
# Local Government Energy Audit Report

## Arthur L. Johnson High School

March 15, 2023

*Prepared for:*

Clark Township Public School
365 Westfield Ave
Clark, New Jersey 07066

*Prepared by:*

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# Disclaimer

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

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

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

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

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

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# ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

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

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

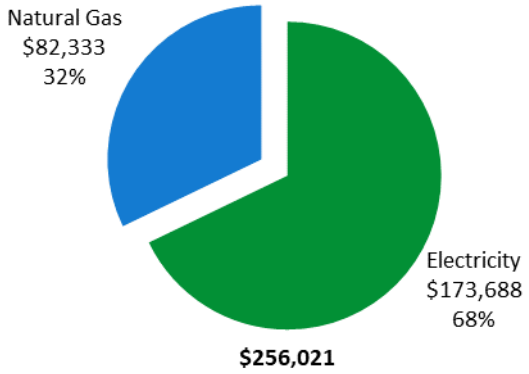
These next generation energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and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

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

# 1 EXECUTIVE SUMMARY

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

## BUILDING PERFORMANCE REPORT

| | | |
|---|---|---|
| Annual Utilities | Costs: $256,021<br><br>Electricity:<br>1,153,361 kWh<br><br>Natural Gas:<br>74,481 Therms |  |
| ENERGY STAR® Benchmarking Score | 64<br>*(1-100 scale)* | Congratulations, your building performs better than the national average. This report has suggestions about how to keep your building running efficiently, further improve performance, and lower your energy bills even more. |

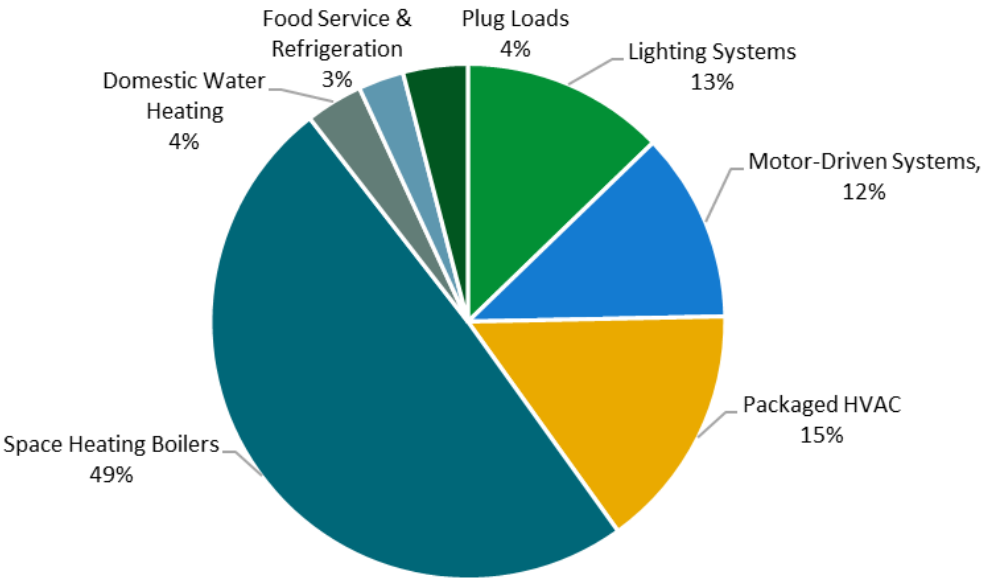


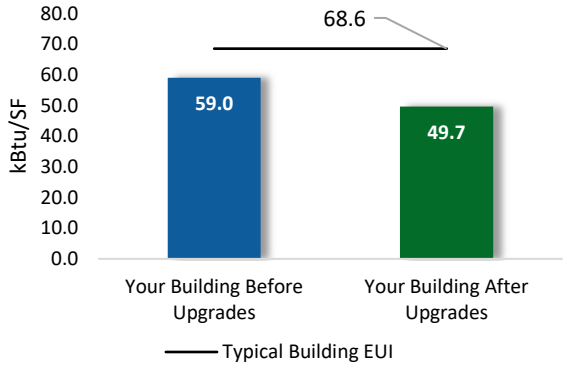

*Figure 1 - Energy Use by System*

## POTENTIAL IMPROVEMENTS

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

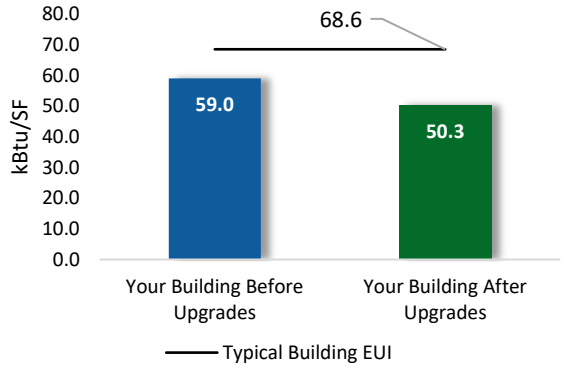
### Scenario 1: Full Package (All Evaluated Measures)

| | |
|---|---|
| Installation Cost | $607,367 |
| Potential Rebates & Incentives[1] | $65,794 |
| Annual Cost Savings | $70,127 |
| Annual Energy Savings | Electricity: 445,098 kWh<br>Natural Gas: 2,803 Therms |
| Greenhouse Gas Emission Savings | 241 Tons |
| Simple Payback | 7.7 Years |
| Site Energy Savings (All Utilities) | 16% |




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

| | |
|---|---|
| Installation Cost | $313,542 |
| Potential Rebates & Incentives | $48,656 |
| Annual Cost Savings | $65,438 |
| Annual Energy Savings | Electricity: 414,453 kWh<br>Natural Gas: 2,736 Therms |
| Greenhouse Gas Emission Savings | 225 Tons |
| Simple Payback | 4.0 Years |
| Site Energy Savings (all utilities) | 15% |




### On-site Generation Potential

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

[1] Incentives are based on previously run state rebate programs. Contact your utility provider for current program incentives that may apply.

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

| # | Energy Conservation Measure | Cost Effective? | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | | **217,425** | **51.5** | **-44** | **$32,259** | **$82,221** | **$19,805** | **$62,416** | **1.9** | **213,818** |
| ECM 1 | Install LED Fixtures | Yes | 10,595 | 2.3 | -1 | $1,589 | $8,220 | $555 | $7,665 | 4.8 | 10,605 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 251 | 0.1 | 0 | $37 | $202 | $20 | $182 | 4.9 | 246 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 206,580 | 49.1 | -43 | $30,632 | $73,798 | $19,230 | $54,568 | 1.8 | 202,966 |
| **Lighting Control Measures** | | | **58,235** | **13.5** | **-12** | **$8,635** | **$56,659** | **$13,945** | **$42,714** | **4.9** | **57,216** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 49,950 | 11.9 | -10 | $7,407 | $45,184 | $5,755 | $39,429 | 5.3 | 49,077 |
| ECM 5 | Install High/Low Lighting Controls | Yes | 8,284 | 1.6 | -2 | $1,228 | $11,475 | $8,190 | $3,285 | 2.7 | 8,140 |
| **Variable Frequency Drive (VFD) Measures** | | | **112,714** | **46.6** | **26** | **$17,262** | **$120,719** | **$12,025** | **$108,694** | **6.3** | **116,554** |
| ECM 6 | Install VFDs on Constant Volume (CV) Fans | Yes | 109,333 | 46.6 | 0 | $16,465 | $117,329 | $11,950 | $105,379 | 6.4 | 110,098 |
| ECM 7 | Install VFDs on Kitchen Hood Fan Motors | Yes | 3,380 | 0.0 | 26 | $797 | $3,391 | $75 | $3,316 | 4.2 | 6,456 |
| **Unitary HVAC Measures** | | | **30,645** | **34.5** | **7** | **$4,689** | **$293,825** | **$17,139** | **$276,686** | **59.0** | **31,647** |
| ECM 8 | Install High Efficiency Air Conditioning Units | No | 25,558 | 26.6 | 7 | $3,923 | $267,616 | $15,589 | $252,028 | 64.2 | 26,525 |
| ECM 9 | Install High Efficiency Heat Pumps | No | 5,087 | 7.9 | 0 | $766 | $26,209 | $1,550 | $24,659 | 32.2 | 5,122 |
| **Gas Heating (HVAC/Process) Replacement** | | | **0** | **0.0** | **181** | **$1,997** | **$27,807** | **$1,500** | **$26,307** | **13.2** | **21,157** |
| ECM 10 | Install High Efficiency Furnaces | Yes | 0 | 0.0 | 181 | $1,997 | $27,807 | $1,500 | $26,307 | 13.2 | 21,157 |
| **HVAC System Improvements** | | | **1,198** | **0.0** | **93** | **$1,207** | **$12,235** | **$0** | **$12,235** | **10.1** | **12,083** |
| ECM 11 | Implement Demand Control Ventilation (DCV) | Yes | 1,198 | 0.0 | 93 | $1,207 | $12,235 | $0 | $12,235 | 10.1 | 12,083 |
| **Domestic Water Heating Upgrade** | | | **0** | **0.0** | **30** | **$330** | **$452** | **$226** | **$226** | **0.7** | **3,500** |
| ECM 12 | Install Low-Flow DHW Devices | Yes | 0 | 0.0 | 30 | $330 | $452 | $226 | $226 | 0.7 | 3,500 |
| **Food Service & Refrigeration Measures** | | | **24,881** | **2.7** | **0** | **$3,747** | **$13,449** | **$1,155** | **$12,294** | **3.3** | **25,055** |
| ECM 13 | Dishwasher Replacement | Yes | 14,143 | 1.6 | 0 | $2,130 | $9,270 | $700 | $8,570 | 4.0 | 14,242 |
| ECM 14 | Refrigerator/Freezer Case Electrically Commutated Motors | Yes | 524 | 0.1 | 0 | $79 | $607 | $80 | $527 | 6.7 | 528 |
| ECM 15 | Refrigeration Controls | Yes | 1,812 | 0.0 | 0 | $273 | $2,193 | $125 | $2,068 | 7.6 | 1,825 |
| ECM 16 | Vending Machine Control | Yes | 8,402 | 1.0 | 0 | $1,265 | $1,380 | $250 | $1,130 | 0.9 | 8,460 |
| **TOTALS (COST EFFECTIVE MEASURES)** | | | **414,453** | **114.3** | **274** | **$65,438** | **$313,542** | **$48,656** | **$264,887** | **4.0** | **449,383** |
| **TOTALS (ALL MEASURES)** | | | **445,098** | **148.8** | **280** | **$70,127** | **$607,367** | **$65,794** | **$541,573** | **7.7** | **481,030** |

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

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

*Figure 2 – Evaluated Energy Improvements*

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

## 1.1 Planning Your Project

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

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

### Pick Your Installation Approach

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

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

## Options from Around the State

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

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

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

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

### *Successor Solar Incentive Program (SuSI)*

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

### *Ongoing Electric Savings with Demand Response*

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

### *Large Energy User Program (LEUP)*

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

# 2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Arthur L. Johnson High School. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs.

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

## 2.1 Site Overview

On August 10, 2022, TRC performed an energy audit at Arthur L. Johnson High School located in Clark, New Jersey. TRC met with Facility Staff to review the facility operations and help focus our investigation on specific energy-using systems.

Arthur L. Johnson High School, located at 365 Westfield Avenue, is a community public high school serving students in ninth to twelfth grades in Clark Township. The facility is comprised of a school building that includes typical educational, administrative, assembly, and recreation spaces. The building is a two-story, 192,825 square foot structure built in 1970. Spaces include classrooms, administrative offices, gymnasiums, locker rooms, weight room, auditorium, media center, mezzanine, kitchen, conference rooms, band rooms, faculty room, corridors, lobbies, restrooms, storage, and mechanical spaces.

The facility lighting system consists of a combination of linear fluorescent lamps and LED fixtures. The building is 100% heated by eight condensing hot water boilers and gas-fired rooftop units, and 70% cooled by various direct expansion condensing units and rooftop units (RTUs).

The facility has retrofitted most of the exterior light fixtures and some interior lights to LED sources. The condensing boilers were installed in 2006.

Facility concerns include: RTUs and condensing units which are operating beyond their useful life and are in fair to poor condition, high maintenance costs, and high electric bills.

## 2.2 Building Occupancy

The school operates on a 10-month schedule, from September to June. The gymnasiums, locker rooms team and training rooms are used after classes for sports and other events. There are some Saturday activities in the gymnasiums. The entire facility is shut down around 11:00 PM after the cleaning process.

During a typical day, the facility is occupied by 713 students and 150 staff. It should be noted that the energy and economic analysis for this building is based on the use of the building during the utility billing period, and that results will vary based on changes to building use patterns.

| Building Name | Weekday/Weekend | Operating Schedule |
|---|---|---|
| Arthut L. Johnson High School - General | Weekday | 6:00 AM - 11:00 PM |
| | Weekend | 9:00 AM - 4:00 PM |
| Arthut L. Johnson High School - Classes | Weekday | 7:30 AM - 2:35 PM |
| | Weekend | Closed |

*Figure 3 - Building Occupancy Schedule*

## 2.3 Building Envelope

Building walls are concrete masonry units (CMU) over structural steel with a brick façade, with gypsum drywall painted CMU interior finish. The flat roof is supported with steel trusses and a reinforced concrete deck and finished with an insulated layer and a covering of a membrane that is in fair condition.

Windows throughout the facility are double paned glass with aluminum frames. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing little signs of excessive wear. The main entrance doors are metal insulated slab with half-glass and aluminum frames. Exit doors are constructed of metal. Exterior doors are in good condition.


*Front Building Walls*

*Building Brick Wall and Roof*

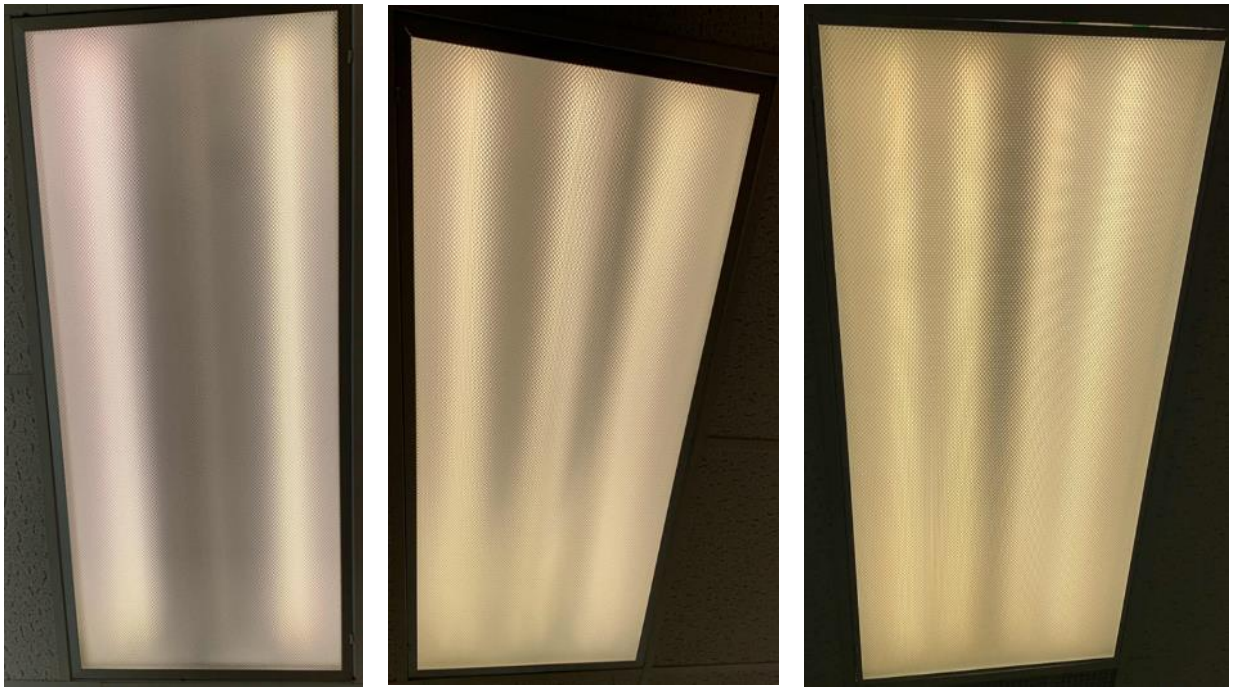
*Window and Exterior Doors*

## 2.4 Lighting Systems

The interior lighting systems use a combination of linear fluorescent fixtures and LED sources. There are also several compact fluorescent lamps (CFLs) and incandescent lamps. Linear fluorescent fixture types include 2-lamp, 3-lamp or 4-lamp, 4-foot-long recessed troffers, and surfaced mounted fixtures as well as 2-foot fixtures with U-bend tubes. The gymnasiums are lit with linear fluorescent T5 high output fixtures while small number of T12 fixtures are found in storage rooms. Spaces lit with LED fixtures include the media center, auditorium, locker rooms, wrestling room, weigh rooms, stairs, and other small offices. The cafeteria is lit with a combination of CFLs and linear T8 fixtures while girl's locker room 48 and other small spaces are lit with CFLs. The auditorium stage is lit with incandescent lamps. Gymnasium 1-15 has 25, 400-Watt metal halide lamps. The remaining spaces are lit with linear fluorescent T8 fixtures.

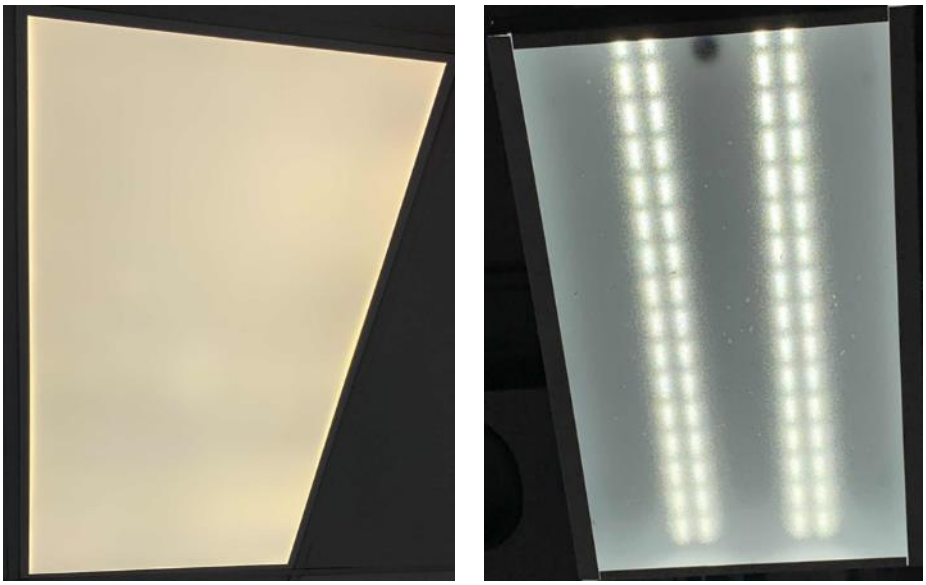
Most fixtures are in good condition. All exit signs are LED units. Interior lighting levels were generally sufficient. Lighting fixtures are controlled variously by manual wall switches and occupancy sensors that are either ceiling or wall mounted.

