "ESCO".

(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.

(3) Use a hybrid approach of the two options described above where the ESCO is used for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

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

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

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

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

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

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

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

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

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

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility already buys electricity from a third-party supplier, review and compare prices at the end of each contract year.

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

8.2 Retail Natural Gas Supply Options

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

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

If your facility does not already purchase natural gas from a third-party supplier, consider shopping for a reduced rate from third-party natural gas suppliers. If your facility already purchases natural gas from a third-party supplier, review and compare prices at the end of each contract year.

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler	15	Compact Fluorescent: 100 Watt - 1L Screw-in	Wall Switch	s	100	600	2	Relamp	No	15	LED Screw-In Lamps: LED -1L	Wall Switch	70	600	0.3	297	0	$46	$258	$15	5.3
Boiler	1	High-Pressure Sodium: (1) 100W Lamp	Wall Switch	s	138	600	1	Fixture Replacement	No	1	LED - Fixtures: 70 Watt LED - 1L	Wall Switch	41	600	0.1	64	0	$10	$17	$0	1.7
Boiler	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	600	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	600	0.0	33	0	$5	$55	$15	7.9
Storage Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	600	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	600	0.0	33	0	$5	$55	$15	7.9
Custodial Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Custodial Office	1	Compact Fluorescent: 100 Watt - 1L Screw-in	Wall Switch	s	100	2,640	2	Relamp	No	1	LED Screw-In Lamps: LED -1L	Wall Switch	70	2,640	0.0	87	0	$13	$17	$1	1.2
Main Hallway	26	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 4	Relamp	Yes	26	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,822	0.8	3,170	-1	$490	$1,749	$260	3.0
Main Hallway	5	Exit Signs: LED - 2 W Lamp	None	s	6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
3-4th grade Hallway	1	Exit Signs: LED - 2 W Lamp	None	s	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
3-4th grade Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 4	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,822	0.4	1,707	0	$264	$911	$140	2.9
Art Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.3	1,219	0	$189	$635	$135	2.7
Hallway	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 4	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,822	0.5	2,073	0	$321	$1,021	$170	2.7
Hallway	4	Exit Signs: LED - 2 W Lamp	None	s	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
Pre-k Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.5	1,389	0	$215	$767	$210	2.6
Pre-k Hallway	7	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	7	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.1	407	0	$63	$507	$70	7.0
Pre-k Hallway	15	Compact Fluorescent: 26 Watt - 1L Pin based	Occupancy Sensor	s	26	1,822	2	Relamp	No	15	LED Screw-In Lamps: LED -1L	Occupancy Sensor	18	1,822	0.1	234	0	$36	$258	$0	7.1
Pre-k Hallway	6	Exit Signs: LED - 2 W Lamp	None	s	6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 194	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.1	198	0	$31	$110	$30	2.6
Room 194	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.3	697	0	$108	$870	$120	7.0
Room 194	4	Exit Signs: LED - 2 W Lamp	None	s	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
Room 194D	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.0	99	0	$15	$55	$15	2.6
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.1	198	0	$31	$110	$30	2.6
Room 194C	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.0	99	0	$15	$55	$15	2.6
Room 194E	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	2,640	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,640	0.0	144	0	$22	$55	$15	1.8
Room 197	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.3	893	0	$138	$493	$135	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
Room 197	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	331	0	$51	$183	$50	2.6
Room 197	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.0	58	0	$9	$72	$10	7.0
Room198	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	331	0	$51	$183	$50	2.6
Room198	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.1	174	0	$27	$217	$30	7.0
Room198	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.3	893	0	$138	$493	$135	2.6
Room 196	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.4	1,091	0	$169	$602	$165	2.6
Room 196	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	331	0	$51	$183	$50	2.6
Room 196	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.0	58	0	$9	$72	$10	7.0
Room 195	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	331	0	$51	$183	$50	2.6
Room 195	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.4	992	0	$153	$548	$150	2.6
Room 195	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.0	58	0	$9	$72	$10	7.0
Room 193	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	331	0	$51	$183	$50	2.6
Room 193	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.3	893	0	$138	$493	$135	2.6
Room 193	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.0	58	0	$9	$72	$10	7.0
Room 192	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.4	1,091	0	$169	$602	$165	2.6
Room 192	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	264	0	$41	$146	$40	2.6
Room 192	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.0	58	0	$9	$72	$10	7.0
Room 190	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	264	0	$41	$146	$40	2.6
Room 190	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.4	1,190	0	$184	$657	$180	2.6
Room 190	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	s	62	1,822	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.0	58	0	$9	$72	$10	7.0
Room 191	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	s	93	1,822	2	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.1	198	0	$31	$110	$30	2.6
Room 186	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 188	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.4	1,707	0	$264	$781	$175	2.3
Room 185	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 184	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2

