# Local Government Energy Audit Report

## Thomas A. Edison Career and Technical Academy

July 31, 2019

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# Disclaimer

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

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

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

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

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

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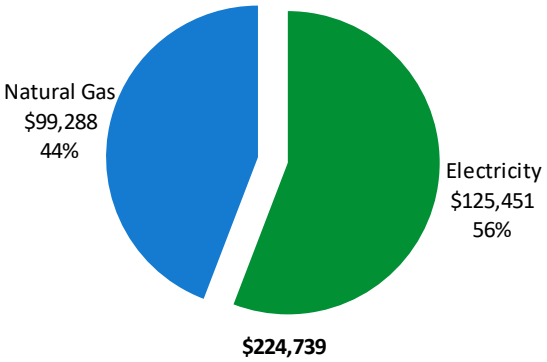
# 1 EXECUTIVE SUMMARY

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

## BUILDING PERFORMANCE REPORT

| | | |
|---|---|---|
| Annual Utilities | Costs: $224,739<br>Electricity:<br>845,507 kWh<br>Natural Gas:<br>127,102 Therms |  |
| ENERGY STAR® Benchmarking Score | 15<br>*(1-100 scale)* | This building performs at or below the national average. This report contains suggestions about how to improve building performance and reduce energy costs. |

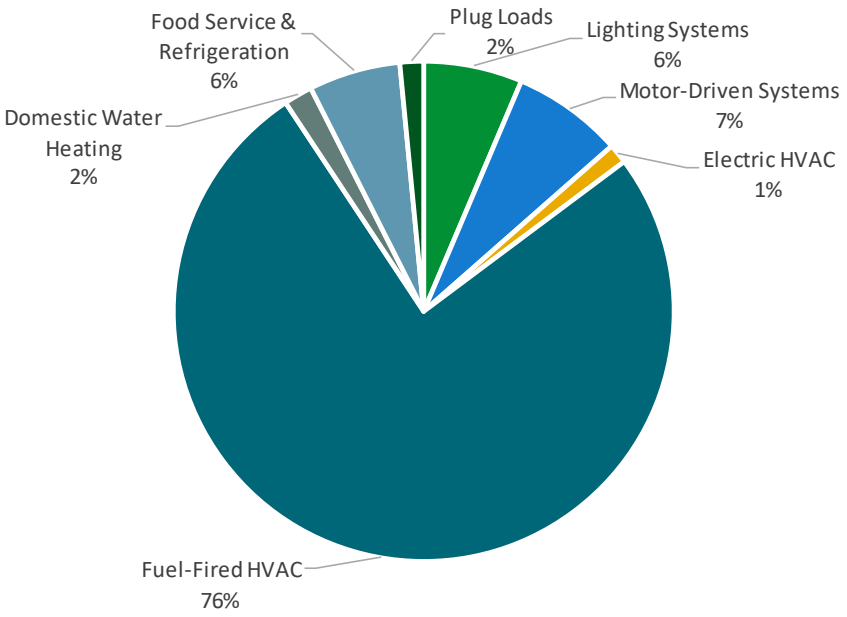


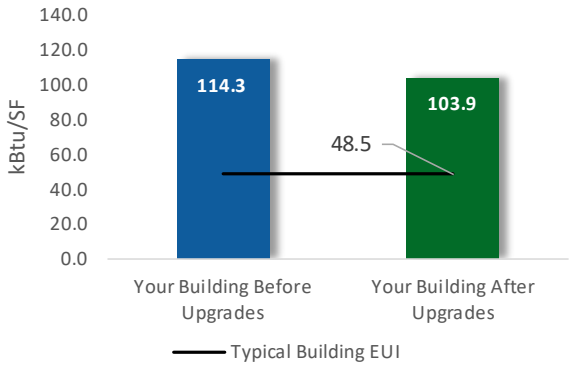

*Figure 1 - Energy Use by System*

## POTENTIAL IMPROVEMENTS

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

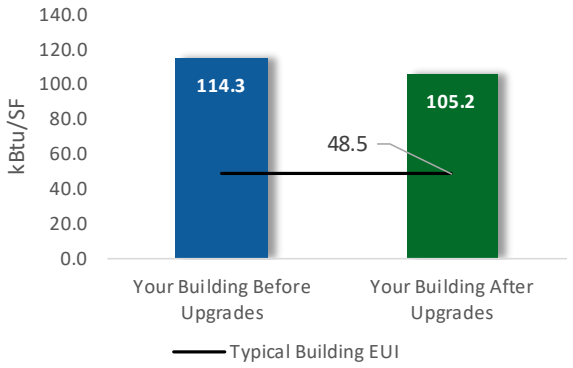
### Scenario 1: Full Package (all evaluated measures)

| | |
|---|---|
| Installation Cost | $366,826 |
| Potential Rebates & Incentives[1] | $42,628 |
| Annual Cost Savings | $55,411 |
| Annual Energy Savings | Electricity: 364,334 kWh<br>Natural Gas: 1,732 Therms |
| Greenhouse Gas Emission Savings | 194 Tons |
| Simple Payback | 5.9 Years |
| Site Energy Savings (all utilities) | 9% |




### Scenario 2: Cost Effective Package[2]

| | |
|---|---|
| Installation Cost | $227,232 |
| Potential Rebates & Incentives | $35,088 |
| Annual Cost Savings | $51,876 |
| Annual Energy Savings | Electricity: 346,213 kWh<br>Natural Gas: 650 Therms |
| Greenhouse Gas Emission Savings | 178 Tons |
| Simple Payback | 3.7 Years |
| Site Energy Savings (all utilities) | 8% |




### On-site Generation Potential

| | |
|---|---|
| Photovoltaic | High |
| Combined Heat and Power | None |

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

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

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **164,708** | **53.0** | **-33** | **$24,181** | **$95,384** | **$22,013** | **$73,371** | **3.0** | **162,009** |
| ECM 1 | Install LED Fixtures | 6,331 | 1.7 | 0 | $936 | $11,992 | $1,145 | $10,847 | 11.6 | 6,326 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 21,322 | 7.0 | -4 | $3,129 | $11,085 | $1,720 | $9,365 | 3.0 | 20,949 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 137,055 | 44.3 | -28 | $20,117 | $72,307 | $19,148 | $53,159 | 2.6 | 134,735 |
| **Lighting Control Measures** | | **36,224** | **12.0** | **-8** | **$5,315** | **$33,300** | **$3,535** | **$29,765** | **5.6** | **35,590** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 33,462 | 11.1 | -7 | $4,910 | $29,700 | $3,535 | $26,165 | 5.3 | 32,876 |
| ECM 5 | Install High/Low Lighting Controls | 2,762 | 0.9 | -1 | $405 | $3,600 | $0 | $3,600 | 8.9 | 2,714 |
| **Motor Upgrades** | | **1,153** | **0.3** | **0** | **$171** | **$10,026** | **$0** | **$10,026** | **58.6** | **1,161** |
| ECM 6 | Premium Efficiency Motors | 1,153 | 0.3 | 0 | $171 | $10,026 | $0 | $10,026 | 58.6 | 1,161 |
| **Variable Frequency Drive (VFD) Measures** | | **129,841** | **39.4** | **0** | **$19,265** | **$92,432** | **$10,790** | **$81,642** | **4.2** | **130,749** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | 112,347 | 34.2 | 0 | $16,669 | $70,176 | $9,240 | $60,936 | 3.7 | 113,133 |
| ECM 8 | Install VFDs on Heating Water Pumps | 17,160 | 2.2 | 0 | $2,546 | $14,282 | $0 | $14,282 | 5.6 | 17,280 |
| ECM 9 | Install Boiler Draft Fan VFDs | 334 | 3.0 | 0 | $50 | $7,974 | $1,550 | $6,424 | 129.6 | 336 |
| **Electric Unitary HVAC Measures** | | **3,757** | **4.2** | **0** | **$557** | **$79,217** | **$4,490** | **$74,727** | **134.1** | **3,783** |
| ECM 10 | Install High Efficiency Air Conditioning Units | 3,725 | 4.1 | 0 | $553 | $77,418 | $4,421 | $72,997 | 132.1 | 3,752 |
| ECM 11 | Install High Efficiency Heat Pumps | 31 | 0.0 | 0 | $5 | $1,799 | $69 | $1,730 | 371.7 | 32 |
| **Gas Heating (HVAC/Process) Replacement** | | **0** | **0.0** | **108** | **$846** | **$23,518** | **$800** | **$22,718** | **26.9** | **12,674** |
| ECM 12 | Install High Efficiency Furnaces | 0 | 0.0 | 108 | $846 | $23,518 | $800 | $22,718 | 26.9 | 12,674 |
| **HVAC System Improvements** | | **0** | **0.0** | **71** | **$556** | **$5,438** | **$0** | **$5,438** | **9.8** | **8,327** |
| ECM 13 | Implement Demand Control Ventilation (DCV) | 0 | 0.0 | 71 | $556 | $5,438 | $0 | $5,438 | 9.8 | 8,327 |
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **34** | **$268** | **$136** | **$0** | **$136** | **0.5** | **4,019** |
| ECM 14 | Install Low-Flow DHW Devices | 0 | 0.0 | 34 | $268 | $136 | $0 | $136 | 0.5 | 4,019 |
| **Food Service & Refrigeration Measures** | | **28,652** | **2.7** | **0** | **$4,251** | **$27,375** | **$1,000** | **$26,375** | **6.2** | **28,852** |
| ECM 15 | Dishwasher Replacement | 12,878 | 1.5 | 0 | $1,911 | $18,859 | $700 | $18,159 | 9.5 | 12,968 |
| ECM 16 | Refrigerator/Freezer Case Electrically Commutated Motors | 7,674 | 0.9 | 0 | $1,139 | $1,820 | $0 | $1,820 | 1.6 | 7,728 |
| ECM 17 | Refrigeration Controls | 8,100 | 0.3 | 0 | $1,202 | $6,696 | $300 | $6,396 | 5.3 | 8,157 |
| **TOTALS (COST EFFECTIVE MEASURES)** | | **346,213** | **102.6** | **65** | **$51,876** | **$227,232** | **$35,088** | **$192,144** | **3.7** | **356,243** |
| **TOTALS (ALL MEASURES)** | | **364,334** | **111.6** | **173** | **$55,411** | **$366,826** | **$42,628** | **$324,198** | **5.9** | **387,164** |

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

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

*Figure 2 – Evaluated Energy Improvements*

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

## 1.1 Planning Your Project

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

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

### Pick Your Installation Approach

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

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

| Energy Conservation Measure | | SmartStart | Direct Install | Pay For Performance |
|---|---|---|---|---|
| ECM 1 | Install LED Fixtures | X | | |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | X | | |
| ECM 3 | Retrofit Fixtures with LED Lamps | X | | |
| ECM 4 | Install Occupancy Sensor Lighting Controls | X | | |
| ECM 5 | Install High/Low Lighting Controls | | | |
| ECM 6 | Premium Efficiency Motors | | | |
| ECM 7 | Install VFDs on Constant Volume (CV) HVAC | X | | |
| ECM 8 | Install VFDs on Hot Water Pumps | | | |
| ECM 9 | Install Boiler Draft Fan VFDs | X | | |
| ECM 10 | Install High Efficiency Electric AC | X | | |
| ECM 11 | Install High Efficiency Heat Pumps | X | | |
| ECM 12 | Install High Efficiency Furnaces | X | | |
| ECM 13 | Implement Demand Control Ventilation | | | |
| ECM 14 | Install Low-Flow Domestic Hot Water Devices | | | |
| ECM 15 | Dishwasher Replacement | X | | |
| ECM 16 | Refrigerator/Freezer Case Electrically Commutated Motors | | | |
| ECM 17 | Refrigeration Controls | X | | |

*Figure 3 – Funding Options*

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

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

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

### *Individual Measures with SmartStart*

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

### *Turnkey Installation with Direct Install*

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

### *Whole Building Approach with Pay for Performance*

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings.