Exterior lighting consists of wall and pole mounted LED fixtures, 3, 400-Watt roof pole mounted metal halide lamps, and several recessed exit doors metal halide lamps. Exterior fixtures are controlled by timers and photocells.



*Linear T8 (2-lamp, 3-lamp, and 4-lamp; 4-Foot)*


*Linear T5 High Output, CFL, LED Exit Sign, and T8 U-Shape*



*LED Fixtures*

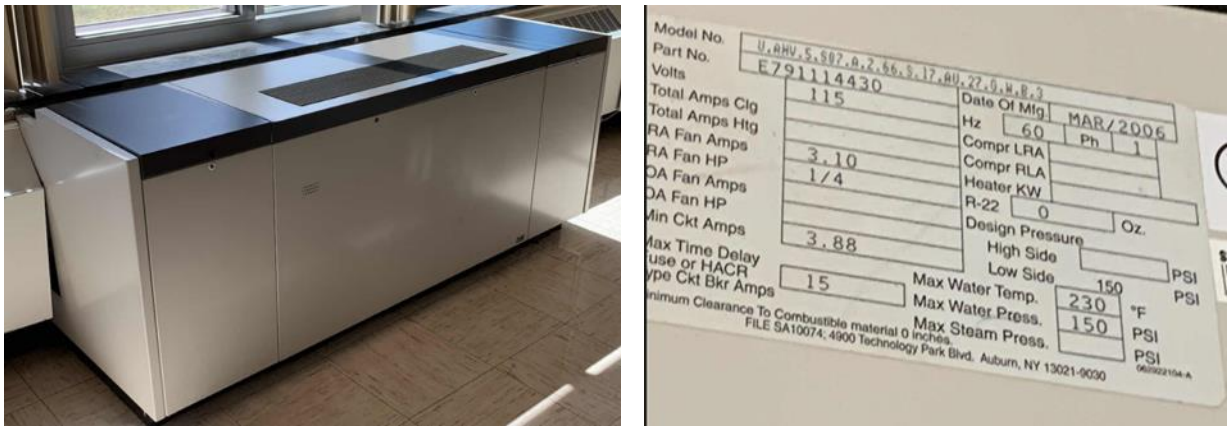
*Exterior Recessed LED Lamp and Fixture*

*Pole Mounted LED Fixture, LED Corn Bulb, and Metal Halide Lamp*

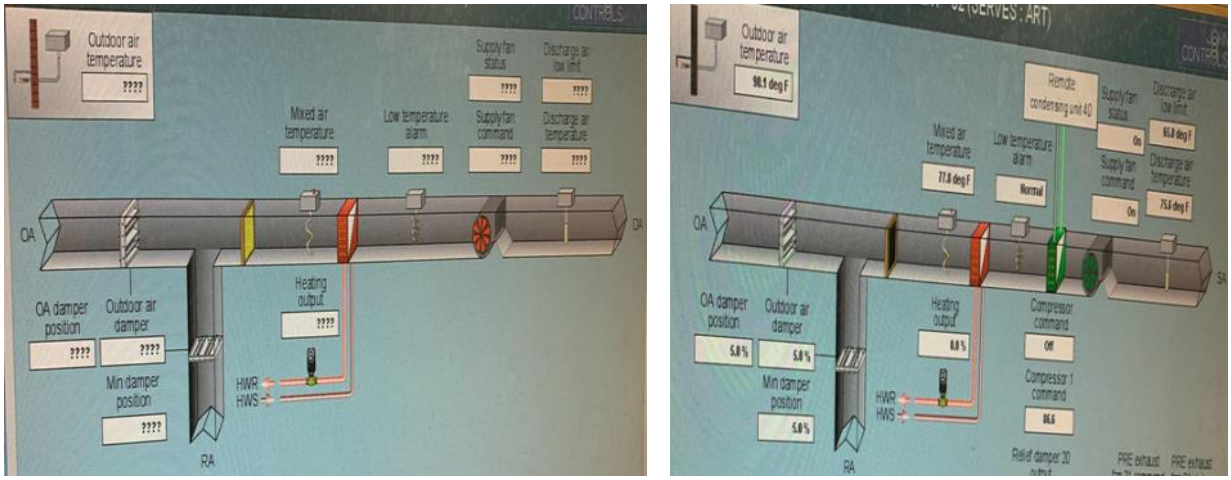
## 2.5 Air Handling Systems

**Unit Ventilators (UVs) & Fan Coil Units (FCUs)**

Unit ventilators are equipped with supply fan motors and digitally controlled outside air dampers and connected to the hot water distribution system. They provide heating and ventilation to classrooms, locker rooms, team rooms, wood shop, wrestling rooms, and corridors. Some UVs provide both heating and cooling with cooling coil connected to roof mounted condensing units. Spaces including coach offices and other spaces are heating using FCUs. The UVs and FCUs are in good condition and are controlled by the Johnson Controls energy management system (EMS).




*Unit Ventilator (UV)*




*EMS Screenshot - Unit Ventilators*

| FCU | Occupied command | Zone temperature | Heating output | Supply fan status | Supply fan command |
|---|---|---|---|---|---|
| FCU - 1 | ???? | ???? | ???? | ???? | ???? |
| FCU - 2 | Occupied | 85.0 deg F | 0.0 % open | On | State1 |
| FCU - 3 | Occupied | 83.0 deg F | 0.0 % open | Off | State1 |
| FCU - 4 | Occupied | 81.9 deg F | 0.0 % | On | On |
| FCU - 5 | Occupied | 83.0 deg F | 0.0 % open | Off | State1 |
| FCU - 6 | ???? | ???? | ???? | ???? | ???? |
| FCU - 7 | Occupied | 80.0 deg F | 0.0 % open | Off | State0 |
| FCU - 8 | Occupied | 81.0 deg F | 0.0 % open | Off | State1 |
| FCU - 9 | Occupied | 77.0 deg F | 0.0 % open | Off | State0 |
| FCU - 10 | Occupied | 85.0 deg F | 0.0 % open | Off | State0 |

*EMS Screenshot FCUs - Summary*

## Unitary Electric HVAC Equipment

Classrooms and offices are air conditioned using 34 window ACs, some of which are ENERGY STAR® rated. These are mainly 1-ton cooling units and in good condition. The building has various split system ACs and roof and exterior ground mounted condensing units serving the cooling coils of various indoor units. These vary in capacity between 1 ton and 45 tons. Most of the units are in poor condition and have been evaluated for replacement.

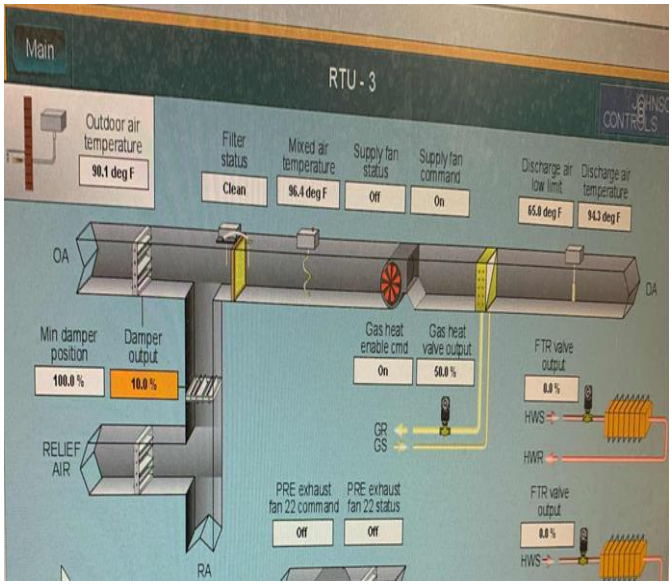
There are five split air source heat pumps that serve classrooms and offices. These have cooling capacities of 3 tons and 3.5 tons and heating capacities of 34 MBh and 45 MBh. They are in fair condition and have been evaluated for replacement. The units are controlled by programmable thermostats.


*Split Air Source Heat Pump*


*Window AC and Outside Condensing Unit*

## Unitary Heating Equipment

Spaces including balcony seating, cafeteria, and some first-floor spaces are heated by McQuay roof mounted gas-fired furnaces (RTU-1, 3 and 4). RTU-1 has an output heating capacity of 649.6 MBh while RTU-3 and 4 have output heating capacities of 500 MBh. The units have reached their useful live and appear in poor condition. They have been evaluated for replacement and are controlled by the Johnson EMS.


*RTU-3 - Cafeteria*

## Packaged Units

The second-floor spaces (referred to as zone F) includes guidance offices, special support services, science classrooms, and other offices are conditioned by packaged roof top units (RTUs). They provide cooling through direct expansion coil and are equipped with gas-fired furnace sections. These units vary in cooling capacities between 5 tons to 15 tons, and heating capacities between 96 MBh to 249.6 MBh. The units are equipped with economizers. The units serving the administration offices appear to be variable air volume (VAV) units as they serve VAV boxes according to the facility energy management system (EMS). We could not verify during the audit whether the units have variable frequency drives controlling the fans.

The second-floor balcony seating is serves by a 45-ton roof top unit (RTU-1) with an integrated a gas-fired furnace.

Air distribution is provided to supply air registers by ducts concealed above the ceilings. The RTUs and are controlled by the EMS. The building air distribution setpoints are 72°F for cooling and 68°F for heating. The units have reached their useful live and have been evaluated for replacement.


*Guidance Packaged RTU*

| RTU | Discharge air temperature | Zone temperature | Filter status | Supply fan status | Supply fan command |
|---|---|---|---|---|---|
| RTU - 1 | 61.4 deg F | 68.0 deg F | Clean | On | On |
| RTU - 2 | 58.0 deg F | 66.6 deg F | Clean | | On |
| RTU - 3 | 94.3 deg F | 87.9 deg F | Clean | Off | On |
| RTU - 4 | 90.6 deg F | 88.6 deg F | Clean | On | On |
| RTU - 5 | 74.5 | 74.8 deg F | NA | On | On |
| RTU - 6 | 68.8 deg F | NA | Dirty | On | Off |

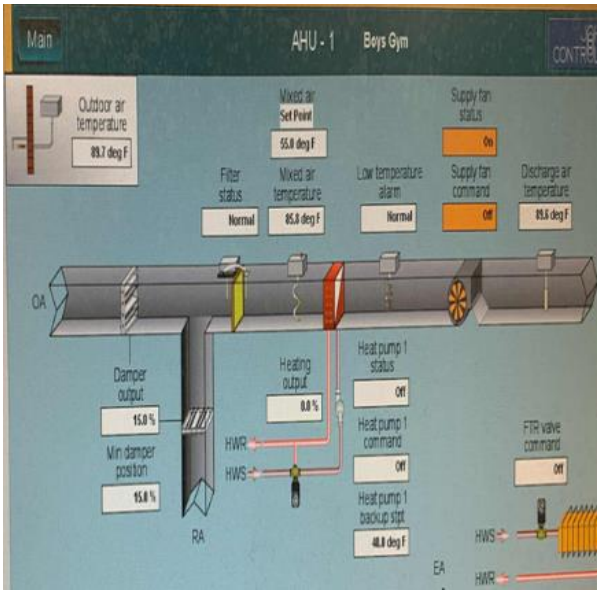
*RTUs - Summary*

*RTU-2 – Classrooms and Offices*

## Air Handling Units (AHUs)

Large building spaces including gymnasiums, band and choral rooms, photo lab, and IMC are conditioned by eight indoor air handling units (AHUs). These units vary in size and are equipped with hot water heating coils, supply and exhaust fan motors for some units, and supply fan only for others. AHUs 5, 6, 7, and 8 are also equipped with cooling coils connected to remote condensing units. Most of the AHUs were not accessible during the audit.

Air distribution is provided to supply air registers by ducts concealed above the ceilings. The AHUs are controlled by the EMS. The building air distribution setpoints are 72°F for cooling and 68°F for heating.




*AHU-1 - Boys Gymnasium*

| AHU | Discharge air temperature | Zone temperature | Low temp alarm | Mixed air temperature | Filter status | Supply fan status | Supply fan command |
|---|---|---|---|---|---|---|---|
| AHU - 1 | 89.6 deg F | 91.2 deg F | Normal | 85.8 deg F | Normal | On | Off |
| AHU - 2 | 88.7 deg F | 88.3 deg F | Normal | 91.0 deg F | Normal | Off | Off |
| AHU - 3 | 86.8 deg F | 86.3 deg F | Normal | 88.4 deg F | Normal | Off | Off |
| AHU - 4 | 87.4 deg F | 86.1 deg F | Normal | 87.0 deg F | Normal | Off | Off |
| AHU - 5 | 88.0 deg F | 86.4 deg F | Normal | 85.1 deg F | Normal | On | On |
| AHU - 6 | 84.9 deg F | 81.0 deg F | Normal | 79.5 deg F | Normal | On | On |
| AHU - 7 | 75.0 deg F | 75.2 deg F | Normal | 72.1 deg F | Normal | On | On |
| AHU - 8 | 74.9 deg F | 69.3 deg F | Normal | 69.2 deg F | Normal | On | On |

*AHUs - Summary*

## 2.6 Building General Exhaust Air Systems

The restrooms, hallways, and other areas are exhausted by motor driven exhaust fans. Some classrooms including science classrooms, art room, and woodshop have specialty exhaust fans. The kitchen has an exhaust fan which serves all kitchen hoods. Equipment is in good condition and controlled by manual switches.

*Typical Exhaust Fan*

*Kitchen Hood and Dishwasher room Exhaust Fans*

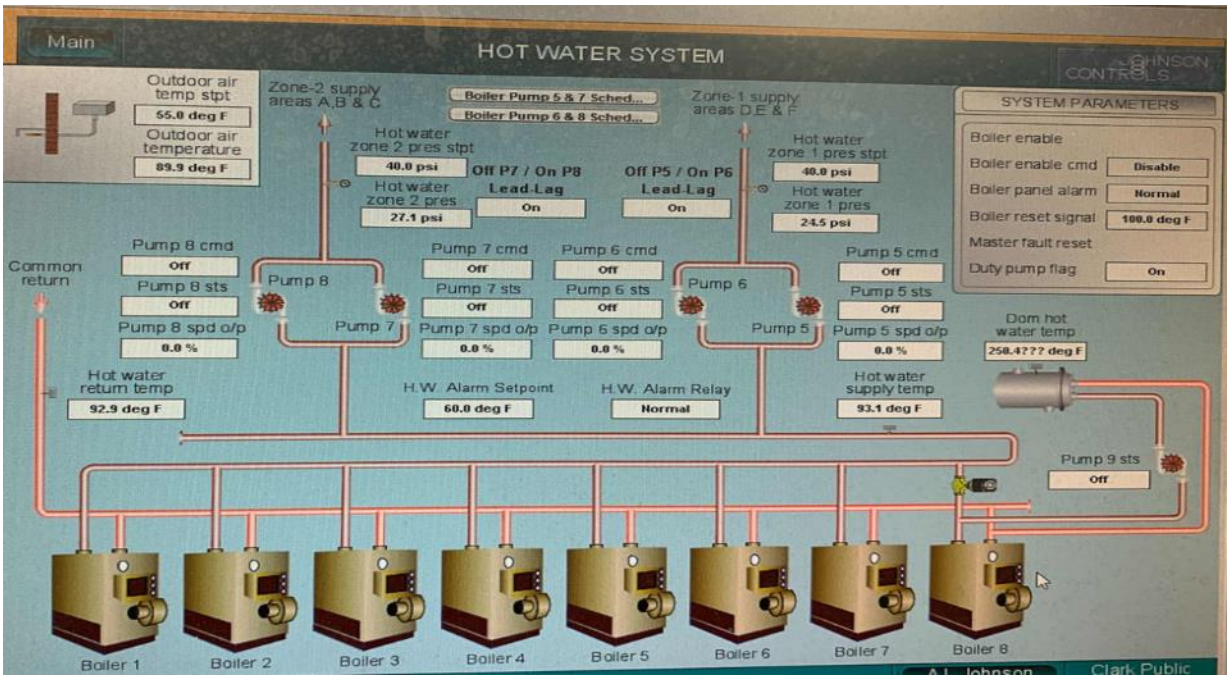
## 2.7 Heating Hot Water Systems

Eight AERCO 1860 MBh output condensing hot water boilers serve most of the building's heating load. The burners are fully modulating with a nominal efficiency of 93%. The boilers are configured in an automated lead-lag control scheme. Multiple boilers are required under high load condition. Installed in 2006, the boilers are in good condition. The hydronic distribution system is a two-pipe, heating-only system. Four, 20 hp variable speed pumps distribute heating hot water to AHUs, UVs, FCUs, hydronic baseboards, and unit heaters.

The boilers operate based on outside air temperature. The boilers and the hot water loop are controlled by a Johnson EMS. The building occupied heating setpoint is 68°F, and unoccupied heating setpoint is 55°F.