	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
Room 181	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Room 182	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 179	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 183	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 189 / Closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	600	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	600	0.0	19	0	$3	$72	$10	21.1
Room 166	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.3	1,097	0	$170	$599	$125	2.8
Room 189 / Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	600	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.0	22	0	$3	$37	$10	7.9
Room 167	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.4	1,463	0	$226	$708	$155	2.4
Room 168	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 169	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 178	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Room 177	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 170 - Library	23	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.7	2,805	-1	$434	$1,380	$300	2.5
Room 170 - Library	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,640	0.0	84	0	$13	$72	$10	4.8
Room 171	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 172	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Room 174	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.4	1,707	0	$264	$781	$175	2.3
Room 175	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.6	2,317	0	$358	$964	$225	2.1
Room 163	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.1	228	0	$35	$261	$40	6.3
Room 163	1	Exit Signs: LED - 2 W Lamp	None	s	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 162	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.4	1,463	0	$226	$708	$155	2.4
Room 160	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Room 159	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Room 157	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.3	1,341	0	$207	$672	$145	2.5
Room 152	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	488	0	$75	$262	$60	2.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 153	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Room 154	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Room 150	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	488	0	$75	$262	$60	2.7
Room 144	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	488	0	$75	$262	$60	2.7
Room 143	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Room 149	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Room 146	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	488	0	$75	$262	$60	2.7
Room 146	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,822	0.1	247	0	$38	$246	$44	5.3
Former Foyer	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.2	854	0	$132	$526	$105	3.2
Former Foyer	1	Exit Signs: LED - 2 W Lamp	None	s	6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 141	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 156	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,640	0.0	84	0	$13	$72	$10	4.8
Room 138	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 139	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,951	0	$302	$1,124	$230	3.0
Room 136	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 137	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Room 135	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Room 133	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 134	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 131	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,951	0	$302	$1,124	$230	3.0
Room 130	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.4	1,463	0	$226	$708	$155	2.4
Room 129	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 128	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 127	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 126	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2