## More Options from Around the State

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the ESIP. Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. You have already taken the first step as an LGEA customer, because this report is required to participate in ESIP.

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

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

### *Ongoing Electric Savings with Demand Response*

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

# 2 EXISTING CONDITIONS

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

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

## 2.1 Site Overview

On February 14, 2019, TRC performed an energy audit at Thomas A. Edison Career and Technical Academy located in Elizabeth, New Jersey. TRC met with Luis Milanes to review the facility operations and help focus our investigation on specific energy-using systems.

Thomas A. Edison Career and Technical Academy is a three-story, 136,440 square foot building built in 1937. Spaces include: classrooms, gymnasium, auditorium, weight rooms, library, woodshops, auto shops, offices, cafeteria, corridors, stairwells, a kitchen and electrical and mechanical spaces.

## 2.2 Building Occupancy

The facility is occupied ten months of the year. Typical weekday occupancy is 114 staff and 787 students.

There is no regular summer occupancy and there are no weekend activities.

| Building Name | Weekday/Weekend | Operating Schedule |
|---|---|---|
| Thomas A. Edison Career and Technical Academy | Weekday | 7:00 AM to 4:30 PM |
| | Weekend | Closed |

*Figure 4 - Building Occupancy Schedule*

## 2.3 Building Envelope

Building walls are brick masonry over structural steel. Most of the roof is flat and covered with black membrane and is in fair condition. A portion of the building has a pitched roof also with the same black membrane.

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

Most of the windows are double glazed and have aluminum frames. 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 aluminum frames and are in fair condition.

*Roof*

*Exterior Walls*

*Windows*

*Exterior Doors*

## 2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 40-Watt. 75-Watt Slimline, and 110-Watt "HO" T12 fixtures. Additionally, there are some compact fluorescent lamps (CFL), incandescent, halogen, metal halide and LED general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 2- 3- or 4-lamp, 4-foot long troffer, recessed, or surface mounted fixtures and a few 2-foot fixtures with linear tube lamps. Gymnasium fixtures have high bay LED lamps and are controlled by occupancy sensors. All exit signs are LED units.

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

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

*Gym Lighting*

*Classroom Lighting*

Auto Shop Lighting


*HID Lamps*

Exterior fixtures include wall packs with high intensity discharge (HID), incandescent, and LED lamps.

Exterior light fixtures are controlled by a time clock.

*Timeclock*

*Wallpacks*

## 2.5 Air Handling Systems

### Air-Handling Units

There are several air-handling units (AHUs) throughout the facility that provide space heating and cooling. AHUs have constant volume supply fans, most with 7.5 hp motors. Cooling is provided by direct expansion (DX) coils and heating is provided by hot water coils located in the AHUs.

### Packaged and Split-System Units

The facility is served by multiple packaged roof-top units, including:

| Unit | Area Served | Size (tons/MBh) | Efficiency (EER/COP) |
|---|---|---|---|
| Split-System AC | Cafeteria/Serving Area | 15.00 tons | 9.00 EER |
| Split-System AC | TEA Room | 7.00 tons | 9.00 EER |
| Packaged AC | Auditorium | 25.00 tons | 10.60 EER |
| Packaged AC | Media Center | 12.50 tons | 11.30 EER |
| Split-System AC | CR207 | 10.00 tons | 11.30 EER |
| Split-System AC | CR105 | 7.50 tons | 11.60 EER |
| Split-System AC | Print Shop | 7.50 tons | 11.00 EER |
| Ductless Mini-Split AC | Room 101 | 1.00 tons | 10.30 EER |
| Packaged AC | Shop Rite | 10.00 tons | 11.20 EER |
| Packaged AC | Room 1B | 5.00 tons | 12.20 EER |
| Ductless Mini-Split HP | Transportation | 0.75 tons<br>7 MBh | 15.40 EER<br>4.44 COP |

Refer to Appendix A for detailed information about each unit.

**Air Conditioners**

Several classrooms use window air conditioning (AC) units. These range in capacity; approximately 1 ton each. The units are in fair condition. Efficiency of the units averages about 10 EER. They are not ENERGY STAR® labeled.

The air handling units are controlled by pneumatic valve controls. The pneumatic system is served by an air compressor with two 1.5 hp compressor motors, located in the boiler room.

*Split-System AC*

*Ductless Mini-Split AC*

*Rooftop Package Unit*

*Indoor Package Unit*

## 2.6 Heating Steam Systems

Two Easco 5,021 MBh steam boilers serve the building heating load and domestic hot water needs. The burners are fully modulating with a nominal efficiency of 80%. The boilers are configured in a lead/lag control scheme. Both boilers are required under high load conditions. Installed in 2013, they are in good condition.

A steam distribution system serves the building heating terminals and heat exchanger. There are four condensate pumps with motors between 1 hp and 2 hp each in the boiler room. There are steam supply and condensate return pipe with insulation in fair condition.

Hot water is produced by a heat exchanger using steam from the boilers and is supplied to the facility by a primary only distribution system with three constant speed 7.5 hp heating hot water pumps operating in lead/lag fashion. Hot water is circulated from the heat exchanger to AHUs and used in hot water coils for space heating. Hot water is also provided directly to hot water unit heaters located in some areas.

*Steam Boiler*

*Boiler Blower*

*Condensation System*

*HW Heating Pumps*

## 2.7 Domestic Hot Water

Hot water is produced with a 100 gallon 199 MBh gas-fired storage water heater with an 80% efficiency.

Hot water is also produced by a heat exchanger using steam from the space heating boiler and stored in two 119 gallon tanks.

Two fractional horsepower circulation pumps distribute water to the separate storage tanks and to end uses. The circulation pumps operate continuously.

*DHW Storage Heater*

*DHW Circulation Pump*

*Indirect DHW Storage Tanks*

*DHW 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 convection gas-fired oven or an electric oven. Bulk prepared foods are held in several electric holding cabinets. Equipment is not high efficiency and is in fair condition.

The dishwasher is a non-ENERGY STAR®, high temperature, rack type unit.

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

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

*Convection Oven*

*Dishwasher*

*Gas Range and Griddle*

*Fryer*

## 2.9 Refrigeration

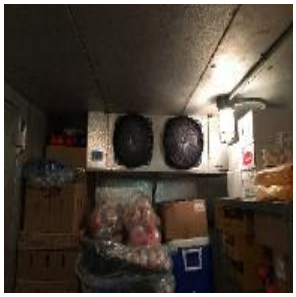
The kitchen has several stand-up refrigerators with solid doors. All equipment is standard efficiency and in fair condition.

The walk-in refrigerators in the kitchen and Shoprite area each have an estimated 1-ton compressor located on top of the walk-in and a two-fan evaporator.

The walk-in medium temperature freezer in the kitchen has a 0.75 ton compressor located on top of the walk-in area and a two fan evaporator.

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

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



*Walk-in Evaporator Fans*

*Ice Maker*

*Milk Cooler*

*Stand-up Refrigerator*

## 2.10 Plug Load & Vending Machines

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

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

There are approximately 145 computer work stations throughout the facility. Plug loads throughout the building include general classroom and office equipment. There are classroom typical loads such as smart boards, projectors, and televisions.

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

*Copiers*

*Computers*

*Breakroom Appliances*

*Woodshop Equipment*

## 2.11 Water-Using Systems

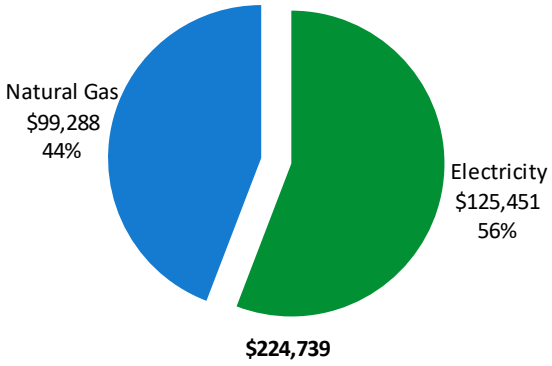
There are 19 restroom sinks. Faucet flow rates are at 1.5 gallons per minute (gpm) or higher.

*Lavatory Faucets*

# 3 Energy Use and Costs

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

| Utility Summary | | |
|---|---|---|
| **Fuel** | **Usage** | **Cost** |
| Electricity | 845,507 kWh | $125,451 |
| Natural Gas | 127,102 Therms | $99,288 |
| **Total** | | **$224,739** |




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

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

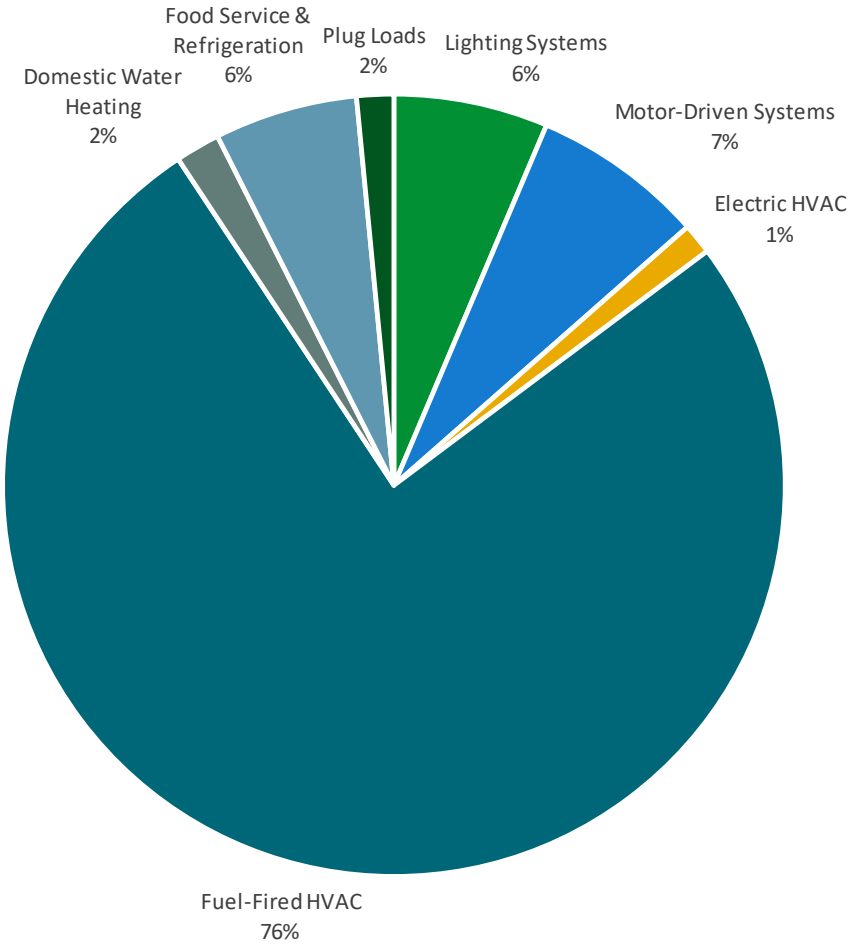
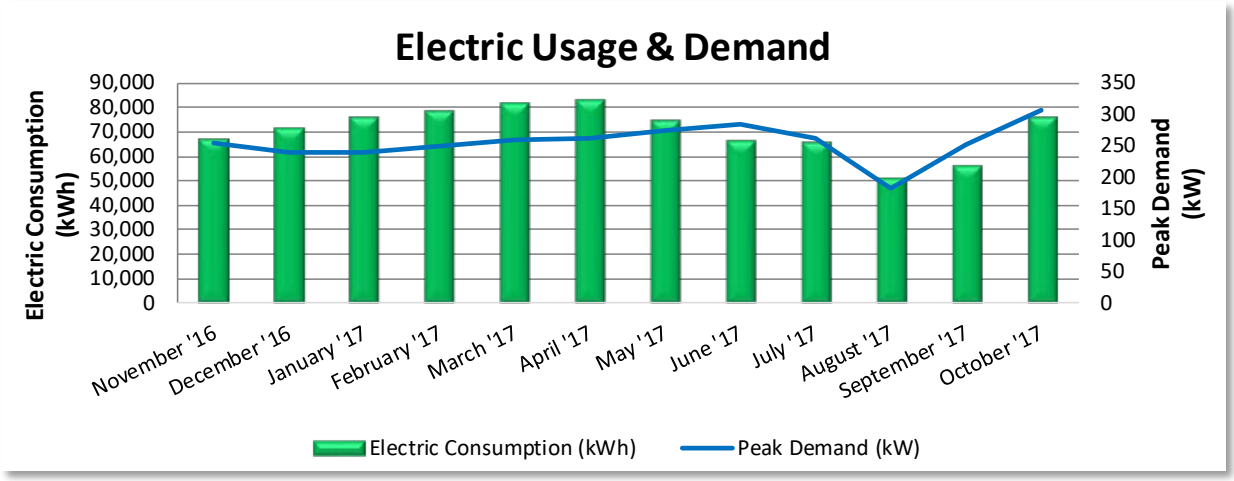



***Figure 5 - Energy Balance***

## 3.1 Electricity

PSE&G delivers electricity under rate class General and Large Light and Power, with electric production provided by a third-party supplier.