*Condensing Boilers*

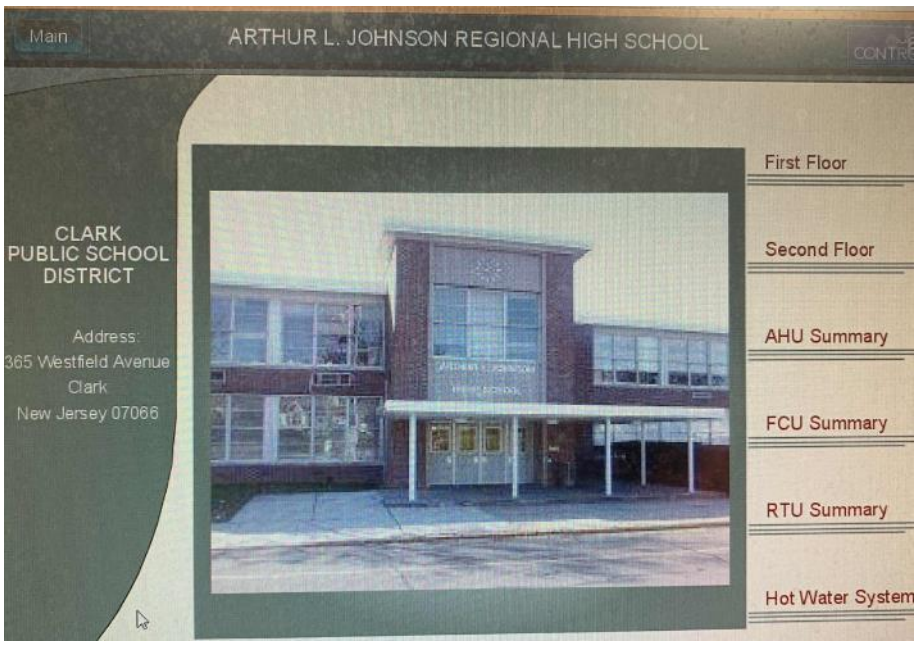



*EMS Screenshot - Hot Water Loop*

## 2.8 Building Energy Management Systems (EMS)

A Johnson Controls EMS controls the HVAC equipment, boilers, air handlers, rooftop units, unit ventilators, and fan coil units. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, and heating water loop temperatures.

The site should expand the EMS control system to the building exhaust air systems.




*Main Page - EMS*

## 2.9 Domestic Hot Water

Hot water is produced by two, 119 gallon, 499 MBh gas-fired condensing storage water heaters rated at 95% efficiency. The water heaters are in the boiler room. Two fractional horsepower circulating pumps distribute water to end uses. The domestic hot water pipes are insulated, and the insulation is in good condition. At the time of the site visit, the domestic water heaters were set at 150°F.


*Domestic Hot Water Heaters and Circulating Pumps*

## 2.10 Food Service Equipment

The facility houses a commercial kitchen and a cafeteria. The cooking system consists of a mix of gas and electric equipment that is used to prepare breakfast and lunch for students. Some the bulk prepared foods are held in a full-size electric holding cabinet and consumed by the high school students. The cooking equipment is in good condition and well maintained.

The dishwasher is a non-ENERGY STAR® high temperature, rack type unit. It is in good condition as well.

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


*Gas-Fired Cooking Equipment*

## 2.11 Refrigeration

The kitchen has six small stand-up refrigerators with glass doors and two large stand-up refrigerators with solid doors. All equipment is standard efficiency and in good condition.

The kitchen also has a low temperature walk-in freezer with 2-fan evaporators, and two commercial ice machines that are in good condition.

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



*Refrigeration Equipment*


*Evaporator (Walk-In Box) and Ice Machine*

## 2.12 Plug Load and Vending Machines

There are 90 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There are classroom typical loads such as smart projectors. Additional loads typically associated with secondary schools include media center and photo lab equipment, and a kiln.

There are also typical office loads such as scanner/copiers, small printers, microwaves, and mini fridges; the site also has a server closet. There are six residential-style refrigerators throughout the facility that are in good condition.

*Copier/Scanner and Residential-Style Refrigerator*

## 2.13 Water-Using Systems

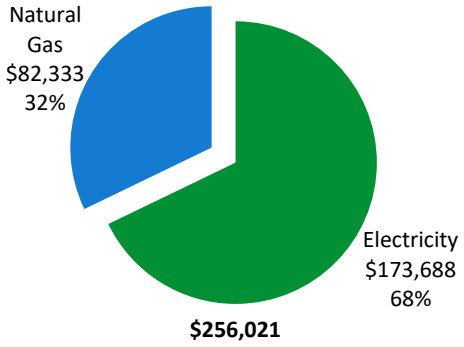
There are restrooms with toilets, urinals, and sinks throughout the building. Most of the faucet flows are rated for 2.2 gallons per minute (gpm). Toilets and urinals vary in rated gallons per flush (gpf). There are some restrooms with showers and showerheads are rated as low flow.

*Typical Restroom Sink*

# 3 Energy Use and Costs

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

| Utility Summary | | |
|---|---|---|
| **Fuel** | **Usage** | **Cost** |
| Electricity | 1,153,361 kWh | $173,688 |
| Natural Gas | 74,481 Therms | $82,333 |
| **Total** | | **$256,021** |




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

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

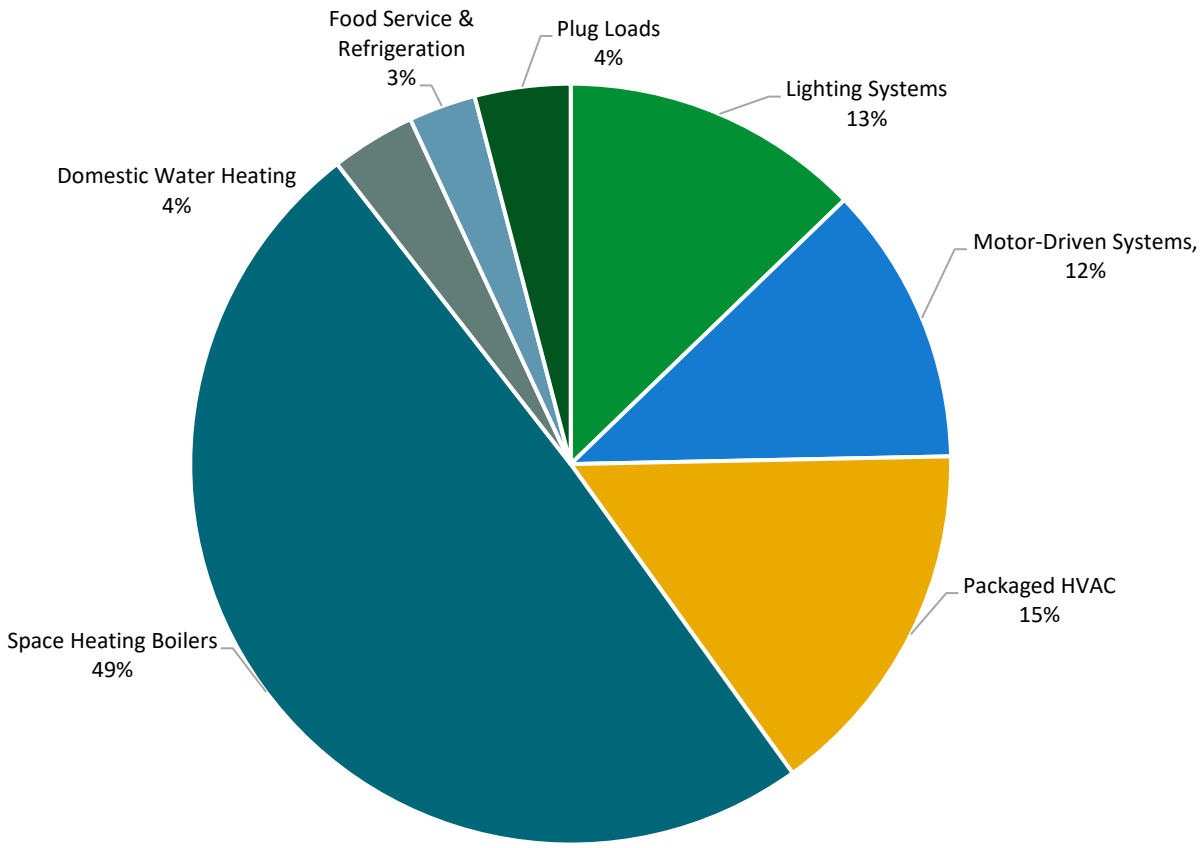
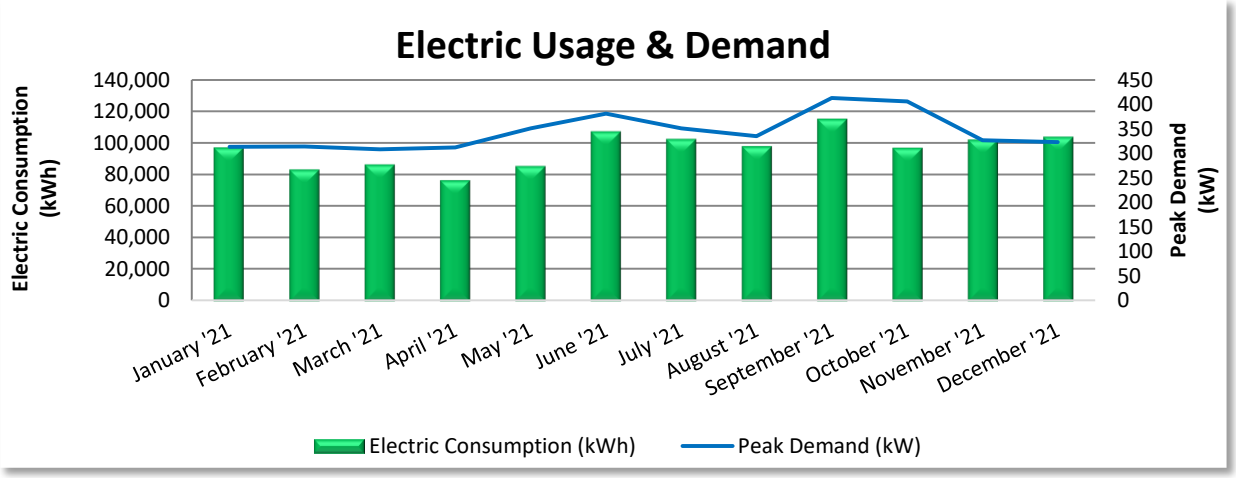



*Figure 4 - Energy Balance*

## 3.1 Electricity

PSE&G delivers electricity under rate class Large Power & Lighting Secondary, with electric production provided by Direct Energy, a third-party supplier.



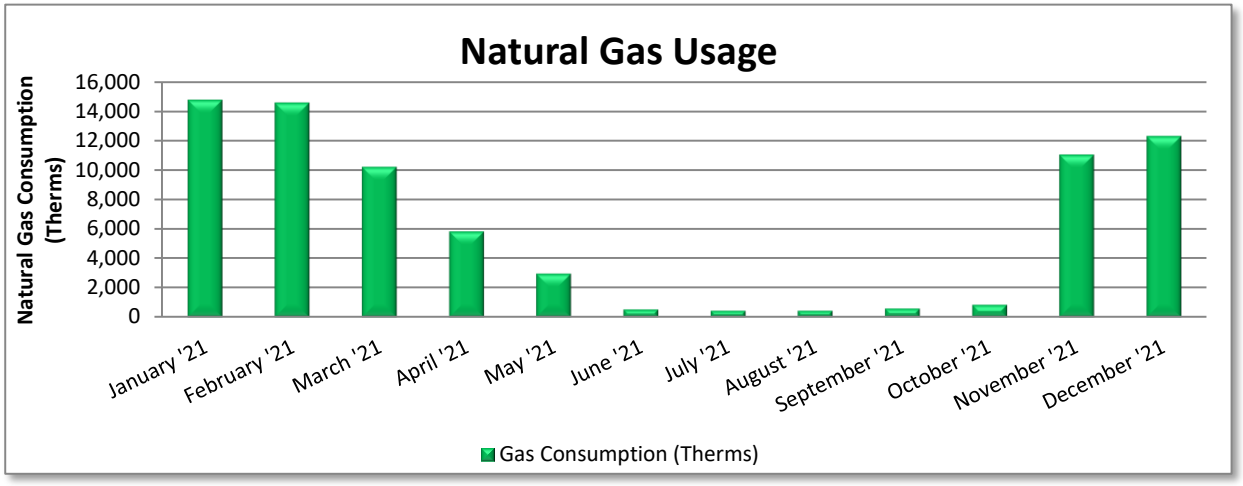

| Electric Billing Data | | | | | |
|---|---|---|---|---|---|
| **Period Ending** | **Days in Period** | **Electric Usage (kWh)** | **Demand (kW)** | **Demand Cost** | **Total Electric Cost** |
| 1/21/21 | 32 | 96,949 | 314 | $1,196 | $13,360 |
| 2/19/21 | 29 | 83,172 | 314 | $1,198 | $12,161 |
| 3/22/21 | 31 | 86,234 | 309 | $1,176 | $12,509 |
| 4/21/21 | 30 | 76,280 | 312 | $1,191 | $11,440 |
| 5/20/21 | 29 | 85,317 | 351 | $1,419 | $12,455 |
| 6/21/21 | 32 | 107,106 | 381 | $4,252 | $18,448 |
| 7/21/21 | 30 | 102,495 | 351 | $4,532 | $16,275 |
| 8/19/21 | 29 | 97,768 | 335 | $4,364 | $16,908 |
| 9/20/21 | 32 | 115,222 | 413 | $5,361 | $19,682 |
| 10/19/21 | 29 | 96,930 | 406 | $2,270 | $11,979 |
| 11/17/21 | 29 | 102,089 | 327 | $1,251 | $13,647 |
| 12/20/21 | 33 | 103,799 | 323 | $1,232 | $14,823 |
| **Totals** | **365** | **1,153,361** | **413** | **$29,441** | **$173,688** |
| **Annual** | **365** | **1,153,361** | **413** | **$29,441** | **$173,688** |

Notes:

- Peak demand of 413 kW occurred in September 2021.
- Average demand over the past 12 months was 345 kW.
- The average electric cost over the past 12 months was $0.151/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

## 3.2 Natural Gas

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




| Gas Billing Data | | | |
|---|---|---|---|
| **Period Ending** | **Days in Period** | **Natural Gas Usage (Therms)** | **Natural Gas Cost** |
| 1/31/21 | 31 | 14,732 | $13,356 |
| 2/28/21 | 28 | 14,553 | $13,073 |
| 3/31/21 | 31 | 10,204 | $9,741 |
| 4/30/21 | 30 | 5,828 | $6,349 |
| 5/31/21 | 31 | 2,970 | $4,179 |
| 6/30/21 | 30 | 526 | $4,161 |
| 7/31/21 | 31 | 453 | $2,274 |
| 8/31/21 | 31 | 455 | $2,275 |
| 9/30/21 | 30 | 600 | $2,372 |
| 10/31/21 | 31 | 857 | $2,597 |
| 11/30/21 | 30 | 11,021 | $10,585 |
| 12/31/21 | 31 | 12,281 | $11,372 |
| **Totals** | **365** | **74,481** | **$82,333** |
| **Annual** | **365** | **74,481** | **$82,333** |

Notes:

- The average gas cost for the past 12 months is $1.105/therm, which is the blended rate used throughout the analysis.

## 3.3 Benchmarking

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

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

| **Benchmarking Score** | **64** |
|---|---|

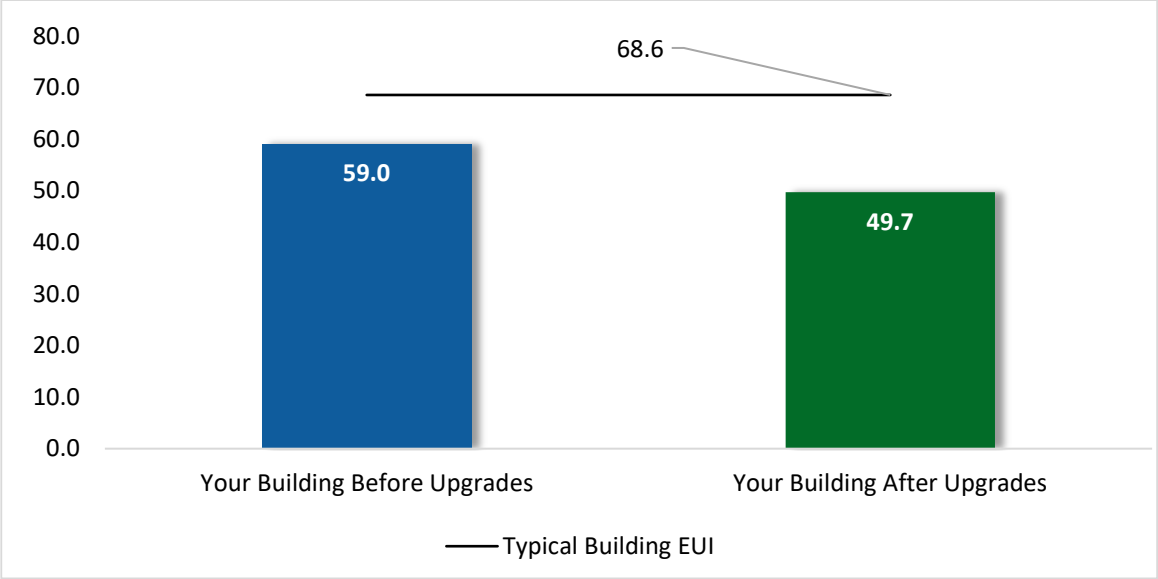



*Figure 5 - Energy Use Intensity Comparison*[3]

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

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

[3] Based on all evaluated ECMs

## Tracking Your Energy Performance

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

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

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

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

# 4 Energy Conservation Measures

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

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

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

Financial incentives are based on previously run state rebate programs. New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website. Some measures and proposed upgrades may be eligible for higher incentives than those shown below.