	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
Gym Hallway	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 4	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,822	0.5	1,829	0	$283	$948	$150	2.8
Gym Hallway	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,640	0.0	84	0	$13	$72	$10	4.8
Gym Hallway	2	Exit Signs: LED - 2 W Lamp	None	s	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 112	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.2	732	0	$113	$335	$80	2.3
Room 113	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.1	549	0	$85	$280	$65	2.5
Room 116	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	0.1	549	0	$85	$280	$65	2.5
101	23	LED Screw-In Lamps: 25 Watt LED - 1L	Wall Switch	s	25	2,640	3	None	Yes	23	LED Screw-In Lamps: 25 Watt LED - 1L	Occupancy Sensor	25	1,822	0.1	518	0	$80	$540	$70	5.9
101	4	Exit Signs: LED - 2 W Lamp	None	s	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
Stage	107	Incandescent: 65 Watt - 1L	Wall Switch	s	65	2,640	2	Relamp	No	107	LED Screw-In Lamps: 20 Watt LED -1L	Wall Switch	20	2,640	3.5	13,983	-3	$2,162	$1,843	$107	0.8
Stage	10	Halogen Incandescent: 500 Watt - 1L	Wall Switch	s	500	2,640	2	Relamp	No	10	LED Screw-In Lamps: 75 Watt LED -1L	Wall Switch	75	2,640	3.1	12,342	-3	$1,909	$172	$10	0.1
Stage	34	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	34	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.8	3,258	-1	$504	$1,242	$340	1.8
Stage	1	Exit Signs: LED - 2 W Lamp	None	s	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
Exit 20	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	244	0	$38	$189	$40	4.0
Exit 20	1	Exit Signs: LED - 2 W Lamp	None	s	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
Gym	24	LED Screw-In Lamps: 120 Watt - 1L	Wall Switch	s	120	2,640	3	None	Yes	24	LED Screw-In Lamps: 120 Watt - 1L	Occupancy Sensor	120	1,822	0.6	2,593	-1	$401	$540	$70	1.2
Gym	4	Exit Signs: LED - 2 W Lamp	None	s	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
Room 107 Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
103 Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	600	2	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	600	0.1	65	0	$10	$110	$30	7.9
Mezzanine	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	488	0	$75	$262	$60	2.7
Exit 4	1	Exit Signs: LED - 2 W Lamp	None	s	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
Exit 4	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.2	610	0	$94	$453	$85	3.9
2nd Fl Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 4	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,822	0.4	1,707	0	$264	$911	$140	2.9
2nd Fl Hallway	3	Exit Signs: LED - 2 W Lamp	None	s	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
Room 215	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Room 213	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	488	0	$75	$262	$60	2.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 212	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Boys Restroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Custodial	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,640	0.0	84	0	$13	$72	$10	4.8
Room 210	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 209	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 208	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.4	1,707	0	$264	$781	$175	2.3
Room 207	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 206	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
ROOM 205	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.1	366	0	$57	$226	$50	3.1
Room 204	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.4	1,707	0	$264	$781	$175	2.3
Room 203	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,829	0	$283	$818	$185	2.2
Room 202	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Stairwell 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,822	0.2	732	0	$113	$419	$60	3.2
Stairwell 2	1	Exit Signs: LED - 2 W Lamp	None	s	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
Cafeterial Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 4	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,822	0.3	1,219	0	$189	$765	$100	3.5
Cafeterial Hallway	3	Exit Signs: LED - 2 W Lamp	None	s	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
Cafeteria	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.5	1,951	0	$302	$854	$195	2.2
Cafeteria	17	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	2,640	2, 3	Relamp	Yes	17	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,822	0.3	1,050	0	$162	$823	$137	4.2
Cafeteria	2	Exit Signs: LED - 2 W Lamp	None	s	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 106 / Kitchen	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,822	0.2	976	0	$151	$562	$115	3.0
Room 106 / Kitchen	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	s	33	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,640	0.0	46	0	$7	$33	$6	3.7
Room 106 / Kitchen	2	Exit Signs: LED - 2 W Lamp	None	s	6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 106 / Kitchen	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	2,640	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,822	0.1	228	0	$35	$261	$40	6.3
Room 106 - Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,640	2	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,640	0.0	96	0	$15	$37	$10	1.8
Recreation Dept	31	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	2,640	2, 3	Relamp	Yes	31	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,822	1.4	5,670	-1	$877	$2,238	$535	1.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Recreation Dept	3	Exit Signs: LED - 2 W Lamp	None	s	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
Warehouse	6	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	s	188	2,000	1, 3	Fixture Replacement	Yes	6	LED - Fixtures: 105 Watt LED - 1L	Occupancy Sensor	56	1,380	0.6	1,968	0	$304	$570	$35	1.8
Warehouse	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	s	114	2,000	2, 3	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,380	0.6	1,953	0	$302	$1,146	$275	2.9
Warehouse	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	2,000	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,380	0.1	345	0	$53	$406	$60	6.5
Warehouse	5	Exit Signs: LED - 2 W Lamp	None	s	6	2,000		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	2,000	0.0	0	0	$0	$0	$0	0.0
Warehouse	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	2,000	2, 3	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,380	0.5	1,478	0	$229	$1,124	$230	3.9
Wall Pack	2	Metal Halide: (1) 175W Lamp	Timeclock	s	215	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	65	4,380	0.2	1,318	0	$207	$1,932	$200	8.4