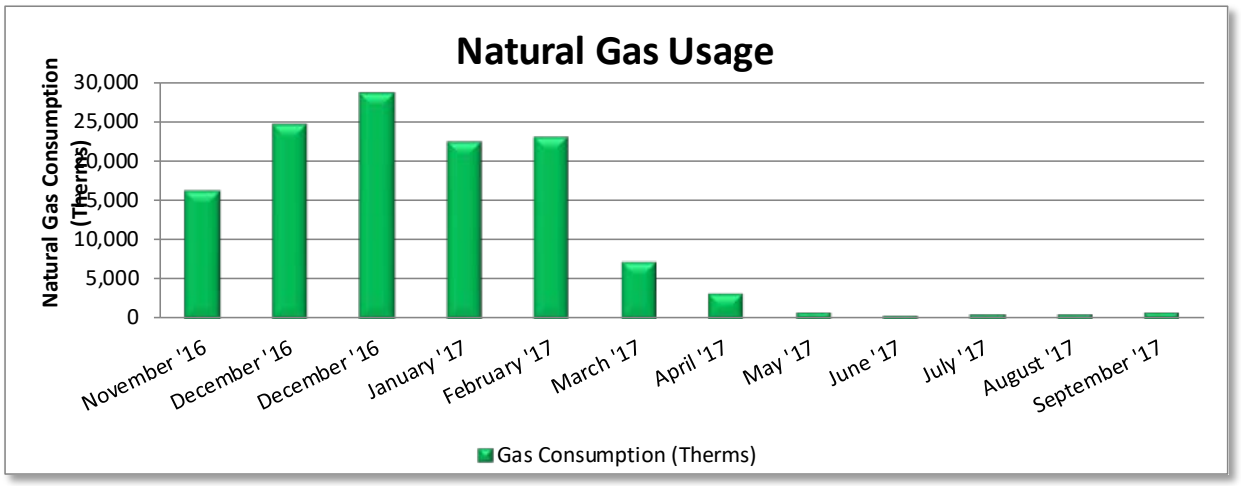

| Electric Billing Data | | | | | | |
|---|---|---|---|---|---|---|
| **Period Ending** | **Days in Period** | **Electric Usage (kWh)** | **Demand (kW)** | **Demand Cost** | **Total Electric Cost** | **TRC Estimated Usage?** |
| 11/14/16 | 30 | 67,263 | 256 | $971 | $9,256 | Yes |
| 12/15/16 | 31 | 71,574 | 239 | $902 | $9,750 | No |
| 1/18/17 | 34 | 75,744 | 241 | $911 | $10,315 | No |
| 2/16/17 | 29 | 78,864 | 250 | $930 | $10,739 | Yes |
| 3/17/17 | 29 | 81,984 | 260 | $1,001 | $11,149 | No |
| 4/18/17 | 32 | 83,172 | 262 | $1,007 | $11,298 | No |
| 5/17/17 | 29 | 74,541 | 273 | $1,039 | $10,187 | Yes |
| 6/16/17 | 30 | 66,268 | 283 | $1,087 | $11,822 | No |
| 7/18/17 | 32 | 65,803 | 262 | $1,005 | $11,582 | No |
| 8/16/17 | 29 | 50,947 | 182 | $698 | $8,788 | No |
| 9/18/17 | 33 | 55,861 | 251 | $966 | $10,285 | No |
| 10/16/17 | 28 | 75,802 | 308 | $1,224 | $10,622 | No |
| **Totals** | **366** | **847,823** | **308** | **$11,741** | **$125,794** | |
| **Annual** | **365** | **845,507** | **308** | **$11,709** | **$125,451** | |

Notes:

- Peak demand of 308 kW occurred in October 2017.
- The average electric cost over the past 12 months was $0.148/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.
- Electricity consumption and demand noticeably drops in summer and is lowest in August because the school is unoccupied.

## 3.2 Natural Gas

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




| Gas Billing Data | | | | |
|---|---|---|---|---|
| **Period Ending** | **Days in Period** | **Natural Gas Usage (Therms)** | **Natural Gas Cost** | **TRC Estimated Usage?** |
| 11/10/16 | 29 | 16,162 | $11,060 | No |
| 12/12/16 | 32 | 24,474 | $16,796 | No |
| 1/12/17 | 31 | 28,474 | $19,380 | No |
| 2/10/17 | 29 | 22,215 | $15,634 | No |
| 3/10/17 | 28 | 22,873 | $15,586 | No |
| 4/11/17 | 32 | 7,023 | $6,991 | No |
| 5/11/17 | 30 | 3,136 | $2,536 | No |
| 6/11/17 | 31 | 788 | $2,395 | Yes |
| 7/12/17 | 31 | 374 | $2,181 | No |
| 8/10/17 | 29 | 424 | $2,015 | No |
| 9/12/17 | 33 | 486 | $2,314 | Yes |
| 10/12/17 | 30 | 673 | $2,399 | No |
| **Totals** | **365** | **127,102** | **$99,288** | |
| **Annual** | **365** | **127,102** | **$99,288** | |

Notes:

- The average gas cost for the past 12 months is $0.781/therm, which is the blended rate used throughout the analysis.
- Gas consumption is primarily in the winter months due to the heating loads being provided by gas-fired equipment.

## 3.3 Benchmarking

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

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

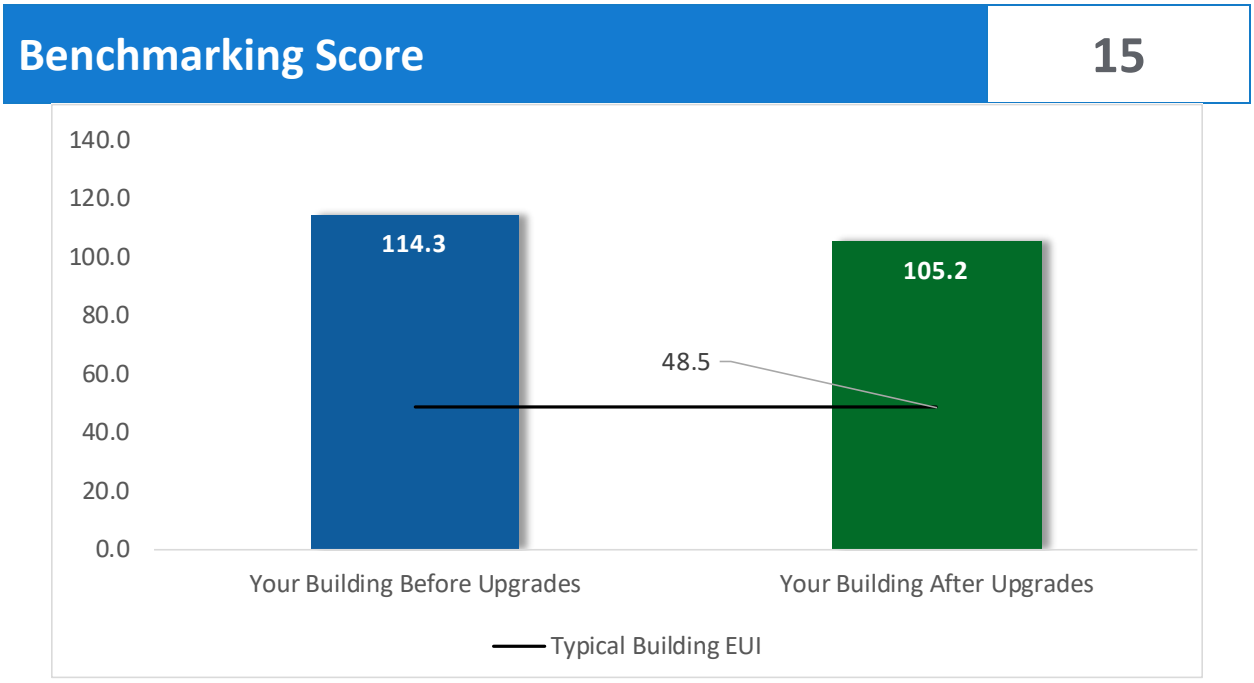



*Figure 6 - Energy Use Intensity Comparison*

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

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

## Tracking Your Energy Performance

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

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

Free online training is available to help you use ENERGY STAR® Portfolio Manager® to track your building's performance at: https://www.energystar.gov/buildings/training.

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

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

# 4 ENERGY CONSERVATION MEASURES

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

Calculations of energy use and savings are based on the current version of the *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*, which is approved by the NJBPU. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances.