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

| # | Energy Conservation Measure | Cost Effective? | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | | **217,425** | **51.5** | **-44** | **$32,259** | **$82,221** | **$19,805** | **$62,416** | **1.9** | **213,818** |
| ECM 1 | Install LED Fixtures | Yes | 10,595 | 2.3 | -1 | $1,589 | $8,220 | $555 | $7,665 | 4.8 | 10,605 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 251 | 0.1 | 0 | $37 | $202 | $20 | $182 | 4.9 | 246 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 206,580 | 49.1 | -43 | $30,632 | $73,798 | $19,230 | $54,568 | 1.8 | 202,966 |
| **Lighting Control Measures** | | | **58,235** | **13.5** | **-12** | **$8,635** | **$56,659** | **$13,945** | **$42,714** | **4.9** | **57,216** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 49,950 | 11.9 | -10 | $7,407 | $45,184 | $5,755 | $39,429 | 5.3 | 49,077 |
| ECM 5 | Install High/Low Lighting Controls | Yes | 8,284 | 1.6 | -2 | $1,228 | $11,475 | $8,190 | $3,285 | 2.7 | 8,140 |
| **Variable Frequency Drive (VFD) Measures** | | | **112,714** | **46.6** | **26** | **$17,262** | **$120,719** | **$12,025** | **$108,694** | **6.3** | **116,554** |
| ECM 6 | Install VFDs on Constant Volume (CV) Fans | Yes | 109,333 | 46.6 | 0 | $16,465 | $117,329 | $11,950 | $105,379 | 6.4 | 110,098 |
| ECM 7 | Install VFDs on Kitchen Hood Fan Motors | Yes | 3,380 | 0.0 | 26 | $797 | $3,391 | $75 | $3,316 | 4.2 | 6,456 |
| **Unitary HVAC Measures** | | | **30,645** | **34.5** | **7** | **$4,689** | **$293,825** | **$17,139** | **$276,686** | **59.0** | **31,647** |
| ECM 8 | Install High Efficiency Air Conditioning Units | No | 25,558 | 26.6 | 7 | $3,923 | $267,616 | $15,589 | $252,028 | 64.2 | 26,525 |
| ECM 9 | Install High Efficiency Heat Pumps | No | 5,087 | 7.9 | 0 | $766 | $26,209 | $1,550 | $24,659 | 32.2 | 5,122 |
| **Gas Heating (HVAC/Process) Replacement** | | | **0** | **0.0** | **181** | **$1,997** | **$27,807** | **$1,500** | **$26,307** | **13.2** | **21,157** |
| ECM 10 | Install High Efficiency Furnaces | Yes | 0 | 0.0 | 181 | $1,997 | $27,807 | $1,500 | $26,307 | 13.2 | 21,157 |
| **HVAC System Improvements** | | | **1,198** | **0.0** | **93** | **$1,207** | **$12,235** | **$0** | **$12,235** | **10.1** | **12,083** |
| ECM 11 | Implement Demand Control Ventilation (DCV) | Yes | 1,198 | 0.0 | 93 | $1,207 | $12,235 | $0 | $12,235 | 10.1 | 12,083 |
| **Domestic Water Heating Upgrade** | | | **0** | **0.0** | **30** | **$330** | **$452** | **$226** | **$226** | **0.7** | **3,500** |
| ECM 12 | Install Low-Flow DHW Devices | Yes | 0 | 0.0 | 30 | $330 | $452 | $226 | $226 | 0.7 | 3,500 |
| **Food Service & Refrigeration Measures** | | | **24,881** | **2.7** | **0** | **$3,747** | **$13,449** | **$1,155** | **$12,294** | **3.3** | **25,055** |
| ECM 13 | Dishwasher Replacement | Yes | 14,143 | 1.6 | 0 | $2,130 | $9,270 | $700 | $8,570 | 4.0 | 14,242 |
| ECM 14 | Refrigerator/Freezer Case Electrically Commutated Motors | Yes | 524 | 0.1 | 0 | $79 | $607 | $80 | $527 | 6.7 | 528 |
| ECM 15 | Refrigeration Controls | Yes | 1,812 | 0.0 | 0 | $273 | $2,193 | $125 | $2,068 | 7.6 | 1,825 |
| ECM 16 | Vending Machine Control | Yes | 8,402 | 1.0 | 0 | $1,265 | $1,380 | $250 | $1,130 | 0.9 | 8,460 |
| **TOTALS** | | | **445,098** | **148.8** | **280** | **$70,127** | **$607,367** | **$65,794** | **$541,573** | **7.7** | **481,030** |

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

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

*Figure 6 – All Evaluated ECMs*

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **217,425** | **51.5** | **-44** | **$32,259** | **$82,221** | **$19,805** | **$62,416** | **1.9** | **213,818** |
| ECM 1 | Install LED Fixtures | 10,595 | 2.3 | -1 | $1,589 | $8,220 | $555 | $7,665 | 4.8 | 10,605 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 251 | 0.1 | 0 | $37 | $202 | $20 | $182 | 4.9 | 246 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 206,580 | 49.1 | -43 | $30,632 | $73,798 | $19,230 | $54,568 | 1.8 | 202,966 |
| **Lighting Control Measures** | | **58,235** | **13.5** | **-12** | **$8,635** | **$56,659** | **$13,945** | **$42,714** | **4.9** | **57,216** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 49,950 | 11.9 | -10 | $7,407 | $45,184 | $5,755 | $39,429 | 5.3 | 49,077 |
| ECM 5 | Install High/Low Lighting Controls | 8,284 | 1.6 | -2 | $1,228 | $11,475 | $8,190 | $3,285 | 2.7 | 8,140 |
| **Variable Frequency Drive (VFD) Measures** | | **112,714** | **46.6** | **26** | **$17,262** | **$120,719** | **$12,025** | **$108,694** | **6.3** | **116,554** |
| ECM 6 | Install VFDs on Constant Volume (CV) Fans | 109,333 | 46.6 | 0 | $16,465 | $117,329 | $11,950 | $105,379 | 6.4 | 110,098 |
| ECM 7 | Install VFDs on Kitchen Hood Fan Motors | 3,380 | 0.0 | 26 | $797 | $3,391 | $75 | $3,316 | 4.2 | 6,456 |
| **Gas Heating (HVAC/Process) Replacement** | | **0** | **0.0** | **181** | **$1,997** | **$27,807** | **$1,500** | **$26,307** | **13.2** | **21,157** |
| ECM 10 | Install High Efficiency Furnaces | 0 | 0.0 | 181 | $1,997 | $27,807 | $1,500 | $26,307 | 13.2 | 21,157 |
| **HVAC System Improvements** | | **1,198** | **0.0** | **93** | **$1,207** | **$12,235** | **$0** | **$12,235** | **10.1** | **12,083** |
| ECM 11 | Implement Demand Control Ventilation (DCV) | 1,198 | 0.0 | 93 | $1,207 | $12,235 | $0 | $12,235 | 10.1 | 12,083 |
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **30** | **$330** | **$452** | **$226** | **$226** | **0.7** | **3,500** |
| ECM 12 | Install Low-Flow DHW Devices | 0 | 0.0 | 30 | $330 | $452 | $226 | $226 | 0.7 | 3,500 |
| **Food Service & Refrigeration Measures** | | **24,881** | **2.7** | **0** | **$3,747** | **$13,449** | **$1,155** | **$12,294** | **3.3** | **25,055** |
| ECM 13 | Dishwasher Replacement | 14,143 | 1.6 | 0 | $2,130 | $9,270 | $700 | $8,570 | 4.0 | 14,242 |
| ECM 14 | Refrigerator/Freezer Case Electrically Commutated Motors | 524 | 0.1 | 0 | $79 | $607 | $80 | $527 | 6.7 | 528 |
| ECM 15 | Refrigeration Controls | 1,812 | 0.0 | 0 | $273 | $2,193 | $125 | $2,068 | 7.6 | 1,825 |
| ECM 16 | Vending Machine Control | 8,402 | 1.0 | 0 | $1,265 | $1,380 | $250 | $1,130 | 0.9 | 8,460 |
| **TOTALS** | | **414,453** | **114.3** | **274** | **$65,438** | **$313,542** | **$48,656** | **$264,887** | **4.0** | **449,383** |

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

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

*Figure 7 – Cost Effective ECMs*

## 4.1 Lighting

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Upgrades** | | **217,425** | **51.5** | **-44** | **$32,259** | **$82,221** | **$19,805** | **$62,416** | **1.9** | **213,818** |
| ECM 1 | Install LED Fixtures | 10,595 | 2.3 | -1 | $1,589 | $8,220 | $555 | $7,665 | 4.8 | 10,605 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 251 | 0.1 | 0 | $37 | $202 | $20 | $182 | 4.9 | 246 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 206,580 | 49.1 | -43 | $30,632 | $73,798 | $19,230 | $54,568 | 1.8 | 202,966 |

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

### ECM 1: Install LED Fixtures

Replace existing fixtures containing metal halide 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 fixtures.

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:** gymnasium 1-25, roof, front entrances, and exit doors.

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

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

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

**Affected building areas**: garage and some storage rooms lit by fixtures with T12 lamps with magnetic ballasts.

### ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent T5, T8, CFLs, 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. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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

**Affected Building Areas:** linear T5 in gymnasiums, all areas with fluorescent fixtures with T8 tubes, CFLs, and incandescent lamps.

## 4.2 Lighting Controls

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lighting Control Measures** | | **58,235** | **13.5** | **-12** | **$8,635** | **$56,659** | **$13,945** | **$42,714** | **4.9** | **57,216** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 49,950 | 11.9 | -10 | $7,407 | $45,184 | $5,755 | $39,429 | 5.3 | 49,077 |
| ECM 5 | Install High/Low Lighting Controls | 8,284 | 1.6 | -2 | $1,228 | $11,475 | $8,190 | $3,285 | 2.7 | 8,140 |

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

### ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

**Affected Building Areas:** offices, classrooms, gymnasiums, locker rooms, library, auditorium, work and team rooms, restrooms, and storage rooms.

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

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

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

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

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

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

**Affected Building Areas**: corridors.

## 4.3 Variable Frequency Drives (VFD)

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variable Frequency Drive (VFD) Measures** | | **112,714** | **46.6** | **26** | **$17,262** | **$120,719** | **$12,025** | **$108,694** | **6.3** | **116,554** |
| ECM 6 | Install VFDs on Constant Volume (CV) Fans | 109,333 | 46.6 | 0 | $16,465 | $117,329 | $11,950 | $105,379 | 6.4 | 110,098 |
| ECM 7 | Install VFDs on Kitchen Hood Fan Motors | 3,380 | 0.0 | 26 | $797 | $3,391 | $75 | $3,316 | 4.2 | 6,456 |

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 inverter duty rated motor to conservatively account for the cost of an inverter duty rated motor.

**ECM 6: Install VFDs on Constant Volume (CV) Fans**

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

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

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

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

**Affected Air Handlers:** All AHUs and RTUs.

### ECM 7: Install VFDs on Kitchen Hood Fan Motors

Install VFDs and sensors to control the kitchen hood fan motor(s). The air flow of the hood is varied based on two key inputs: temperature and smoke/cooking fumes. The VFD controls the amount of exhaust (and kitchen make-up air) based on temperature—the lower the temperature the lower the flow. If the optic sensor is triggered by smoke or cooking fumes, the speed of the fan ramps up to 100%.

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

## 4.4 Unitary HVAC

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Unitary HVAC Measures** | | **30,645** | **34.5** | **7** | **$4,689** | **$293,825** | **$17,139** | **$276,686** | **59.0** | **31,647** |
| ECM 8 | Install High Efficiency Air Conditioning Units | 25,558 | 26.6 | 7 | $3,923 | $267,616 | $15,589 | $252,028 | 64.2 | 26,525 |
| ECM 9 | Install High Efficiency Heat Pumps | 5,087 | 7.9 | 0 | $766 | $26,209 | $1,550 | $24,659 | 32.2 | 5,122 |

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

### ECM 8: Install High Efficiency Air Conditioning Units

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

**Affected Units:** All RTUs and most of the condensing units.

### ECM 9: Install High Efficiency Heat Pumps

We evaluated replacing 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.

**Affected Units:** four Fujitsu split air source heat pumps.

## 4.5 Gas-Fired Heating

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Gas Heating (HVAC/Process) Replacement** | | **0** | **0.0** | **181** | **$1,997** | **$27,807** | **$1,500** | **$26,307** | **13.2** | **21,157** |
| ECM 10 | Install High Efficiency Furnaces | 0 | 0.0 | 181 | $1,997 | $27,807 | $1,500 | $26,307 | 13.2 | 21,157 |

### ECM 10: Install High Efficiency Furnaces

Replace standard efficiency furnaces with high efficiency 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 require proper drainage.

**Affected Units:** RTU-1, 3, & 4.

## 4.6 HVAC Improvements

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **HVAC System Improvements** | | **1,198** | **0.0** | **93** | **$1,207** | **$12,235** | **$0** | **$12,235** | **10.1** | **12,083** |
| ECM 11 | Implement Demand Control Ventilation (DCV) | 1,198 | 0.0 | 93 | $1,207 | $12,235 | $0 | $12,235 | 10.1 | 12,083 |

### ECM 11: Implement Demand Control Ventilation (DCV)

(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:** library, first floor, and second floor balcony seating.

## 4.7 Domestic Water Heating

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **30** | **$330** | **$452** | **$226** | **$226** | **0.7** | **3,500** |
| ECM 12 | Install Low-Flow DHW Devices | 0 | 0.0 | 30 | $330 | $452 | $226 | $226 | 0.7 | 3,500 |

### ECM 12: Install Low-Flow DHW Devices

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

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

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

## 4.8 Food Service & Refrigeration Measures

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Food Service & Refrigeration Measures** | | **24,881** | **2.7** | **0** | **$3,747** | **$13,449** | **$1,155** | **$12,294** | **3.3** | **25,055** |
| ECM 13 | Dishwasher Replacement | 14,143 | 1.6 | 0 | $2,130 | $9,270 | $700 | $8,570 | 4.0 | 14,242 |
| ECM 14 | Refrigerator/Freezer Case Electrically Commutated Motors | 524 | 0.1 | 0 | $79 | $607 | $80 | $527 | 6.7 | 528 |
| ECM 15 | Refrigeration Controls | 1,812 | 0.0 | 0 | $273 | $2,193 | $125 | $2,068 | 7.6 | 1,825 |
| ECM 16 | Vending Machine Control | 8,402 | 1.0 | 0 | $1,265 | $1,380 | $250 | $1,130 | 0.9 | 8,460 |

### ECM 13: Dishwasher Replacement

Replace existing dishwasher with new energy-efficient door type/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 14: Freezer Electrically Commutated Motors

Replace shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in walk-in 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 15: Refrigeration Controls

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

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

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

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

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

## ECM 16: Vending Machine Control

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

## 4.9 Measures for Future Consideration

There are additional opportunities for improvement that Clark Township Public School may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment, and/or include significant system reconfiguration. These measure(s) are therefore beyond the scope of this energy audit. These measure(s) are described here to support a whole building approach to energy efficiency and sustainability.

Clark Township Public School may wish to consider the Energy Savings Improvement Program (ESIP) or other whole building approach. With interest in implementing comprehensive, largescale and/or complex system wide projects, these measures may be pursued during development of a future energy savings plan. We recommend that you work with your energy service company (ESCO) and/or design team to:

- Evaluate these measures further.
- Develop firm costs.
- Determine measure savings.
- Prepare detailed implementation plans.

Other modernization or capital improvement funds may be leveraged for these types of refurbishments. As you plan for capital upgrades, be sure to consider the energy impact of the building systems and controls being specified.

**Retro-Commissioning Study**

Due to the complexity of today's HVAC systems and controls, a thorough analysis and rebalance of heating, ventilation, and cooling systems should periodically be conducted. There are indications at this site that systems may not be operating correctly or as efficiently as they could be. One important tool available to building operators to ensure proper system operation is retro commissioning.

Retro-commissioning is a common practice recommended by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to be implemented every few years. We recommend that you contact a reputable engineering firm that specializes in energy control systems and retro-commissioning. Ask them to propose a scope of work and an outline of the procedures and processes to be implemented, including a schedule and the roles of all responsible parties.

Once goals and responsibilities are established, the objective of the investigation process is to understand how the building is currently operating, identify the issues, and determine the most cost-effective way to improve performance. The retro-commissioning agent will review building documentation, interview building occupants, and inspect and test the equipment. Information is then compiled into a report and shared with facility staff, who will select which recommendations to implement after reviewing the findings.

The implementation phase puts the selected processes into place. Typical measures may include sensor calibration, equipment schedule changes, damper linkage repair and similar relatively low-cost adjustments—although more expensive sophisticated programming and building control system upgrades may be warranted. Approved measures may be implemented by the agent, the building staff, or by subcontractors. Typically, a combination of these individuals makes up the retro-commissioning team.

After the approved measures are implemented, the team will verify that the changes are working as expected. Baseline and post-case measurements will allow building staff to monitor equipment and ensure that the benefits are maintained.

## Replace Smooth V-Belts with Notched or Synchronous Belts

This measure is for the replacement of smooth V-belts in non-residential package and split HVAC systems with notched V-belts or for the installation of new equipment with synchronous belts instead of smooth V-belts. Typically, there is a V-belt between the motor and the supply air fan and/or return air fan in larger package and split HVAC systems.

In general, there are two styles of grooved V-belts: notched and synchronous. The U.S. Department of Energy (DOE) compares these two types as follows[4]

| Characteristic | Notched V-Belts | Synchronous Belts |
|---|---|---|
| Description | A notched belt has grooves or notches that run perpendicular to the belt's length, which reduces the bending resistance of the belt. | They are also called cogged, timing, positive-drive, or high-torque drive belts, and are "toothed". |
| Pulleys/Sprockets | Can use the same pulleys as cross-section standard V-belts | Require the installation of mating grooved sprockets. |
| Typical Efficiency | Run cooler, last longer, and are about 2% more efficient than standard V-belts. | Operate with a consistent efficiency of 98% and maintain their efficiency over a wide load range. |
| Constraints | Have a sharp reduction in efficiency at high torque due to increased slippage. | Noisier than V-belts, less suited for use on shock-loaded applications, and transfer more vibration due to their stiffness. |
| Other Benefits | Lower cost than synchronous belts, overall. | Require minimal maintenance and re-tensioning. Operate in wet and oily environments, and run slip-free |

The DOE offers the following suggested actions with respect to investigating the applicability of notched or synchronous V belts:

- Conduct a survey of belt-driven equipment. Gather application and operating-hour data. Then determine the cost effectiveness of replacing existing V-belts with notched belts or synchronous belts and sprockets.
- Consider synchronous belts for all new installations; the price premium is minimal due to the avoidance of conventional pulley costs.
- Consider having a power transmission specialist determine the energy and cost savings potential from retrofitting all V-belt drives with synchronous belts. Synchronous belts rely on tooth grip instead of friction to efficiently transfer power and provide a constant speed ratio.
- Install notched belts where the retrofit of a synchronous belt is not cost effective.

[4] https://www.nrel.gov/docs/fy13osti/56012.pdf US DOE Motor Systems Tip Sheet #5

# 5 Energy Efficient Best Practices

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs.

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

You may already be doing some of these things—see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

## Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before—you cannot manage what you do not measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[5]. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

## Weatherization

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

## Doors and Windows

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

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

## Lighting Maintenance

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

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

## Lighting Controls

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

## Motor Controls

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

## Motor Maintenance

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

## Fans to Reduce Cooling Load

Install ceiling fans to supplement your cooling system. Thermostat settings can typically be increased by 4°F with no change in overall occupant comfort due to the wind chill effect of moving air.

## Thermostat Schedules and Temperature Resets

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

## Economizer Maintenance

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

Periodic inspection and maintenance will keep economizers working in sync with the heating and cooling system. This maintenance should be part of annual system maintenance, and it should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position.

## AC System Evaporator/Condenser Coil Cleaning

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

## HVAC Filter Cleaning and Replacement

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

## Ductwork Maintenance

Duct maintenance has two primary goals: keep the ducts clean to avoid air quality problems and seal leaks to save energy. Check for cleanliness, obstructions that block airflow, water damage, and leaks. Ducts should be inspected at least every two years.

