
# Local Government Energy Audit Report

## Police Headquarters

November 17, 2021

*Prepared for:*

City of Trenton
225 N Clinton Avenue
Trenton, NJ 08609

*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.

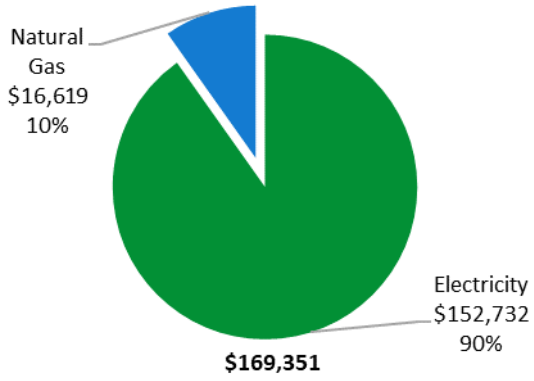
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and 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 expected to start rolling out in the spring and summer of 2021. 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 Police Headquarters. 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: $169,351<br>Electricity:<br>1,231,546 kWh<br>Natural Gas:<br>20,439 Therms |  |
| ENERGY STAR® Benchmarking Score | N/A<br>*(1-100 scale)* | A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs. |

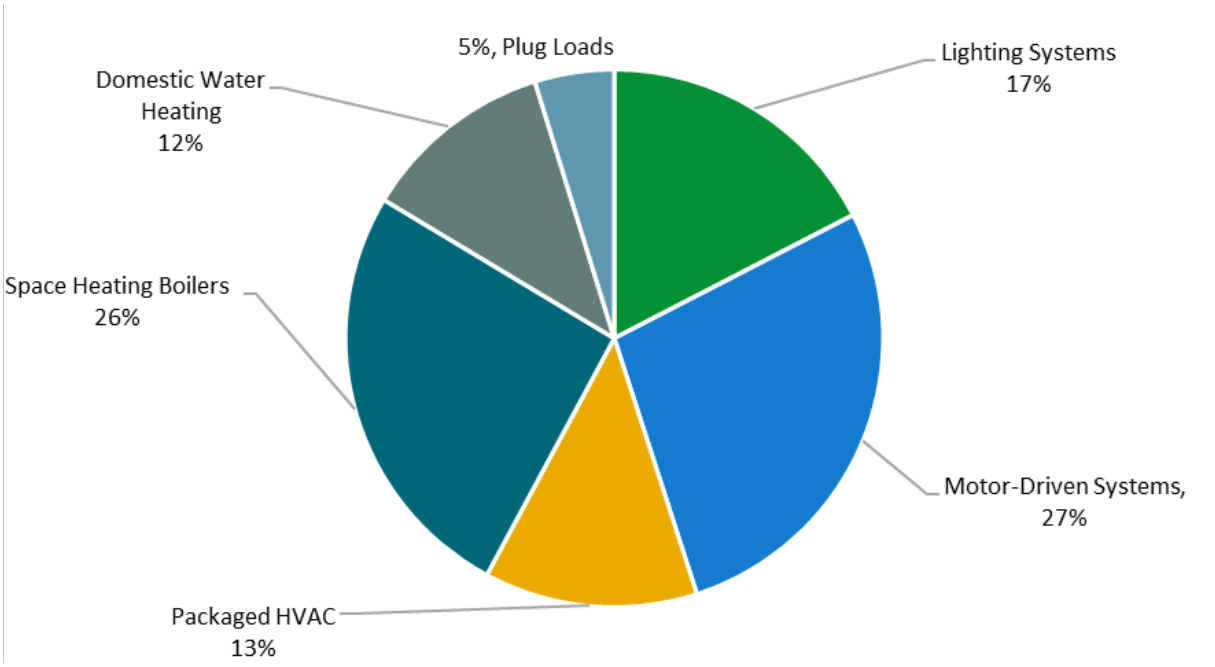


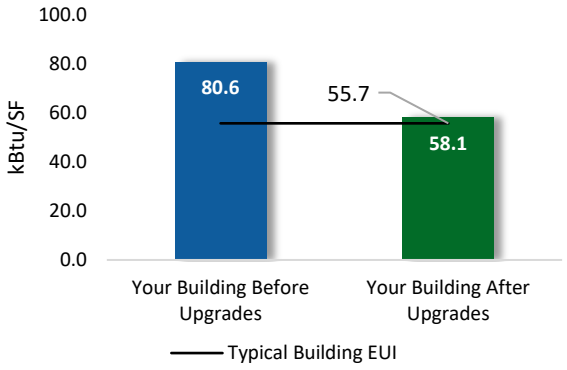

*Figure 1 - Energy Use by System*

## POTENTIAL IMPROVEMENTS

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

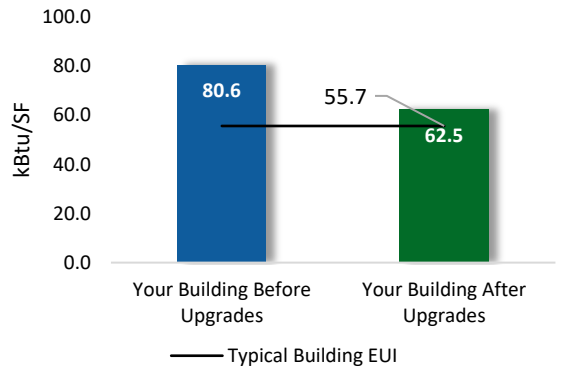
### Scenario 1: Full Package (all evaluated measures)

| | |
|---|---|
| Installation Cost | $622,227 |
| Potential Rebates & Incentives[1] | $57,480 |
| Annual Cost Savings | $60,169 |
| Annual Energy Savings | Electricity: 477,791 kWh<br>Natural Gas: 1,126 Therms |
| Greenhouse Gas Emission Savings | 247 Tons |
| Simple Payback | 9.4 Years |
| Site Energy Savings (all utilities) | 28% |