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

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

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 | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **164,708** | **53.0** | **-33** | **$24,181** | **$95,384** | **$22,013** | **$73,371** | **3.0** | **162,009** |
| ECM 1 | Install LED Fixtures | 6,331 | 1.7 | 0 | $936 | $11,992 | $1,145 | $10,847 | 11.6 | 6,326 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 21,322 | 7.0 | -4 | $3,129 | $11,085 | $1,720 | $9,365 | 3.0 | 20,949 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 137,055 | 44.3 | -28 | $20,117 | $72,307 | $19,148 | $53,159 | 2.6 | 134,735 |
| **Lighting Control Measures** | | **36,224** | **12.0** | **-8** | **$5,315** | **$33,300** | **$3,535** | **$29,765** | **5.6** | **35,590** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 33,462 | 11.1 | -7 | $4,910 | $29,700 | $3,535 | $26,165 | 5.3 | 32,876 |
| ECM 5 | Install High/Low Lighting Controls | 2,762 | 0.9 | -1 | $405 | $3,600 | $0 | $3,600 | 8.9 | 2,714 |
| **Motor Upgrades** | | **1,153** | **0.3** | **0** | **$171** | **$10,026** | **$0** | **$10,026** | **58.6** | **1,161** |
| ECM 6 | Premium Efficiency Motors | 1,153 | 0.3 | 0 | $171 | $10,026 | $0 | $10,026 | 58.6 | 1,161 |
| **Variable Frequency Drive (VFD) Measures** | | **129,841** | **39.4** | **0** | **$19,265** | **$92,432** | **$10,790** | **$81,642** | **4.2** | **130,749** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | 112,347 | 34.2 | 0 | $16,669 | $70,176 | $9,240 | $60,936 | 3.7 | 113,133 |
| ECM 8 | Install VFDs on Heating Water Pumps | 17,160 | 2.2 | 0 | $2,546 | $14,282 | $0 | $14,282 | 5.6 | 17,280 |
| ECM 9 | Install Boiler Draft Fan VFDs | 334 | 3.0 | 0 | $50 | $7,974 | $1,550 | $6,424 | 129.6 | 336 |
| **Electric Unitary HVAC Measures** | | **3,757** | **4.2** | **0** | **$557** | **$79,217** | **$4,490** | **$74,727** | **134.1** | **3,783** |
| ECM 10 | Install High Efficiency Air Conditioning Units | 3,725 | 4.1 | 0 | $553 | $77,418 | $4,421 | $72,997 | 132.1 | 3,752 |
| ECM 11 | Install High Efficiency Heat Pumps | 31 | 0.0 | 0 | $5 | $1,799 | $69 | $1,730 | 371.7 | 32 |
| **Gas Heating (HVAC/Process) Replacement** | | **0** | **0.0** | **108** | **$846** | **$23,518** | **$800** | **$22,718** | **26.9** | **12,674** |
| ECM 12 | Install High Efficiency Furnaces | 0 | 0.0 | 108 | $846 | $23,518 | $800 | $22,718 | 26.9 | 12,674 |
| **HVAC System Improvements** | | **0** | **0.0** | **71** | **$556** | **$5,438** | **$0** | **$5,438** | **9.8** | **8,327** |
| ECM 13 | Implement Demand Control Ventilation (DCV) | 0 | 0.0 | 71 | $556 | $5,438 | $0 | $5,438 | 9.8 | 8,327 |
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **34** | **$268** | **$136** | **$0** | **$136** | **0.5** | **4,019** |
| ECM 14 | Install Low-Flow DHW Devices | 0 | 0.0 | 34 | $268 | $136 | $0 | $136 | 0.5 | 4,019 |
| **Food Service & Refrigeration Measures** | | **28,652** | **2.7** | **0** | **$4,251** | **$27,375** | **$1,000** | **$26,375** | **6.2** | **28,852** |
| ECM 15 | Dishwasher Replacement | 12,878 | 1.5 | 0 | $1,911 | $18,859 | $700 | $18,159 | 9.5 | 12,968 |
| ECM 16 | Refrigerator/Freezer Case Electrically Commutated Motors | 7,674 | 0.9 | 0 | $1,139 | $1,820 | $0 | $1,820 | 1.6 | 7,728 |
| ECM 17 | Refrigeration Controls | 8,100 | 0.3 | 0 | $1,202 | $6,696 | $300 | $6,396 | 5.3 | 8,157 |
| **TOTALS (COST EFFECTIVE MEASURES)** | | **346,213** | **102.6** | **65** | **$51,876** | **$227,232** | **$35,088** | **$192,144** | **3.7** | **356,243** |
| **TOTALS (ALL MEASURES)** | | **364,334** | **111.6** | **173** | **$55,411** | **$366,826** | **$42,628** | **$324,198** | **5.9** | **387,164** |

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

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

*Figure 7 – All Evaluated ECMs*

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **164,708** | **53.0** | **-33** | **$24,181** | **$95,384** | **$22,013** | **$73,371** | **3.0** | **162,009** |
| ECM 1 | Install LED Fixtures | 6,331 | 1.7 | 0 | $936 | $11,992 | $1,145 | $10,847 | 11.6 | 6,326 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 21,322 | 7.0 | -4 | $3,129 | $11,085 | $1,720 | $9,365 | 3.0 | 20,949 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 137,055 | 44.3 | -28 | $20,117 | $72,307 | $19,148 | $53,159 | 2.6 | 134,735 |
| **Lighting Control Measures** | | **36,224** | **12.0** | **-8** | **$5,315** | **$33,300** | **$3,535** | **$29,765** | **5.6** | **35,590** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 33,462 | 11.1 | -7 | $4,910 | $29,700 | $3,535 | $26,165 | 5.3 | 32,876 |
| ECM 5 | Install High/Low Lighting Controls | 2,762 | 0.9 | -1 | $405 | $3,600 | $0 | $3,600 | 8.9 | 2,714 |
| **Variable Frequency Drive (VFD) Measures** | | **129,841** | **39.4** | **0** | **$19,265** | **$92,432** | **$10,790** | **$81,642** | **4.2** | **130,749** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | 112,347 | 34.2 | 0 | $16,669 | $70,176 | $9,240 | $60,936 | 3.7 | 113,133 |
| ECM 8 | Install VFDs on Heating Water Pumps | 17,160 | 2.2 | 0 | $2,546 | $14,282 | $0 | $14,282 | 5.6 | 17,280 |
| **HVAC System Improvements** | | **0** | **0.0** | **71** | **$556** | **$5,438** | **$0** | **$5,438** | **9.8** | **8,327** |
| ECM 13 | Implement Demand Control Ventilation (DCV) | 0 | 0.0 | 71 | $556 | $5,438 | $0 | $5,438 | 9.8 | 8,327 |
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **34** | **$268** | **$136** | **$0** | **$136** | **0.5** | **4,019** |
| ECM 14 | Install Low-Flow DHW Devices | 0 | 0.0 | 34 | $268 | $136 | $0 | $136 | 0.5 | 4,019 |
| **Food Service & Refrigeration Measures** | | **28,652** | **2.7** | **0** | **$4,251** | **$27,375** | **$1,000** | **$26,375** | **6.2** | **28,852** |
| ECM 16 | Refrigerator/Freezer Case Electrically Commutated Motors | 7,674 | 0.9 | 0 | $1,139 | $1,820 | $0 | $1,820 | 1.6 | 7,728 |
| ECM 17 | Refrigeration Controls | 8,100 | 0.3 | 0 | $1,202 | $6,696 | $300 | $6,396 | 5.3 | 8,157 |
| **TOTALS (COST EFFECTIVE MEASURES)** | | **346,213** | **102.6** | **65** | **$51,876** | **$227,232** | **$35,088** | **$192,144** | **3.7** | **356,243** |
| **TOTALS (ALL MEASURES)** | | **364,334** | **111.6** | **173** | **$55,411** | **$366,826** | **$42,628** | **$324,198** | **5.9** | **387,164** |

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

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

*Figure 8 – Cost Effective ECMs*

## 4.1 Lighting

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **164,708** | **53.0** | **-33** | **$24,181** | **$95,384** | **$22,013** | **$73,371** | **3.0** | **162,009** |
| ECM 1 | Install LED Fixtures | 6,331 | 1.7 | 0 | $936 | $11,992 | $1,145 | $10,847 | 11.6 | 6,326 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 21,322 | 7.0 | -4 | $3,129 | $11,085 | $1,720 | $9,365 | 3.0 | 20,949 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 137,055 | 44.3 | -28 | $20,117 | $72,307 | $19,148 | $53,159 | 2.6 | 134,735 |

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

### ECM 1: Install LED Fixtures

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

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

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

**Affected building areas:** spray room, stairwell one, and exterior fixtures.

### ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures by removing the fluorescent tubes and ballasts and replacing them with LED tubes and LED drivers (if necessary), which are designed to be used in retrofitted fluorescent fixtures. LED replacements are available for eight-foot lamps, including for high output (recessed double contact) units.

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**: T-12 fixtures in the boiler room, auto shop, autobody, and print shop.

### ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent, CFL, and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies.

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

**Affected building areas:** all areas with fluorescent fixtures with T8 tubes, incandescent lamps, and CFLs.

## 4.2 Lighting Controls

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Control Measures** | | **36,224** | **12.0** | **-8** | **$5,315** | **$33,300** | **$3,535** | **$29,765** | **5.6** | **35,590** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 33,462 | 11.1 | -7 | $4,910 | $29,700 | $3,535 | $26,165 | 5.3 | 32,876 |
| ECM 5 | Install High/Low Lighting Controls | 2,762 | 0.9 | -1 | $405 | $3,600 | $0 | $3,600 | 8.9 | 2,714 |

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 lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

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

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

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

**Affected building areas:** offices, conference rooms, classrooms, library, restrooms, auditorium, weight room, kitchen, locker rooms, and storage rooms.

### ECM 5: Install High/Low Lighting Controls

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

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

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

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

**Affected building areas**: hallways/corridors.

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

## 4.3 Motors

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Motor Upgrades** | | **1,153** | **0.3** | **0** | **$171** | **$10,026** | **$0** | **$10,026** | **58.6** | **1,161** |
| ECM 6 | Premium Efficiency Motors | 1,153 | 0.3 | 0 | $171 | $10,026 | $0 | $10,026 | 58.6 | 1,161 |

### ECM 6: Premium Efficiency Motors

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

**Affected motors**:

| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Additional Motor Description |
|---|---|---|---|---|---|
| Boiler Room | Fresh air intake | 2 | Supply Fan | 7.5 | |
| Cafeteria/Kitchen | Exhaust | 2 | Exhaust Fan | 0.3 | |
| Boiler Room | Main Office | 2 | Air Compressor | 1.5 | |

| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Additional Motor Description |
|---|---|---|---|---|---|
| Boiler Room | Condensate | 1 | Condensate Pump | 1.5 | |
| Boiler Room | Condensate | 2 | Condensate Pump | 1.0 | |
| Boiler Room | vacuum/condensate | 1 | Condensate Pump | 2.0 | |
| Boiler Room | vacuum/condensate | 2 | Water Supply Pump | 1.5 | |
| Room 1B Mech Room | Room 1B | 1 | Supply Fan | 1.0 | Carrier 50BR unit |

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

## 4.4 Variable Frequency Drives (VFD)

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variable Frequency Drive (VFD) Measures** | | **129,841** | **39.4** | **0** | **$19,265** | **$92,432** | **$10,790** | **$81,642** | **4.2** | **130,749** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | 112,347 | 34.2 | 0 | $16,669 | $70,176 | $9,240 | $60,936 | 3.7 | 113,133 |
| ECM 8 | Install VFDs on Heating Water Pumps | 17,160 | 2.2 | 0 | $2,546 | $14,282 | $0 | $14,282 | 5.6 | 17,280 |
| ECM 9 | Install Boiler Draft Fan VFDs | 334 | 3.0 | 0 | $50 | $7,974 | $1,550 | $6,424 | 129.6 | 336 |

Variable frequency drives control motors for fans, pumps, and process equipment based on the actual output required of the driven equipment. Energy savings result from more efficient control of motor energy usage when equipment operates at partial load. The magnitude of energy savings depends on the estimated amount of time that the motor would operate at partial load. For equipment with proposed VFDs, we have included replacing the controlled motor with a new motor —unless the existing motor meets or exceeds IHP 2014 standards—to conservatively account for the cost of an inverter duty rated motor.

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

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

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

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating.

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

**Affected air handlers**: serving area, ShopRite area, print shop, wood shop, auto shop, auto body, art room, gym, auditorium, and media center.

## ECM 8: Install VFDs on Heating Water Pumps

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

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

**Affected pumps**: Heating hot water distribution pumps in boiler room.

## ECM 9: Install Boiler Draft Fan VFDs

Replace existing volume control devices on boiler draft fans, such as inlet vanes or dampers, with VFDs. Inlet vanes or dampers are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device will be removed or permanently disabled, and the control signal will be redirected to the VFD to determine proper fan motor speed.

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

Payback based on energy savings is relatively long due to the low operating hours of the equipment. Additional maintenance savings may result from this measure. VFDs are solid state electronic devices, which generally requires less maintenance than mechanical air volume control devices.

## 4.5 Electric Unitary HVAC

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Electric Unitary HVAC Measures** | | **3,757** | **4.2** | **0** | **$557** | **$79,217** | **$4,490** | **$74,727** | **134.1** | **3,783** |
| ECM 10 | Install High Efficiency Air Conditioning Units | 3,725 | 4.1 | 0 | $553 | $77,418 | $4,421 | $72,997 | 132.1 | 3,752 |
| ECM 11 | Install High Efficiency Heat Pumps | 31 | 0.0 | 0 | $5 | $1,799 | $69 | $1,730 | 371.7 | 32 |

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

### ECM 10: Install High Efficiency Air Conditioning Units

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

This measure is part of a measure to replace package units at this site and as such must be considered in combination with ECM 7 and 12.