The biggest symptoms of clogged air ducts are differing temperatures throughout the building and areas with limited airflow from supply registers. If a particular air duct is clogged, then air flow will only be cut off to some rooms in the building—not all of them. The reduced airflow will make it more difficult for those areas to reach the temperature setpoint, which will cause the HVAC system to run longer to cool or heat that area properly. If you suspect clogged air ducts, ensure that all areas in front of supply registers are clear of items that may block or restrict air flow, and you should check for fire dampers or balancing dampers that have failed closed.

Duct leakage in commercial buildings can account for 5%–25% of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Check ductwork for leakage. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

Distribution system losses are dependent on-air system temperature, the size of the distribution system, and the level of insulation of the ductwork. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is missing or worn, the system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

## Boiler Maintenance

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

## 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.

## Optimize HVAC Equipment Schedules

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

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

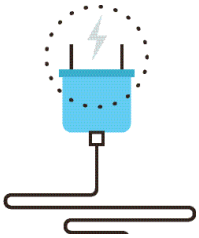
## Water Heater Maintenance

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

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

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

## Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[6]. Your local utility may offer incentives or rebates for this equipment.

## Water Conservation


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

For more information regarding water conservation go to the EPA's WaterSense website[7] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[8] 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.

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

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

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

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

## Procurement Strategies

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

# 6 On-site Generation

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

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

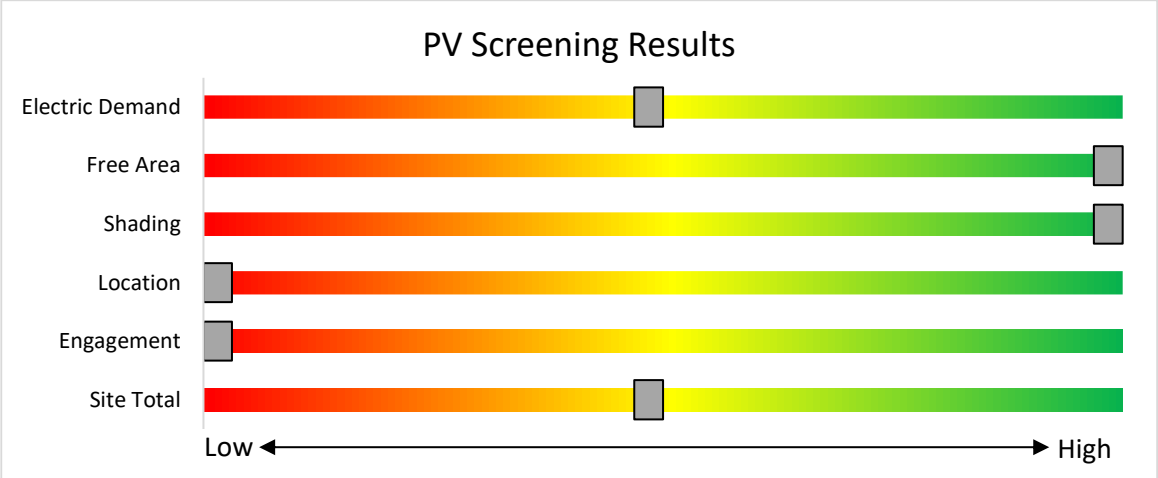
## 6.1 Solar Photovoltaic

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

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

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

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




| | | |
|---|---|---|
| **Potential** | Medium | |
| **System Potential** | 345 | kW DC STC |
| **Electric Generation** | 411,023 | kWh/yr |
| **Displaced Cost** | $61,900 | /yr |
| **Installed Cost** | $1,255,800 | |

*Figure 8 - Photovoltaic Screening*

**Successor Solar Incentive Program (SuSI)**

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

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

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

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

## 6.2 Combined Heat and Power

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

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

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

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

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

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

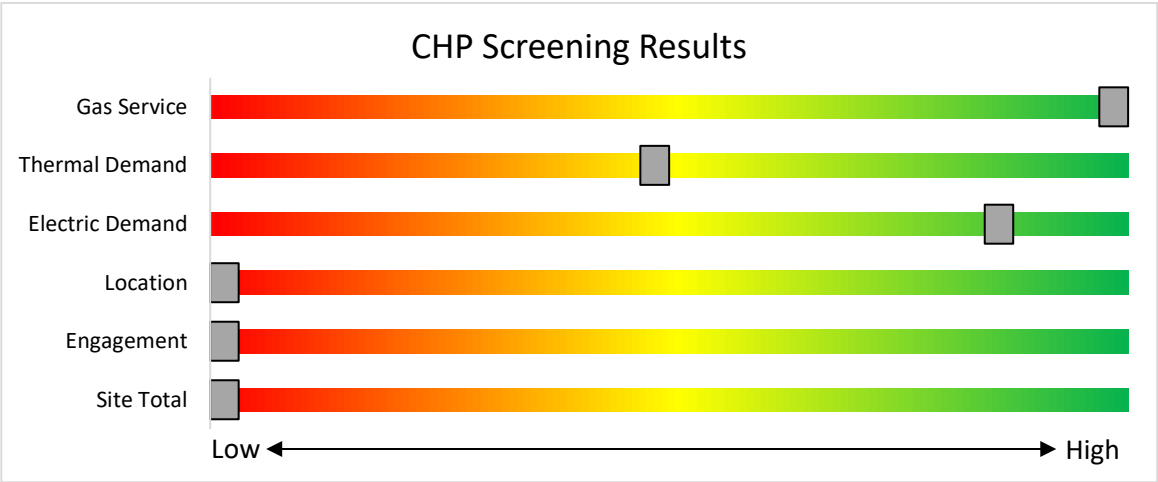


*Figure 9 - Combined Heat and Power Screening*

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

# 7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? Your utility provider may be able to help.

## 7.1 Utility Energy Efficiency Programs

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


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

https://www.njcleanenergy.com/transition

# 8 New Jersey's Clean Energy Programs

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


## 8.1 Large Energy Users

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

**Incentives**

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

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

**How to Participate**

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

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

## 8.2 Combined Heat and Power

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

**Incentives**

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

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

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

**How to Participate**

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

## 8.3 Successor Solar Incentive Program (SuSI)

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

**Administratively Determined Incentive (ADI) Program**

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

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

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

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

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

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

**Competitive Solar Incentive Program**

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

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

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

## 8.4 Energy Savings Improvement Program

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

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

**How to Participate**

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

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

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

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

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

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

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

# 9 PROJECT DEVELOPMENT

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

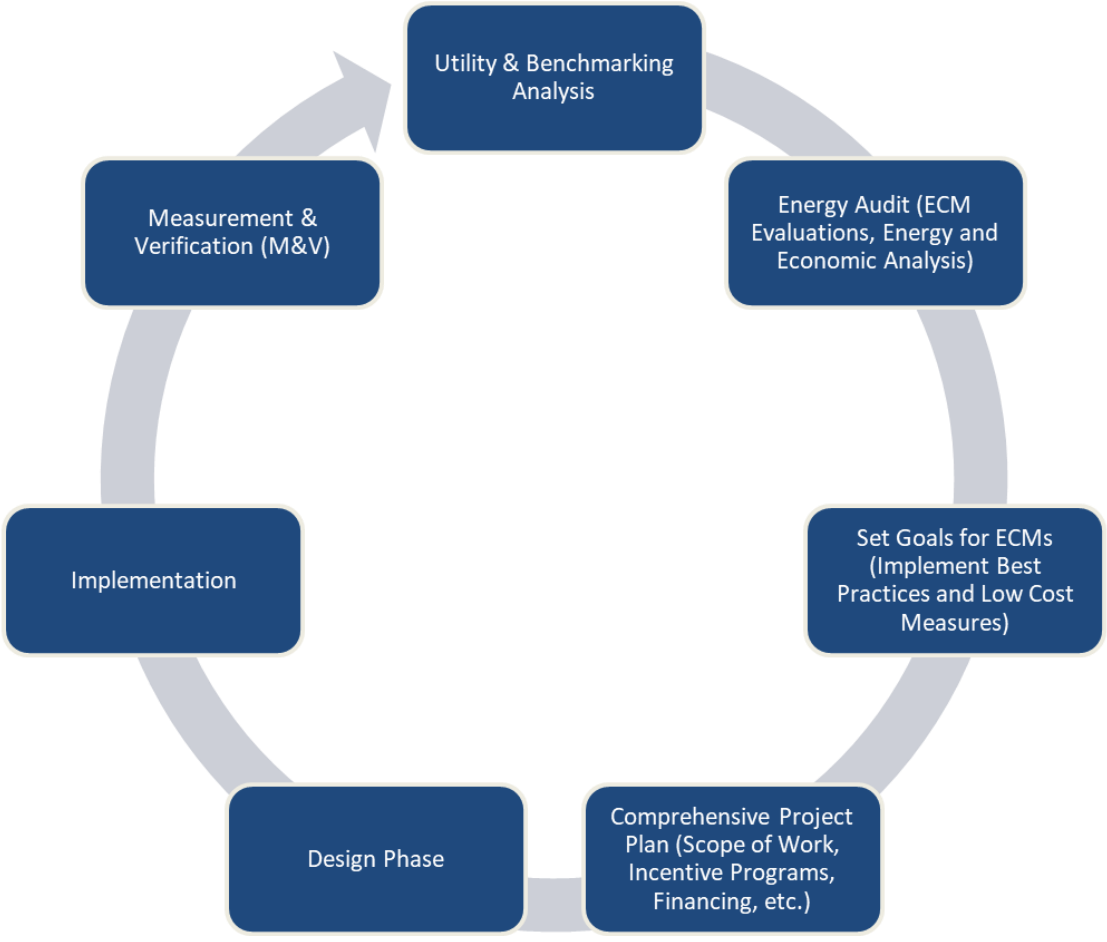



*Figure 10 – Project Development Cycle*

# 10 Energy Purchasing and Procurement Strategies

## 10.1 Retail Electric Supply Options

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

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

A list of licensed third-party electric suppliers is available at the NJBPU website[9].

## 10.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[10].

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

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

# APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

## Lighting Inventory & Recommendations

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| 30 Maintenance | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 30 Maintenance | 2 | LED Lamps: (2) 10W Tubular Lamps | Wall Switch | S | 20 | 2,980 | | None | No | 2 | LED Lamps: (2) 10W Tubular Lamps | Wall Switch | 20 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 30 Maintenance | 2 | LED Lamps: (2) 12W Tubular Lamps | Wall Switch | S | 24 | 2,980 | | None | No | 2 | LED Lamps: (2) 12W Tubular Lamps | Wall Switch | 24 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 31 Athletic | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 31 Athletic | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 16 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.9 | 3,880 | -1 | $575 | $1,708 | $390 | 2.3 |
| 42A Peer Meditation | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 42A Peer Meditation | 6 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 6 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.1 | 244 | 0 | $36 | $270 | $35 | 6.5 |
| 42C IT | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.2 | 970 | 0 | $144 | $562 | $115 | 3.1 |
| 42D Storage | 1 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | S | 40 | 2,793 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 42E Storage | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 1,000 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 690 | 0.0 | 27 | 0 | $4 | $116 | $0 | 28.7 |
| 44 Team Room | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 44 Team Room | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.3 | 1,376 | 0 | $204 | $635 | $135 | 2.5 |
| 44A Team Locker Room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $189 | $40 | 3.7 |
| 59 Mechanical | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 8 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.2 | 865 | 0 | $128 | $292 | $80 | 1.7 |
| 62C Work Room | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 551 | 0 | $82 | $416 | $75 | 4.2 |
| 63A Storage | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 1,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 1,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Auditorium | 4 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 2,000 | 3, 4 | Relamp | Yes | 4 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 1,380 | 0.1 | 233 | 0 | $35 | $370 | $43 | 9.5 |
| Auditorium | 4 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Auditorium | 2 | LED - Fixtures: Bollard Fixture | Wall Switch | S | 18 | 2,000 | | None | No | 2 | LED - Fixtures: Bollard Fixture | Wall Switch | 18 | 2,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Auditorium | 40 | LED - Fixtures: Downlight Recessed | Wall Switch | S | 45 | 2,000 | 4 | None | Yes | 40 | LED - Fixtures: Downlight Recessed | Occupancy Sensor | 45 | 1,380 | 0.4 | 1,228 | 0 | $182 | $810 | $105 | 3.9 |
| Auditorium- Stage 41A | 4 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Auditorium- Stage 41A | 2 | Halogen Incandescent: Stage Spot Luminaire | Wall Switch | S | 500 | 500 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures | Wall Switch | 75 | 500 | 0.6 | 468 | 0 | $69 | $690 | $60 | 9.1 |
| Auditorium- Stage 41A | 18 | Incandescent: 65W A Lamp | Wall Switch | S | 65 | 500 | 3 | Relamp | No | 18 | LED Lamps: 10W A Lamp | Wall Switch | 10 | 500 | 0.7 | 545 | 0 | $81 | $310 | $18 | 3.6 |
| Auditorium- Stage 41A | 6 | Halogen Incandescent: Stage Spot Luminaire | Wall Switch | S | 400 | 500 | 1 | Fixture Replacement | No | 6 | LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures | Wall Switch | 60 | 500 | 1.5 | 1,122 | 0 | $166 | $2,070 | $180 | 11.4 |
| Auditorium- Stage 41A | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 500 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 345 | 0.4 | 277 | 0 | $41 | $708 | $155 | 13.5 |