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

| | |
|---|---|
| Installation Cost | $157,567 |
| Potential Rebates & Incentives | $39,480 |
| Annual Cost Savings | $47,893 |
| Annual Energy Savings | Electricity: 378,800 kWh<br>Natural Gas: 1,126 Therms |
| Greenhouse Gas Emission Savings | 197 Tons |
| Simple Payback | 2.5 Years |
| Site Energy Savings (all utilities) | 22% |




### On-site Generation Potential

| | |
|---|---|
| Photovoltaic | High |
| 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** | | | **188,996** | **26.4** | **-29** | **$23,199** | **$59,647** | **$12,439** | **$47,208** | **2.0** | **186,864** |
| ECM 1 | Install LED Fixtures | Yes | 51,879 | 0.4 | 0 | $6,431 | $22,837 | $3,595 | $19,242 | 3.0 | 52,207 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 215 | 0.1 | 0 | $26 | $179 | $25 | $154 | 5.9 | 211 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 136,902 | 25.9 | -29 | $16,741 | $36,631 | $8,819 | $27,812 | 1.7 | 134,445 |
| **Lighting Control Measures** | | | **34,253** | **6.2** | **-7** | **$4,189** | **$38,004** | **$10,115** | **$27,889** | **6.7** | **33,639** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 23,944 | 4.5 | -5 | $2,928 | $28,554 | $3,325 | $25,229 | 8.6 | 23,514 |
| ECM 5 | Install High/Low Lighting Controls | Yes | 10,310 | 1.7 | -2 | $1,261 | $9,450 | $6,790 | $2,660 | 2.1 | 10,125 |
| **Motor Upgrades** | | | **576** | **0.3** | **0** | **$71** | **$1,131** | **$0** | **$1,131** | **15.8** | **580** |
| ECM 6 | Premium Efficiency Motors | Yes | 576 | 0.3 | 0 | $71 | $1,131 | $0 | $1,131 | 15.8 | 580 |
| **Variable Frequency Drive (VFD) Measures** | | | **167,554** | **28.0** | **0** | **$20,779** | **$142,493** | **$23,300** | **$119,193** | **5.7** | **168,725** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | Yes | 149,366 | 23.3 | 0 | $18,524 | $53,317 | $15,400 | $37,917 | 2.0 | 150,410 |
| ECM 8 | Install VFDs on Chilled Water Pumps | No | 9,608 | 3.7 | 0 | $1,192 | $43,281 | $4,300 | $38,981 | 32.7 | 9,675 |
| ECM 9 | Install VFDs on Heating Water Pumps | No | 8,580 | 1.0 | 0 | $1,064 | $45,894 | $3,600 | $42,294 | 39.7 | 8,640 |
| **Unitary HVAC Measures** | | | **4,499** | **3.0** | **0** | **$558** | **$34,211** | **$2,100** | **$32,111** | **57.6** | **4,530** |
| ECM 10 | Install High Efficiency Air Conditioning Units | No | 4,499 | 3.0 | 0 | $558 | $34,211 | $2,100 | $32,111 | 57.6 | 4,530 |
| **Electric Chiller Replacement** | | | **76,304** | **134.5** | **0** | **$9,463** | **$341,274** | **$8,000** | **$333,274** | **35.2** | **76,838** |
| ECM 11 | Install High Efficiency Chillers | No | 76,304 | 134.5 | 0 | $9,463 | $341,274 | $8,000 | $333,274 | 35.2 | 76,838 |
| **HVAC System Improvements** | | | **1,640** | **0.0** | **126** | **$1,225** | **$3,868** | **$796** | **$3,072** | **2.5** | **16,364** |
| ECM 12 | Install Programmable Thermostats | Yes | 1,640 | 0.0 | 0 | $203 | $2,309 | $0 | $2,309 | 11.4 | 1,652 |
| ECM 13 | Install Pipe Insulation | Yes | 0 | 0.0 | 126 | $1,022 | $1,558 | $796 | $762 | 0.7 | 14,712 |
| **Domestic Water Heating Upgrade** | | | **0** | **0.0** | **24** | **$193** | **$680** | **$430** | **$250** | **1.3** | **2,775** |
| ECM 14 | Install Low-Flow DHW Devices | Yes | 0 | 0.0 | 24 | $193 | $680 | $430 | $250 | 1.3 | 2,775 |
| **Food Service & Refrigeration Measures** | | | **3,969** | **0.5** | **0** | **$492** | **$920** | **$300** | **$620** | **1.3** | **3,997** |
| ECM 15 | Vending Machine Control | Yes | 3,969 | 0.5 | 0 | $492 | $920 | $300 | $620 | 1.3 | 3,997 |
| **TOTALS (COST EFFECTIVE MEASURES)** | | | **378,800** | **56.7** | **113** | **$47,893** | **$157,567** | **$39,480** | **$118,087** | **2.5** | **394,629** |
| **TOTALS (ALL MEASURES)** | | | **477,791** | **198.8** | **113** | **$60,169** | **$622,227** | **$57,480** | **$564,747** | **9.4** | **494,312** |

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

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

*Figure 2 – Evaluated Energy Improvements*

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

## 1.1 Planning Your Project

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

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

### Pick Your Installation Approach

Utility run energy efficiency programs and 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 & Power (CHP)*

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

### *Ongoing Electric Savings with Demand Response*

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

# 2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Police Headquarters. 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 March 30, 2021, TRC performed an energy audit at Police Headquarters located in Trenton, New Jersey. TRC met with Wagner Buenno to review the facility operations and help focus our investigation on specific energy-using systems.

Police Headquarters is a four-story, 77,500 square foot building built in 1971. Spaces include offices, corridors, stairwells, restrooms, locker rooms, courtroom, holding cells, storage spaces, training rooms, and basement mechanical space.