### ECM 11: Install High Efficiency Heat Pumps

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

## 4.6 Gas-Fired Heating

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Gas Heating (HVAC/Process) Replacement** | | **0** | **0.0** | **108** | **$846** | **$23,518** | **$800** | **$22,718** | **26.9** | **12,674** |
| ECM 12 | Install High Efficiency Furnaces | 0 | 0.0 | 108 | $846 | $23,518 | $800 | $22,718 | 26.9 | 12,674 |

### ECM 12: Install High Efficiency Furnaces

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

Note: these units produce acidic condensate that requires proper drainage.

This measure is part of a measure to replace package units at this site and as such must be considered in combination with ECM 7 and 10.

## 4.7 HVAC

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **HVAC System Improvements** | | **0** | **0.0** | **71** | **$556** | **$5,438** | **$0** | **$5,438** | **9.8** | **8,327** |
| ECM 13 | Implement Demand Control Ventilation (DCV) | 0 | 0.0 | 71 | $556 | $5,438 | $0 | $5,438 | 9.8 | 8,327 |

### ECM 13: Implement Demand Control Ventilation (DCV)

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

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

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

**Affected building areas:** gymnasium.

## 4.8 Domestic Water Heating

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **34** | **$268** | **$136** | **$0** | **$136** | **0.5** | **4,019** |
| ECM 14 | Install Low-Flow DHW Devices | 0 | 0.0 | 34 | $268 | $136 | $0 | $136 | 0.5 | 4,019 |

### ECM 14: 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 |

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.

## 4.9 Food Service & Refrigeration Measures

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated Install Cost ($) | Estimated Incentive ($)* | Estimated Net Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Food Service & Refrigeration Measures** | | **28,652** | **2.7** | **0** | **$4,251** | **$27,375** | **$1,000** | **$26,375** | **6.2** | **28,852** |
| ECM 15 | Dishwasher Replacement | 12,878 | 1.5 | 0 | $1,911 | $18,859 | $700 | $18,159 | 9.5 | 12,968 |
| ECM 16 | Refrigerator/Freezer Case Electrically Commutated Motors | 7,674 | 0.9 | 0 | $1,139 | $1,820 | $0 | $1,820 | 1.6 | 7,728 |
| ECM 17 | Refrigeration Controls | 8,100 | 0.3 | 0 | $1,202 | $6,696 | $300 | $6,396 | 5.3 | 8,157 |

### ECM 15: Dishwasher Replacement

Replace existing dishwasher with new energy efficient single-rack conveyor dishwasher. New high efficiency models often use an average of 40% less energy and water, compared to current standard efficiency equipment.

### ECM 16: Refrigerator/Freezer Case Electrically Commutated Motors

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

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

## ECM 17: Refrigeration Controls

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

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

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

# 5 ENERGY EFFICIENT BEST PRACTICES

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

## Energy Tracking with ENERGY STAR® Portfolio Manager®

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

## Lighting Maintenance

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

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

## 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.

## 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.

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

## HVAC Filter Cleaning and Replacement

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

## Duct Sealing

Duct leakage in commercial buildings can account for five to twenty-five percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

## Steam Trap Repair and Replacement

Steam traps are a crucial part of delivering heat from the boiler to the space heating units. Repair of replace traps that are blocked or allowing steam to pass. Inspect steam traps as part of a regular steam system maintenance plan.

## Boiler Maintenance

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

## Furnace Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should : check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

## Water Heater Maintenance

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

- Leaks or heavy corrosion on the pipes and valves.
- Corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot, or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional.

- For electric water heaters, look for signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank.
- For water heaters more than three years old, have a technician inspect the sacrificial anode annually.

## Compressed Air System Maintenance

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

- Inspection, cleaning, and replacement of inlet filter cartridges
- Cleaning of drain traps
- Daily inspection of lubricant levels to reduce unwanted friction
- Inspection of belt condition and tension
- Check for leaks and adjust loose connections
- Overall system cleaning

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

## Water Conservation


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

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

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

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

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

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

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

## 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.

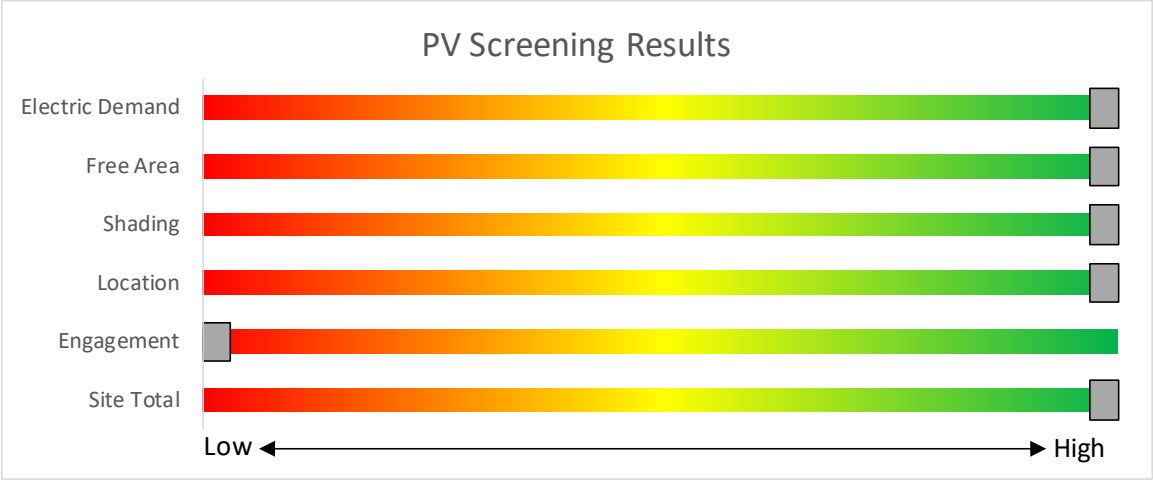
## 6.1 Solar Photovoltaic

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 **high potential** for installing a PV array.

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

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



| | | |
|---|---|---|
| **Potential** | High | |
| **System Potential** | 250 | kW DC STC |
| **Electric Generation** | 297,843 | kWh/yr |
| **Displaced Cost** | $44,190 | /yr |
| **Installed Cost** | $650,000 | |

*Figure 9 - Photovoltaic Screening*

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

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

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

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

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

## 6.2 Combined Heat and Power

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

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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has **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. Low or infrequent thermal load and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

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

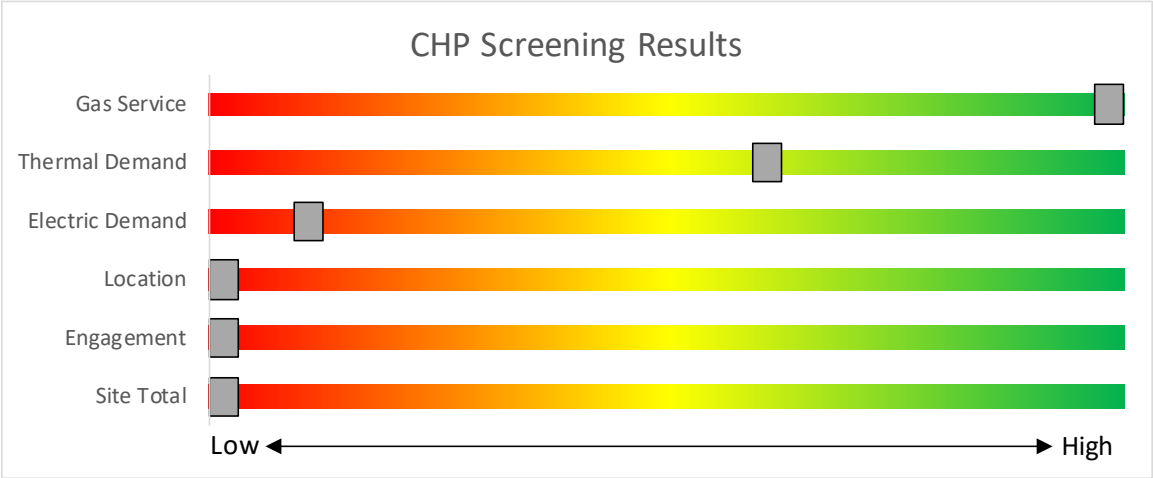



*Figure 10 - Combined Heat and Power Screening*

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

# 7 PROJECT FUNDING AND INCENTIVES

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

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

## 7.1 SmartStart


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

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

**Equipment with Prescriptive Incentives Currently Available:**

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

**Incentives**

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

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are capped at 50% of the total installed incremental project cost, or a project cost buy down to a one-year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

