Local Government Energy Audit Report

Hubbard Middle School

January 13, 2023

Prepared for:

Plainfield Board of Education
661 W Eighth St
Plainfield, New Jersey 07060

Prepared by:

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Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities and help prioritize specific measures for implementation. 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 reviewed the energy conservation measures and estimates of energy savings 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 material and labor costs primarily on RS Means cost manuals as well as on our experience at similar facilities. This approach is based on standard cost estimating manuals and is vendor neutral. Cost estimates include material and labor pricing associated with one for one equipment replacements. Cost estimates do not include demolition or removal of hazardous waste. The actual implementation costs for energy savings projects are anticipated to be significantly higher based on the specific conditions at your site(s). We strongly recommend that you work with your design engineer or contractor to develop actual project costs for your specific scope of work for the installation of high efficiency equipment. We encourage you to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on selected products and installers. TRC and NJBPU do not guarantee cost estimates and shall in no event be held liable should actual installed costs vary from these material and labor estimates.

Incentive values provided in this report are estimated based of previously run state efficiency programs. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. Please review all available utility program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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

Table of Contents

ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

For the purposes of your LGEA, estimated incentives and rebates are included as placeholders for planning purposes. New Jersey utilities are rolling out their own energy efficiency programs, which your project may be eligible for depending on individual measures, quantities, and size of the building.

In 2018, Governor Murphy signed into law the landmark legislation known as the Clean Energy Act. The law called for a significant overhaul of New Jersey's clean energy systems by building sustainable infrastructure in order to fight climate change and reduce carbon emissions, which will in turn create well-paying local jobs, grow the state's economy, and improve public health while ensuring a cleaner environment for current and future residents.

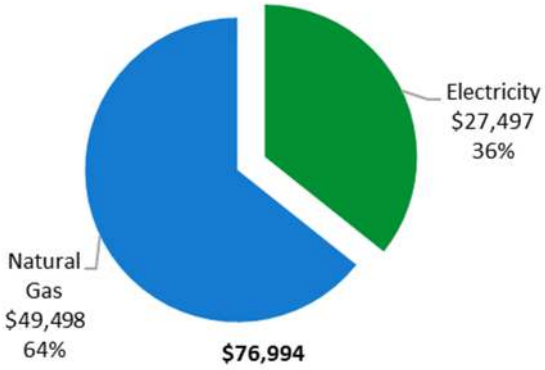
These next generation energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and incentives directly to customers like you. NJCEP will still offer programs for new construction, renewable energy, the Energy Savings Improvement Program (ESIP), and large energy users.

New utility programs are under development. Keep up to date with developments by visiting the NJCEP website.

1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $76,994 Electricity: 317,787 kWh Natural Gas: 64,711 Therms	
ENERGY STAR® Benchmarking Score	59 *(1-100 scale)*	Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

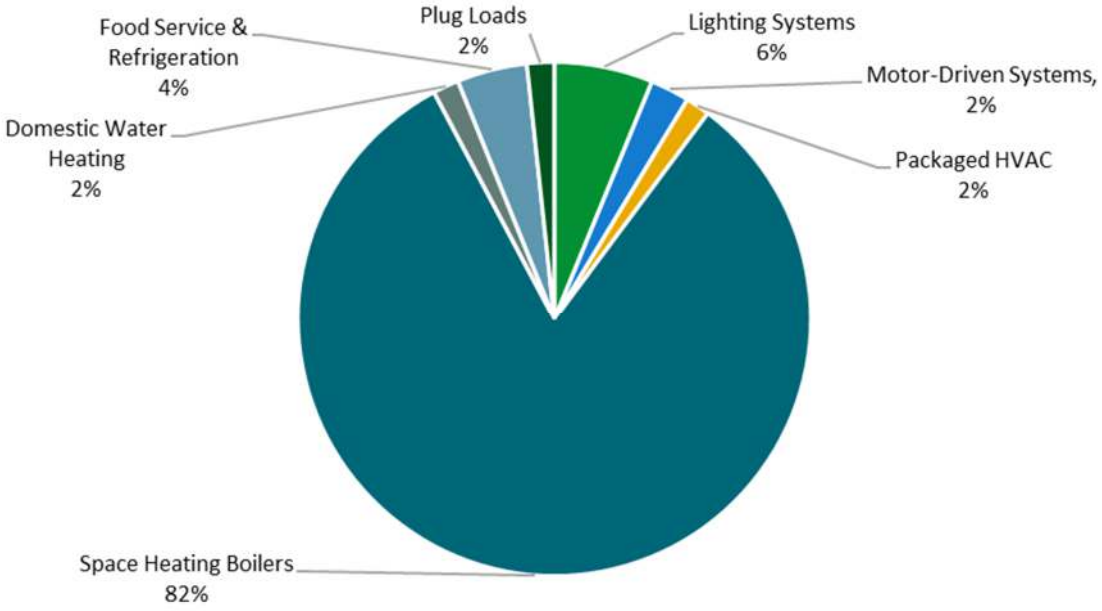


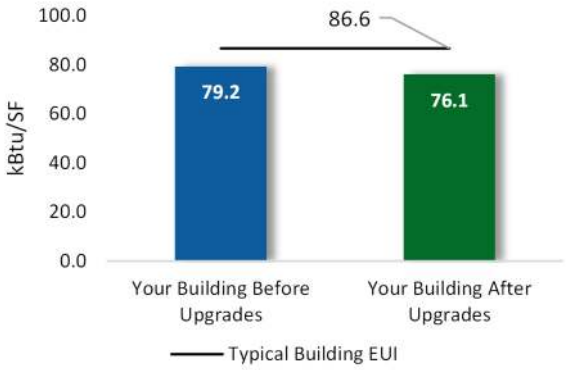
Figure 1 - Energy Use by System

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.

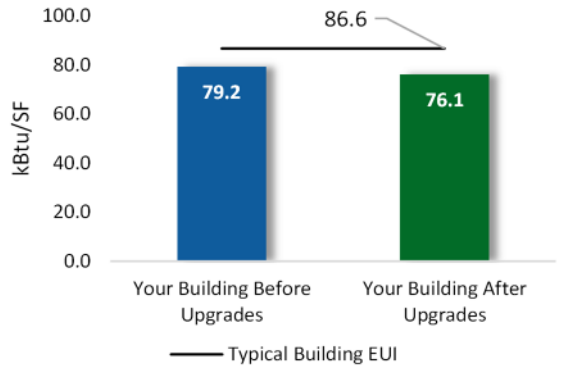
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$65,427
Potential Rebates & Incentives[1]	$14,794
Annual Cost Savings	$7,970
Annual Energy Savings	Electricity: 93,714 kWh Natural Gas: -181 Therms
Greenhouse Gas Emission Savings	46 Tons
Simple Payback	6.4 Years
Site Energy Savings (All Utilities)	4%



Scenario 2: Cost Effective Package[2]

Installation Cost	$63,185
Potential Rebates & Incentives	$14,794
Annual Cost Savings	$7,908
Annual Energy Savings	Electricity: 92,991 kWh Natural Gas: -181 Therms
Greenhouse Gas Emission Savings	46 Tons
Simple Payback	6.1 Years
Site Energy Savings (all utilities)	4%



On-site Generation Potential

Photovoltaic	Medium
Combined Heat and Power	None

[1] Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that 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	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**75,008**	**26.3**	**-16**	**$6,371**	**$44,999**	**$11,808**	**$33,191**	**5.2**	**73,712**
ECM 1	Install LED Fixtures	Yes	635	0.0	0	$55	$346	$50	$296	5.4	640
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	250	0.1	0	$21	$206	$30	$176	8.3	246
ECM 3	Retrofit Fixtures with LED Lamps	Yes	74,123	26.2	-15	$6,295	$44,447	$11,728	$32,719	5.2	72,826
Lighting Control Measures			**14,819**	**5.2**	**-3**	**$1,259**	**$17,474**	**$2,880**	**$14,594**	**11.6**	**14,560**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	14,161	5.1	-3	$1,203	$16,124	$2,110	$14,014	11.7	13,914
ECM 5	Install High/Low Lighting Controls	Yes	658	0.1	0	$56	$1,350	$770	$580	10.4	647
Motor Upgrades			**345**	**0.1**	**0**	**$30**	**$1,057**	**$0**	**$1,057**	**35.4**	**348**
ECM 6	Premium Efficiency Motors	No	345	0.1	0	$30	$1,057	$0	$1,057	35.4	348
Unitary HVAC Measures			**378**	**0.5**	**0**	**$33**	**$1,185**	**$0**	**$1,185**	**36.2**	**381**
ECM 7	Install High Efficiency Air Conditioning Units	No	378	0.5	0	$33	$1,185	$0	$1,185	36.2	381
Domestic Water Heating Upgrade			**0**	**0.0**	**1**	**$4**	**$22**	**$6**	**$16**	**3.5**	**69**
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	1	$4	$22	$6	$16	3.5	69
Food Service & Refrigeration Measures			**3,163**	**0.4**	**0**	**$274**	**$690**	**$100**	**$590**	**2.2**	**3,185**
ECM 9	Vending Machine Control	Yes	3,163	0.4	0	$274	$690	$100	$590	2.2	3,185
TOTALS (COST EFFECTIVE MEASURES)			**92,991**	**31.9**	**-18**	**$7,908**	**$63,185**	**$14,794**	**$48,391**	**6.1**	**91,526**
TOTALS (ALL MEASURES)			**93,714**	**32.5**	**-18**	**$7,970**	**$65,427**	**$14,794**	**$50,633**	**6.4**	**92,254**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

Utility-run energy efficiency programs, such as 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.

For details on these programs please visit New Jersey's Clean Energy Program website or contact your utility provider.

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 and Power (CHP)

The CHP program provides incentives for combined heat and power (i.e., 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.

Successor Solar Incentive Program (SuSI)

New Jersey is committed to supporting solar energy. Solar projects help the state reach the renewable goals outlined in the state's Energy Master Plan. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available, but certified solar projects are able to earn one SREC II (Solar Renewable Energy Certificates II) for each megawatt-hour of solar electricity produced from a qualifying solar facility.