## 2.2 Building Occupancy

The facility is occupied year-round. Typical weekday occupancy is 200 staff and 60 visitors.

| Building Name | Weekday/Weekend | Operating Schedule |
|---|---|---|
| Police Headquarters | Weekday | 12:00 PM - 12:00 PM |
| | Weekend | 12:00 PM - 12:00 PM |

*Figure 3 - Building Occupancy Schedule*

## 2.3 Building Envelope

The municipal court, police department garages, and communication center walls are concrete block over structural steel with a brick facade. The roof is flat and covered with rolled asphalt, and it is in poor condition. The flat roof is supported with steel trusses and a metal deck.

The police headquarters walls are made of concrete masonry units (CMUs) with a brick facade and gypsum drywall interior finish. The flat roof is supported by reinforced concrete deck and finished with rolled asphalt and is in poor condition. Roof encloses semi-conditioned space (e.g., a space that is not intentionally heated but escaping heat from HVAC equipment caused the space to be conditioned.). The thermal barrier is at the roof.

*Exterior Building Façade*

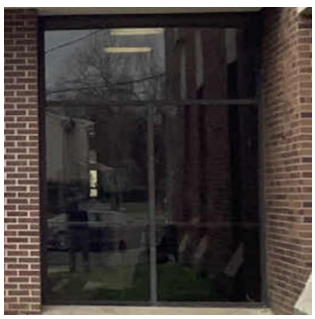
*Rolled Asphalt Flat Roof*

Most of the windows are single glazed have aluminum frames without a thermal break. The glass-to-frame seals are in poor condition. Exterior doors have aluminum frames and are in fair condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

*Exterior Glass Doors*

*Metal Doors*

*Garage Doors*



*Windows*

## 2.4 Lighting Systems

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

Fixture types include 2-lamp, 3-lamp, or 4-lamp, 2-foot or 4-foot-long troffers, recessed fixtures, surface mounted fixtures and 2-foot fixtures with U-bend tube lamps. A few T-9 lamps are in fixtures throughout the facility.

*Fluorescent 4-foot t-I*

*Fluorescent 4-foot T8*

*Fluorescent 4-foot T8*

*Circular Fixture*

*T8 Lighting*

*T8 U-bend Lighting*

Most fixtures are in fair condition. Lenses in the grid ceiling in the court rooms are missing lenses. All exit signs are LED. Interior lighting fixtures are controlled by wall switches. Exterior lights are controlled by multiple timeclocks. They are mostly HID lamps with a few exceptions of LED re-lamped fixtures. The pole mount fixtures are HID. The facility does not have walkway lighting.

*HID Canopy*

*Wall Pack,*

*Wall Pack*

*Parking Lot Lighting*

*LED Walkway Lighting*

*LED Walkway Lighting*

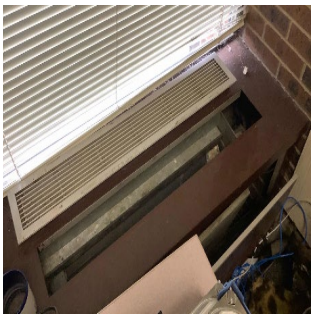
## 2.5 Air Handling Systems

**Unit Ventilators**

Unit ventilators are equipped with supply fan motors and pneumatically controlled outside air dampers and fan coil valves. This system is original to the building and appears to be in fair operating condition. They serve the police offices.

*Unit Ventilator*

*Thermostat*



*Unit Ventilator*

**Packaged Units**

The communication center is served with packaged air conditioning units controlled by room thermostats. These 12.2 EER units have a 7.5-ton cooling capacity.

Refer to Appendix A for detailed information about each unit.

*Packaged RTU*

*Packaged RTU*


*Unit Label*

## Unitary Electric HVAC Equipment

The police offices use through-the wall air conditioning (AC) units. These vary in capacity between .75 tons and 1 ton of cooling. The units are in good condition. They are not ENERGY STAR® labeled.

*Window AC units*

*Window AC units*

*Window AC units*

There are various office areas throughout police headquarters and the municipal court that are conditioned by ductless mini-split air conditioners or split air-source heat pumps (ASHPs). The court administration offices and detention center have ductless mini split air conditioning units. The units are beyond their useful life. Their cooling capacity ranges between 1 ton and 2 tons. These systems are controlled by remote controls within the space.

The ASHPs serve the prosecutor offices and garage IT areas. The heat pumps are within their useful life, in good condition, and are standard efficiency. The heating capacity is between 14 Mbh and 21.6 Mbh and a heating seasonal performance factor (HSPF) between 9 and 10.6.

*Split Air-Source Heat Pump (HP)*

*Split Air-Source Heat Pump (HP)*

*Remote Control*

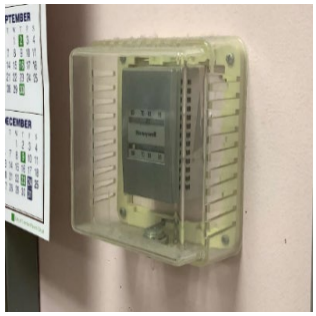
## Air Handling Units (AHUs)

Most of the building is conditioned by air handling units. These units are equipped with a supply fan motor, return fan motor, hot water heating coil, and chilled water coil for cooling. The units are in a top floor mechanical space, the basement mechanical spaces, and the ground floor mechanical space adjacent to the court room. The constant speed and standard efficiency supply fan motors range in size between 5 hp and 15 hp. The return motors range in size between 2 hp and 7.5 hp. The HVAC systems are pneumatically controlled. Two .75 hp air compressors located in the basement mechanical space and mechanical space near the court room serve the pneumatic system.

*Air Handling Units (AHU)*

*Air Compressor*

*Zone Pneumatic Controls*



*Thermostat*

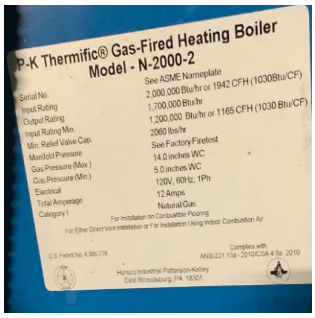
## 2.6 Heating Hot Water Systems

Four P-K Thermific 1,700 MBh output hot water boilers serve the building's heating load. The burners are non-modulating with a nominal efficiency of 85%. The boilers are configured in an automated control scheme. They are in good condition.