| | 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 | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Boys gym exit foyer | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boys Gymnasium 38 | 4 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boys Gymnasium 38 | 34 | Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L | Occupancy Sensor | S | 234 | 2,793 | 3 | Relamp | No | 34 | LED - Linear Tubes: (4) 4' T5HO (25W) Lamps | Occupancy Sensor | 102 | 2,793 | 3.2 | 13,789 | -3 | $2,045 | $3,590 | $680 | 1.4 |
| Boys Gymnasium 38 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.2 | 1,101 | 0 | $163 | $562 | $115 | 2.7 |
| Boys Locker Room 43 | 3 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boys Locker Room 43 | 11 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | S | 32 | 2,980 | 4 | None | Yes | 11 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 32 | 2,056 | 0.1 | 358 | 0 | $53 | $270 | $35 | 4.4 |
| Boys Locker Room 43 | 13 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 13 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.1 | 528 | 0 | $78 | $270 | $35 | 3.0 |
| C1 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.2 | 826 | 0 | $122 | $489 | $95 | 3.2 |
| Cafeteria - 39 | 22 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 2,980 | 3, 4 | Relamp | Yes | 22 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 2,056 | 0.4 | 1,909 | 0 | $283 | $1,090 | $114 | 3.4 |
| Cafeteria - 39 | 6 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Cafeteria - 39 | 82 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 82 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 3.7 | 16,930 | -4 | $2,510 | $6,111 | $1,440 | 1.9 |
| Classroom 1 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 10A | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 15 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.7 | 2,903 | -1 | $430 | $1,092 | $260 | 1.9 |
| Classroom 11 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 14 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 15 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.0 | 152 | 0 | $23 | $55 | $15 | 1.8 |
| Classroom 16 TV Studio | 2 | Compact Fluorescent: Biaxial 65W CFL | Occupancy Sensor | S | 65 | 2,793 | 3, 4 | Relamp | Yes | 2 | LED Lamps: Biaxial LED Lamps | Occupancy Sensor | 46 | 1,927 | 0.0 | 204 | 0 | $30 | $216 | $40 | 5.8 |
| Classroom 16 TV Studio | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,927 | 0.2 | 774 | 0 | $115 | $489 | $95 | 3.4 |
| Classroom 16A | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.1 | 581 | 0 | $86 | $434 | $80 | 4.1 |
| Classroom 17 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.5 | 2,322 | 0 | $344 | $927 | $215 | 2.1 |
| Classroom 18 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.5 | 2,322 | 0 | $344 | $927 | $215 | 2.1 |
| Classroom 19 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.5 | 2,322 | 0 | $344 | $927 | $215 | 2.1 |
| Classroom 2 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 20 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.5 | 2,322 | 0 | $344 | $927 | $215 | 2.1 |
| Classroom 21 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Classroom 21 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 21B Conference | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.1 | 581 | 0 | $86 | $434 | $80 | 4.1 |
| Classroom 21C Art Gallery | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.0 | 194 | 0 | $29 | $287 | $55 | 8.1 |
| Classroom 21C Art Gallery | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.0 | 197 | 0 | $29 | $226 | $50 | 6.0 |
| Classroom 22 | 4 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Occupancy Sensor | S | 52 | 2,793 | 3, 4 | Relamp | Yes | 4 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 1,927 | 0.1 | 325 | 0 | $48 | $370 | $43 | 6.8 |
| Classroom 22 | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Classroom 22 | 20 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 20 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 1.1 | 4,546 | -1 | $674 | $2,001 | $470 | 2.3 |
| Classroom 26 Wrestling Room | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Classroom 26 Wrestling Room | 21 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | S | 40 | 2,793 | 4 | None | Yes | 21 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 1,927 | 0.2 | 800 | 0 | $119 | $540 | $70 | 4.0 |
| Classroom 28 Drafting | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.5 | 2,322 | 0 | $344 | $927 | $215 | 2.1 |
| Classroom 29 Health | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 10 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 0.5 | 2,273 | 0 | $337 | $1,000 | $235 | 2.3 |
| Classroom 3 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 32 | 21 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 21 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 1.0 | 4,064 | -1 | $603 | $1,690 | $385 | 2.2 |
| Classroom 33 | 2 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Occupancy Sensor | S | 52 | 2,793 | 3, 4 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 1,927 | 0.0 | 163 | 0 | $24 | $166 | $24 | 5.9 |
| Classroom 33 | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Classroom 33 | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 14 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 0.7 | 3,182 | -1 | $472 | $1,292 | $315 | 2.1 |
| Classroom 36 | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 14 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.6 | 2,709 | -1 | $402 | $1,037 | $245 | 2.0 |
| Classroom 4 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 5A | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.3 | 1,161 | 0 | $172 | $599 | $125 | 2.8 |
| Classroom 5B | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 6 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 7 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 8 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 15 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.7 | 2,903 | -1 | $430 | $1,092 | $260 | 1.9 |
| Classroom 9 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Computer Lab 12 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 15 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.5 | 2,281 | 0 | $338 | $822 | $225 | 1.8 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Computer Lab 12 | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 2,793 | 0.0 | 89 | 0 | $13 | $72 | $10 | 4.7 |
| Computer Lab 13 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.5 | 2,478 | -1 | $367 | $927 | $215 | 1.9 |
| Computer Lab 37 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.5 | 2,478 | -1 | $367 | $927 | $215 | 1.9 |
| Corridor 12A | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.1 | 413 | 0 | $61 | $335 | $135 | 3.3 |
| Corridor A | 3 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor A | 30 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 30 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.9 | 4,129 | -1 | $612 | $2,220 | $1,350 | 1.4 |
| Corridor B | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor B | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.3 | 1,376 | 0 | $204 | $815 | $450 | 1.8 |
| Corridor behind kitchen | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor behind kitchen | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.2 | 688 | 0 | $102 | $408 | $225 | 1.8 |
| Corridor between rm 33 and 22 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 2,980 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (1) 4' Lamp | High/Low Control | 15 | 2,056 | 0.0 | 144 | 0 | $21 | $262 | $80 | 8.5 |
| Corridor C | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor C | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.3 | 1,376 | 0 | $204 | $815 | $450 | 1.8 |
| Corridor D | 5 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 5 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor D | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor D | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 16 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.5 | 2,202 | 0 | $327 | $1,259 | $720 | 1.7 |
| Corridor E | 4 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor E | 28 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 28 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.8 | 3,854 | -1 | $571 | $2,147 | $1,260 | 1.6 |
| Corridor F | 9 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 2,980 | 3, 5 | Relamp | Yes | 9 | LED Lamps: GX23 (Plug-In) Lamps | High/Low Control | 37 | 2,056 | 0.2 | 781 | 0 | $116 | $675 | $333 | 3.0 |
| Corridor F | 7 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 7 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor F | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $298 | $90 | 5.1 |
| Corridor G | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor G | 4 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 5 | None | Yes | 4 | LED - Fixtures: Ambient 2x4 Fixture | High/Low Control | 40 | 2,056 | 0.0 | 163 | 0 | $24 | $225 | $140 | 3.5 |
| Corridor H | 2 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 2,980 | 3, 5 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | High/Low Control | 37 | 2,056 | 0.0 | 174 | 0 | $26 | $275 | $74 | 7.8 |
| Corridor H | 3 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Corridor H | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 5 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,056 | 0.2 | 1,101 | 0 | $163 | $742 | $360 | 2.3 |
| Corridor inside 31 Athletic | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 2,980 | 0.0 | 184 | 0 | $27 | $73 | $20 | 1.9 |
| Elevator Room 54 | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | 4 | None | Yes | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Occupancy Sensor | 10 | 2,056 | 0.0 | 20 | 0 | $3 | $116 | $20 | 31.9 |
| Entrance Corridor | 2 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 2,980 | 3, 5 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | High/Low Control | 37 | 2,056 | 0.0 | 174 | 0 | $26 | $275 | $74 | 7.8 |
| Entrance Corridor | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Entrance Corridor | 6 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 5 | None | Yes | 6 | LED - Fixtures: Ambient 2x4 Fixture | High/Low Control | 40 | 2,056 | 0.1 | 244 | 0 | $36 | $225 | $210 | 0.4 |
| Entrance Foyer | 3 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | S | 32 | 2,980 | 5 | None | Yes | 3 | LED - Fixtures: Ambient 2x2 Fixture | High/Low Control | 32 | 2,056 | 0.0 | 98 | 0 | $14 | $225 | $105 | 8.3 |
| Exit 23 | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 81 | 0 | $12 | $116 | $20 | 8.0 |
| Exterior - boiler room wall packs | 3 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | S | 45 | 4,380 | | None | No | 3 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 45 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - Entrance 10 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 16 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 17 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 18 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 19 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 22 | 2 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 307 | 0 | $46 | $304 | $10 | 6.4 |
| Exterior - Entrance 24 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 25 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 29 | 2 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 307 | 0 | $46 | $304 | $10 | 6.4 |
| Exterior - Entrance 29 | 1 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | S | 45 | 4,380 | | None | No | 1 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 45 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - Entrance 3 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 30 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Entrance 4 | 1 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 153 | 0 | $23 | $152 | $5 | 6.4 |
| Exterior - Front entrance | 4 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 4 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 613 | 0 | $92 | $607 | $20 | 6.4 |
| Exterior - Front entrance | 5 | Metal Halide: (1) 50W Lamp | Timeclock | S | 50 | 4,380 | 1 | Fixture Replacement | No | 5 | LED - Fixtures: Downlight Recessed | Timeclock | 15 | 4,380 | 0.0 | 767 | 0 | $115 | $759 | $25 | 6.4 |
| Exterior - Parking lot (1) SW | 10 | LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture | Timeclock | S | 200 | 4,380 | | None | No | 10 | LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture | Timeclock | 200 | 4,380 | 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 | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Exterior - Parking lot (2)North | 6 | LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture | Timeclock | S | 200 | 4,380 | | None | No | 6 | LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture | Timeclock | 200 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - Parking lot (3) N | 10 | LED Lamps: 65W LED Corn Bulb | Timeclock | S | 65 | 4,380 | | None | No | 10 | LED Lamps: 65W LED Corn Bulb | Timeclock | 65 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - wall packs | 2 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Photocell | S | 45 | 4,380 | | None | No | 2 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Photocell | 45 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - wall packs | 1 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Photocell | S | 45 | 4,380 | | None | No | 1 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Photocell | 45 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior by football field | 11 | LED Lamps: 65W LED Corn Bulb | Photocell | S | 65 | 4,380 | | None | No | 11 | LED Lamps: 65W LED Corn Bulb | Photocell | 65 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior Soccer | 2 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Photocell | S | 120 | 4,380 | | None | No | 2 | LED - Fixtures: Large Pole/Arm-Mounted Area/Roadway Fixture | Photocell | 120 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Faculty Dining - 39B | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,000 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,380 | 0.3 | 831 | 0 | $123 | $599 | $125 | 3.8 |
| Garage 1 | 4 | Linear Fluorescent - EST12: 4' T12 (34W) - 1L | Wall Switch | S | 43 | 2,000 | 2, 4 | Relamp & Reballast | Yes | 4 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 1,380 | 0.1 | 290 | 0 | $43 | $472 | $55 | 9.7 |
| Girl Gym Foyer | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Girl Gym Foyer | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.0 | 73 | 0 | $11 | $37 | $10 | 2.5 |
| Girl Gym Foyer (2) | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Girl Gym Foyer (2) | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.0 | 73 | 0 | $11 | $37 | $10 | 2.5 |
| Girls Locker Room 47 | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Girls Locker Room 47 | 17 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3, 4 | Relamp | Yes | 17 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,380 | 0.5 | 1,570 | 0 | $233 | $1,161 | $240 | 4.0 |
| Gym 38 Foyer | 2 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 2,000 | 3, 4 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 1,380 | 0.0 | 116 | 0 | $17 | $166 | $24 | 8.2 |
| Gym 38 Foyer | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Gym 38 Foyer | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,000 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 1,380 | 0.0 | 55 | 0 | $8 | $116 | $20 | 11.9 |
| Gymnasium 1 - 25 | 4 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Gymnasium 1 - 25 | 22 | Linear Fluorescent - T5HO: 4' T5HO (54W) - 4L | Occupancy Sensor | S | 234 | 2,793 | 3 | Relamp | No | 22 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,793 | 2.8 | 11,896 | -2 | $1,764 | $1,607 | $440 | 0.7 |
| Gymnasium 1 - 25 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,793 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,927 | 0.2 | 1,032 | 0 | $153 | $562 | $115 | 2.9 |
| Gymnasium 1 - 25 | 1 | Metal Halide: (1) 400W Lamp | Wall Switch | S | 458 | 2,793 | 1, 4 | Fixture Replacement | Yes | 1 | LED - Fixtures: High-Bay | Occupancy Sensor | 120 | 1,927 | 0.3 | 1,153 | 0 | $171 | $762 | $85 | 4.0 |
| Health office 65 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,000 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,380 | 0.3 | 831 | 0 | $123 | $599 | $125 | 3.8 |
| Janitorial 11C | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Janitorial 36B | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Janitorial 46B | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,000 | 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 | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Janitorial 49A | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Janitorial 58 | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Janitorial 65C | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen 1 | 3 | Incandescent: (1) 250W A21 Screw-In Lamp | Wall Switch | S | 250 | 660 | | None | No | 3 | Incandescent: (1) 250W A21 Screw-In Lamp | Wall Switch | 250 | 660 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen 1 | 4 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,000 | | None | No | 4 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen 1 | 38 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3, 4 | Relamp | Yes | 38 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,380 | 1.1 | 3,510 | -1 | $521 | $2,198 | $485 | 3.3 |
| Kitchen Foyer 40D | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.0 | 73 | 0 | $11 | $37 | $10 | 2.5 |
| Locker Room - Girls 48 | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Locker Room - Girls 48 | 15 | Compact Fluorescent: 23W A Lamp | Wall Switch | S | 23 | 2,000 | 3, 4 | Relamp | Yes | 15 | LED Lamps: A Lamp | Occupancy Sensor | 16 | 1,380 | 0.1 | 395 | 0 | $59 | $528 | $50 | 8.2 |
| Locker Room 43F | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,000 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 1,380 | 0.0 | 55 | 0 | $8 | $116 | $20 | 11.9 |
| Locker Room 43G | 4 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | S | 32 | 2,000 | 4 | None | Yes | 4 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 32 | 1,380 | 0.0 | 87 | 0 | $13 | $270 | $35 | 18.2 |
| Locker Room 43J | 3 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,000 | 4 | None | Yes | 3 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 1,380 | 0.0 | 82 | 0 | $12 | $270 | $35 | 19.4 |
| Locker Room 43K | 2 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 2,000 | 3, 4 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 1,380 | 0.0 | 116 | 0 | $17 | $166 | $24 | 8.2 |
| Locker Room 48 B girls | 2 | Compact Fluorescent: (2) 13W Biaxial Plug-In Lamps | Wall Switch | S | 26 | 2,000 | 3, 4 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 19 | 1,380 | 0.0 | 57 | 0 | $8 | $166 | $24 | 16.9 |
| Locker Room 48 B girls | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 2,000 | 0.0 | 64 | 0 | $9 | $72 | $10 | 6.6 |
| Locker Room 48D Girls | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,380 | 0.1 | 173 | 0 | $26 | $261 | $40 | 8.6 |
| Main Office | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3, 4 | Relamp | Yes | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,380 | 0.5 | 1,478 | 0 | $219 | $1,124 | $230 | 4.1 |
| Maintenance shop 27 | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Maintenance shop 27 | 39 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3 | Relamp | No | 39 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.9 | 2,831 | -1 | $420 | $1,424 | $390 | 2.5 |
| Mechanical 1 | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 1 | 13 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,000 | 3 | Relamp | No | 13 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.3 | 944 | 0 | $140 | $475 | $130 | 2.5 |
| Office - 239 BOE | 11 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,000 | 4 | None | Yes | 11 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 1,380 | 0.1 | 300 | 0 | $44 | $270 | $35 | 5.3 |
| Office - 239C | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 81 | 0 | $12 | $116 | $20 | 8.0 |
| Office - 239E | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 81 | 0 | $12 | $116 | $20 | 8.0 |
| Office - 26A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.1 | 413 | 0 | $61 | $226 | $50 | 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 | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Office - 30A | 2 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | S | 32 | 2,980 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 32 | 2,056 | 0.0 | 65 | 0 | $10 | $116 | $20 | 10.0 |
| Office - 31A | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 2,980 | 0.0 | 184 | 0 | $27 | $73 | $20 | 1.9 |
| Office - 31A | 1 | LED - Fixtures: 30W LED Recessed | Wall Switch | S | 30 | 2,980 | | None | No | 1 | LED - Fixtures: 30W LED Recessed | Wall Switch | 30 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - 33D | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.1 | 413 | 0 | $61 | $226 | $50 | 2.9 |
| Office - 34 Special Services | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - 34 Special Services | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.3 | 1,455 | 0 | $216 | $708 | $155 | 2.6 |
| Office - 34 Special Services | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 2,980 | 0.0 | 95 | 0 | $14 | $72 | $10 | 4.4 |
| Office - 34A | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.2 | 970 | 0 | $144 | $562 | $115 | 3.1 |
| Office - 34B | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - 34B | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.3 | 1,213 | 0 | $180 | $635 | $135 | 2.8 |
| Office - 34B | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 2,056 | 0.1 | 257 | 0 | $38 | $261 | $40 | 5.8 |
| Office - 35 | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - 35 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.0 | 108 | 0 | $16 | $37 | $10 | 1.7 |
| Office - 35 | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 7 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.4 | 1,698 | 0 | $252 | $781 | $175 | 2.4 |
| Office - 35 | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 2,056 | 0.1 | 257 | 0 | $38 | $261 | $40 | 5.8 |
| Office - 35A | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.2 | 728 | 0 | $108 | $489 | $95 | 3.7 |
| Office - 35B | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.1 | 485 | 0 | $72 | $262 | $60 | 2.8 |
| Office - 35C | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.1 | 485 | 0 | $72 | $262 | $60 | 2.8 |
| Office - 35D | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.1 | 485 | 0 | $72 | $262 | $60 | 2.8 |
| Office - 35E | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.1 | 485 | 0 | $72 | $262 | $60 | 2.8 |
| Office - 40C | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $189 | $40 | 3.7 |
| Office - 40C Custodial | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.1 | 413 | 0 | $61 | $226 | $50 | 2.9 |
| Office - 42B | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 81 | 0 | $12 | $116 | $20 | 8.0 |
| Office - 47A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $189 | $40 | 3.7 |
| Office - 62A Principal | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 551 | 0 | $82 | $416 | $75 | 4.2 |