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce electric demand during times of peak demand, the grid is made more reliable, and overall transmission costs are reduced for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

Large Energy User Program (LEUP)

LEUP designed to promote self-investment in energy efficiency and combined heat and power or fuel cell projects. It incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Hubbard Middle 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.

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 11, 2022, TRC performed an energy audit at Hubbard Middle School located in Plainfield, New Jersey. TRC met with facility staff to review the facility operations and help focus our investigation on specific energy-using systems.

Hubbard Middle School is a three-story, 95,375 square foot building built in 1927. Spaces include classrooms, gymnasium, cafeteria, corridors, stairwells, offices, kitchen, and basement mechanical space.

2.2 Building Occupancy

The facility is occupied from September through June, etc. Typical weekday occupancy is 95 staff and 836 students. Summer occupancy includes a summer day camp and continuing maintenance activities.

Building Name	Weekday/Weekend	Operating Schedule
Hubbard Middle School	Weekday	6:30 AM - 11:00 PM
	Weekend	Varied

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

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

Steel trusses support a pitched roof with a wood deck covered with asphalt shingles. Roof encloses conditioned space. The thermal barrier is at the roof.

Building Exterior

Different Roof Surfaces

Interior Structural Steel with Wood Decking

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

Windows

Windows

Exterior Door

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 34-Watt T12 and T5HO fixtures. Additionally, there are some compact fluorescent lamps (CFL), and LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 2-lamp, 3-lamp, or 4-lamp, 4-foot-long pendent mount linear fixtures and recessed troffers. Most fixtures are in fair condition. Gymnasium fixtures have manually controlled high bay high output (HO) linear fluorescent lamps. Auditorium fixtures have a mix of manually controlled metal halide and LED lamps. All exit signs are LED.

Interior lighting levels were generally sufficient.

Linear Classroom Fixture

Gymnasium High Bay Fixture

Recessed Troffer Fixture

Most lighting fixtures are controlled manually and the remainder by occupancy sensors.

Manual Switch

Manual Key Switch

Ceiling Mounted Sensor

Exterior fixtures include wall packs and flood lights with LED lamps, and LED wall pack fixtures. Exterior fixtures are timer and/or photocell controlled.

LED Floodlight

Wall Pack w/LED Lamp

LED Wall Pack Fixture

2.5 Air Handling Systems

Unit Ventilators

Unit ventilators (UV) are equipped with supply fan motors and pneumatically controlled outside air dampers. Fan coil valves are connected to the steam distribution system. UVs provide heating and ventilation to classrooms.

Newer Unit Ventilator

Older Unit Ventilator

Corridor Fan Coil Unit

Unitary Electric HVAC Equipment

Most classrooms and offices are cooled using window or portable air conditioning (AC) units. These vary in capacity between 0.5 tons and 3-tons. Most units are in fair condition. They range in efficiency between 8.5 EER and 12 EER.

Auditorium Window Unit

Portable Unit

Older Window Unit

The server room (140DR) is conditioned by a ductless mini split unit. It is 1.5 tons with an EER of 10. The unit is in poor condition.

Outdoor Condensing Unit

Indoor Unit

Thermostat

Air Handling Units (AHUs)

Classroom 133 and office 121 are conditioned by air handling units. Each unit is equipped with a supply fan motor and a refrigerant coil for cooling. They are physically located above the ceiling and were inaccessible during the energy audit. The supply fan motors are assumed to be 0.5 hp, constant speed, and standard efficiency.

These systems include dedicated outdoor condensing units. The unit in classroom 133 has a cooling capacity of 1.5-tons and the unit serving office 121 is rated at 2.0 tons. The condensing unit for office 121 is new and in good condition while the classroom 133 unit is old and in poor condition. This is a split air-conditioning (AC) system configuration.

Outdoor Condensing Unit

Outdoor Condensing Unit

Digital Thermostat

2.6 Heating Steam Systems

Two, 5,520 MBh steam boilers serve the building's heating load. The boilers are configured in an automated control scheme. Only one boiler is required under high load conditions. Installed in 2001, they are in poor condition. There is no service contract in place.

A two-pipe steam distribution system serves the building heating terminals. There are two, 2 hp boiler feed pumps and two condensate pumps in the boiler room.

Boiler

Digital Thermostat

Air Compressor

2.7 Domestic Hot Water

Most building hot water is produced by two, 100-gallon, 199 MBh gas-fired storage water heaters, each with an efficiency rating of 80%. The kitchen hot water is produced by a 50-gallon, 40 MBh gas-fired storage water heater with an efficiency rating of 80%.

A 1/8 hp circulation pump distributes water to end uses. The circulation pump operates continuously.

Hot Water Storage Tank

Hot Water Storage Tank

Circulation Pump

2.8 Food Service Equipment

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

The dishwasher is an ENERGY STAR® high temperature, rack type unit. The dishwasher has a 24-kW booster water heater.

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

Steamer

Double Rack Oven

Warmer

2.9 Refrigeration

The kitchen has several stand-up refrigerators with solid doors. There is also a stand-up solid door freezer. There is a refrigerator chest. All equipment is standard and in fair condition.

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

Freezer with Solid Doors

Refrigerator with Solid Door

Refrigerator with Solid Doors

2.10 Plug Load and Vending Machines

The location is doing a great job managing their electrical plug loads. This report makes additional suggestions for ECMs in this area as well as energy efficient best practices.

There are 97 computer workstations throughout the facility. Each student has a tablet or Chromebook. Plug loads throughout the building include general cafe and office equipment. There are classroom typical loads such as smart boards, Apple TVs, and fans.

There are several mini refrigerators throughout the building. These vary in condition and efficiency.

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

Tablet Charging Containers

Copier

Vending Machines

2.11 On-Site Generation

Hubbard Middle School has a photovoltaic (PV) array with approximately 141 panels. This system provides approximately 33% of the electricity used.

Solar Array

Solar Array

Inverters

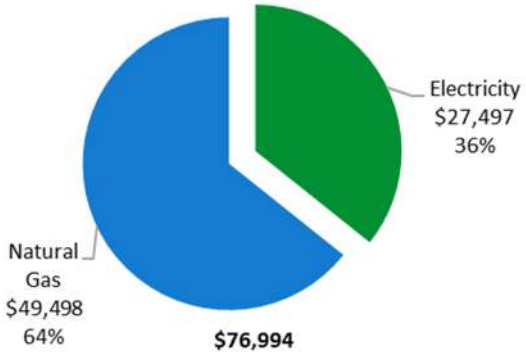
2.12 Water-Using Systems

There are 13 restrooms with toilets and sinks. Faucet flow rates are at 1.5 gallons per minute (gpm) or higher.

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	317,787 kWh	$27,497
Natural Gas	64,711 Therms	$49,498
Total		**$76,994**



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.

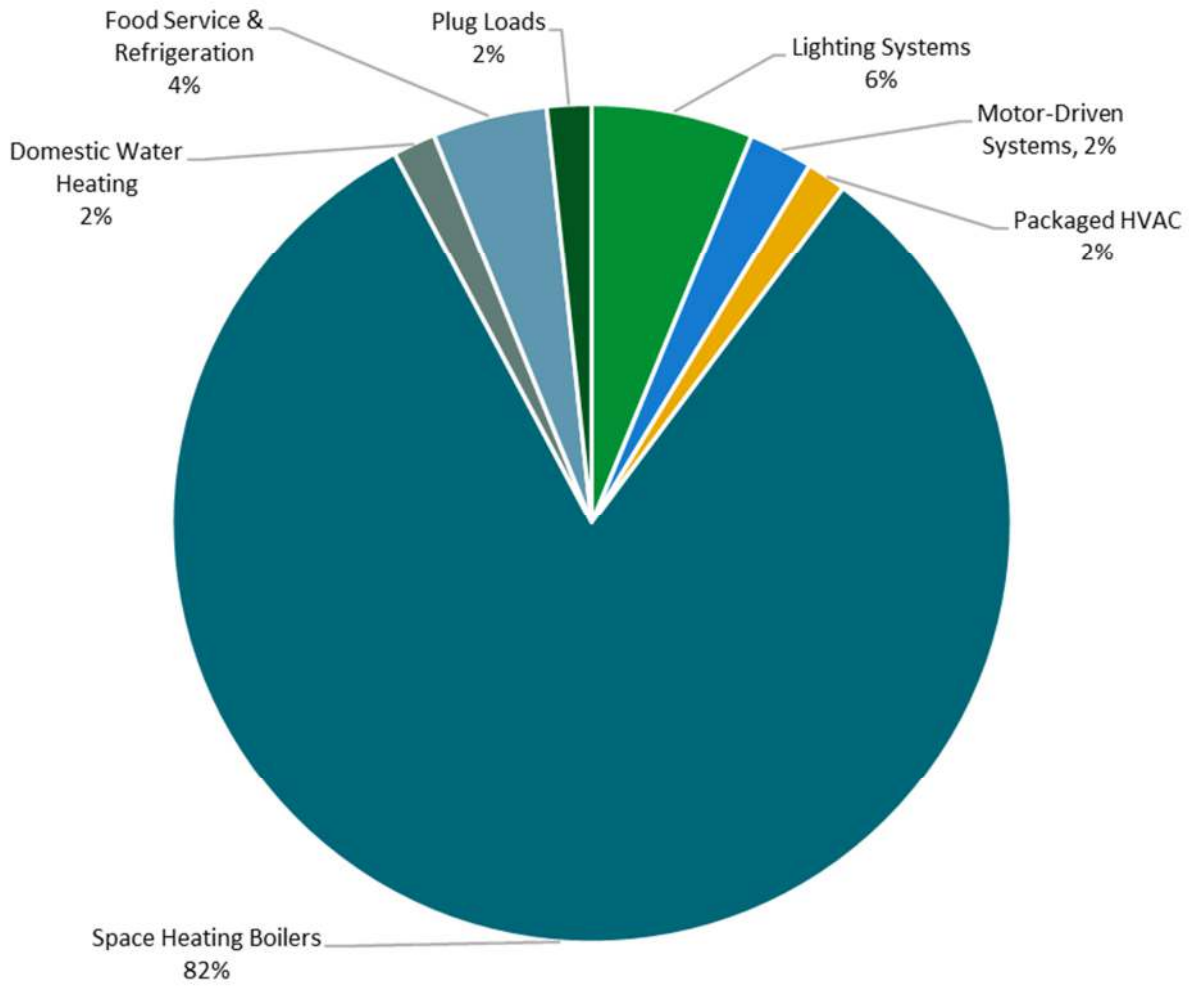
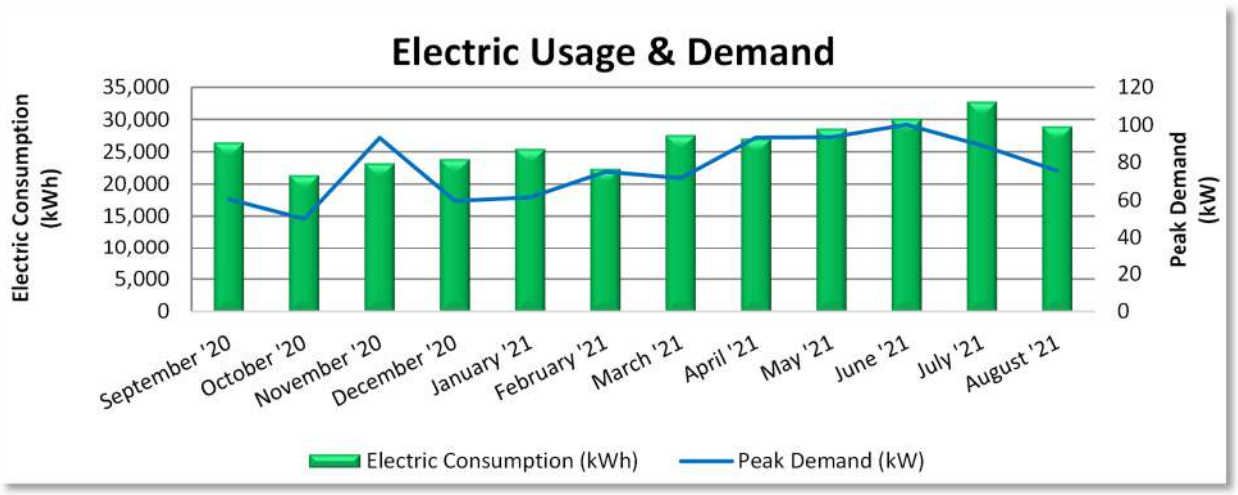