**How to Participate**

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

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

## 7.2 Energy Savings Improvement Program

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

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

**How to Participate**

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

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

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

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

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

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

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

## 7.3 SREC Registration Program

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

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

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

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

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

# 8 Energy Purchasing and Procurement Strategies

## 8.1 Retail Electric Supply Options

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

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

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

## 8.2 Retail Natural Gas Supply Options

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

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

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

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

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

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

# APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

## Lighting Inventory & Recommendations

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| 3rd Floor Roof Access | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| 3rd Floor Hall | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 1,995 | 3, 5 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | High/Low Control | 44 | 1,377 | 0.4 | 1,244 | 0 | $183 | $943 | $135 | 4.4 |
| 3rd Floor Hall | 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 |
| 3rd Floor Electric room | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Gym Penthouse | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 8 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.3 | 983 | 0 | $144 | $584 | $160 | 2.9 |
| Boiler Room | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.1 | 290 | 0 | $43 | $146 | $40 | 2.5 |
| Office | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 487 | 0 | $71 | $489 | $95 | 5.5 |
| Stairwell | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Boiler Room | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 5 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.1 | 362 | 0 | $53 | $183 | $50 | 2.5 |
| Boiler Room | 4 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boiler Room | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 6 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.2 | 737 | 0 | $108 | $438 | $120 | 2.9 |
| Boiler Room | 1 | Linear Fluorescent - T12: 8' T12 (75W) - 2L | Wall Switch | s | 158 | 1,995 | 2 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 8' Lamps | Wall Switch | 72 | 1,995 | 0.1 | 189 | 0 | $28 | $129 | $20 | 3.9 |
| Cafeteria | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.5 | 1,474 | 0 | $216 | $854 | $195 | 3.0 |
| Kitchen | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.3 | 812 | 0 | $119 | $635 | $135 | 4.2 |
| Vent hood | 6 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 6 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.2 | 672 | 0 | $99 | $103 | $6 | 1.0 |
| Kitchen Office | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 487 | 0 | $71 | $489 | $95 | 5.5 |
| Walkins | 2 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.1 | 224 | 0 | $33 | $34 | $2 | 1.0 |
| Serving Area | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.4 | 1,290 | 0 | $189 | $781 | $175 | 3.2 |
| Cafeteria | 47 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 47 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 2.5 | 7,630 | -2 | $1,120 | $4,242 | $1,045 | 2.9 |
| Cafeteria | 4 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Electric Closet | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Gym | 26 | LED - Fixtures: High-Bay | Occupancy Sensor | s | 120 | 1,377 | | None | No | 26 | LED - Fixtures: High-Bay | Occupancy Sensor | 120 | 1,377 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Gym | 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 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Weight Room | 47 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 47 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 1.4 | 4,331 | -1 | $636 | $2,526 | $575 | 3.1 |
| Weight Room | 3 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Weight Room Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Boys Locker | 35 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | s | 32 | 1,995 | 3, 4 | Relamp | Yes | 35 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 1,377 | 0.6 | 1,689 | 0 | $248 | $1,449 | $280 | 4.7 |
| Boys Locker | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boys Locker Toilets | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 184 | 0 | $27 | $73 | $20 | 2.0 |
| Boys Locker Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| Janiotor Closet | 1 | Compact Fluorescent: One lamp screw-in | Wall Switch | s | 13 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 9 | 0 | $1 | $17 | $1 | 12.9 |
| Supply Area | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Girls Locker Office | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.2 | 461 | 0 | $68 | $453 | $85 | 5.4 |
| Girls Locker Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Mens Restroom | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 369 | 0 | $54 | $416 | $75 | 6.3 |
| Mens Restroom | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3, 4 | Relamp | Yes | 1 | LED Lamps: One Lamp Screw-in | Occupancy Sensor | 9 | 1,377 | 0.0 | 118 | 0 | $17 | $17 | $1 | 0.9 |
| Womens Restroom | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 369 | 0 | $54 | $416 | $75 | 6.3 |
| Womens Restroom | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3, 4 | Relamp | Yes | 1 | LED Lamps: One Lamp Screw-in | Occupancy Sensor | 9 | 1,377 | 0.0 | 118 | 0 | $17 | $17 | $1 | 0.9 |
| Shop Rite Jr | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 276 | 0 | $41 | $110 | $30 | 2.0 |
| Shop Rite Jr | 29 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 29 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.9 | 2,672 | -1 | $392 | $1,599 | $360 | 3.2 |
| Shop Rite Jr | 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 |
| Shop Rite Walkin | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| ShopRite storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| Shoprite wash area | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Shoprite restroom | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 276 | 0 | $41 | $380 | $65 | 7.8 |
| Boiler Room | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Office storage | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| TEA room | 29 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 29 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 1.5 | 4,708 | -1 | $691 | $2,658 | $650 | 2.9 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| TEA room | 36 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 36 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 1.9 | 5,845 | -1 | $858 | $3,439 | $825 | 3.0 |
| TEA vent hood | 8 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 8 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.3 | 895 | 0 | $131 | $138 | $8 | 1.0 |
| TEA Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |
| TEA mens restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| TEA womens restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| TEA dry storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $40 | 7.9 |
| Health room | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 15 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.5 | 1,382 | 0 | $203 | $818 | $185 | 3.1 |
| Health room | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Gym storage | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.2 | 461 | 0 | $68 | $453 | $50 | 6.0 |
| Gym storage | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 369 | 0 | $54 | $146 | $40 | 2.0 |
| print shop | 4 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | s | 88 | 1,995 | 2, 4 | Relamp & Reballast | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.2 | 597 | 0 | $88 | $275 | $40 | 2.7 |
| print shop | 24 | Linear Fluorescent - T12HO: 8' T12HO (110W) - 2L | Wall Switch | s | 252 | 1,995 | 2, 4 | Relamp & Reballast | Yes | 24 | LED - Linear Tubes: (2) 8' Lamps | Occupancy Sensor | 72 | 1,377 | 3.5 | 10,656 | -2 | $1,564 | $3,629 | $550 | 2.0 |
| print shop | 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 |
| print shop upper storage | 24 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 24 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.7 | 2,212 | 0 | $325 | $1,416 | $240 | 3.6 |
| print shop desk light | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | s | 33 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 1,995 | 0.0 | 70 | 0 | $10 | $65 | $12 | 5.1 |
| print shop storage room | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | s | 32 | 1,995 | 3 | Relamp | No | 3 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,995 | 0.0 | 115 | 0 | $17 | $55 | $15 | 2.4 |
| print shop paper storage | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | s | 32 | 1,995 | 3 | Relamp | No | 4 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,995 | 0.1 | 154 | 0 | $23 | $73 | $20 | 2.4 |
| print shop restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| wood shop | 13 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 13 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.3 | 941 | 0 | $138 | $475 | $130 | 2.5 |
| wood shop | 24 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 24 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.6 | 1,738 | 0 | $255 | $876 | $240 | 2.5 |
| wood shop | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 16 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.4 | 1,159 | 0 | $170 | $584 | $160 | 2.5 |
| wood shop | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.1 | 290 | 0 | $43 | $146 | $40 | 2.5 |
| wood shop | 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 |
| wood shop upper storage1 | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.2 | 461 | 0 | $68 | $453 | $50 | 6.0 |
| wood shop upper storage2 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.5 | 1,474 | 0 | $216 | $854 | $160 | 3.2 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| carpentary storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Office | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Office 2 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.0 | 123 | 0 | $18 | $73 | $20 | 2.9 |
| Wood shop restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Wood Shop electric room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Wood shop tool storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Auto shop | 31 | Linear Fluorescent - T12: 8' T12 (75W) - 2L | Wall Switch | s | 158 | 1,995 | 2 | Relamp & Reballast | No | 31 | LED - Linear Tubes: (2) 8' Lamps | Wall Switch | 72 | 1,995 | 1.9 | 5,851 | -1 | $859 | $3,989 | $620 | 3.9 |
| Auto shop | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 3 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 1,995 | 0.1 | 191 | 0 | $28 | $217 | $30 | 6.7 |
| Auto shop | 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 |
| Auto shop | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.0 | 123 | 0 | $18 | $73 | $20 | 2.9 |
| Auto shop office | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.0 | 123 | 0 | $18 | $73 | $20 | 2.9 |
| Auto shop parts cage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |
| Auto shop upper storage | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.2 | 737 | 0 | $108 | $562 | $80 | 4.5 |
| Auto shop restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Auto body | 28 | Linear Fluorescent - T12: 8' T12 (75W) - 2L | Wall Switch | s | 158 | 1,995 | 2 | Relamp & Reballast | No | 28 | LED - Linear Tubes: (2) 8' Lamps | Wall Switch | 72 | 1,995 | 1.7 | 5,284 | -1 | $775 | $3,603 | $560 | 3.9 |
| Auto body | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | s | 32 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,995 | 0.0 | 77 | 0 | $11 | $37 | $10 | 2.4 |
| Spray Room | 8 | Metal Halide: (1) 250W Lamp | Wall Switch | s | 295 | 1,000 | 1, 4 | Fixture Replacement | Yes | 8 | LED - Fixtures: Downlight Recessed | Occupancy Sensor | 89 | 690 | 1.3 | 2,059 | 0 | $302 | $1,484 | $75 | 4.7 |
| Spray room backroom | 2 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.1 | 224 | 0 | $33 | $34 | $2 | 1.0 |
| Spray room restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Spray room office | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | s | 32 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,995 | 0.0 | 38 | 0 | $6 | $18 | $5 | 2.4 |
| Spray room office | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Auto Body | 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 |
| Art Room 002B | 24 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 24 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 1.3 | 3,896 | -1 | $572 | $2,293 | $550 | 3.0 |
| Art Room 002B | 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 |
| Custodial Closet | 1 | Compact Fluorescent: One lamp screw-in | Wall Switch | s | 13 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 9 | 0 | $1 | $17 | $1 | 12.9 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Process Tech 002A | 22 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 22 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 1.2 | 3,572 | -1 | $524 | $2,147 | $510 | 3.1 |
| Process Tech 002A | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Room 1B | 24 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 4 | Relamp | Yes | 24 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,377 | 1.1 | 3,317 | -1 | $487 | $1,855 | $430 | 2.9 |
| Room 1B | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Room 1B Mech Room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Room 1B paper storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| Room 1B records | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 276 | 0 | $41 | $380 | $65 | 7.8 |
| Room 001A | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 4 | Relamp | Yes | 16 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,377 | 0.7 | 2,212 | 0 | $325 | $1,146 | $275 | 2.7 |
| Room 001A | 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 |
| Office electric room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| Shops hallway | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 5 | Relamp | Yes | 18 | LED - Linear Tubes: (4) 4' Lamps | High/Low Control | 58 | 1,377 | 1.0 | 2,922 | -1 | $429 | $1,990 | $360 | 3.8 |
| Shops hallway | 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 |
| Shops hallway | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,377 | 0.1 | 184 | 0 | $27 | $73 | $20 | 2.0 |
| Shops hallway | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | High/Low Control | 44 | 1,377 | 0.1 | 276 | 0 | $41 | $335 | $30 | 7.5 |
| G vestibule | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| G vestibule | 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 |
| 002A Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| Cosmetology/Barbering | 27 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 27 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 1.4 | 4,383 | -1 | $643 | $2,512 | $610 | 3.0 |
| Cosmetology/Barbering | 4 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| cosmetology/Barbering restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.0 | 123 | 0 | $18 | $73 | $20 | 2.9 |
| Cosmetology/Barbering storage 1+3 | 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 |
| Cosmetology/Barbering storage 1+3 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 649 | 0 | $95 | $562 | $80 | 5.1 |
| Cosmetology/Barbering storage 2 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.2 | 553 | 0 | $81 | $489 | $60 | 5.3 |
| Language arts | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.3 | 812 | 0 | $119 | $635 | $135 | 4.2 |
| Literacy/copy room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| CR 104 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| Guidence Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| Guidence center corridor | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 5 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,377 | 0.1 | 369 | 0 | $54 | $371 | $40 | 6.1 |
| Guidence restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Guidence Office Reilly | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| guidence Office Mularz | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| Guidence Office Medley | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| VP Office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 369 | 0 | $54 | $416 | $75 | 6.3 |
| Mens Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Main Office | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.5 | 1,461 | 0 | $214 | $927 | $215 | 3.3 |
| Principals Office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 649 | 0 | $95 | $562 | $115 | 4.7 |
| Principals restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Main Office storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.0 | 123 | 0 | $18 | $73 | $20 | 2.9 |
| Boys restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,377 | 0.1 | 276 | 0 | $41 | $380 | $65 | 7.8 |
| electric room | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| storage | 2 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.1 | 224 | 0 | $33 | $34 | $2 | 1.0 |
| CR107 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| Nurses Office | 2 | Compact Fluorescent: One lamp screw-in | Wall Switch | s | 18 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 13 | 1,995 | 0.0 | 24 | 0 | $3 | $34 | $2 | 9.3 |
| Nurses Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $146 | $40 | 2.2 |
| Nurses Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $146 | $40 | 2.2 |
| CR103 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR108 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR102 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.5 | 1,461 | 0 | $214 | $927 | $215 | 3.3 |
| Storage | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Custodian | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Girls Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |
| CR109 | 34 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 34 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 1.8 | 5,520 | -1 | $810 | $3,023 | $750 | 2.8 |
| CR100 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.6 | 1,948 | 0 | $286 | $1,146 | $275 | 3.0 |
| CR101 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR101 | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,377 | 0.1 | 258 | 0 | $38 | $487 | $65 | 11.1 |
| Unmarked Room | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Server Room | 1 | Compact Fluorescent: One lamp screw-in | Wall Switch | s | 13 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 9 | 0 | $1 | $17 | $1 | 12.9 |
| 1st Floor Hallway | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 5 | Relamp | Yes | 15 | LED - Linear Tubes: (4) 4' Lamps | High/Low Control | 58 | 1,377 | 0.8 | 2,435 | -1 | $357 | $1,770 | $300 | 4.1 |
| 1st Floor Hallway | 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 |
| Stairwell 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.1 | 246 | 0 | $36 | $146 | $40 | 2.9 |
| CR206C | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.3 | 974 | 0 | $143 | $708 | $155 | 3.9 |
| CR206B | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.5 | 1,461 | 0 | $214 | $927 | $215 | 3.3 |
| CR206A | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.6 | 1,948 | 0 | $286 | $1,146 | $275 | 3.0 |
| CR207 | 17 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 4 | Relamp | Yes | 17 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,377 | 0.8 | 2,350 | 0 | $345 | $1,201 | $290 | 2.6 |
| CR207 | 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 |
| CR207 storage | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 145 | 0 | $21 | $73 | $20 | 2.5 |
| CR 207 safe | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |
| CR208A | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.5 | 1,461 | 0 | $214 | $927 | $215 | 3.3 |
| 208ABC Corridor | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 5 | Relamp | Yes | 9 | LED - Linear Tubes: (4) 4' Lamps | High/Low Control | 58 | 1,377 | 0.5 | 1,461 | 0 | $214 | $1,107 | $180 | 4.3 |
| 208ABC Corridor | 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 |
| CR208C | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 4 | Relamp | Yes | 18 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,377 | 0.8 | 2,488 | -1 | $365 | $1,526 | $340 | 3.2 |
| CR208C restroom | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | s | 33 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 1,995 | 0.0 | 35 | 0 | $5 | $33 | $6 | 5.1 |
| CR208C storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.0 | 123 | 0 | $18 | $73 | $20 | 2.9 |
| CR208C | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 1,995 | 0.0 | 64 | 0 | $9 | $72 | $10 | 6.7 |
| CR208B | 13 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 13 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.7 | 2,111 | 0 | $310 | $1,219 | $295 | 3.0 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| CR205 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| Boys restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |
| Electric Room | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| storage room | 2 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.1 | 224 | 0 | $33 | $34 | $2 | 1.0 |
| CR 204 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR 209 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| Language Arts | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.0 | 123 | 0 | $18 | $73 | $20 | 2.9 |
| Library/Math Office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 649 | 0 | $95 | $562 | $115 | 4.7 |
| Library Restroom | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Library Hallway | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Library Hallway | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 5 | Relamp | Yes | 4 | LED - Linear Tubes: (3) 4' Lamps | High/Low Control | 44 | 1,377 | 0.2 | 553 | 0 | $81 | $444 | $60 | 4.7 |
| Library | 21 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 21 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.6 | 1,935 | 0 | $284 | $1,307 | $280 | 3.6 |
| Library | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,377 | 0.5 | 1,659 | 0 | $243 | $657 | $180 | 2.0 |
| Library | 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 |
| Auditorium | 9 | Compact Fluorescent: Six Lamp Screw-in | Wall Switch | s | 192 | 1,995 | 3, 4 | Relamp | Yes | 9 | LED Lamps: Six Lamp Screw-in | Occupancy Sensor | 134 | 1,377 | 0.6 | 1,961 | 0 | $288 | $1,200 | $89 | 3.9 |
| Auditorium | 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 |
| Stage | 11 | Halogen Incandescent: One lamp screw-in | Wall Switch | s | 150 | 1,995 | 3, 4 | Relamp | Yes | 11 | LED Lamps: One Lamp Screw-in | Occupancy Sensor | 23 | 1,377 | 1.1 | 3,246 | -1 | $476 | $602 | $46 | 1.2 |
| Backstage | 2 | Halogen Incandescent: One lamp screw-in | Wall Switch | s | 150 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED Lamps: One Lamp Screw-in | Occupancy Sensor | 23 | 1,377 | 0.2 | 590 | 0 | $87 | $330 | $37 | 3.4 |
| Teachers room | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.3 | 812 | 0 | $119 | $635 | $135 | 4.2 |
| teachers restroom | 1 | LED - Fixtures: Ambient 1x4 Fixture | Wall Switch | s | 22 | 1,995 | | None | No | 1 | LED - Fixtures: Ambient 1x4 Fixture | Wall Switch | 22 | 1,995 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| CR 222 | 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 |
| CR 222 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,377 | 0.2 | 553 | 0 | $81 | $489 | $95 | 4.9 |
| cr 222 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $146 | $40 | 2.2 |
| CR 222 spare office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $146 | $40 | 2.2 |
| CR 222 spare office | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 18 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 1.0 | 2,922 | -1 | $429 | $1,855 | $430 | 3.3 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| CR 222 spare office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,377 | 0.1 | 369 | 0 | $54 | $146 | $40 | 2.0 |
| CR 222 spare office | 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 |
| Transportation | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 487 | 0 | $71 | $489 | $95 | 5.5 |
| Transportation | 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 |
| Transportatoin Office | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 487 | 0 | $71 | $489 | $95 | 5.5 |
| Transportation Office | 13 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 13 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.7 | 2,111 | 0 | $310 | $1,219 | $295 | 3.0 |
| Transportation Office | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3, 4 | Relamp | Yes | 1 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,377 | 0.0 | 86 | 0 | $13 | $72 | $10 | 4.9 |
| Transportation Office | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Transportation Office | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 1 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 162 | 0 | $24 | $73 | $20 | 2.2 |
| Transportation Office | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3, 4 | Relamp | Yes | 1 | LED Lamps: One Lamp Screw-in | Occupancy Sensor | 9 | 1,377 | 0.0 | 118 | 0 | $17 | $17 | $1 | 0.9 |
| Transportation Restroom | 1 | Incandescent: Two Lamp Screw-in | Wall Switch | s | 120 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: Two Lamp Screw-in | Wall Switch | 18 | 1,995 | 0.1 | 224 | 0 | $33 | $34 | $2 | 1.0 |
| Transportation Directors Office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.2 | 649 | 0 | $95 | $562 | $115 | 4.7 |
| Transportation Directors Office | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boiler Room | 2 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.1 | 224 | 0 | $33 | $34 | $2 | 1.0 |
| Stairs to Lobby | 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 |
| CR 210 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR 203 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| Storage | 2 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.1 | 224 | 0 | $33 | $34 | $2 | 1.0 |
| Custodial Closet | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Girls Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |
| CR 202 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| storage | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| CR 201 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR 200 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| storage | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Cr 211 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR 212 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| 3rd Floor stroage | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| 3rd Floor custodial | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| CR 300 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR306 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR 301 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR 302 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| storage | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| storage | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| CR 303 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| CR 305 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.4 | 1,299 | 0 | $191 | $854 | $195 | 3.5 |
| storage | 1 | Compact Fluorescent: One lamp screw-in | Wall Switch | s | 13 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 9 | 0 | $1 | $17 | $1 | 12.9 |
| storage | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Custodial Closet | 1 | Incandescent: One lamp screw-in | Wall Switch | s | 60 | 1,995 | 3 | Relamp | No | 1 | LED Lamps: One Lamp Screw-in | Wall Switch | 9 | 1,995 | 0.0 | 112 | 0 | $16 | $17 | $1 | 1.0 |
| Boys restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.1 | 325 | 0 | $48 | $416 | $75 | 7.2 |
| CR 304 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 4 | Relamp | Yes | 15 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,377 | 0.8 | 2,435 | -1 | $357 | $1,365 | $335 | 2.9 |
| Stairwell 3 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 4 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.2 | 492 | 0 | $72 | $292 | $80 | 2.9 |
| Stairwell 3 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| 2nd Floor hallway | 13 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | s | 93 | 1,995 | 3, 5 | Relamp | Yes | 13 | LED - Linear Tubes: (3) 4' Lamps | High/Low Control | 44 | 1,377 | 0.6 | 1,797 | 0 | $264 | $1,162 | $195 | 3.7 |
| 2nd Floor hallway | 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 |
| 2nd Floor hallway | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3, 5 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | High/Low Control | 58 | 1,377 | 0.2 | 649 | 0 | $95 | $517 | $80 | 4.6 |
| Stairwell 5 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.1 | 246 | 0 | $36 | $146 | $40 | 2.9 |
| Stairwell 4 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | s | 62 | 1,995 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,995 | 0.0 | 72 | 0 | $11 | $37 | $10 | 2.5 |
| Stairwell 4 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 4 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.2 | 492 | 0 | $72 | $292 | $80 | 2.9 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Stairwell 1 | 1 | Metal Halide: (1) 100W Lamp | Wall Switch | s | 128 | 1,995 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Wall Switch | 38 | 1,995 | 0.1 | 197 | 0 | $29 | $152 | $5 | 5.1 |
| Stairwell 1 | 2 | Halogen Incandescent: One lamp screw-in | Wall Switch | s | 75 | 1,995 | 3 | Relamp | No | 2 | LED Lamps: One Lamp Screw-in | Wall Switch | 11 | 1,995 | 0.1 | 280 | 0 | $41 | $34 | $2 | 0.8 |
| Stairwell 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | s | 114 | 1,995 | 3 | Relamp | No | 2 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,995 | 0.1 | 246 | 0 | $36 | $146 | $40 | 2.9 |
| Building Lights | 14 | Incandescent: One lamp screw-in | Timeclock | | 60 | 4,380 | 3 | Relamp | No | 14 | LED Lamps: One Lamp Screw-in | Timeclock | 9 | 4,380 | 0.4 | 3,127 | 0 | $464 | $241 | $14 | 0.5 |
| Building Lights | 11 | Metal Halide: (1) 100W Lamp | Timeclock | | 128 | 4,380 | 1 | Fixture Replacement | No | 11 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 38 | 4,380 | 0.5 | 4,317 | 0 | $641 | $10,626 | $1,100 | 14.9 |
| Building Lights | 4 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | | 45 | 4,380 | | None | No | 4 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 45 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Motor Inventory & Recommendations