| | 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 | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Office - 62D | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.2 | 970 | 0 | $144 | $562 | $115 | 3.1 |
| Office - C3-A | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.2 | 826 | 0 | $122 | $489 | $95 | 3.2 |
| Office - C3-B | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.2 | 826 | 0 | $122 | $489 | $95 | 3.2 |
| Office - C4 principal conference room | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.3 | 1,239 | 0 | $184 | $599 | $125 | 2.6 |
| Office - C5 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.1 | 619 | 0 | $92 | $434 | $80 | 3.9 |
| Office - Locker room 48A girls | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $189 | $40 | 3.7 |
| Office - Media Center | 3 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Media Center | 18 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | S | 32 | 2,980 | 4 | None | Yes | 18 | LED - Fixtures: Ambient 2x2 Fixture | Occupancy Sensor | 32 | 2,056 | 0.1 | 585 | 0 | $87 | $540 | $70 | 5.4 |
| Office - Media Center | 67 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 67 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.6 | 2,723 | -1 | $404 | $1,350 | $175 | 2.9 |
| Restroom - 47A | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - 48A | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Boys Corridor C | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.1 | 619 | 0 | $92 | $434 | $80 | 3.9 |
| Restroom - Boys corridor E | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,793 | 0.0 | 203 | 0 | $30 | $73 | $20 | 1.8 |
| Restroom - Boys Corridor G | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.2 | 688 | 0 | $102 | $453 | $85 | 3.6 |
| Restroom - Boys Corridor G near exit 10 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $189 | $40 | 3.7 |
| Restroom - Boys/girls inside 65 | 1 | Compact Fluorescent: (1) 26W Circline/T6 Plug-In Lamp | Wall Switch | S | 26 | 2,980 | 3 | Relamp | No | 1 | LED Lamps: <Consider Replacement> Lamps | Wall Switch | 19 | 2,980 | 0.0 | 23 | 0 | $3 | $55 | $0 | 16.2 |
| Restroom - Female 47D | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.0 | 108 | 0 | $16 | $37 | $10 | 1.7 |
| Restroom - Female Faculty | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Female Faculty | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $189 | $40 | 3.7 |
| Restroom - Female faculty corridor A | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.2 | 970 | 0 | $144 | $562 | $115 | 3.1 |
| Restroom - Girl corridor E | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,793 | 0.0 | 203 | 0 | $30 | $73 | $20 | 1.8 |
| Restroom - Girls corridor A | 3 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | S | 40 | 2,793 | | None | No | 3 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Girls Corridor G | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.2 | 688 | 0 | $102 | $453 | $85 | 3.6 |
| Restroom - Girls Corridor G near exit 10 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $343 | $55 | 7.1 |
| Restroom - Inside health 65 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.0 | 108 | 0 | $16 | $37 | $10 | 1.7 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Restroom - Male Faculty | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Male Faculty | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 275 | 0 | $41 | $189 | $40 | 3.7 |
| Restroom - Male Faculty corridor A | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,056 | 0.2 | 970 | 0 | $144 | $562 | $115 | 3.1 |
| Restroom inside 40C | 1 | Compact Fluorescent: (3) 14W CFL A Lamp | Wall Switch | S | 42 | 2,980 | 3 | Relamp | No | 1 | LED Lamps: A Lamp | Wall Switch | 30 | 2,980 | 0.0 | 39 | 0 | $6 | $17 | $1 | 2.8 |
| Roof | 3 | Metal Halide: (1) 400W Lamp | Photocell | S | 458 | 4,380 | 1 | Fixture Replacement | No | 3 | LED - Fixtures: High-Bay | Photocell | 120 | 4,380 | 0.0 | 4,441 | 0 | $669 | $1,477 | $150 | 2.0 |
| Room 64 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.1 | 619 | 0 | $92 | $434 | $80 | 3.9 |
| Room 65C | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.0 | 108 | 0 | $16 | $37 | $10 | 1.7 |
| Room 65D | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.0 | 108 | 0 | $16 | $37 | $10 | 1.7 |
| Room 65E | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.0 | 108 | 0 | $16 | $37 | $10 | 1.7 |
| Server Room 10C | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.4 | 1,858 | 0 | $276 | $763 | $170 | 2.2 |
| Server Room 41C | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,980 | 0.0 | 108 | 0 | $16 | $37 | $10 | 1.7 |
| Stair A | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair A | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair A | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |
| Stair B | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair B | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair B | 1 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | S | 32 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | 32 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair B | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair C | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair C | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair C | 1 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | S | 32 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x2 Fixture | Wall Switch | 32 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair C | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair D | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair D | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair D | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | S | 32 | 4,048 | | None | No | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | 32 | 4,048 | 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 | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Stair D | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair E | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair E | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair E | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | S | 32 | 4,048 | | None | No | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | 32 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair E | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair F | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair F | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair F | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | S | 32 | 4,048 | | None | No | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | 32 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair F | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair G | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair G | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair G | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | S | 32 | 4,048 | | None | No | 1 | LED - Fixtures: 32W LED Recessed | Wall Switch | 32 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair G | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 4,048 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Storage 22A | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 1,000 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 690 | 0.0 | 73 | 0 | $11 | $325 | $15 | 28.8 |
| Storage 22C | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage 22D | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage 25B | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 1,000 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 1,000 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Storage 27A | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,000 | 0.0 | 62 | 0 | $9 | $73 | $20 | 5.8 |
| Storage 27B | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage 27D | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 36 | 0 | $5 | $37 | $10 | 4.9 |
| Storage 31B | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | S | 88 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 65 | 0 | $10 | $37 | $10 | 2.8 |
| Storage 33C | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage 40A | 2 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | S | 88 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 150 | 0 | $22 | $189 | $20 | 7.6 |
| Storage 43B | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 185 | 0 | $27 | $416 | $40 | 13.7 |
| Storage 45A | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 1,000 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 1,000 | 0.0 | 17 | 0 | $2 | $25 | $2 | 9.4 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Storage 46A | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 1,000 | 0.0 | 62 | 0 | $9 | $73 | $20 | 5.8 |
| Storage 47B | 3 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 1,000 | 4 | None | Yes | 3 | LED Lamps: (1) 10W A19 Screw-In Lamp | Occupancy Sensor | 10 | 690 | 0.0 | 10 | 0 | $2 | $270 | $0 | 178.0 |
| Storage 60 | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | S | 88 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 65 | 0 | $10 | $37 | $10 | 2.8 |
| Storage 63 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 36 | 0 | $5 | $37 | $10 | 4.9 |
| Storage inside 31 Atheltic | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage inside 32 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 1,000 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 690 | 0.1 | 208 | 0 | $31 | $434 | $45 | 12.6 |
| Storage Inside 40C | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 1,000 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 1,000 | 0.0 | 56 | 0 | $8 | $17 | $1 | 2.0 |
| Storage on Room 22 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage on Room 33 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage S3 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 1,000 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 690 | 0.1 | 97 | 0 | $14 | $343 | $20 | 22.5 |
| Storage V-11 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 690 | 0.1 | 139 | 0 | $21 | $226 | $30 | 9.5 |
| Weight room 23 and 24 | 27 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 27 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.2 | 1,097 | 0 | $163 | $540 | $70 | 2.9 |
| 227A | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 7 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.3 | 1,445 | 0 | $214 | $653 | $140 | 2.4 |
| 233 Faculty | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.3 | 1,239 | 0 | $184 | $599 | $125 | 2.6 |
| Classroom 201 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 202 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 204 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 205 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 206 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 207 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.0 | 152 | 0 | $23 | $55 | $15 | 1.8 |
| Classroom 208 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.0 | 152 | 0 | $23 | $55 | $15 | 1.8 |
| Classroom 209 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 210 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 211 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 212 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Classroom 213 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 214 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,793 | 0.0 | 172 | 0 | $26 | $73 | $20 | 2.1 |
| Classroom 215 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.4 | 1,825 | 0 | $271 | $657 | $180 | 1.8 |
| Classroom 216 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.5 | 2,322 | 0 | $344 | $927 | $215 | 2.1 |
| Classroom 217 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.4 | 1,825 | 0 | $271 | $657 | $180 | 1.8 |
| Classroom 218 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,548 | 0 | $230 | $708 | $155 | 2.4 |
| Classroom 219 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.4 | 1,825 | 0 | $271 | $657 | $180 | 1.8 |
| Classroom 220 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.4 | 1,825 | 0 | $271 | $657 | $180 | 1.8 |
| Classroom 221 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 0.4 | 1,818 | 0 | $270 | $854 | $195 | 2.4 |
| Classroom 222 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 2,793 | 0.0 | 172 | 0 | $26 | $73 | $20 | 2.1 |
| Classroom 222A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 0.1 | 455 | 0 | $67 | $262 | $60 | 3.0 |
| Classroom 222B | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 0.1 | 455 | 0 | $67 | $262 | $60 | 3.0 |
| Classroom 223 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 16 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 0.9 | 3,637 | -1 | $539 | $1,708 | $390 | 2.4 |
| Classroom 223A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Occupancy Sensor | S | 114 | 2,793 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,927 | 0.1 | 455 | 0 | $67 | $262 | $60 | 3.0 |
| Classroom 224 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 15 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.7 | 2,903 | -1 | $430 | $1,092 | $260 | 1.9 |
| Classroom 225 | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 18 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.8 | 3,483 | -1 | $517 | $1,526 | $340 | 2.3 |
| Classroom 226 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 227B | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,927 | 0.4 | 1,742 | 0 | $258 | $763 | $170 | 2.3 |
| Classroom 228 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.0 | 152 | 0 | $23 | $55 | $15 | 1.8 |
| Classroom 228A | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,927 | 0.1 | 387 | 0 | $57 | $380 | $65 | 5.5 |
| Classroom 229 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.0 | 152 | 0 | $23 | $55 | $15 | 1.8 |
| Classroom 229A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,927 | 0.1 | 258 | 0 | $38 | $189 | $40 | 3.9 |
| Classroom 230 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.0 | 152 | 0 | $23 | $55 | $15 | 1.8 |
| Classroom C23A | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.2 | 913 | 0 | $135 | $329 | $90 | 1.8 |
| Corridor A | 4 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Corridor A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,048 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,793 | 0.1 | 374 | 0 | $55 | $298 | $90 | 3.8 |
| Corridor B | 3 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3, 5 | Relamp | Yes | 3 | LED Lamps: GX23 (Plug-In) Lamps | High/Low Control | 37 | 2,793 | 0.1 | 354 | 0 | $52 | $300 | $111 | 3.6 |
| Corridor B | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor B | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,048 | 3, 5 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,793 | 0.3 | 1,870 | 0 | $277 | $815 | $450 | 1.3 |
| Corridor C | 4 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3, 5 | Relamp | Yes | 4 | LED Lamps: GX23 (Plug-In) Lamps | High/Low Control | 37 | 2,793 | 0.1 | 471 | 0 | $70 | $325 | $148 | 2.5 |
| Corridor C | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor C | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,048 | 3, 5 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,793 | 0.3 | 1,870 | 0 | $277 | $815 | $450 | 1.3 |
| Corridor E | 8 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 8 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.1 | 534 | 0 | $79 | $200 | $16 | 2.3 |
| Corridor E | 3 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor E | 25 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,048 | 3, 5 | Relamp | Yes | 25 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,793 | 0.8 | 4,674 | -1 | $693 | $2,038 | $1,125 | 1.3 |
| Corridor F | 7 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3, 5 | Relamp | Yes | 7 | LED Lamps: GX23 (Plug-In) Lamps | High/Low Control | 37 | 2,793 | 0.1 | 825 | 0 | $122 | $625 | $259 | 3.0 |
| Corridor F | 6 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor F | 19 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,048 | 3, 5 | Relamp | Yes | 19 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,793 | 0.6 | 3,552 | -1 | $527 | $1,594 | $855 | 1.4 |
| Corridor G | 4 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3, 5 | Relamp | Yes | 4 | LED Lamps: GX23 (Plug-In) Lamps | High/Low Control | 37 | 2,793 | 0.1 | 471 | 0 | $70 | $325 | $148 | 2.5 |
| Corridor G | 2 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor G | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,048 | 3, 5 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 2,793 | 0.3 | 1,870 | 0 | $277 | $815 | $450 | 1.3 |
| Janitorial 228C | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Janitorial 236A | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Janitorial 240D | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,980 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - 203 | 9 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 9 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.1 | 366 | 0 | $54 | $270 | $35 | 4.3 |
| Office - 238 | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | | None | No | 1 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | 40 | 2,980 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - 238A | 3 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 3 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 122 | 0 | $18 | $270 | $35 | 13.0 |
| Office - 238B | 3 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 3 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 122 | 0 | $18 | $270 | $35 | 13.0 |
| Office - 238C | 6 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 6 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.1 | 244 | 0 | $36 | $270 | $35 | 6.5 |
| Office - 239A | 4 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 4 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 163 | 0 | $24 | $270 | $35 | 9.7 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Office - 239B | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 81 | 0 | $12 | $116 | $20 | 8.0 |
| Office - 239D | 3 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 2,980 | 4 | None | Yes | 3 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,056 | 0.0 | 122 | 0 | $18 | $270 | $35 | 13.0 |
| Office - C21 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.1 | 619 | 0 | $92 | $434 | $80 | 3.9 |
| Office - C22 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | S | 93 | 2,793 | 3 | Relamp | No | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,793 | 0.1 | 456 | 0 | $68 | $164 | $45 | 1.8 |
| Office - C23B | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.2 | 826 | 0 | $122 | $489 | $95 | 3.2 |
| Office - C24 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | S | 93 | 2,980 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 2,056 | 0.3 | 1,239 | 0 | $184 | $599 | $125 | 2.6 |
| Office - C25 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,980 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,056 | 0.1 | 551 | 0 | $82 | $416 | $75 | 4.2 |
| Restroom - Boys corridor C | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,793 | 0.0 | 203 | 0 | $30 | $73 | $20 | 1.8 |
| Restroom - Boys corridor E | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,793 | 0.0 | 203 | 0 | $30 | $73 | $20 | 1.8 |
| Restroom - Female Faculty in 233 | 5 | LED - Fixtures: Ambient 1x4 Fixture | Wall Switch | S | 32 | 2,980 | 4 | None | Yes | 5 | LED - Fixtures: Ambient 1x4 Fixture | Occupancy Sensor | 32 | 2,056 | 0.0 | 163 | 0 | $24 | $270 | $35 | 9.7 |
| Restroom - Girl corridor A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,793 | 0.0 | 203 | 0 | $30 | $73 | $20 | 1.8 |
| Restroom - Girl corridor C | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,793 | 0.0 | 203 | 0 | $30 | $73 | $20 | 1.8 |
| Restroom - Girl corridor E | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | S | 62 | 2,793 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,793 | 0.0 | 203 | 0 | $30 | $73 | $20 | 1.8 |
| Restroom - Male Faculty in 233 | 5 | LED - Fixtures: Ambient 1x4 Fixture | Wall Switch | S | 32 | 2,980 | 4 | None | Yes | 5 | LED - Fixtures: Ambient 1x4 Fixture | Occupancy Sensor | 32 | 2,056 | 0.0 | 163 | 0 | $24 | $270 | $35 | 9.7 |
| Stair A | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |
| Stair B | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |
| Stair C | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |
| Stair D | 2 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3, 4 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 2,793 | 0.0 | 236 | 0 | $35 | $166 | $24 | 4.1 |
| Stair D | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |
| Stair E | 2 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3, 4 | Relamp | Yes | 2 | LED Lamps: GX23 (Plug-In) Lamps | Occupancy Sensor | 37 | 2,793 | 0.0 | 236 | 0 | $35 | $166 | $24 | 4.1 |
| Stair E | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |
| Stair F | 1 | Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps | Wall Switch | S | 52 | 4,048 | 3 | Relamp | No | 1 | LED Lamps: GX23 (Plug-In) Lamps | Wall Switch | 37 | 4,048 | 0.0 | 67 | 0 | $10 | $25 | $2 | 2.3 |
| Stair F | 1 | Exit Signs: LED - 2 W Lamp | None | S | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stair F | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |
| Stair G | 2 | LED - Fixtures: Ambient 2x4 Fixture | Wall Switch | S | 40 | 4,048 | 4 | None | Yes | 2 | LED - Fixtures: Ambient 2x4 Fixture | Occupancy Sensor | 40 | 2,793 | 0.0 | 110 | 0 | $16 | $116 | $20 | 5.9 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Storage 225A | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 690 | 0.1 | 92 | 0 | $14 | $189 | $20 | 12.3 |
| Storage 227B | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 36 | 0 | $5 | $37 | $10 | 4.9 |
| Storage 227C | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 36 | 0 | $5 | $37 | $10 | 4.9 |
| Storage 231 | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 1,000 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 9 | 0 | $1 | $73 | $20 | 40.6 |
| Storage 240A | 4 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 1,000 | 3 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 18 | 0 | $3 | $146 | $40 | 40.6 |
| Storage 240B | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 4 | 0 | $1 | $37 | $10 | 40.6 |
| Storage 240C | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 4 | 0 | $1 | $37 | $10 | 40.6 |
| Storage 240E | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 1,000 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,000 | 0.0 | 4 | 0 | $1 | $37 | $10 | 40.6 |

## Motor Inventory & Recommendations

| | | Existing Conditions | | | | | | | | | Proposed Conditions | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Full Load Efficiency | VFD Control? | Manufacturer | Model | Remaining Useful Life | Annual Operating Hours | ECM # | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Roof | Various Spaces | 8 | Exhaust Fan | 0.3 | 72.4% | No | NA | NA | B | 2,333 | | No | 72.4% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | EF-4 | 1 | Exhaust Fan | 1.0 | 82.5% | No | NA | NA | B | 2,333 | | No | 82.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Various Spaces | 6 | Exhaust Fan | 0.8 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Various Spaces | 64 | Exhaust Fan | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Various Spaces | 2 | Exhaust Fan | 0.2 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Various Spaces | 2 | Exhaust Fan | 0.5 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 1st Floor | Various Classrooms | 44 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 1st Floor | Corridors | 11 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 1st Floor | Offices and Support Areas | 15 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 1st Floor | Stairs | 7 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 2nd Floor | Various Classrooms | 32 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 2nd Floor | Corridors | 8 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 2nd Floor | Offices and Support Areas | 7 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| 2nd Floor | Stairs | 5 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Kitchen | 1 | Kitchen Hood Exhaust Fan | 1.5 | 84.0% | No | NA | NA | B | 3,938 | 7 | No | 86.5% | Yes | 1 | 0.0 | 3,380 | 26 | $797 | $3,391 | $75 | 4.2 |
| Roof | RTU-2 - 2nd Floor | 1 | Supply Fan | 5.0 | 87.5% | No | McQuay | RPS015CSA | B | 2,333 | 6 | No | 89.5% | Yes | 1 | 1.5 | 3,880 | 0 | $584 | $4,076 | $900 | 5.4 |
| Roof | RTU-2 - 2nd Floor | 1 | Return Fan | 1.5 | 84.0% | No | McQuay | RPS015CSA | B | 2,333 | 6 | No | 86.5% | Yes | 1 | 0.5 | 1,226 | 0 | $185 | $3,391 | $75 | 18.0 |
| Grade | Guidance Office Unit | 1 | Supply Fan | 1.5 | 84.0% | No | NA | NA | B | 2,333 | 6 | No | 86.5% | Yes | 1 | 0.4 | 1,226 | 0 | $185 | $3,391 | $75 | 18.0 |
| Roof | RTU-1 - Balcony Seating | 1 | Supply Fan | 20.0 | 92.0% | No | McQuay | RDS800CYA | B | 2,333 | 6 | No | 93.0% | Yes | 1 | 5.8 | 14,464 | 0 | $2,178 | $8,582 | $1,300 | 3.3 |
| Roof | RTU-1 - Balcony Seating | 1 | Return Fan | 15.0 | 91.0% | No | McQuay | RDS800CYA | B | 2,333 | 6 | No | 93.0% | Yes | 1 | 4.6 | 11,176 | 0 | $1,683 | $7,041 | $1,200 | 3.5 |

| | | Existing Conditions | | | | | | | | | Proposed Conditions | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Full Load Efficiency | VFD Control? | Manufacturer | Model | Remaining Useful Life | Annual Operating Hours | ECM # | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Maintenance Shop Rm27 | Maintenance Shop | 1 | Ventilation Fan | 1.5 | 82.5% | No | NA | NA | B | 600 | | No | 82.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Maintenance Shop Rm27 | Garage Door Motor | 1 | Other | 0.5 | 70.0% | No | Marathon | 7VN56C17D1169F | W | 600 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boys Gym | Basketball Backboards | 5 | Other | 0.5 | 70.0% | No | NA | NA | W | 100 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boys Gym | AHU-1 & 2 - Boys Gym | 2 | Supply Fan | 3.0 | 86.5% | No | | | B | 600 | 6 | No | 89.5% | Yes | 2 | 1.8 | 1,235 | 0 | $186 | $7,768 | $400 | 39.6 |
| Gym 1 - 25 | AHU-3 & 4 - Girls Gym | 2 | Supply Fan | 3.0 | 86.5% | No | | | B | 600 | 6 | No | 89.5% | Yes | 2 | 1.8 | 1,235 | 0 | $186 | $7,768 | $400 | 39.6 |
| High School | AHU-5 - Choral/Business | 1 | Supply Fan | 3.0 | 89.5% | No | | | B | 600 | 6 | No | 89.5% | Yes | 1 | 0.9 | 563 | 0 | $85 | $3,884 | $200 | 43.5 |
| Gym 1 - 25 | AHU-3 HW Circ Pump | 1 | Heating Hot Water Pump | 0.8 | 70.0% | No | | | B | 600 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Gym 1 - 25 | AHU-4 HW Circ Pump | 1 | Heating Hot Water Pump | 0.8 | 70.0% | No | | | B | 600 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boiler Room | Boiler Room | 1 | Exhaust Fan | 0.5 | 70.0% | No | NA | NA | W | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boiler Room | Boiler Room | 1 | Fan Coil Unit | 0.3 | 70.0% | No | NA | NA | B | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Boiler Room | Hot Water Loop | 4 | Heating Hot Water Pump | 20.0 | 93.0% | Yes | Baldor | EM2334T | W | 1,797 | | No | 93.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior | Guidance Offices | 1 | Supply Fan | 1.5 | 86.5% | No | | | B | 2,333 | 6 | No | 86.5% | Yes | 1 | 0.4 | 1,132 | 0 | $170 | $3,391 | $75 | 19.5 |
| Exterior | Guidance Offices | 1 | Supply Fan | 1.5 | 86.5% | No | | | B | 2,333 | 6 | No | 86.5% | Yes | 1 | 0.4 | 1,132 | 0 | $170 | $3,391 | $75 | 19.5 |
| Roof | Offices and Support Areas | 2 | Supply Fan | 1.0 | 86.5% | No | | | B | 2,333 | 6 | No | 86.5% | Yes | 2 | 0.6 | 1,509 | 0 | $227 | $6,020 | $150 | 25.8 |
| Roof | Offices and Support Areas | 2 | Supply Fan | 3.0 | 86.5% | No | | | W | 2,333 | 6 | No | 89.5% | Yes | 2 | 1.8 | 4,801 | 0 | $723 | $7,768 | $400 | 10.2 |
| Roof | RTU-3 & 4 | 2 | Supply Fan | 20.0 | 91.0% | No | McQuay | RDS800CYA | B | 2,333 | 6 | No | 93.0% | Yes | 2 | 11.8 | 29,802 | 0 | $4,488 | $17,164 | $2,600 | 3.2 |
| Roof | RTU-3 & 4 | 2 | Exhaust Fan | 15.0 | 91.0% | No | McQuay | RDS800CYA | B | 2,333 | 6 | No | 93.0% | Yes | 2 | 9.2 | 22,351 | 0 | $3,366 | $14,082 | $2,400 | 3.5 |
| Various | Various Spaces | 5 | Supply Fan | 0.1 | 65.0% | No | | | W | 2,333 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Various | Various Spaces | 9 | Supply Fan | 0.5 | 70.0% | No | | | W | 2,333 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Various Spaces | 1 | Supply Fan | 1.0 | 86.5% | No | CNV | D1EB060A25B | B | 2,333 | | No | 86.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

| | | Existing Conditions | | | | | | | | | Proposed Conditions | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Full Load Efficiency | VFD Control? | Manufacturer | Model | Remaining Useful Life | Annual Operating Hours | ECM # | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Mechanical Room 1 | DHW Circulation Pump | 2 | DHW Circulation Pump | 0.1 | 65.0% | No | | | W | 4,380 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| High School | AHU-6 - Band Room 22 | 1 | Supply Fan | 3.0 | 86.5% | No | | | W | 2,333 | 6 | No | 89.5% | Yes | 1 | 0.9 | 2,400 | 0 | $361 | $3,884 | $200 | 10.2 |
| High School | AHU-7 - Photo Lab 37 | 1 | Supply Fan | 3.0 | 86.5% | No | | | W | 2,333 | 6 | No | 89.5% | Yes | 1 | 0.9 | 2,400 | 0 | $361 | $3,884 | $200 | 10.2 |
| High School | AHU-8 - IMC | 1 | Supply Fan | 3.0 | 86.5% | No | | | W | 2,333 | 6 | No | 89.5% | Yes | 1 | 0.9 | 2,400 | 0 | $361 | $3,884 | $200 | 10.2 |
| Roof | RTU-5 & 6 | 1 | Supply Fan | 5.0 | 86.5% | No | | | W | 2,333 | 6 | No | 89.5% | Yes | 1 | 1.5 | 4,001 | 0 | $602 | $4,076 | $900 | 5.3 |
| Roof | RTU-5 & 6 | 1 | Exhaust Fan | 3.0 | 86.5% | No | | | W | 2,333 | 6 | No | 89.5% | Yes | 1 | 0.9 | 2,400 | 0 | $361 | $3,884 | $200 | 10.2 |