Figure 4 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class Large Power & Lighting Secondary.



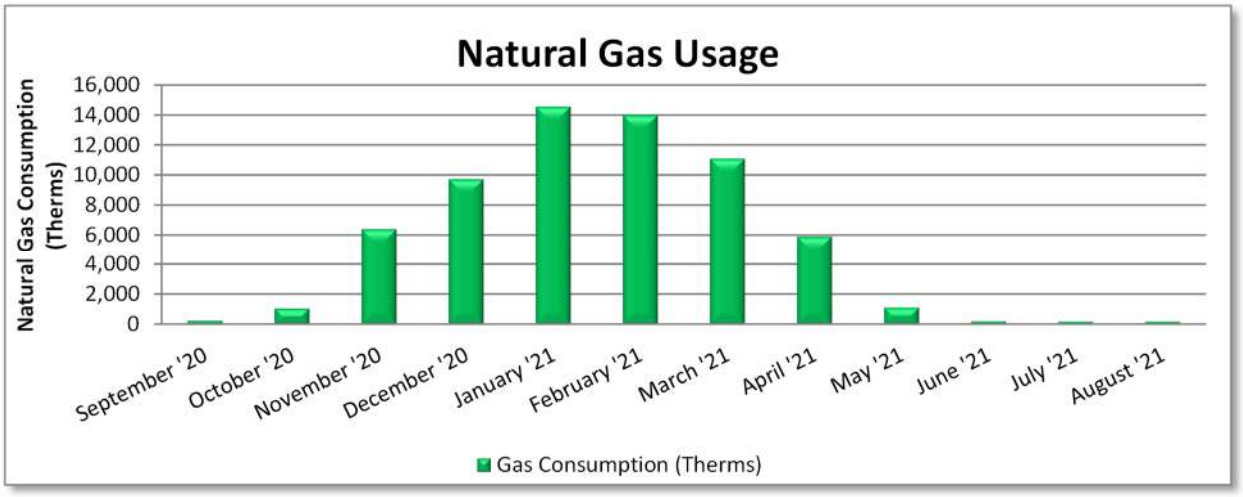
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
9/24/20	30	26,467	60	768	2,517
10/23/20	29	21,364	50	188	1,695
11/23/20	31	23,198	93	351	1,991
12/24/20	31	23,877	60	224	1,950
1/26/21	33	25,462	61	231	2,015
2/25/21	30	22,371	75	282	2,016
3/26/21	29	27,578	72	270	2,002
4/27/21	32	27,053	93	374	2,080
5/26/21	29	28,596	93	353	2,077
6/25/21	30	30,132	100	1,280	3,103
7/27/21	32	32,737	89	1,138	3,220
8/25/21	29	28,952	76	967	2,831
Totals	**365**	**317,787**	**100**	**$6,426**	**$27,497**
Annual	**365**	**317,787**	**100**	**$6,426**	**$27,497**

Notes:

- Peak demand of 100 kW occurred in June 2021.
- Average demand over the past 12 months was 77 kW.
- The average electric cost over the past 12 months was $0.087/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.
- On-site generation is through a PPA, and the site purchases the generated electricity. All the electricity generated on-site is used on-site.

3.2 Natural Gas

PSE&G delivers natural gas under rate class General Service Gas Heating.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
9/24/20	30	266	$359
10/23/20	29	1,073	$830
11/23/20	31	6,397	$5,691
12/24/20	31	9,723	$7,621
1/26/21	33	14,540	$10,419
2/25/21	30	13,990	$10,381
3/26/21	29	11,085	$8,676
4/27/21	32	5,912	$3,676
5/26/21	29	1,128	$877
6/25/21	30	213	$334
7/27/21	32	197	$323
8/25/21	29	186	$314
Totals	**365**	**64,711**	**$49,498**
Annual	**365**	**64,711**	**$49,498**

Notes:

- The average gas cost for the past 12 months is $0.765/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**59**

Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more.

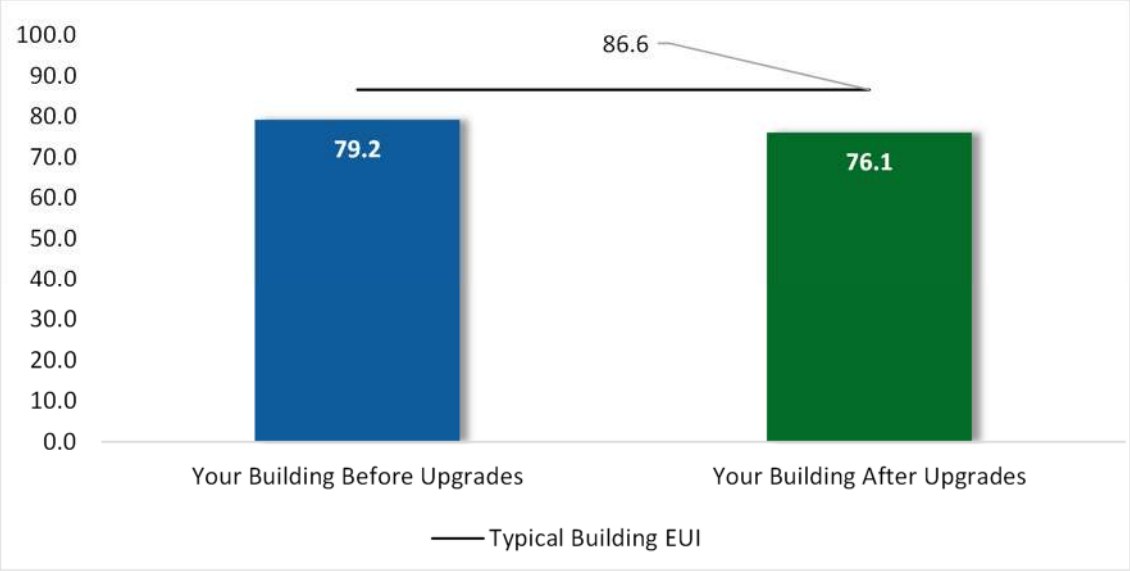


Figure 5 - Energy Use Intensity Comparison[3]

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. Several factors can cause a building to vary from 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.

[3] Based on all evaluated ECMs

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.