Wall Pack	5	High-Pressure Sodium: (1) 100W Lamp	Timeclock	s	138	4,380	1	Fixture Replacement	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	41	4,380	0.2	2,116	0	$332	$4,830	$500	13.0
Wall Pack	2	Metal Halide: (1) 400W Lamp	Timeclock	s	458	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	137	4,380	0.3	2,808	0	$441	$1,932	$200	3.9
Wall Pack	2	Metal Halide: (1) 150W Lamp	Timeclock	s	190	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	57	4,380	0.1	1,165	0	$183	$1,932	$200	9.5
Wall Pack	17	LED Screw-In Lamps: 75 Watt LED - 1L	Timeclock	s	75	4,380		None	No	17	LED Screw-In Lamps: 75 Watt LED - 1L	Timeclock	75	4,380	0.0	0	0	$0	$0	$0	0.0
Recessed	21	Metal Halide: (1) 70W Lamp	Timeclock	s	95	4,380	1	Fixture Replacement	No	21	LED - Fixtures: Downlight Recessed	Timeclock	29	4,380	0.7	6,117	0	$961	$3,187	$105	3.2
Pole Light	7	LED Screw-In Lamps: 125 Watt LED - 1L	Timeclock	s	125	4,380		None	No	7	LED Screw-In Lamps: 125 Watt LED - 1L	Timeclock	125	4,380	0.0	0	0	$0	$0	$0	0.0
Wall Pack	1	LED Screw-In Lamps: 9 Watt LED - 1L	Timeclock	s	9	4,380		None	No	1	LED Screw-In Lamps: 9 Watt LED - 1L	Timeclock	9	4,380	0.0	0	0	$0	$0	$0	0.0
Wall Pack	2	LED Screw-In Lamps: 15 Watt LED - 1L	Timeclock	s	15	4,380		None	No	2	LED Screw-In Lamps: 15 Watt LED - 1L	Timeclock	15	4,380	0.0	0	0	$0	$0	$0	0.0
Wall Pack	8	Metal Halide: (1) 150W Lamp	Timeclock	s	125	4,380	1	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	38	4,380	0.4	3,066	0	$481	$7,728	$800	14.4
Front Recessed	24	LED Screw-In Lamps: 21 Watt LED - 1L	Timeclock	s	21	4,380		None	No	24	LED Screw-In Lamps: 21 Watt LED - 1L	Timeclock	21	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
Audotorium	Audotorium	2	Heating Hot Water Pump	2.0	86.5%	No	B	1,373		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Audotorium	Auditorium AHU	2	Supply Fan	10.0	88.6%	No	B	3,391	5, 6	Yes	91.7%	Yes	2	6.0	22,717	0	$3,567	$10,750	$1,600	2.6
School	School	32	Supply Fan	0.5	78.2%	No	B	2,745		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hot Water	2	Heating Hot Water Pump	0.3	68.5%	No	B	1,373		No	68.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hot Water	4	Heating Hot Water Pump	5.0	89.5%	No	B	1,373	5, 8	Yes	89.5%	Yes	4	1.9	8,580	0	$1,347	$16,305	$0	12.1
Boiler Room	Hot Water	2	Heating Hot Water Pump	1.0	85.5%	No	B	1,373		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Hot Water	1	Heating Hot Water Pump	7.5	91.0%	No	B	1,696	5, 7	Yes	91.0%	Yes	1	0.7	3,909	0	$614	$4,738	$0	7.7
Boiler Room	Chilled Water Supply	1	Chilled Water Pump	7.5	91.0%	No	B	1,696	5, 7	Yes	91.0%	Yes	1	1.4	3,909	0	$614	$4,738	$0	7.7
Boiler Room	Chilled Water Supply	1	Chilled Water Pump	3.0	89.5%	No	B	1,373	5, 7	Yes	89.5%	Yes	1	0.6	1,287	0	$202	$3,884	$0	19.2
Boiler Room	Chilled Water Supply	1	Chilled Water Pump	15.0	93.0%	No	B	1,696	5, 7	Yes	93.0%	Yes	1	2.8	7,650	0	$1,201	$7,041	$0	5.9
Boiler Room	Chilled Water Supply	3	Chilled Water Pump	5.0	82.5%	No	B	1,373	5, 7	Yes	89.5%	Yes	3	3.3	7,964	0	$1,251	$12,229	$0	9.8
Room 160	Room 160	1	Process Pump	25.0	91.7%	No	B	2,000		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Mezzanine	AHU2	1	Supply Fan	10.0	86.6%	No	B	2,745	5, 6	Yes	91.7%	Yes	1	3.1	9,755	0	$1,532	$5,375	$800	3.0
Mezzanine	AHU1	1	Supply Fan	7.5	91.0%	No	B	2,745	5, 6	Yes	91.7%	Yes	1	2.2	6,416	0	$1,008	$4,761	$600	4.1
Roof	Cooling Tower	1	Cooling Tower Fan	25.0	92.4%	No	B	2,000	5, 9	Yes	93.6%	Yes	1	-0.5	7,599	0	$1,193	$10,845	$1,500	7.8
Boiler Room	Booster Pump	1	Process Pump	0.2	68.5%	No	B	2,745		No	68.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Cafeteria	2	Air Compressor	7.5	88.5%	No	B	1,460		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	PAC-Unit	1	Supply Fan	0.5	76.2%	No	B	2,745		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
Roof	PAC-Unit	1	Supply Fan	0.8	81.8%	No	B	2,745		No	81.8%	No		0.0	0	0	$0	$0	$0	0.0
Roof	PAC-Unit	1	Supply Fan	3.0	89.5%	No	B	2,745	5, 6	Yes	89.5%	Yes	1	0.9	2,574	0	$404	$3,884	$240	9.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	PAC-Unit	1	Supply Fan	3.0	89.5%	No	B	2,745	5, 6	Yes	89.5%	Yes	1	0.9	2,574	0	$404	$3,884	$240	9.0
Roof	PAC-Unit	1	Supply Fan	3.0	89.5%	No	B	2,745	5, 6	Yes	89.5%	Yes	1	0.9	2,574	0	$404	$3,884	$240	9.0
Roof	PAC-Unit	1	Supply Fan	3.0	89.5%	No	B	2,745	5, 6	Yes	89.5%	Yes	1	0.9	2,574	0	$404	$3,884	$240	9.0
Roof	PAC-Unit	1	Supply Fan	3.0	89.5%	No	B	2,745	5, 6	Yes	89.5%	Yes	1	0.9	2,574	0	$404	$3,884	$240	9.0
Roof	PAC-Unit	1	Supply Fan	1.0	85.5%	No	B	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	PAC-Unit	1	Supply Fan	1.0	85.5%	No	B	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	PAC-Unit	1	Supply Fan	0.3	68.5%	No	B	2,745		No	68.5%	No		0.0	0	0	$0	$0	$0	0.0
Boiler Room	Boiler	2	Combustion Air Fan	7.5	85.5%	No	B	500		No	85.5%	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	Teacher Lounge	1	Packaged AC	4.00		B	NR	Yes	1	Packaged AC	4.00		14.00		1.0	750	0	$118	$9,076	$368	73.9
Roof	Teacher Lounge	1	Electric Resistance Heat		78.50	B		No							0.0	0	0	$0	$0	$0	0.0
Roof	Office	1	Packaged AC	2.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 163	1	Split-System AC	2.50		N		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 163	1	Split-System AC	2.00		B	NR	Yes	1	Split-System AC	2.00		14.00		0.4	299	0	$47	$2,992	$184	59.7
Roof	Computer Lab	1	Split-System AC	2.00		B	NR	Yes	1	Split-System AC	2.00		14.00		0.4	299	0	$47	$2,992	$184	59.7
Roof	Computer Lab	1	Split-System AC	2.50		B	NR	Yes	1	Split-System AC	2.50		14.00		0.5	374	0	$59	$3,741	$230	59.7
Roof	Room 161	1	Packaged AC	5.00		B	NR	Yes	1	Packaged AC	5.00		14.00		0.9	749	0	$118	$11,345	$460	92.6
Roof	Room 161	1	Electric Resistance Heat		78.50	B		No							0.0	0	0	$0	$0	$0	0.0
Roof	Library	1	Packaged AC	10.00		B	NR	Yes	1	Packaged AC	10.00		11.50		1.0	763	0	$120	$17,821	$730	142.7
Roof	Library	1	Electric Resistance Heat		122.00	B		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 192	1	Packaged AC	9.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Various	1	Packaged AC	7.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 195	1	Packaged AC	7.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 196	1	Packaged AC	7.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 198	1	Packaged AC	3.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Recreation	1	Packaged AC	5.00		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Room 188	1	Split-System AC	2.50		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Main Office	1	Packaged AC	4.00		B	NR	Yes	1	Packaged AC	4.00		14.00		1.0	750	0	$118	$9,076	$368	73.9
Roof	Room 127	1	Packaged AC	3.00		N		No							0.0	0	0	$0	$0	$0	0.0