| | | Existing Conditions | | | | | | | Proposed Conditions | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Full Load Efficiency | VFD Control? | Remaining Useful Life | Annual Operating Hours | ECM # | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Boiler Room | Condensate | 1 | Condensate Pump | 1.5 | 82.5% | No | W | 2,500 | 6 | Yes | 84.0% | No | | 0.0 | 45 | 0 | $7 | $913 | $0 | 135.5 |
| Boiler Room | Condensate | 2 | Condensate Pump | 1.0 | 75.5% | No | W | 2,500 | 6 | Yes | 77.0% | No | | 0.0 | 72 | 0 | $11 | $1,131 | $0 | 105.6 |
| Boiler Room | vacuum/condensate | 1 | Condensate Pump | 2.0 | 84.0% | No | W | 2,500 | 6 | Yes | 85.5% | No | | 0.0 | 58 | 0 | $9 | $765 | $0 | 88.2 |
| Boiler Room | vacuum/condensate | 2 | Water Supply Pump | 1.5 | 82.5% | No | W | 2,500 | 6 | Yes | 84.0% | No | | 0.0 | 91 | 0 | $13 | $1,826 | $0 | 135.5 |
| Wood Shop | Wood Shop | 2 | Air Compressor | 5.0 | 89.5% | No | W | 200 | | No | 89.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Auditorium | 1 | Supply Fan | 7.5 | 91.0% | No | W | 3,000 | 7 | No | 91.0% | Yes | 1 | 2.1 | 6,917 | 0 | $1,026 | $4,738 | $600 | 4.0 |
| Roof | Media Center | 1 | Supply Fan | 3.0 | 89.5% | No | w | 3,000 | 7 | No | 89.5% | Yes | 1 | 0.9 | 2,813 | 0 | $417 | $3,884 | $240 | 8.7 |
| Room 1B Mech Room | Room 1B | 1 | Supply Fan | 1.0 | 82.5% | No | W | 3,000 | 6 | Yes | 85.5% | No | | 0.0 | 71 | 0 | $11 | $474 | $0 | 44.8 |

## Electric HVAC Inventory & Recommendations

| | | Existing Conditions | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (MBh) | Remaining Useful Life | ECM # | Install High Efficiency System? | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (MBh) | Cooling Mode Efficiency (SEER/EER) | Heating Mode Efficiency (COP) | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Multiple Locations | Classrooms | 11 | Window AC | 1.00 | | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Ground | Cafeteria/Serving Area | 1 | Split-System AC | 15.00 | | B | 10 | Yes | 1 | Split-System AC | 15.00 | | 11.50 | | 2.2 | 1,957 | 0 | $290 | $17,398 | $1,185 | 55.8 |
| Ground | TEA Room | 1 | Split-System AC | 7.00 | | W | 10 | Yes | 1 | Split-System AC | 7.00 | | 11.50 | | 1.0 | 913 | 0 | $135 | $8,146 | $511 | 56.4 |
| Roof | Auditorium | 1 | Packaged AC | 25.00 | | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Media Center | 1 | Packaged AC | 12.50 | | w | 10 | Yes | 1 | Packaged AC | 12.50 | | 11.50 | | 0.1 | 104 | 0 | $15 | $17,423 | $988 | 1,066.3 |
| Roof | CR207 | 1 | Split-System AC | 10.00 | | b | 10 | Yes | 1 | Split-System AC | 10.00 | | 11.50 | | 0.1 | 83 | 0 | $12 | $11,638 | $730 | 884.6 |
| Roof | CR105 | 1 | Split-System AC | 7.50 | | b | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Print Shop | 1 | Split-System AC | 7.50 | | b | 10 | Yes | 1 | Split-System AC | 7.50 | | 11.50 | | 0.2 | 160 | 0 | $24 | $8,728 | $548 | 344.4 |
| Roof | Room 101 | 1 | Ductless Mini-Split AC | 1.00 | | b | 10 | Yes | 1 | Ductless Mini-Split AC | 1.00 | | 18.00 | | 0.2 | 224 | 0 | $33 | $2,739 | $0 | 82.3 |
| Roof | Shop Rite | 1 | Packaged AC | 10.00 | | N | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Room 1B Mech Room | Room 1B | 1 | Packaged AC | 5.00 | | W | 10 | Yes | 1 | Packaged AC | 5.00 | | 14.00 | | 0.3 | 285 | 0 | $42 | $11,345 | $460 | 257.8 |
| Roof | Transportation | 1 | Ductless Mini-Split HP | 0.75 | 7.00 | W | 11 | Yes | 1 | Ductless Mini-Split HP | 0.75 | 7.00 | 18.00 | 3.80 | 0.0 | 31 | 0 | $5 | $1,799 | $69 | 371.7 |