4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements and provide information about the cost effectiveness of those improvements. Most energy conservation measures have received preliminary analysis of feasibility, which identifies expected ranges of savings. 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 previously run state rebate programs. New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website. Some measures and proposed upgrades may be eligible for higher incentives than those shown below.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**75,008**	**26.3**	**-16**	**$6,371**	**$44,999**	**$11,808**	**$33,191**	**5.2**	**73,712**
ECM 1	Install LED Fixtures	Yes	635	0.0	0	$55	$346	$50	$296	5.4	640
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	250	0.1	0	$21	$206	$30	$176	8.3	246
ECM 3	Retrofit Fixtures with LED Lamps	Yes	74,123	26.2	-15	$6,295	$44,447	$11,728	$32,719	5.2	72,826
Lighting Control Measures			**14,819**	**5.2**	**-3**	**$1,259**	**$17,474**	**$2,880**	**$14,594**	**11.6**	**14,560**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	14,161	5.1	-3	$1,203	$16,124	$2,110	$14,014	11.7	13,914
ECM 5	Install High/Low Lighting Controls	Yes	658	0.1	0	$56	$1,350	$770	$580	10.4	647
Motor Upgrades			**345**	**0.1**	**0**	**$30**	**$1,057**	**$0**	**$1,057**	**35.4**	**348**
ECM 6	Premium Efficiency Motors	No	345	0.1	0	$30	$1,057	$0	$1,057	35.4	348
Unitary HVAC Measures			**378**	**0.5**	**0**	**$33**	**$1,185**	**$0**	**$1,185**	**36.2**	**381**
ECM 7	Install High Efficiency Air Conditioning Units	No	378	0.5	0	$33	$1,185	$0	$1,185	36.2	381
Domestic Water Heating Upgrade			**0**	**0.0**	**1**	**$4**	**$22**	**$6**	**$16**	**3.5**	**69**
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	1	$4	$22	$6	$16	3.5	69
Food Service & Refrigeration Measures			**3,163**	**0.4**	**0**	**$274**	**$690**	**$100**	**$590**	**2.2**	**3,185**
ECM 9	Vending Machine Control	Yes	3,163	0.4	0	$274	$690	$100	$590	2.2	3,185
TOTALS			**93,714**	**32.5**	**-18**	**$7,970**	**$65,427**	**$14,794**	**$50,633**	**6.4**	**92,254**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**75,008**	**26.3**	**-16**	**$6,371**	**$44,999**	**$11,808**	**$33,191**	**5.2**	**73,712**
ECM 1	Install LED Fixtures	635	0.0	0	$55	$346	$50	$296	5.4	640
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	250	0.1	0	$21	$206	$30	$176	8.3	246
ECM 3	Retrofit Fixtures with LED Lamps	74,123	26.2	-15	$6,295	$44,447	$11,728	$32,719	5.2	72,826
Lighting Control Measures		**14,819**	**5.2**	**-3**	**$1,259**	**$17,474**	**$2,880**	**$14,594**	**11.6**	**14,560**
ECM 4	Install Occupancy Sensor Lighting Controls	14,161	5.1	-3	$1,203	$16,124	$2,110	$14,014	11.7	13,914
ECM 5	Install High/Low Lighting Controls	658	0.1	0	$56	$1,350	$770	$580	10.4	647
Domestic Water Heating Upgrade		**0**	**0.0**	**1**	**$4**	**$22**	**$6**	**$16**	**3.5**	**69**
ECM 8	Install Low-Flow DHW Devices	0	0.0	1	$4	$22	$6	$16	3.5	69
Food Service & Refrigeration Measures		**3,163**	**0.4**	**0**	**$274**	**$690**	**$100**	**$590**	**2.2**	**3,185**
ECM 9	Vending Machine Control	3,163	0.4	0	$274	$690	$100	$590	2.2	3,185
TOTALS		**92,991**	**31.9**	**-18**	**$7,908**	**$63,185**	**$14,794**	**$48,391**	**6.1**	**91,526**

* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

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

Figure 7 – 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 ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**75,008**	**26.3**	**-16**	**$6,371**	**$44,999**	**$11,808**	**$33,191**	**5.2**	**73,712**
ECM 1	Install LED Fixtures	635	0.0	0	$55	$346	$50	$296	5.4	640
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	250	0.1	0	$21	$206	$30	$176	8.3	246
ECM 3	Retrofit Fixtures with LED Lamps	74,123	26.2	-15	$6,295	$44,447	$11,728	$32,719	5.2	72,826

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

ECM 1: Install LED Fixtures

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

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

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: exterior fixture.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected Building areas: elevator room and storage 225SC.

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent, CFL, or 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. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

This measure saves energy by installing LEDs, which use less power than other lighting technologies yet provide equivalent lighting output for the space. Maintenance savings may also be available, as longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected Building Areas: all areas with fluorescent fixtures with T8 or T5 tubes, CFL, and incandescent lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**14,819**	**5.2**	**-3**	**$1,259**	**$17,474**	**$2,880**	**$14,594**	**11.6**	**14,560**
ECM 4	Install Occupancy Sensor Lighting Controls	14,161	5.1	-3	$1,203	$16,124	$2,110	$14,014	11.7	13,914
ECM 5	Install High/Low Lighting Controls	658	0.1	0	$56	$1,350	$770	$580	10.4	647

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected Building Areas: offices, classrooms, gymnasium, library, restrooms, and storage rooms.

ECM 5: Install High/Low Lighting Controls

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

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

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

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 occupants approach the area.

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

Affected Building Areas: hallways and stairwells.

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**345**	**0.1**	**0**	**$30**	**$1,057**	**$0**	**$1,057**	**35.4**	**348**
ECM 6	Premium Efficiency Motors	345	0.1	0	$30	$1,057	$0	$1,057	35.4	348

ECM 6: Premium Efficiency Motors

We evaluated replacing 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
Hubbard Middle School	Hubbard Middle School	3	Exhaust Fan	0.5	

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 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**378**	**0.5**	**0**	**$33**	**$1,185**	**$0**	**$1,185**	**36.2**	**381**
ECM 7	Install High Efficiency Air Conditioning Units	378	0.5	0	$33	$1,185	$0	$1,185	36.2	381

We evaluated 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 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 2.33-ton window AC unit is eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 7: Install High Efficiency Air Conditioning Units

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

Affected Units: classroom AC unit.

4.5 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**1**	**$4**	**$22**	**$6**	**$16**	**3.5**	**69**
ECM 8	Install Low-Flow DHW Devices	0	0.0	1	$4	$22	$6	$16	3.5	69

ECM 8: Install Low-Flow DHW Devices

Install low-flow devices to reduce overall hot water demand. The following low-flow devices are recommended to reduce hot water usage:

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm
Showerhead	2.0 gpm
Pre-rinse spray valve (kitchen)	1.28 gpm

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing. Additional cost savings may result from reduced water usage.

4.6 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**3,163**	**0.4**	**0**	**$274**	**$690**	**$100**	**$590**	**2.2**	**3,185**
ECM 9	Vending Machine Control	3,163	0.4	0	$274	$690	$100	$590	2.2	3,185

ECM 9: 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.

Operation and maintenance (O&M) plans enhance the operational efficiency of HVAC and other energy intensive systems and could save 5% –20% of the energy usage in your building without substantial capital investment. A successful plan includes your records of energy usage trends and costs, building equipment lists, current maintenance practices, and planned capital upgrades, and it incorporates your ideas for improved building operation. Your plan will address goals for energy-efficient operation, provide detail on how to reach the goals, and outline procedures for measuring and reporting whether goals have been achieved.

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 cannot manage what you do not 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.

Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. Materials used may include caulk, polyurethane foam, and other weather-stripping materials. There is an energy savings opportunity by reducing the uncontrolled air exchange between the outside and inside of the building. Blower door assisted comprehensive building air sealing will reduce the amount of air exchange, which will in turn reduce the load on the buildings heating and cooling equipment, providing energy savings and increased occupant comfort.

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 can lead to increased occupant comfort as well as heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

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

Lighting Maintenance

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

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

Lighting Controls

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

Motor Controls

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Whenever possible, use automatic devices such as twist timers or occupancy sensors to turn off motors when they are not needed.

Motor Maintenance

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

Destratification Fans

For areas with high ceilings, destratification fans balance the air temperature from floor to ceiling. They help reduce the recovery time needed to warm the space after nightly temperature setbacks, and they will increase occupants' the comfort level.

Areas with high ceilings require the heating system to heat a larger volume of space than that which is occupied. As the warm air rises, the warmest space is at the ceiling level, rather than floor level. Higher temperatures at the ceiling accelerate heat loss through the roof, which requires additional energy consumption by the heating equipment to compensate for this accelerated heat transfer.

Thermostat Schedules and Temperature Resets

Use thermostat setback temperatures and schedules to reduce heating and cooling energy use during periods of low or no occupancy. Thermostats should be programmed for a setback of 5°F-10°F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

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.

Steam Trap Repair and Replacement

Steam traps are a crucial part of delivering heat from the boiler to the space heating units. Steam traps are automatic valves that remove condensate from the system. If the traps fail closed, condensate can build up in the steam supply side of the trap, which reduces the flow in the steam lines and thermal capacity of the radiators. Or they may fail open, allowing steam into the condensate return lines resulting in wasted energy, water, and hammering. Losses can be significantly reduced by testing and replacing equipment as they start to fail. Repair or replace traps that are blocked or allowing steam to pass. Inspect steam traps as part of a regular steam system maintenance plan.

Thermostatic Radiator Valve Installations

We recommend investigating the installation of thermostatic control valves for existing radiators. Traditionally radiators have manual valves that are used to control the flow through the radiator. Replacing these manual valves with thermostatic control valves allows for automatic modulation of the steam or hot water flow to maintain the temperature setting. The valve will incrementally close as space temperature increases. This will allow a maximum temperature to be set per area/room. Using thermostatic control valves will result in energy savings by reducing the overheating of spaces throughout the facility.

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 and efficiently. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the boiler tubes to improve heat transfer.

Optimize HVAC Equipment Schedules

Energy management systems (EMS) typically provide advanced controls for building HVAC systems, including chillers, boilers, air handling units, rooftop units and exhaust fans. The EMS monitors and reports operational status, schedules equipment start and stop times, locks out equipment operation based on outside air or space temperature, and often optimizes damper and valve operation based on complex algorithms. These EMS features, when in proper adjustment, can improve comfort for building occupants and save substantial energy.

Know your EMS scheduling capabilities. Regularly monitor HVAC equipment operating schedules and match them to building operating hours in order to eliminate unnecessary equipment operation and save energy. Monitoring should be performed often at sites with frequently changing usage patterns – daily in some cases. We recommend using the *optimal start* feature of the EMS (if available) to optimize the building warmup sequence. Most EMS scheduling programs provide for holiday schedules, which can be used during reduced use or shutdown periods. Finally, many systems are equipped with a one-time override function, which can be used to provide additional space conditioning due to a one-time, special event. When available this override feature should be used rather than changing the base operating schedule.

Water Heater Maintenance

The lower the supply water temperature that is used for hand washing sinks, the less energy is needed to heat the water. Reducing the temperature results in energy savings and the change is often unnoticeable to users. Be sure to review the domestic water temperature requirements for sterilizers and dishwashers as you investigate reducing the supply water temperature.

Also, 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.

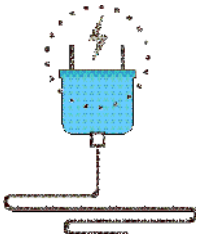
Refrigeration Equipment Maintenance

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between 5% and 10% on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[5]. Your local utility may offer incentives or rebates for this equipment.