The hydronic distribution system is a four-pipe heating and cooling system. The boilers are configured in a constant flow primary distribution with two, 5 hp constant speed controlled hot water pumps operating with a lead-lag control scheme. The boilers provide hot water to fin tube radiators, unit ventilators, and air handling units throughout the building. TRC recommends insulating 9 feet of 4-inch, and 66 feet of 2.5-inch bare hot water supply pipe.

*Hot Water Boiler*

*Pump*




*Label*

*Heating Hot Water Pump*

*Heating Hot Water Pump*


*Unit Label*

## 2.7 Chilled Water Systems

The chiller plant consists of two Trane 200-ton, water-cooled reciprocal chillers. They are configured in a primary distribution loop with two constant flow primary 7.5 hp pumps, and two constant flow 7.5 hp pumps to the cooling tower on the roof. The cooling tower is newer and has a 20 hp fan motor. The chiller plant supplies chilled water to air handlers 1, 2, 3, and 4. The facility engineers manually stage the chillers and they do not meet demand.

A single 26-ton Trane air-cooled scroll chiller serves the cooling for court room 1 and 2. The chilled water is circulated by two, 1.5 hp constant speed pumps. They are connected to air handler 5 located in the mechanical room near the court room. The chiller is newer with two, 1.27 hp fans, with one of them having VFD control.

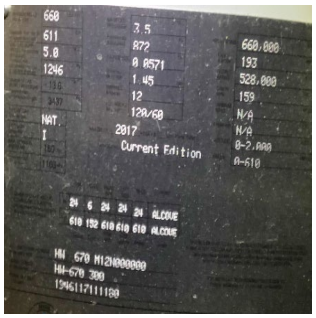

*Cooling Tower & Equipment*

## 2.8 Domestic Hot Water

Hot water is produced by an AO Smith 660 MBh, gas-fired boiler with an 80% efficiency. A 4.5 kW electric storage water heater water serves the communication center and locker rooms. One continuously operating 1/8 hp circulation pump circulates water to end uses. .

Approximately 120 feet of 2-inch of uninsulated domestic hot water pipes are in the basement mechanical space.

*Domestic Hot Water (DHW) Boiler, Unit Label*




*Unit Label*

*DHW Storage Tank Heater*

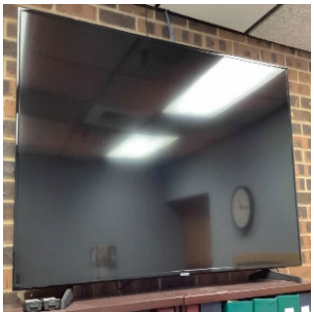
## 2.9 Plug Load & Vending Machines

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

There are 220 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. This includes coffee machines, space heaters, portable fans, microwaves, printers, copiers, projectors, refrigerators, scanners, televisions, toasters, toaster ovens, and water coolers.

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

*Desktop Computer*



*Television*

*Printer*

*Coffee Machine*

*Toaster Oven*

*Fan and Electric Resistance Heater*

## 2.10 Water-Using Systems

There are 15 restrooms with toilets and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. In addition, the facility has four locker rooms that are frequently used. The showerheads are rated at 2.5 gpm.

*Restroom Sink*

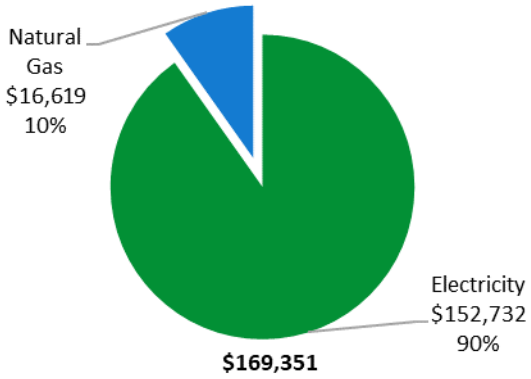
*Kitchen Sink*

*Showerhead*

# 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 | 1,231,546 kWh | $152,732 |
| Natural Gas | 20,439 Therms | $16,619 |
| **Total** | | **$169,351** |




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.