## Fuel Heating Inventory & Recommendations

| | | Existing Conditions | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Output Capacity per Unit (MBh) | Remaining Useful Life | ECM # | Install High Efficiency System? | System Quantity | System Type | Output Capacity per Unit (MBh) | Heating Efficiency | Heating Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Autobody | Spray/Bake | 1 | Furnace | 714.00 | W | 12 | Yes | 1 | Furnace | 714.00 | 95.00% | AFUE | 0.0 | 0 | 56 | $440 | $16,177 | $400 | 35.8 |
| Boiler Room | Entire Building | 1 | Natural Draft Steam Boiler | 5,021.00 | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boiler Room | Entire Building | 1 | Natural Draft Steam Boiler | 5,021.00 | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Auditorium | 1 | Furnace | 324.00 | W | 12 | Yes | 1 | Furnace | 324.00 | 95.00% | AFUE | 0.0 | 0 | 52 | $405 | $7,341 | $400 | 17.1 |

## Demand Control Ventilation Recommendations

| | | Recommendation Inputs | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Affected | ECM # | Number of Zones | Cooling Capacity of Controlled System (Tons) | Electric Heating Capacity of Controlled System (kBtu/hr) | Output Heating Capacity of Controlled System (MBh) | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Gym Penthouse | Gym (heat only) | 13 | 4.00 | 0.00 | | 1,293.00 | 0.0 | 0 | 71 | $556 | $5,438 | $0 | 9.8 |

## DHW Inventory & Recommendations

| | | Existing Conditions | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Remaining Useful Life | ECM # | Replace? | System Quantity | System Type | Fuel Type | System Efficiency | Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Boiler Room | DHW | 1 | Storage Tank Water Heater (> 50 Gal) | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boiler Room | DHW storage | 2 | Indirect System | 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 | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Multiple Locations | 14 | 18 | Faucet Aerator (Lavatory) | 1.50 | 0.50 | 0.0 | 0 | 30 | $235 | $129 | $0 | 0.5 |
| Multiple Locations | 14 | 1 | Faucet Aerator (Lavatory) | 3.00 | 0.50 | 0.0 | 0 | 4 | $33 | $7 | $0 | 0.2 |

## Walk-In Cooler/Freezer Inventory & Recommendations

| | Existing Conditions | | Proposed Conditions | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Cooler/ Freezer Quantity | Case Type/Temperature | ECM # | Install EC Evaporator Fan Motors? | Install Electric Defrost Control? | Install Evaporator Fan Control? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 2 | Cooler (35F to 55F) | 16, 17 | Yes | No | Yes | 0.6 | 7,931 | 0 | $1,177 | $3,955 | $150 | 3.2 |
| Kitchen | 1 | Medium Temp Freezer (0F to 30F) | 16, 17 | Yes | No | Yes | 0.3 | 3,878 | 0 | $575 | $2,281 | $75 | 3.8 |
| Shoprite | 1 | Cooler (35F to 55F) | 16, 17 | Yes | No | Yes | 0.3 | 3,966 | 0 | $588 | $2,281 | $75 | 3.7 |

## Commercial Refrigerator/Freezer Inventory & Recommendations

| | Existing Conditions | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Refrigerator/ Freezer Type | ENERGY STAR Qualified? | ECM # | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 1 | Stand-Up Refrigerator, Solid Door (>50 cu. ft.) | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 2 | Stand-Up Refrigerator, Solid Door (>50 cu. ft.) | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 1 | Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.) | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Commercial Ice Maker Inventory & Recommendations

| | Existing Conditions | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Ice Maker Type | ENERGY STAR Qualified? | ECM # | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Multiple Locations | 3 | Ice Making Head (<450 lbs/day), Batch | Yes | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Cooking Equipment Inventory & Recommendations

| | Existing Conditions | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Equipment Type | High Efficiency Equipement? | ECM # | Install High Efficiency Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 1 | Electric Convection Oven (Half Size) | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 5 | Electric Convection Oven (Half Size) | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 2 | Insulated Food Holding Cabinet (Full Size) | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 2 | Gas Fryer | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 2 | Gas Griddle (4 Feet Width) | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 1 | Gas Convection Oven (Full Size) | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 1 | Gas Griddle (≤2 Feet Width) | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 1 | Gas Large Vat Fryer | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 1 | Insulated Food Holding Cabinet (Full Size) | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |
| Kitchen | 1 | Gas Steamer | No | | No | 0.0 | 0 | 0 | FALSE | $0 | $0 | #DIV/0! |

## Dishwasher Inventory & Recommendations

| | Existing Conditions | | | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Dishwasher Type | Water Heater Fuel Type | Booster Heater Fuel Type | ENERGY STAR Qualified? | ECM # | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Payback w/ Incentives in Years |
| Kitchen | 1 | Single Tank Conveyor (High Temp) | Electric | N/A | No | 15 | Yes | 1.5 | 12,878 | 0 | $1,911 | $18,859 | $700 | 9.5 |

**Plug Load Inventory**

| | Existing Conditions | | | |
|---|---|---|---|---|
| Location | Quantity | Equipment Description | Energy Rate (W) | ENERGY STAR Qualified? |
| Multiple Locations | 145 | Desktops | 75.0 | |
| Multiple Locations | 67 | Printers | 20.0 | |
| Multiple Locations | 46 | Smart Board | 200.0 | |
| Multiple Locations | 46 | Projector | 200.0 | |
| Multiple Locations | 12 | mini fridge | 30.0 | |
| Multiple Locations | 9 | microwave | 1,000.0 | |
| Multiple Locations | 9 | coffee makers | 400.0 | No |
| Multiple Locations | 3 | laptops | 40.0 | No |
| Multiple Locations | 1 | toaster ovens | 1,200.0 | No |
| Multiple Locations | 3 | refrigerators | 600.0 | No |
| Multiple Locations | 1 | kiln | 11,000.0 | No |
| Multiple Locations | 15 | copier | 515.0 | No |
| Multiple Locations | 1 | paper shredder | 360.0 | No |
| Multiple Locations | 1 | laminator | 360.0 | No |
| Multiple Locations | 4 | 3d printer | 515.0 | No |
| Multiple Locations | 4 | cash registers | 40.0 | No |
| Multiple Locations | 1 | CRT TV | 120.0 | No |
| Kitchen | 1 | Clothes Washer | 900.0 | No |
| Kitchen | 1 | Clothes Dryer | 1,600.0 | No |
| Woodshop | 5 | Wood working machinery | 1,750.0 | No |
| Woodshop | 5 | Saws | 550.0 | No |
| Autoshop | 1 | Various Autoshop Equipment | 7,500.0 | No |

# APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

## ENERGY STAR® Statement of Energy Performance

**15**

**ENERGY STAR® Score[1]**

**Thomas A. Edison Career and Technical Academy (87)**

**Primary Property Type:** K-12 School
**Gross Floor Area (ft²):** 136,440
**Built:** 1937

**For Year Ending:** September 30, 2017
**Date Generated:** April 08, 2019

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

### Property & Contact Information

| Property Address | Property Owner | Primary Contact |
|---|---|---|
| Thomas A. Edison Career and Technical Academy (87)<br>625 Summer Street<br>Elizabeth, New Jersey 07202 | Elizabeth Board of Education<br>500 North Broad Street<br>Elizabeth, NJ 07208<br>908-436-5180 | Luis Couto<br>500 North Broad Street<br>Elizabeth, NJ 07208<br>908-436-5180<br>coutolu@epsnj.org |

**Property ID:** 6888965

### Energy Consumption and Energy Use Intensity (EUI)

**Site EUI**
106.3 kBtu/ft²

**Source EUI**
146.6 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Natural Gas (kBtu) | 11,784,471 (81%) |
| Electric - Grid (kBtu) | 2,722,164 (19%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 72.8 |
| National Median Source EUI (kBtu/ft²) | 100.4 |
| % Diff from National Median Source EUI | 46% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 902 |

### Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

**Licensed Professional**

____ _____
.
(___)___-_____
_____

**Professional Engineer Stamp (if applicable)**

# APPENDIX C: GLOSSARY

| TERM | DEFINITION |
|---|---|
| **Blended Rate** | Used to calculate fiscal savings associated with measures. The blended rate is calculated by dividing the amount of your bill by the total energy use. For example, if your bill is $22,217.22, and you used 266,400 kilowatt-hours, your blended rate is 8.3 cents per kilowatt-hour. |
| **Btu** | *British thermal unit*: a unit of energy equal to the amount of heat required to increase the temperature of one pound of water by one-degree Fahrenheit. |
| **CHP** | *Combined heat and power*. Also referred to as cogeneration. |
| **COP** | *Coefficient of performance*: a measure of efficiency in terms of useful energy delivered divided by total energy input. |
| **Demand Response** | Demand response reduces or shifts electricity usage at or among participating buildings/sites during peak energy use periods in response to time-based rates or other forms of financial incentives. |
| **DCV** | *Demand control ventilation*: a control strategy to limit the amount of outside air introduced to the conditioned space based on actual occupancy need. |
| **US DOE** | *United States Department of Energy* |
| **EC Motor** | *Electronically commutated motor* |
| **ECM** | *Energy conservation measure* |
| **EER** | *Energy efficiency ratio*: a measure of efficiency in terms of cooling energy provided divided by electric input. |
| **EUI** | *Energy Use Intensity:* measures energy consumption per square foot and is a standard metric for comparing buildings' energy performance. |
| **Energy Efficiency** | Reducing the amount of energy necessary to provide comfort and service to a building/area. Achieved through the installation of new equipment and/or optimizing the operation of energy use systems. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service. |
| **ENERGY STAR®** | ENERGY STAR is the government-backed symbol for energy efficiency. The ENERGY STAR® program is managed by the EPA. |
| **EPA** | *United States Environmental Protection Agency* |
| **Generation** | The process of generating electric power from sources of primary energy (e.g., natural gas, the sun, oil). |
| **GHG** | *Greenhouse gaess:* 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's Board of Public Utilities* |
| **NJCEP** | *New Jersey Clean Energy Program:* NJCEP is a statewide program that offers financial incentives, programs and services for New Jersey residents, business owners and local governments to help them save energy, money and the environment. |
| **psig** | Pounds per square inch gauge |
| **Plug Load** | Refers to the amount of power used in a space by products that are powered by means of an ordinary AC plug. |
| **PV** | *Photovoltaic:* refers to an electronic device capable of converting incident light directly into electricity (direct current). |

| | |
|---|---|
| **SEER** | *Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input. |
| **SEP** | *Statement of energy performance:* a summary document from the ENERGY STAR® Portfolio Manager®. |
| **Simple Payback** | The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings. |
| **SREC** | *Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array. |
| **T5, T8, T12** | A reference to a linear lamp diameter. The number represents increments of 1/8$^{th}$ 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. |