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[6] or download a copy of EPA's "WaterSense™ at Work: Best Management Practices for Commercial and Institutional Facilities"[7]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.

[5] For additional information refer to "Assessing and Reducing Plug and Process Loads in Office Buildings" http://www.nrel.gov/docs/fy13osti/54175.pdf, or "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

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

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

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.

6 On-site Generation

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

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

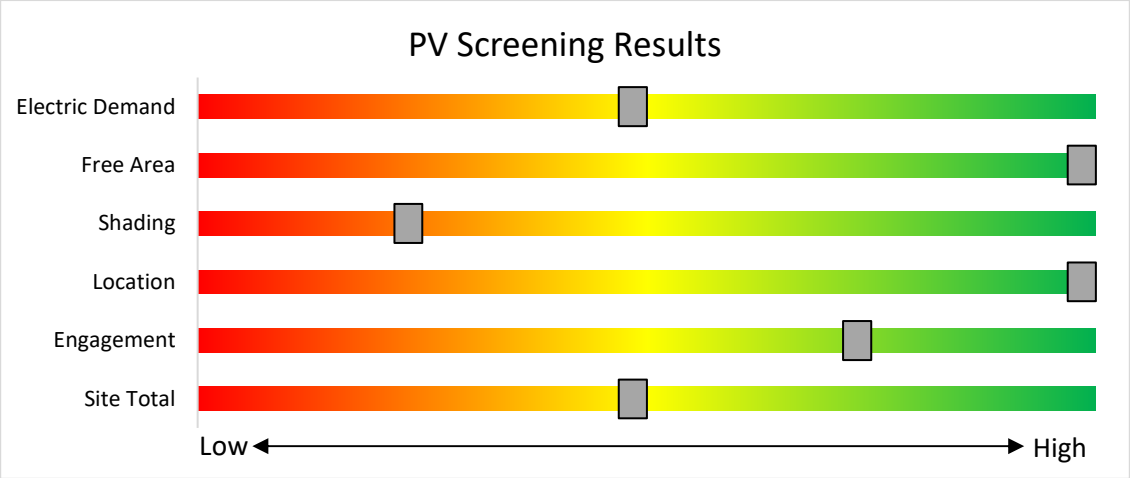
6.1 Solar Photovoltaic

Photovoltaic (PV) panels convert sunlight into electricity. Individual panels are combined into an array that produces direct current (DC) electricity. The DC 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 an additional PV array.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the medium potential. A PV array located on the roof may be feasible. If you are interested in pursuing the installation of PV, we recommend conducting a full feasibility study.

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



Potential	Medium	
System Potential	77	kW DC STC
Electric Generation	57,938	kWh/yr
Displaced Cost	$5,010	/yr
Installed Cost	$200,200	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The SuSI program is used to register and certify solar projects in New Jersey. Rebates are not available for solar projects. Solar projects may qualify to earn SREC- IIs (Solar Renewable Energy Certificates-II), however, the project owners *must* register their solar projects prior to the start of construction to establish the project's eligibility.

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:

Successor Solar Incentive Program (SuSI): https://www.njcleanenergy.com/renewable-energy/programs/susi-program

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

6.2 Combined Heat and Power

Combined heat and power (CHP) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines.

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

The key criteria used for screening is the amount of time that the CHP system would operate at full load and the facility's ability to use the recovered heat. Facilities with a continuous need for large quantities of waste heat are the best candidates for CHP.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The 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.

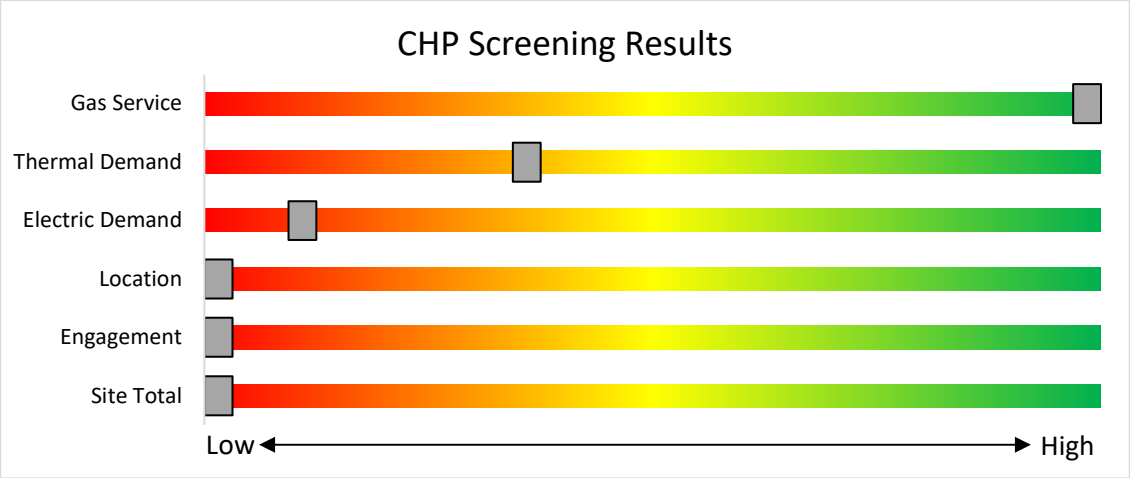


Figure 9 - Combined Heat and Power Screening

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? Your utility provider may be able to help.

7.1 Utility Energy Efficiency Programs

The Clean Energy Act, signed into law by Governor Murphy in 2018, requires New Jersey's investor-owned gas and electric utilities to reduce their customers' use by set percentages over time. To help reach these targets the New Jersey Board of Public Utilities approved a comprehensive suite of energy efficiency programs to be run by the utility companies.

These new utility programs are rolling out in the spring and summer of 2021. Keep up to date with developments by visiting:

https://www.njcleanenergy.com/transition

8 New Jersey's Clean Energy Programs

New Jersey's Clean Energy Program will continue to offer some energy efficiency programs.

8.1 Large Energy Users

The Large Energy Users Program (LEUP) is designed to foster self-directed investment in energy projects. This program is offered to New Jersey's largest energy customers that annually contribute at least $200,000 to the NJCEP aggregate of all buildings/sites. This equates to roughly $5 million in energy costs in the prior fiscal year.

Incentives

Incentives are based on the specifications below. The maximum incentive per entity is the lesser of:

- $4 million
- 75% of the total project(s) cost
- 90% of total NJCEP fund contribution in previous year
- $0.33 per projected kWh saved; $3.75 per projected Therm saved annually

How to Participate

To participate in LEUP, you will first need submit an enrollment application. This program requires all qualified and approved applicants to submit an energy plan that outlines the proposed energy efficiency work for review and approval. Applicants may submit a Draft Energy Efficiency Plan (DEEP), or a Final Energy Efficiency Plan (FEEP). Once the FEEP is approved, the proposed work can begin.

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

8.2 Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or waste heat to power (WHP) projects. Eligible CHP or WHP projects must achieve an annual system efficiency of at least 65% (lower heating value, or LHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

Incentives

Eligible Technologies	Size (Installed Rated Capacity)[1]	Incentive ($/kW)	% of Total Cost Cap per Project[3]	$ Cap per Project[3]
Powered by non-renewable or renewable fuel source[4]	≤500 kW	$2,000	30-40%[2]	$2 million
Gas Internal Combustion Engine	>500 kW - 1 MW	$1,000		
Gas Combustion Turbine	> 1 MW - 3 MW	$550	30%	$3 million
Microturbine Fuel Cells with Heat Recovery	>3 MW	$350		
Waste Heat to Power*	<1 MW	$1,000	30%	$2 million
	> 1MW	$500		$3 million

*Waste Heat to Power: Powered by non-renewable fuel source, heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine).

Check the NJCEP website for details on program availability, current incentive levels, and requirements.

How to Participate

You will work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at www.njcleanenergy.com/CHP.

8.3 Successor Solar Incentive Program (SuSI)

The SuSI program replaces the SREC Registration Program (SRP) and the Transition Incentive (TI) program. The program is used to register and certify 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 SREC-IIs (Solar Renewable Energy Certificates-II). SuSI consists of two sub-programs. The Administratively Determined Incentive (ADI) Program and the Competitive Solar Incentive (CSI) Program.

Administratively Determined Incentive (ADI) Program

The ADI Program provides administratively set incentives for net metered residential projects, net metered non-residential projects 5 MW or less, and all community solar projects.

After the registration is accepted, construction is complete, and a complete final as-built packet has been submitted, the project is issued a New Jersey certification number, which enables it to generate New Jersey SREC- IIs.

Market Segments	Size MW dc	Incentive Value ($/SREC II)	Public Entities Incentive Value - $20 Adder ($/SRECII)
Net Metered Residential	All types and sizes	$90	N/A
Small Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects smaller than 1 MW	$100	$120
Large Net Metered Non-Residential located on Rooftop, Carport, Canopy and Floating Solar	Projects 1 MW to 5 MW	$90	$110
Small Net Metered Non-Residential Ground Mount	Projects smaller than 1 MW	$85	$105
Large Net Metered Non-Residential Ground Mount	Projects 1 MW to 5 MW	$80	$100
LMI Community Solar	Up to 5 MW	$90	N/A
Non-LMI Community Solar	Up to 5 MW	$70	N/A
Interim Subsection (t)	All types and sizes	$100	N/A

Eligible projects may generate SREC-IIs for 15 years following the commencement of commercial operations which is defined as permission to operate (PTO) from the Electric Distribution Company. After 15 years, projects may be eligible for a NJ Class I REC.

SREC-IIs will be purchased monthly by the SREC-II Program Administrator who will allocate the SREC-IIs to the Load Serving Entities (BGS Providers and Third-Party Suppliers) annually based on their market share of retail electricity sold during the relevant Energy Year.

The ADI Program online portal is now open to new registrations effective August 28, 2021.

Competitive Solar Incentive Program

The Competitive Solar Incentive (CSI) Program will provide competitively set incentives for grid supply projects and net metered non-residential projects greater than 5MW. The program is currently under development with the goal of holding the first solicitation by early-to-mid 2022. For updates, please continue to check the Solar Proceedings page on the New Jersey's Clean Energy Program website.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan.