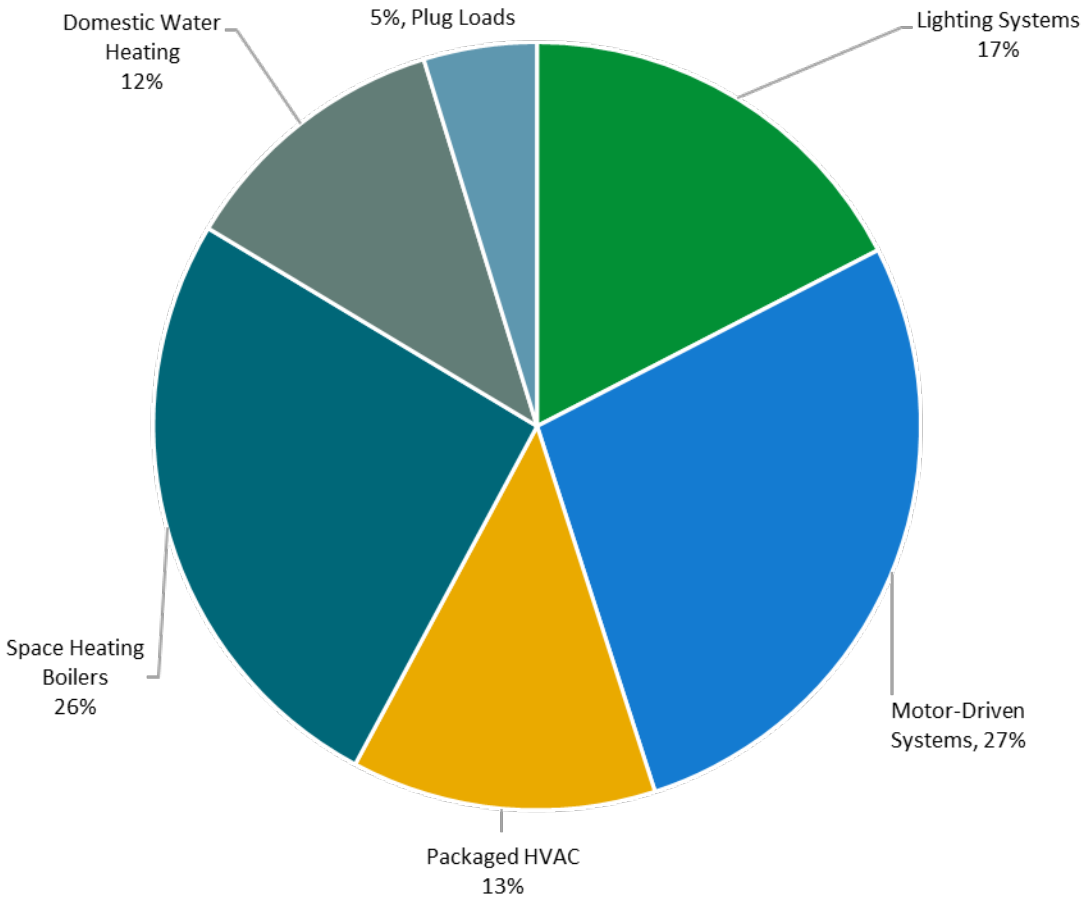
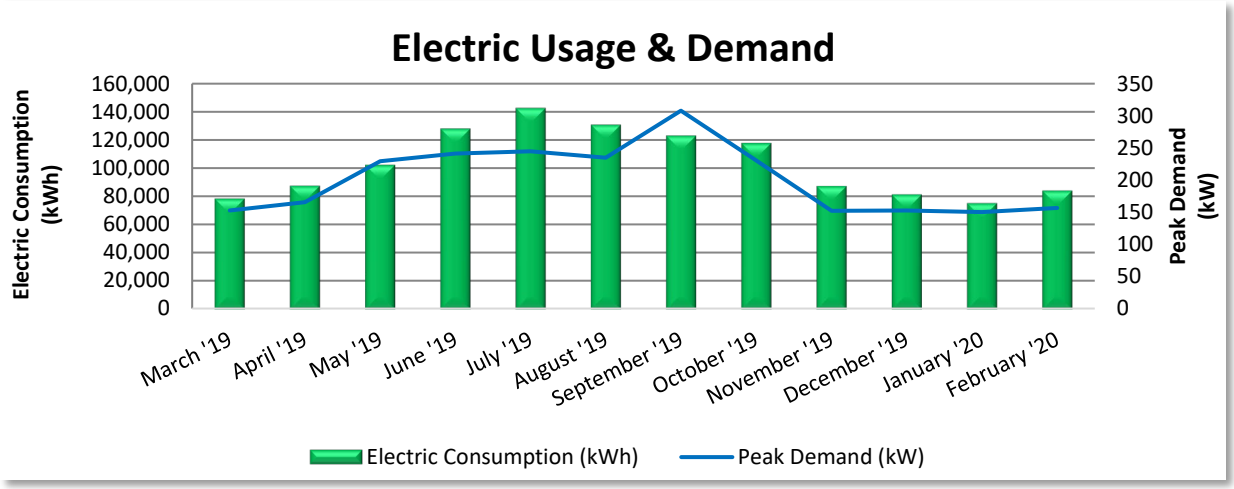



*Figure 4 - Energy Balance*

## 3.1 Electricity

PSE&G delivers electricity under rate class Large Power & Lighting Secondary (LPLS), General Lighting & Power (GLP), with electric supply provided by Direct Energy Business, LLC, a third-party supplier.