## Packaged HVAC Inventory & Recommendations

| | | Existing Conditions | | | | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (MBh) | Cooling Mode Efficiency (SEER/IEER/ EER) | Heating Mode Efficiency | Manufacturer | Model | Remaining Useful Life | ECM # | Install High Efficiency System? | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (MBh) | Cooling Mode Efficiency (SEER/IEER/ EER) | Heating Mode Efficiency | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Various | Classrooms and Offices | 5 | Split-System | 1.00 | | 11.00 | | York | AY012MA321A | B | 8 | Yes | 5 | Split-System | 1.00 | | 16.00 | | 0.9 | 818 | 0 | $123 | $26,962 | $525 | 214.6 |
| Various | Classrooms and Offices | 5 | Split-System | 1.50 | | 11.00 | | York | AY018MA312A | B | 8 | Yes | 5 | Split-System | 1.50 | | 16.00 | | 1.3 | 1,227 | 0 | $185 | $28,388 | $788 | 149.3 |
| Various | Classrooms and Offices | 8 | Split-System | 2.00 | | 11.00 | | York | AY024MA321A | B | 8 | Yes | 8 | Split-System | 2.00 | | 16.00 | | 2.7 | 2,618 | 0 | $394 | $47,373 | $1,680 | 115.9 |
| Various | Classrooms and Offices | 1 | Split-System | 1.00 | | 11.00 | | Sanyo | C1211 | B | 8 | Yes | 1 | Split-System | 1.00 | | 16.00 | | 0.2 | 164 | 0 | $25 | $5,392 | $105 | 214.6 |
| Roof | RCU-23 & 24 - Band and Choral Classrooms | 2 | Split-System | 10.00 | | 9.50 | | York | H3CE120A25A | B | 8 | Yes | 2 | Split-System | 10.00 | | 14.00 | | 4.1 | 3,898 | 0 | $587 | $8,447 | $1,580 | 11.7 |
| Roof | Classrooms and Offices | 3 | Split-System | 3.50 | | 11.00 | | York | H1RA042S25G | B | 8 | Yes | 3 | Split-System | 3.50 | | 16.00 | | 1.8 | 1,718 | 0 | $259 | $19,220 | $1,103 | 70.0 |
| Roof | Classroom and Offices | 2 | Split-System | 2.50 | | 11.00 | | York | AY030MA321A | B | 8 | Yes | 2 | Split-System | 2.50 | | 16.00 | | 0.9 | 818 | 0 | $123 | $12,249 | $525 | 95.2 |
| Roof | RTU-1 - Balcony Seating | 1 | Split-System | 45.00 | | 10.50 | | McQuay | RCS045DYY | B | 8 | Yes | 1 | Split-System | 45.00 | | 12.50 | | 4.1 | 3,950 | 0 | $595 | $31,199 | $3,825 | 46.0 |
| Roof | Classrooms and Offices | 1 | Split-System | 7.50 | | 9.50 | | York | H5CE090A25A | B | 8 | Yes | 1 | Split-System | 7.50 | | 14.00 | | 1.5 | 1,462 | 0 | $220 | $5,887 | $593 | 24.1 |
| Roof | Classrooms and Offices | 1 | Split-System Air-Source HP | 3.00 | 34.00 | 11.00 | 6.5 HSPF | Fujitsu | AOU36PLXB | B | 9 | Yes | 1 | Split-System Air-Source HP | 3.00 | 34.00 | 15.50 | 8.5 HSPF | 1.5 | 1,071 | 0 | $161 | $5,073 | $300 | 29.6 |
| Roof | Classroom and Offices | 1 | Split-System | 2.00 | | 14.00 | | Broadair AC Manufacturing | BC42-14D242G-32S1RB | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Roof | Classrooms and Offices | 1 | Split-System | 7.50 | | 9.50 | | Trane | TTA09023AAA | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior Ground | Guidance Offices | 1 | Package Unit | 7.50 | 96.00 | 9.50 | 0.8 AFUE | York | DU-07N12ATAAA1A | B | 8 | Yes | 1 | Package Unit | 7.50 | 96.00 | 14.00 | 0.82 Et | 1.5 | 1,462 | 1 | $236 | $11,397 | $593 | 45.7 |
| Exterior Ground | Special Services | 1 | Package Unit | 6.50 | 96.00 | 9.50 | 0.8 AFUE | York | DU-06N12ATAAA1B | B | 8 | Yes | 1 | Package Unit | 6.50 | 96.00 | 14.00 | 0.82 Et | 1.3 | 1,267 | 1 | $207 | $10,535 | $514 | 48.4 |
| Roof | Offices and Support Areas | 2 | Package Unit | 5.00 | | 10.00 | | York | D1EB060A25B | B | 8 | Yes | 2 | Package Unit | 5.00 | | 16.00 | | 2.3 | 2,160 | 0 | $325 | $16,410 | $1,030 | 47.3 |
| Roof | Offices and Support Areas | 2 | Package Unit | 7.50 | | 10.50 | | Trane | TCD090C300BC | B | 8 | Yes | 2 | Package Unit | 7.50 | | 14.00 | | 2.1 | 2,057 | 0 | $310 | $20,422 | $1,185 | 62.1 |
| Roof | RTU-2 - Classrooms and Offices | 1 | Package Unit | 15.00 | 249.60 | 11.10 | 0.8 AFUE | McQuay | RPS015CSA | B | 8 | Yes | 1 | Package Unit | 15.00 | 249.60 | 14.00 | 0.82 Et | 1.7 | 1,612 | 4 | $285 | $17,812 | $1,335 | 57.8 |
| Various | Classrooms and Offices | 34 | Window AC | 1.00 | | 9.50 | | Various | Various | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Various | Classrooms and Offices | 1 | Split-System | 2.00 | | 11.00 | | Fujitsu | AOU240L1 | B | 8 | Yes | 1 | Split-System | 2.00 | | 16.00 | | 0.3 | 327 | 0 | $49 | $5,922 | $210 | 115.9 |
| Various | Classrooms and Offices | 3 | Split-System Air-Source HP | 3.00 | 34.00 | 12.00 | 6.5 HSPF | Fujitsu | AOU36RLX | B | 9 | Yes | 3 | Split-System Air-Source HP | 3.00 | 34.00 | 15.50 | 8.5 HSPF | 4.4 | 2,822 | 0 | $425 | $15,218 | $900 | 33.7 |

| | | Existing Conditions | | | | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (MBh) | Cooling Mode Efficiency (SEER/IEER/ EER) | Heating Mode Efficiency | Manufacturer | Model | Remaining Useful Life | ECM # | Install High Efficiency System? | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (kBtu/hr) | Cooling Mode Efficiency (SEER/EER) | Heating Mode Efficiency | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Various | Classrooms and Offices | 1 | Split-System Air-Source HP | 3.50 | 45.00 | 12.00 | 6.5 HSPF | Fujitsu | AOU42RLX | B | 9 | Yes | 1 | Split-System Air-Source HP | 3.50 | 45.00 | 15.50 | 8.5 HSPF | 2.1 | 1,194 | 0 | $180 | $5,918 | $350 | 31.0 |
| Roof | RTU-3 - Cafeteria | 1 | Forced Air Furnace | | 500.00 | | 0.8 AFUE | McQuay | RDS800CYA | B | 10 | Yes | 1 | Forced Air Furnace | | 500.00 | | 0.97 AFUE | 0.0 | 0 | 55 | $605 | $8,904 | $500 | 13.9 |
| Roof | RTU-4 - First Floor | 1 | Forced Air Furnace | | 500.00 | | 0.8 AFUE | McQuay | RDS800CYA | B | 10 | Yes | 1 | Forced Air Furnace | | 500.00 | | 0.97 AFUE | 0.0 | 0 | 55 | $605 | $8,904 | $500 | 13.9 |
| Roof | RTU-1 - Balcony Seating | 1 | Forced Air Furnace | | 649.60 | | 0.8 AFUE | McQuay | RDS800CYA | B | 10 | Yes | 1 | Forced Air Furnace | | 649.60 | | 0.97 AFUE | 0.0 | 0 | 71 | $787 | $9,999 | $500 | 12.1 |

## Space Heating Boiler Inventory & Recommendations

| | | Existing Conditions | | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Output Capacity per Unit (MBh) | Manufacturer | Model | Remaining Useful Life | ECM # | Install High Efficiency System? | System Quantity | System Type | Output Capacity per Unit (MBh) | Heating Efficiency | Heating Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Boiler Room | Heating Hot Water Loop | 8 | Condensing Hot Water Boiler | 1,860 | Aerco | Benchmark 2.0 | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Demand Control Ventilation Recommendations

| | | Recommendation Inputs | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Affected | ECM # | Number of Zones | Cooling Capacity of Controlled System (Tons) | Electric Heating Capacity of Controlled System (kBtu/hr) | Output Heating Capacity of Controlled System (MBh) | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Roof | Bacony Seating - RTU-1 | 11 | 3.00 | 45.00 | 0.00 | 649.60 | 0.0 | 1,198 | 37 | $585 | $4,078 | $0 | 7.0 |
| Roof | Cafeteria-RTU-3 | 11 | 3.00 | 0.00 | 0.00 | 500.00 | 0.0 | 0 | 28 | $311 | $4,078 | $0 | 13.1 |
| Roof | First Floor - RTU-4 | 11 | 3.00 | 0.00 | 0.00 | 500.00 | 0.0 | 0 | 28 | $311 | $4,078 | $0 | 13.1 |

## DHW Inventory & Recommendations

| | | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Manufacturer | Model | Remaining Useful Life | ECM # | Replace? | System Quantity | System Type | Fuel Type | System Efficiency | Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Boiler Room | DHW Loop | 2 | Storage Tank Water Heater (> 50 Gal) | AO Smith | BTH 500-A | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Low-Flow Device Recommendations

| | Recommendation Inputs | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | ECM # | Device Quantity | Device Type | Existing Flow Rate (gpm) | Proposed Flow Rate (gpm) | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Restrooms | 12 | 63 | Faucet Aerator (Lavatory) | 2.20 | 0.50 | 0.0 | 0 | 30 | $330 | $452 | $226 | 0.7 |

## Walk-In Cooler/Freezer Inventory & Recommendations

| | Existing Conditions | | | | Proposed Conditions | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Cooler/ Freezer Quantity | Case Type/Temperature | Manufacturer | Model | 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 | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 1 | Low Temp Freezer (-35F to -5F) | Trenton | Unknown | 14, 15 | Yes | Yes | Yes | 0.1 | 2,336 | 0 | $352 | $2,799 | $205 | 7.4 |

## Commercial Refrigerator/Freezer Inventory & Recommendations

| | Existing Conditions | | | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Refrigerator/ Freezer Type | Manufacturer | Model | ENERGY STAR Qualified? | ECM # | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 6 | Stand-Up Refrigerator, Glass Door (≤15 cu. ft.) | Various | Various | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 2 | Stand-Up Refrigerator, Solid Door (>50 cu. ft.) | Continental | 3R-SS-PT | 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 | Manufacturer | Model | ENERGY STAR Qualified? | ECM # | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 1 | Ice Making Head (<450 lbs/day), Batch | Hoshizaki | NA | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 1 | Ice Making Head (<450 lbs/day), Batch | Ice-O-Matic | NA | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Novelty Cooler Inventory & Recommendations

| | Existing Conditions | | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Cooler Description | Manufacturer | Model | ECM # | Install Automatic Shutoff Control? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Kitchen | 1 | Refrigerator Chest | AHT | RIO S125 | | No | 0.00 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Cooking Equipment Inventory & Recommendations

| | Existing Conditions | | | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Equipment Type | Manufacturer | Model | High Efficiency Equipement? | ECM # | Install High Efficiency Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Classroom 32 | 1 | Gas Combination Oven/Steam Cooker (<15 Pans) | NA | NA | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 1 | Gas Combination Oven/Steam Cooker (<15 Pans) | Southbend | NA | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 1 | Gas Convection Oven (Full Size) | Imperial | NA | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 1 | Insulated Food Holding Cabinet (Full Size) | Food Warming Equip | TS-1826-18 | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen | 1 | Electric Steamer | Turbochef | Tornado | No | | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Dishwasher Inventory & Recommendations

| | Existing Conditions | | | | | | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Dishwasher Type | Manufacturer | Model | Water Heater Fuel Type | Booster Heater Fuel Type | ENERGY STAR Qualified? | ECM # | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Payback w/ Incentives in Years |
| Kitchen | 1 | Door Type (High Temp) | Hobart | CRS-76 | Electric | Electric | No | 13 | Yes | 1.6 | 14,143 | 0 | $2,130 | $9,270 | $700 | 4.0 |

## Plug Load Inventory

| | Existing Conditions | | | | | |
|---|---|---|---|---|---|---|
| Location | Quantity | Equipment Description | Energy Rate (W) | ENERGY STAR Qualified? | Manufacturer | Model |
| Various | 44 | Fan | 100 | No | NA | NA |
| Media Center | 2 | Dehumidifier 135 Pints/day | 1,273 | No | Aprilaire | 1770A |
| Various | 3 | Dehumidifier | 480 | No | Dayton | NA |
| Various | 4 | Coffee Maker | 900 | No | Various | Various |
| Classroom 32 | 1 | Clothes Dryer | 5,000 | No | Whirlpool | NA |
| Various | 90 | Desktop Computer | 270 | Yes | Various | Various |
| Classrooms | 62 | Projector | 200 | No | Various | Various |
| Classrooms | 65 | Laptop | 29 | Yes | Various | Various |
| Various | 24 | Microwave | 800 | No | Various | Various |
| Offices | 3 | Shredder | 1,600 | No | Fellows | Powershred |
| Various | 36 | Printer (Medium) | 192 | No | Various | Various |
| Offices | 9 | Printer (Large) | 600 | No | Xerox | Various |
| Various | 6 | Refrigerator (Large) | 572 | No | Various | Various |
| Various | 20 | Refrigerator (Mini) | 126 | No | Various | Various |
| Various | 19 | Television | 240 | No | Various | Various |
| Various | 4 | Toaster | 1,500 | No | Various | Various |
| Offices | 2 | Water Cooler | 350 | No | Various | Various |
| Classroom 225 | 1 | Kiln | 9,984 | No | Skutt | KM-1027-3 |
| Kitchen | 1 | Food warmer | 1,440 | No | Vollrath | FMA7036 |
| Kitchen | 2 | Food warmer | 1,530 | No | Hatco Corporation | GRSDS-30D |
| Kitchen | 11 | Kitchen Miscelleneous Plug Load | 500 | No | NA | NA |
| High School | 1 | Server | 4,000 | No | | |

## Vending Machine Inventory & Recommendations

| | Existing Conditions | | Proposed Conditions | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Quantity | Vending Machine Type | ECM # | Install Controls? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Various | 5 | Refrigerated | 16 | Yes | 0.9 | 8,059 | 0 | $1,214 | $1,150 | $250 | 0.7 |
| Various | 1 | Non-Refrigerated | 16 | Yes | 0.0 | 343 | 0 | $52 | $230 | $0 | 4.5 |

# APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

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## ENERGY STAR® Statement of Energy Performance

**64**

ENERGY STAR® Score[1]

### Arthur L. Johnson High School

**Primary Property Type:** K-12 School
**Gross Floor Area (ft²):** 192,825
**Built:** 1970

**For Year Ending:** November 30, 2021
**Date Generated:** November 01, 2022

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

### Property & Contact Information

| Property Address | Property Owner | Primary Contact |
|---|---|---|
| Arthur L. Johnson High School<br>365 Westfield Avenue<br>Clark, New Jersey 07067 | Clark Public School District<br>365 Westfield Ave<br>Clark, NJ 07066<br>(732) 574-9600 | Paul Vizzuso<br>365 Westfield Ave<br>Clark, NJ 07066<br>(732) 574-9600 ext 3354<br>pvizzuso@clarkschools.org |

**Property ID:** 21589156

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

**Site EUI**
59.1 kBtu/ft²

**Source EUI**
97.6 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Natural Gas (kBtu) | 7,491,596 (66%) |
| Electric - Grid (kBtu) | 3,912,444 (34%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 68.6 |
| National Median Source EUI (kBtu/ft²) | 113.2 |
| % Diff from National Median Source EUI | -14% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 739 |

### Signature & Stamp of Verifying Professional

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

LP Signature: _____ Date: _____

**Licensed Professional**

____ _____
,
(____)____-_____
_____

**Professional Engineer or Registered Architect Stamp (if applicable)**

# APPENDIX C: GLOSSARY

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

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

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