If you are considering installing solar photovoltaics on your building, visit the following link for more information: https://njcleanenergy.com/renewable-energy/programs/susi-program.

8.4 Energy Savings Improvement Program

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

9 PROJECT DEVELOPMENT

Energy conservation measures (ECMs) have been identified for your site, and their energy and economic analyses are provided within this LGEA report. Note that some of the identified projects may be mutually exclusive, such as replacing equipment versus upgrading motors or controls. The next steps with project development are to set goals and create a comprehensive project plan. The graphic below provides an overview of the process flow for a typical energy efficiency or renewable energy project. We recommend implementing as many ECMs as possible prior to undertaking a feasibility study for a renewable project. The cyclical nature of this process flow demonstrates the ongoing work required to continually improve building energy efficiency over time. If your building(s) scope of work is relatively simple to implement or small in scope, the measurement and verification (M&V) step may not be required. It should be noted through a typical project cycle, there will be changes in costs based on specific scopes of work, contractor selections, design considerations, construction, etc. The estimated costs provided throughout this LGEA report demonstrate the unburdened turn-key material and labor cost only. There will be contingencies and additional costs at the time of implementation. We recommend comprehensive project planning that includes the review of multiple bids for project work, incorporates potential operations and maintenance (O&M) cost savings, and maximizes your incentive potential.

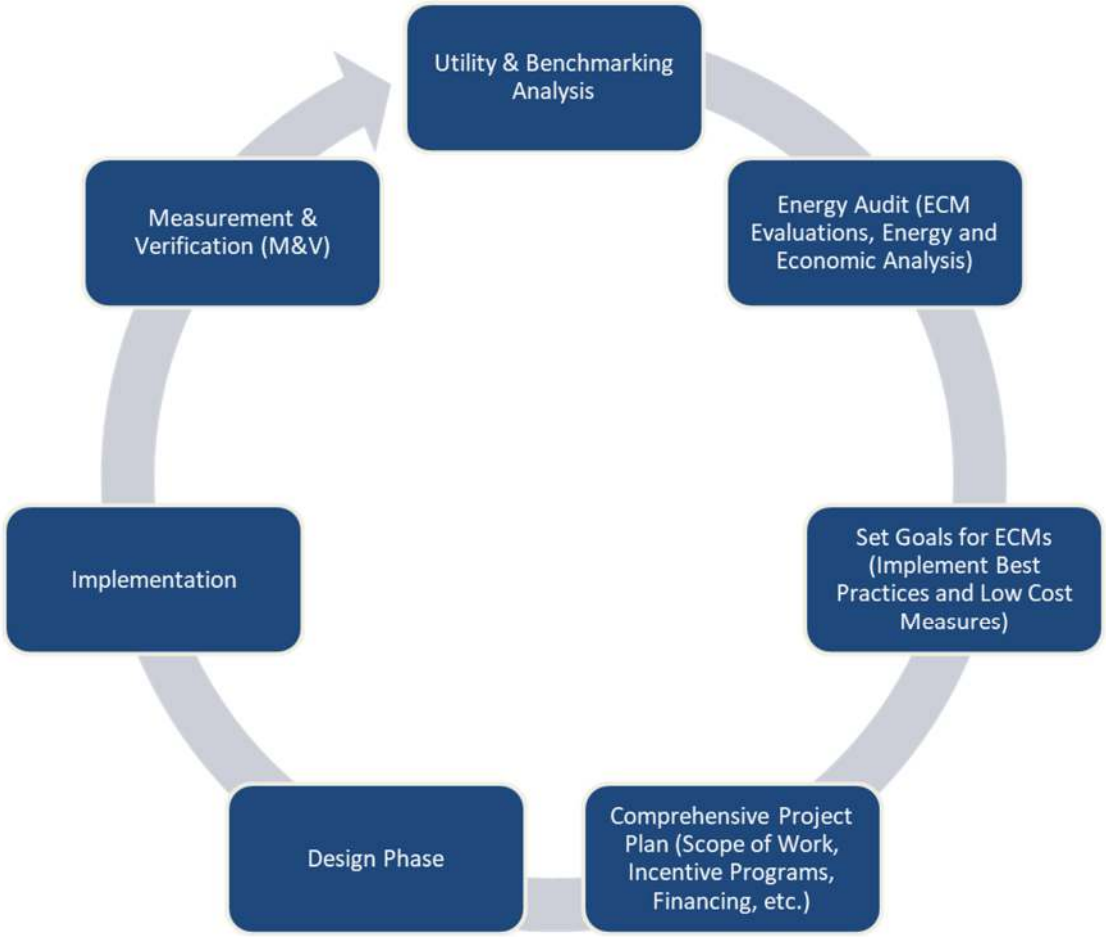


Figure 10 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 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. 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[8].

10.2 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 fluctuate monthly. The utility provides basic gas supply service 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[9].

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

[9] 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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Auditorium	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Auditorium	9	LED Lamps: (1) 100W Corn Bulb Screw-In Lamp	Wall Switch	S	100	1,800		None	No	9	LED Lamps: (1) 100W Corn Bulb Screw-In Lamp	Wall Switch	100	1,800	0.0	0	0	$0	$0	$0	0.0
Auditorium	4	LED Lamps: (1) 15W PAR38 Screw-In Lamp	Wall Switch	S	15	1,800		None	No	4	LED Lamps: (1) 15W PAR38 Screw-In Lamp	Wall Switch	15	1,800	0.0	0	0	$0	$0	$0	0.0
Auditorium Exit A	6	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 5	Relamp	Yes	6	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	1,242	0.1	261	0	$22	$335	$240	4.3
Auditorium Exit B	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,242	0.1	333	0	$28	$371	$180	6.8
Auditorium	3	Metal Halide: (1) 400W Lamp	Wall Switch	S	458	1,800	3	Relamp	No	3	LED Lamps - E39: ≤125 W Lamp	Wall Switch	120	1,800	0.7	2,008	0	$171	$898	$150	4.4
Auditorium Corridor	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Auditorium Corridor	3	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,080	5	None	Yes	3	LED Lamps: (1) 10W A19 Screw-In Lamp	High/Low Control	10	2,125	0.0	32	0	$3	$225	$105	44.8
Auditorium Corridor	3	LED Lamps: (3) 10W A19 Screw-In Lamps	Wall Switch	S	30	3,080	5	None	Yes	3	LED Lamps: (3) 10W A19 Screw-In Lamps	High/Low Control	30	2,125	0.0	95	0	$8	$225	$105	14.9
Classroom 108	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,800	0.2	588	0	$50	$329	$90	4.8
Classroom 108	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,800	0.0	111	0	$9	$73	$20	5.6
Classroom 108	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,800	0.1	172	0	$15	$217	$30	12.8
Classroom 110	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,800	0.2	653	0	$55	$365	$100	4.8
Classroom 110	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,800	0.1	172	0	$15	$217	$30	12.8
Classroom 112	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,800	0.2	588	0	$50	$329	$90	4.8
Classroom 112	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,800	0.1	172	0	$15	$217	$30	12.8
Classroom 123	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	166	0	$14	$73	$20	3.8
Classroom 123	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	166	0	$14	$73	$20	3.8
Classroom 123	15	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	15	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.8	2,197	0	$187	$1,365	$335	5.5
Classroom 132	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,800	3, 4	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,242	0.7	1,995	0	$169	$1,416	$310	6.5
Classroom 134	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.9	2,344	0	$199	$1,708	$390	6.6
Classroom 133	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,800	3	Relamp	No	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,800	0.2	588	0	$50	$329	$90	4.8
Classroom 136	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4
Classroom 138	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	732	0	$62	$635	$135	8.0
Classroom 142	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.0	83	0	$7	$37	$10	3.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 142	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.0	83	0	$7	$37	$10	3.8
Classroom 142	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.6	1,758	0	$149	$1,146	$275	5.8
Classroom 143	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.4	1,025	0	$87	$781	$175	7.0
Classroom 145	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	249	0	$21	$380	$65	14.8
Classroom 145	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	732	0	$62	$365	$100	4.3
Classroom 147	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	166	0	$14	$73	$20	3.8
Classroom 147	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4
Classroom 151	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.2	499	0	$42	$489	$95	9.3
Corridor Main	14	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	14	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Main	70	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,094	3	Relamp	No	70	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,094	1.7	5,321	-1	$452	$2,556	$700	4.1
Corridor Main	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,094	3	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,094	0.1	258	0	$22	$146	$40	4.8
Corridor Main	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,080	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,080	0.0	190	0	$16	$73	$20	3.3
Corridor Music	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,094	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,094	0.1	456	0	$39	$219	$60	4.1
Corridor Music A	2	Compact Fluorescent: (2) 13W Biaxial Plug-In Lamps	Wall Switch	S	26	3,080	3	Relamp	No	2	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	19	3,080	0.0	47	0	$4	$50	$4	11.4
Dining Area 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	36	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	36	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	1.1	2,993	-1	$254	$2,125	$465	6.5
Dining Area 213	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	249	0	$21	$380	$65	14.8
Electrical Room 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	500	0.0	31	0	$3	$73	$20	20.3
Elevator 1	1	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	4,290	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,290	0.0	203	0	$17	$69	$10	3.4
Exterior 1	1	LED Lamps: (2) 12W BR30 Screw-In Lamps	Timeclock		24	4,380		None	No	1	LED Lamps: (2) 12W BR30 Screw-In Lamps	Timeclock	24	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	2	LED Lamps: (3) 6W CA10 Screw-In Lamps	Timeclock		18	4,380		None	No	2	LED Lamps: (3) 6W CA10 Screw-In Lamps	Timeclock	18	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	4	LED Lamps: (1) 35W Corn Bulb Screw-In Lamp	Photocell		35	4,380		None	No	4	LED Lamps: (1) 35W Corn Bulb Screw-In Lamp	Photocell	35	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	2	LED Lamps: (2) 12W PAR30 Screw-In Lamps	Photocell		24	4,380		None	No	2	LED Lamps: (2) 12W PAR30 Screw-In Lamps	Photocell	24	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	7	LED - Fixtures: Wall Pack	Photocell		20	4,380		None	No	7	LED - Fixtures: Wall Pack	Photocell	20	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior 1	1	Metal Halide: (1) 150W Lamp	Timeclock		190	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	45	4,380	0.0	635	0	$55	$346	$50	5.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior courtyard	3	LED - Fixtures: Flood Fixture	Wall Switch		20	4,380		None	No	3	LED - Fixtures: Flood Fixture	Wall Switch	20	4,380	0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	10	Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L	Occupancy Sensor	S	234	2,094	3	Relamp	No	10	LED - Linear Tubes: (4) 4' T5HO (25W) Lamps	Occupancy Sensor	102	2,094	1.0	3,040	-1	$258	$1,056	$200	3.3
Janitorial 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	500	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.0	10	0	$1	$18	$5	16.2
Janitorial JC143	1	Compact Fluorescent: (2) 13W Biaxial Plug-In Lamps	Wall Switch	S	26	500	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	19	500	0.0	4	0	$0	$25	$2	70.3
Janitorial JC147	1	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Wall Switch	S	39	500	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	28	500	0.0	6	0	$1	$38	$3	67.1
Kitchen 152	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.6	1,758	0	$149	$1,146	$275	5.8
Kitchen 152	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,242	0.1	155	0	$13	$145	$20	9.5
Library 140	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Library 140	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	1,800	3	Relamp	No	18	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,800	0.7	1,996	0	$169	$1,315	$360	5.6
Library 140A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	166	0	$14	$189	$40	10.6
Library 140B	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Locker Room 155	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room 155	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,800	0.0	35	0	$3	$18	$5	4.5
Locker Room 155	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.7	1,995	0	$169	$1,416	$310	6.5
Mechanical 152B	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	500	3	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	500	0.0	32	0	$3	$145	$20	46.1
Mechanical 2	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Mechanical 2	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	3	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.2	182	0	$15	$365	$100	17.2
Office - Enclosed 105	1	LED Lamps: (3) 10W A19 Screw-In Lamps	None	S	30	1,800		None	No	1	LED Lamps: (3) 10W A19 Screw-In Lamps	None	30	1,800	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 107	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,800	0.0	65	0	$6	$37	$10	4.8
Office - Enclosed 109	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.1	293	0	$25	$262	$60	8.1
Office - Enclosed 109A	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Office - Enclosed 109B	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Office - Enclosed 109C	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,800	0.0	65	0	$6	$37	$10	4.8
Office - Enclosed 109D	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6