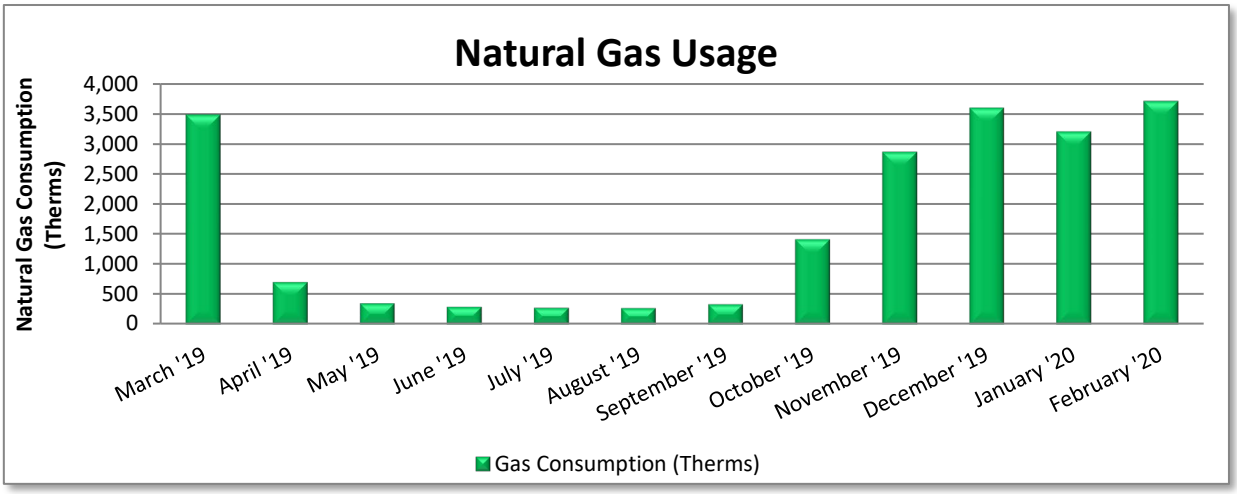

| Electric Billing Data | | | | | |
|---|---|---|---|---|---|
| **Period Ending** | **Days in Period** | **Electric Usage (kWh)** | **Demand (kW)** | **Demand Cost** | **Total Electric Cost** |
| 4/4/19 | 31 | 78,427 | 153 | $581 | $9,003 |
| 5/6/19 | 32 | 87,570 | 166 | $631 | $10,212 |
| 6/5/19 | 30 | 102,216 | 230 | $2,968 | $14,022 |
| 7/5/19 | 30 | 127,917 | 242 | $3,118 | $16,830 |
| 8/5/19 | 31 | 142,584 | 245 | $3,168 | $18,354 |
| 9/4/19 | 30 | 130,731 | 235 | $3,045 | $17,000 |
| 10/3/19 | 29 | 123,048 | 308 | $936 | $14,267 |
| 11/3/19 | 31 | 117,840 | 230 | $759 | $13,700 |
| 12/4/19 | 31 | 87,251 | 152 | $582 | $10,245 |
| 1/6/20 | 33 | 81,374 | 153 | $583 | $10,067 |
| 2/4/20 | 29 | 75,232 | 151 | $575 | $9,492 |
| 3/5/20 | 30 | 84,104 | 157 | $598 | $10,378 |
| **Totals** | **367** | **1,238,294** | **308** | **$17,544** | **$153,569** |
| **Annual** | **365** | **1,231,546** | **308** | **$17,448** | **$152,732** |

Notes:

- Peak demand of 308 kW occurred in September 2019.
- Average demand over the past 12 months was 202 kW.
- The average electric cost over the past 12 months was $0.124/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

## 3.2 Natural Gas

PSE&G delivers natural gas under rate class Large Volume Gas (LVG).




| Gas Billing Data | | | |
|---|---|---|---|
| **Period Ending** | **Days in Period** | **Natural Gas Usage (Therms)** | **Natural Gas Cost** |
| 4/4/19 | 31 | 3,488 | $2,133 |
| 5/6/19 | 32 | 707 | $540 |
| 6/5/19 | 30 | 355 | $340 |
| 7/5/19 | 30 | 296 | $306 |
| 8/5/19 | 31 | 281 | $296 |
| 9/4/19 | 30 | 273 | $292 |
| 10/3/19 | 29 | 340 | $336 |
| 11/3/19 | 31 | 1,420 | $1,278 |
| 12/4/19 | 31 | 2,870 | $2,604 |
| 1/6/20 | 33 | 3,602 | $3,051 |
| 2/4/20 | 29 | 3,207 | $2,694 |
| 3/5/20 | 30 | 3,713 | $2,841 |
| **Totals** | **367** | **20,551** | **$16,710** |
| **Annual** | **365** | **20,439** | **$16,619** |

Notes:

- The average gas cost for the past 12 months is $0.813/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** | **[N/A]** |
|---|---|

Due to its unique characteristics, this building type is not able to receive a benchmarking score. This report contains suggestions about how to improve building performance and reduce energy costs.

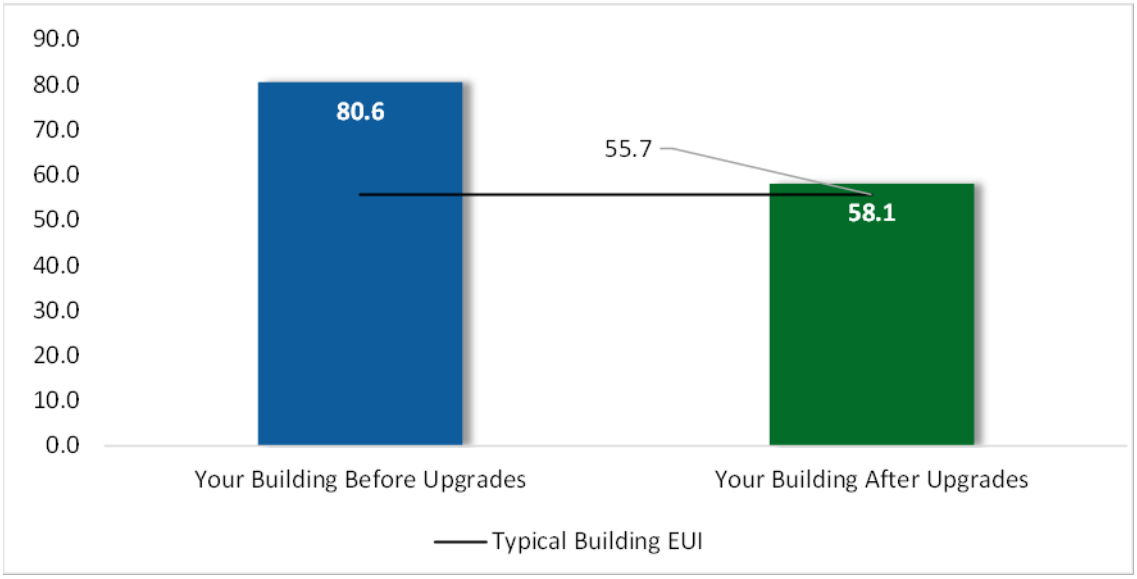



*Figure 5 - Energy Use Intensity Comparison*[3]

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

[3] Based on all evaluated ECMs

## Tracking Your Energy Performance

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

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

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

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[4].