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	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	Main Office	1	Electric Resistance Heat		78.50	B		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School	1	Water-Cooled Centrifugal Chiller	180.00		NR	Yes	1	Water-Cooled Centrifugal Chiller	Variable	180.00	0.64	0.39	37.1	22,176	0	$3,482	$153,573	$5,400	42.5

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	School	2	Non-Condensing Hot Water Boiler	######	B	NR	Yes	2	Non-Condensing Hot Water Boiler	######	85.00%	Ec	0.0	0	191	$2,184	$165,157	$0	75.6
Roof	Recreation-PAC Unit	1	Warm Air Unit Heater	125.00		NR	Yes	1	Non-Condensing Hot Water Boiler	125.00	85.00%	AFUE	0.0	0	2	$28	$4,573	$400	150.1
Roof	Room 192	1	Furnace	156.00			No						0.0	0	0	$0	$0	$0	0.0
Roof	Varrious	1	Furnace	146.00			No						0.0	0	0	$0	$0	$0	0.0
Roof	Room 195	1	Furnace	146.00			No						0.0	0	0	$0	$0	$0	0.0
Roof	Room 196	1	Furnace	146.00			No						0.0	0	0	$0	$0	$0	0.0
Roof	Room 198	1	Furnace	56.00			No						0.0	0	0	$0	$0	$0	0.0
Roof	Recreation	1	Furnace	100.00			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
Roof	Library	NR	1.00	10.00	122.00		0.0	255	0	$40	$1,359	$0	33.9