	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - Enclosed 115A	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.1	293	0	$25	$262	$60	8.1
Office - Enclosed 115B	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Office - Enclosed 115C	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	249	0	$21	$380	$65	14.8
Office - Enclosed 115D	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Office - Enclosed 117	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.1	293	0	$25	$262	$60	8.1
Office - Enclosed 121	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	333	0	$28	$416	$75	12.1
Office - Enclosed 122	1	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Wall Switch	S	15	1,800		None	No	1	LED Lamps: (1) 15W Corn Bulb Screw-In Lamp	Wall Switch	15	1,800	0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 122	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,800	0.0	35	0	$3	$18	$5	4.5
Office - Enclosed 122	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Office - Enclosed 131A	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Office - Enclosed 131B	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Office - Open Plan 115	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.3	831	0	$71	$635	$135	7.1
Restroom - Female 151B	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,800	0.0	95	0	$8	$98	$18	9.9
Restroom - Female 2	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,800	0.0	95	0	$8	$98	$18	9.9
Restroom - Female 3	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,800	0.0	95	0	$8	$98	$18	9.9
Restroom - Male 151A	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,800	0.0	95	0	$8	$98	$18	9.9
Restroom - Male 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,800	0.0	131	0	$11	$73	$20	4.8
Server Room 140DR	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	500	0.0	31	0	$3	$73	$20	20.3
Storage 152GS	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.0	36	0	$3	$73	$20	17.2
Storage 152GS	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	500	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	500	0.0	16	0	$1	$72	$10	46.1
Storage MT147	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	500	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.0	10	0	$1	$18	$5	16.2
Storage SC135	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	500	3	Relamp	No	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.1	39	0	$3	$73	$20	16.2
Storage WT147	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	500	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.0	10	0	$1	$18	$5	16.2
Classroom 201	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.2	499	0	$42	$489	$95	9.3
Classroom 201	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.0	83	0	$7	$37	$10	3.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 202	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,800	0.0	65	0	$6	$37	$10	4.8
Classroom 202	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,800	0.3	915	0	$78	$511	$140	4.8
Classroom 202	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	1,800	3	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,800	0.0	115	0	$10	$145	$20	12.8
Classroom 203	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 203	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 204	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 205	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 206	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 207	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4
Classroom 208	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 209	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 210	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 210	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 211	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 211	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,318	0	$112	$927	$215	6.4
Classroom 221	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4
Classroom 222	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4
Classroom 223	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.4	1,172	0	$100	$854	$195	6.6
Classroom 224	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4
Classroom 225	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.5	1,465	0	$124	$1,000	$235	6.2
Classroom 226	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.6	1,758	0	$149	$1,146	$275	5.8
Classroom 227	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.4	1,172	0	$100	$854	$195	6.6
Classroom 228	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.7	1,995	0	$169	$1,416	$310	6.5
Classroom 230	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4
Classroom 232	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.3	879	0	$75	$708	$155	7.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor 6	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 6	63	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,094	3	Relamp	No	63	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,094	1.5	4,789	-1	$407	$2,300	$630	4.1
Gymnasium 2 Bleachers	5	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	S	15	1,800		None	No	5	LED Lamps: (1) 15W A19 Screw-In Lamp	Wall Switch	15	1,800	0.0	0	0	$0	$0	$0	0.0
Janitorial JC225	1	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Wall Switch	S	39	500	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	28	500	0.0	6	0	$1	$38	$3	67.1
Office - Enclosed 229	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Restroom - Female 4	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,800	0.0	95	0	$8	$98	$18	9.9
Restroom - Female 5	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,800	3	Relamp	No	3	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,800	0.0	95	0	$8	$98	$18	9.9
Restroom - Male 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,800	0.0	131	0	$11	$73	$20	4.8
Restroom - Male 4	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,800	0.0	131	0	$11	$73	$20	4.8
Storage 223SC	2	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	500	2	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.1	47	0	$4	$138	$20	29.3
Storage 225SC	2	Compact Fluorescent: (3) 13W Biaxial Plug-In Lamps	Wall Switch	S	39	500	3	Relamp	No	2	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	28	500	0.0	12	0	$1	$75	$6	67.1
Storage 228A	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	500	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	500	0.0	31	0	$3	$73	$20	20.3
Storage 228B	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	500	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.0	10	0	$1	$18	$5	16.2
Storage 228SC	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	500	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.0	10	0	$1	$18	$5	16.2
Classroom 301	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 301	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.1	146	0	$12	$73	$20	4.3
Classroom 301	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.1	146	0	$12	$73	$20	4.3
Classroom 301	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 302	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 302	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 302	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 302	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 303	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 303	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 303	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 303	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 304	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	1,800	4	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,242	0.0	64	0	$5	$0	$0	0.0
Classroom 304	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	1,800	4	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,242	0.0	64	0	$5	$270	$35	42.9
Classroom 304	3	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	S	35	1,800	4	None	Yes	3	LED - Fixtures: Ambient 2x4 Fixture	Occupancy Sensor	35	1,242	0.0	64	0	$5	$0	$0	0.0
Classroom 304	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 305	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,800	3	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,800	0.3	882	0	$75	$493	$135	4.8
Classroom 306	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	1,800	3	Relamp	No	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,800	0.3	882	0	$75	$493	$135	4.8
Classroom 307	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 307	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 307	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 307	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 308	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 308	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 308	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 308	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 309	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,800	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,242	0.0	44	0	$4	$18	$5	3.6
Classroom 309	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 309	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 309	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Classroom 310	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	8,760	3, 4	Relamp	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	6,044	0.0	212	0	$18	$18	$5	0.7
Classroom 310	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 310	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$219	$60	4.3
Classroom 310	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3, 4	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,242	0.2	439	0	$37	$489	$95	10.6
Corridor 1	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,080	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,125	0.1	285	0	$24	$298	$90	8.6

	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Janitorial 1	1	Compact Fluorescent: T9 (22) - 1L	Wall Switch	S	22	500		None	No	1	Compact Fluorescent: T9 (22) - 1L	Wall Switch	22	500	0.0	0	0	$0	$0	$0	0.0
Janitorial 2	1	Compact Fluorescent: T9 (22) - 1L	Wall Switch	S	22	500		None	No	1	Compact Fluorescent: T9 (22) - 1L	Wall Switch	22	500	0.0	0	0	$0	$0	$0	0.0
Restroom - Female 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	166	0	$14	$343	$55	20.4
Restroom - Male 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.1	166	0	$14	$343	$55	20.4
Locker Room Girls	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Locker Room Girls	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3, 4	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,242	0.6	1,746	0	$148	$1,307	$280	6.9
Office - Enclosed Girls Locker Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,800	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,800	0.0	111	0	$9	$73	$20	5.6
Storage 120B	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	500	3	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	500	0.0	18	0	$1	$65	$12	35.5
Storage 120B	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	500	3	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	500	0.0	19	0	$2	$37	$10	16.2
Stairs 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	8,760	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.1	1,618	0	$137	$371	$180	1.4