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

# 4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements 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** | | | **188,996** | **26.4** | **-29** | **$23,199** | **$59,647** | **$12,439** | **$47,208** | **2.0** | **186,864** |
| ECM 1 | Install LED Fixtures | Yes | 51,879 | 0.4 | 0 | $6,431 | $22,837 | $3,595 | $19,242 | 3.0 | 52,207 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 215 | 0.1 | 0 | $26 | $179 | $25 | $154 | 5.9 | 211 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 136,902 | 25.9 | -29 | $16,741 | $36,631 | $8,819 | $27,812 | 1.7 | 134,445 |
| **Lighting Control Measures** | | | **34,253** | **6.2** | **-7** | **$4,189** | **$38,004** | **$10,115** | **$27,889** | **6.7** | **33,639** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 23,944 | 4.5 | -5 | $2,928 | $28,554 | $3,325 | $25,229 | 8.6 | 23,514 |
| ECM 5 | Install High/Low Lighting Controls | Yes | 10,310 | 1.7 | -2 | $1,261 | $9,450 | $6,790 | $2,660 | 2.1 | 10,125 |
| **Motor Upgrades** | | | **576** | **0.3** | **0** | **$71** | **$1,131** | **$0** | **$1,131** | **15.8** | **580** |
| ECM 6 | Premium Efficiency Motors | Yes | 576 | 0.3 | 0 | $71 | $1,131 | $0 | $1,131 | 15.8 | 580 |
| **Variable Frequency Drive (VFD) Measures** | | | **167,554** | **28.0** | **0** | **$20,779** | **$142,493** | **$23,300** | **$119,193** | **5.7** | **168,725** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | Yes | 149,366 | 23.3 | 0 | $18,524 | $53,317 | $15,400 | $37,917 | 2.0 | 150,410 |
| ECM 8 | Install VFDs on Chilled Water Pumps | No | 9,608 | 3.7 | 0 | $1,192 | $43,281 | $4,300 | $38,981 | 32.7 | 9,675 |
| ECM 9 | Install VFDs on Heating Water Pumps | No | 8,580 | 1.0 | 0 | $1,064 | $45,894 | $3,600 | $42,294 | 39.7 | 8,640 |
| **Unitary HVAC Measures** | | | **4,499** | **3.0** | **0** | **$558** | **$34,211** | **$2,100** | **$32,111** | **57.6** | **4,530** |
| ECM 10 | Install High Efficiency Air Conditioning Units | No | 4,499 | 3.0 | 0 | $558 | $34,211 | $2,100 | $32,111 | 57.6 | 4,530 |
| **Electric Chiller Replacement** | | | **76,304** | **134.5** | **0** | **$9,463** | **$341,274** | **$8,000** | **$333,274** | **35.2** | **76,838** |
| ECM 11 | Install High Efficiency Chillers | No | 76,304 | 134.5 | 0 | $9,463 | $341,274 | $8,000 | $333,274 | 35.2 | 76,838 |
| **HVAC System Improvements** | | | **1,640** | **0.0** | **126** | **$1,225** | **$3,868** | **$796** | **$3,072** | **2.5** | **16,364** |
| ECM 12 | Install Programmable Thermostats | Yes | 1,640 | 0.0 | 0 | $203 | $2,309 | $0 | $2,309 | 11.4 | 1,652 |
| ECM 13 | Install Pipe Insulation | Yes | 0 | 0.0 | 126 | $1,022 | $1,558 | $796 | $762 | 0.7 | 14,712 |
| **Domestic Water Heating Upgrade** | | | **0** | **0.0** | **24** | **$193** | **$680** | **$430** | **$250** | **1.3** | **2,775** |
| ECM 14 | Install Low-Flow DHW Devices | Yes | 0 | 0.0 | 24 | $193 | $680 | $430 | $250 | 1.3 | 2,775 |
| **Food Service & Refrigeration Measures** | | | **3,969** | **0.5** | **0** | **$492** | **$920** | **$300** | **$620** | **1.3** | **3,997** |
| ECM 15 | Vending Machine Control | Yes | 3,969 | 0.5 | 0 | $492 | $920 | $300 | $620 | 1.3 | 3,997 |
| **TOTALS** | | | **477,791** | **198.8** | **113** | **$60,169** | **$622,227** | **$57,480** | **$564,747** | **9.4** | **494,312** |