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	School	1	Storage Tank Water Heater (> 50 Gal)	b		No						0.0	0	0	$0	$0	$0	0.0

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
Cafeteria	2	Refrigerator Chest	No	NR	Yes	0.2	2,000	0	$314	$4,780	$0	15.2
Cafeteria	1	Refrigerator Chest	No	NR	Yes	0.1	982	0	$154	$3,150	$0	20.4
Kitchen	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	NR	Yes	0.1	470	0	$74	$1,376	$75	17.6
Kitchen	2	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	No	NR	Yes	0.2	1,886	0	$296	$4,416	$400	13.6
Kitchen	1	Stand-Up Freezer, Solid Door (>50 cu. ft.)	No	NR	Yes	0.3	2,520	0	$396	$2,787	$600	5.5

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
Cafeteria	5	Electric Griddle (≤2 Feet Width)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Convection Oven (Full Size)	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (3/4 Size)	Yes		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?**
Various	8	Microwave	800.0	No
Various	152	Computer Desktop	120.0	Yes
Various	33	Printer	13.0	Yes
Various	5	Refrigerator	115.0	Yes
Various	3	Water Cooler	98.0	Yes
Various	5	Small Refrigerator	25.0	Yes

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**
Room 153	1	Refrigerated	10	Yes	0.2	1,612	0	$253	$230	$0	0.9
Room 153	1	Non-Refrigerated	10	Yes	0.0	343	0	$54	$230	$0	4.3

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

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ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Hannah Caldwell

Primary Property Type: K-12 School
Gross Floor Area (ft²): 87,000
Built: 1996

For Year Ending: September 30, 2017
Date Generated: November 26, 2018

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
Hannah Caldwell 1120 Commerce Avenue Union, New Jersey 07083 **Property ID:** 6455067	________________ , (___)____-_____	____ _______ , (___)____-_____ ________________

Energy Consumption and Energy Use Intensity (EUI)

Site EUI 79.4 kBtu/ft²	**Annual Energy by Fuel**		**National Median Comparison**	
	Natural Gas (kBtu)	4,221,590 (61%)	National Median Site EUI (kBtu/ft²)	66.9
	Electric - Grid (kBtu)	2,689,318 (39%)	National Median Source EUI (kBtu/ft²)	115.9
			% Diff from National Median Source EUI	19%
Source EUI 137.5 kBtu/ft²			**Annual Emissions**	
			Greenhouse Gas Emissions (Metric Tons CO2e/year)	497

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 financial savings. 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	A British thermal unit is the amount of heat required to increase the temperature of one pound water by one-degree Fahrenheit. Commonly used to measure natural gas consumption.
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.
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 energy management systems.
Generation	The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil).
HVAC	Heating, ventilation, and air conditioning.
kW	Kilowatt. Equal to 1,000 Watts.
Load	The total amount of power used by a building system 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.
MMBtu	One million British thermal units.
psig	Pounds per square inch.
Plug Load	Refers to the amount of energy used in a space by products that are powered by means of an ordinary AC plug.
Simple Payback	The amount of time needed to recoup the funds expended in an investment, or to reach the break-even point.
Temperature Setpoint	The temperature at which a temperature regulating device (thermostat, for example) has been set.
Turnkey	Provision of a complete product or service that is ready for immediate use
Watt (W)	Unit of power commonly used to measure electricity use.