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?	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 2	Hubbard Middle School	1	Air Compressor	3.0	89.5%	No	Baldor	Unknown	W	500		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Hubbard Middle School	2	Air Compressor	1.5	86.5%	No	Baldor	Unknown	W	500		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Hubbard Middle School	2	Boiler Feed Water Pump	2.0	85.5%	No	AO Smith	P48N2EB7B2	W	2,520		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Hubbard Middle School	2	Condensate Pump	5.0	87.5%	No	Baldor	VM3613	W	2,520		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle School	10	Exhaust Fan	0.2	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle School	3	Exhaust Fan	0.5	70.0%	No	Unknown	Unknown	B	2,745	6	Yes	78.2%	No		0.1	345	0	$30	$1,057	$0	35.4
Mechanical 2	Hubbard Middle School	1	DHW Circulation Pump	0.1	65.0%	No	Taco	0012-BF-4	W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior 1	Kitchen	1	Kitchen Hood Exhaust Fan	1.0	70.0%	No	Unknown	Unknown	W	1,200		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle School	1	Other	20.0	92.4%	No	ITI Hydro	US-75-63-20-208	W	100		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle School	2	Supply Fan	0.5	70.0%	No	Unknown	Unknown	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Gymnasium 1	Gymnasium 1	2	Exhaust Fan	0.5	70.0%	No	Unknown	Unknown	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor Main	Corridor Main	5	Fan Coil Unit	0.1	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor 6	Corridor 6	4	Fan Coil Unit	0.1	65.0%	No	Unknown	Unknown	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle School	30	Supply Fan	0.1	65.0%	No	Century	8-119855-0	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle School	14	Supply Fan	0.1	65.0%	No	Holtzer-Cabot	4730	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle School	7	Supply Fan	0.3	65.0%	No	McQuay	63261701	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged 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)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	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/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior 1/Server Room 140DR	Server Room 140DR	1	Ductless Mini-Split AC	1.50		10.00		Mitsubishi	PUY-A18NHA	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1/Classroom 133	Classroom 133	1	Split-System	1.50		8.00		Comfortmaker	AG018GB3	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior 1/Office 121	Office 121	1	Split-System	2.00		14.00		York	YCD24B23SA	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	8	Window AC	3.00		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	3	Window AC	2.33		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	6	Window AC	1.50		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	3	Window AC	1.10		12.20		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Enclosed 229	Office - Enclosed 229	1	Window AC	1.48		10.00		Friedrich	KM18L30-C	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Open Plan 115	Office - Open Plan 115	1	Window AC	1.83		9.40		Electrolux	FAS226T2A	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	4	Window AC	1.00		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	6	Window AC	1.00		10.00		Comfortair	PS-121C	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	7	Window AC	0.83		10.00		Dayton	40JZ85	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	3	Window AC	0.50		10.00		Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Hubbard Middle School	Hubbard Middle Schooll	1	Window AC	2.33		8.50		Frigidaire	FAS296N2A2	B	7	Yes	1	Window AC	2.33		12.00		0.7	1,267	0	$110	$1,685	$250	13.1

Space Heating Boiler 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)	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 2	Hubbard Middle School	2	Forced Draft Steam Boiler	5,520	Weil McLain	Model 94	B		No						0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical 152B	Kitchen	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	RG1PV50S6N	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical 2	Hubbard Middle School	2	Storage Tank Water Heater (> 50 Gal)	Bradford White	EF100T199E3NA2	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical 152B	Kitchen	1	Booster Water Heater	Hatco	C-24	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Classroom 142	8	3	Faucet Aerator (Kitchen)	2.20	1.50	0.0	0	1	$4	$22	$6	3.5

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen 152	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	Unknown	Uknown	No		No	0.0	0	0	$0	$0	$0	0.0
Storage 152GS	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Unknown	Uknown	No		No	0.0	0	0	$0	$0	$0	0.0
Storage 152GS	1	Stand-Up Freezer, Solid Door (≤15 cu. ft.)	Unknown	Uknown	No		No	0.0	0	0	$0	$0	$0	0.0
Dining Area 1	2	Refrigerator Chest	Unknown	Uknown	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Electric Griddle (5 Feet Width)	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Insulated Food Holding Cabinet (3/4 Size)	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Gas Rack Oven (Double)	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0
Kitchen	1	Electric Steamer	Unknown	Unknown	No		No	0.0	0	0	$0	$0	$0	0.0

Dishwasher Inventory & Recommendations

	Existing Conditions							Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Manufacturer	Model	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Single Tank Conveyor (High Temp)	Hatco	Unknown	Electric	N/A	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

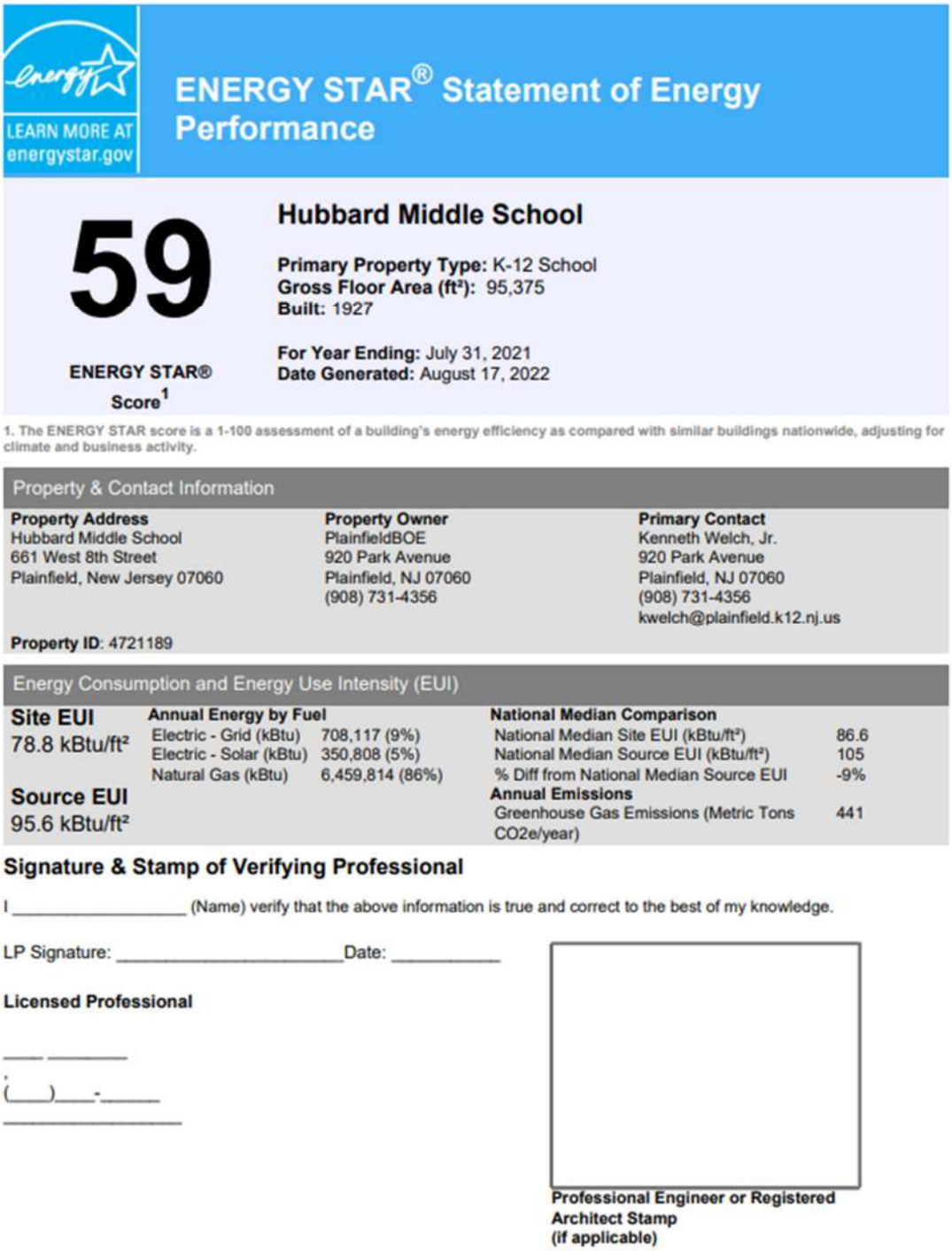
	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Hubbard Middle School	2	Coffee Machine	200	No	Varied	Varied
Hubbard Middle School	29	Desktop	270	No	Dell	Unknown
Hubbard Middle School	5	Large Fan	500	No	Dayton	Unknown
Hubbard Middle School	4	Fan	200	No	Varied	Varied
Art Rm	1	Kiln	6,000	No	Amaco	D1639
Hubbard Middle School	11	Microwave	800	No	Varied	Varied
Hubbard Middle School	64	Apple TV	100	No	Apple	Unknown
Hubbard Middle School	4	Papper Shredder	50	No	Unknown	Unknown
Hubbard Middle School	54	Printer	100	No	Varied	Varied
Hubbard Middle School	3	Copier	800	No	Xerox	Unknown
Hubbard Middle School	7	Mini-Refrigerator	200	No	Varied	Varied
Hubbard Middle School	2	Refrigerator	383	No	Varied	Varied
Hubbard Middle School	51	Smartboard	100	No	Varied	Varied
Hubbard Middle School	6	Television	100	No	Varied	Varied
Hubbard Middle School	12	Water Fountain	150	No	Elkay	Unknown
Hubbard Middle School	885	Tablet	75	No	Varied	Varied
Hubbard Middle School	68	Laptop	75	No	Varied	Varied

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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dining Area 1	1	Non-Refrigerated	9	Yes	0.0	343	0	$30	$230	$0	7.8
Dining Area 1	1	Glass Fronted Refrigerated	9	Yes	0.1	1,209	0	$105	$230	$50	1.7
Dining Area 213	1	Refrigerated	9	Yes	0.2	1,612	0	$139	$230	$50	1.3

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

Energy use intensity (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

59

ENERGY STAR® Score[1]

Hubbard Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 95,375
Built: 1927

For Year Ending: July 31, 2021
Date Generated: August 17, 2022

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
Hubbard Middle School 661 West 8th Street Plainfield, New Jersey 07060	PlainfieldBOE 920 Park Avenue Plainfield, NJ 07060 (908) 731-4356	Kenneth Welch, Jr. 920 Park Avenue Plainfield, NJ 07060 (908) 731-4356 kwelch@plainfield.k12.nj.us

Property ID: 4721189

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
78.8 kBtu/ft²

Source EUI
95.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	708,117 (9%)
Electric - Solar (kBtu)	350,808 (5%)
Natural Gas (kBtu)	6,459,814 (86%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	86.6
National Median Source EUI (kBtu/ft²)	105
% Diff from National Median Source EUI	-9%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	441

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

LP Signature: _____ Date: _____

Licensed Professional

___ _____
,
(___)___-_____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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