* - All incentives presented in this table are included as placeholders 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 | 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** | | | **188,996** | **26.4** | **-29** | **$23,199** | **$59,647** | **$12,439** | **$47,208** | **2.0** | **186,864** |
| ECM 1 | Install LED Fixtures | Yes | 51,879 | 0.4 | 0 | $6,431 | $22,837 | $3,595 | $19,242 | 3.0 | 52,207 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 215 | 0.1 | 0 | $26 | $179 | $25 | $154 | 5.9 | 211 |
| ECM 3 | Retrofit Fixtures with LED Lamps | Yes | 136,902 | 25.9 | -29 | $16,741 | $36,631 | $8,819 | $27,812 | 1.7 | 134,445 |
| **Lighting Control Measures** | | | **34,253** | **6.2** | **-7** | **$4,189** | **$38,004** | **$10,115** | **$27,889** | **6.7** | **33,639** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | Yes | 23,944 | 4.5 | -5 | $2,928 | $28,554 | $3,325 | $25,229 | 8.6 | 23,514 |
| ECM 5 | Install High/Low Lighting Controls | Yes | 10,310 | 1.7 | -2 | $1,261 | $9,450 | $6,790 | $2,660 | 2.1 | 10,125 |
| **Motor Upgrades** | | | **576** | **0.3** | **0** | **$71** | **$1,131** | **$0** | **$1,131** | **15.8** | **580** |
| ECM 6 | Premium Efficiency Motors | Yes | 576 | 0.3 | 0 | $71 | $1,131 | $0 | $1,131 | 15.8 | 580 |
| **Variable Frequency Drive (VFD) Measures** | | | **167,554** | **28.0** | **0** | **$20,779** | **$142,493** | **$23,300** | **$119,193** | **5.7** | **168,725** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | Yes | 149,366 | 23.3 | 0 | $18,524 | $53,317 | $15,400 | $37,917 | 2.0 | 150,410 |
| ECM 8 | Install VFDs on Chilled Water Pumps | No | 9,608 | 3.7 | 0 | $1,192 | $43,281 | $4,300 | $38,981 | 32.7 | 9,675 |
| ECM 9 | Install VFDs on Heating Water Pumps | No | 8,580 | 1.0 | 0 | $1,064 | $45,894 | $3,600 | $42,294 | 39.7 | 8,640 |
| **Unitary HVAC Measures** | | | **4,499** | **3.0** | **0** | **$558** | **$34,211** | **$2,100** | **$32,111** | **57.6** | **4,530** |
| ECM 10 | Install High Efficiency Air Conditioning Units | No | 4,499 | 3.0 | 0 | $558 | $34,211 | $2,100 | $32,111 | 57.6 | 4,530 |
| **Electric Chiller Replacement** | | | **76,304** | **134.5** | **0** | **$9,463** | **$341,274** | **$8,000** | **$333,274** | **35.2** | **76,838** |
| ECM 11 | Install High Efficiency Chillers | No | 76,304 | 134.5 | 0 | $9,463 | $341,274 | $8,000 | $333,274 | 35.2 | 76,838 |
| **HVAC System Improvements** | | | **1,640** | **0.0** | **126** | **$1,225** | **$3,868** | **$796** | **$3,072** | **2.5** | **16,364** |
| ECM 12 | Install Programmable Thermostats | Yes | 1,640 | 0.0 | 0 | $203 | $2,309 | $0 | $2,309 | 11.4 | 1,652 |
| ECM 13 | Install Pipe Insulation | Yes | 0 | 0.0 | 126 | $1,022 | $1,558 | $796 | $762 | 0.7 | 14,712 |
| **Domestic Water Heating Upgrade** | | | **0** | **0.0** | **24** | **$193** | **$680** | **$430** | **$250** | **1.3** | **2,775** |
| ECM 14 | Install Low-Flow DHW Devices | Yes | 0 | 0.0 | 24 | $193 | $680 | $430 | $250 | 1.3 | 2,775 |
| **Food Service & Refrigeration Measures** | | | **3,969** | **0.5** | **0** | **$492** | **$920** | **$300** | **$620** | **1.3** | **3,997** |
| ECM 15 | Vending Machine Control | Yes | 3,969 | 0.5 | 0 | $492 | $920 | $300 | $620 | 1.3 | 3,997 |
| **TOTALS** | | | **477,791** | **198.8** | **113** | **$60,169** | **$622,227** | **$57,480** | **$564,747** | **9.4** | **494,312** |

* - All incentives presented in this table are included as placeholders 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** | | **188,996** | **26.4** | **-29** | **$23,199** | **$59,647** | **$12,439** | **$47,208** | **2.0** | **186,864** |
| ECM 1 | Install LED Fixtures | 51,879 | 0.4 | 0 | $6,431 | $22,837 | $3,595 | $19,242 | 3.0 | 52,207 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 215 | 0.1 | 0 | $26 | $179 | $25 | $154 | 5.9 | 211 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 136,902 | 25.9 | -29 | $16,741 | $36,631 | $8,819 | $27,812 | 1.7 | 134,445 |

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

### ECM 1: Install LED Fixtures

Replace existing fixtures containing HID or fluorescent 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.

Replace pin based CFL fixtures in the women's room and the Judges office with LED fixtures of similar style and luminosity

Replace various exterior metal halide fixtures and 2 high pressure sodium fixtures in the Police Department garage with LED fixtures.

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

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

**Affected building areas:** restroom, judge's office, police department garage and exterior fixtures

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

Retrofit T12 magnetic ballast 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**: storage 1 and office court 2

### ECM 3: Retrofit Fixtures with LED Lamps

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

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

**Affected building areas:** all areas with fluorescent fixtures with T8 tubes, CFL, or 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** | | **34,253** | **6.2** | **-7** | **$4,189** | **$38,004** | **$10,115** | **$27,889** | **6.7** | **33,639** |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 23,944 | 4.5 | -5 | $2,928 | $28,554 | $3,325 | $25,229 | 8.6 | 23,514 |
| ECM 5 | Install High/Low Lighting Controls | 10,310 | 1.7 | -2 | $1,261 | $9,450 | $6,790 | $2,660 | 2.1 | 10,125 |

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

### ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

**Affected building areas:** offices, conference rooms, locker rooms, restrooms, training room, 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.

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

**Affected building areas**: hallways, stairwells, garage, and open office

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

## 4.3 Motors

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Motor Upgrades** | | **576** | **0.3** | **0** | **$71** | **$1,131** | **$0** | **$1,131** | **15.8** | **580** |
| ECM 6 | Premium Efficiency Motors | 576 | 0.3 | 0 | $71 | $1,131 | $0 | $1,131 | 15.8 | 580 |

### ECM 6: Premium Efficiency Motors

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

The primary savings from replacing fan coil units will be from improved fan motor efficiency, however, those savings are unlikely to justify replacing the fan coils. The next potential savings would be from installing fan coils that provide for more optimal use of outside air than the existing fan coil units.

The potential savings from installing new fan coils with electronically commutated (ec) motors was evaluated. EC motors are generally more efficient than other fractional hp motors and have the capability of operating at variable speeds. In general, replacing the fan coils should be considered a capital improvement measure that has the potential to provide energy savings and improve occupant comfort.

**Affected motors:**

| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Additional Motor Description |
|---|---|---|---|---|---|
| Mechanical 4 boiler room | Police Headquarters | 1 | Condenser Water Pump | 7.5 | |

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

## 4.4 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** | | **167,554** | **28.0** | **0** | **$20,779** | **$142,493** | **$23,300** | **$119,193** | **5.7** | **168,725** |
| ECM 7 | Install VFDs on Constant Volume (CV) Fans | 149,366 | 23.3 | 0 | $18,524 | $53,317 | $15,400 | $37,917 | 2.0 | 150,410 |
| ECM 8 | Install VFDs on Chilled Water Pumps | 9,608 | 3.7 | 0 | $1,192 | $43,281 | $4,300 | $38,981 | 32.7 | 9,675 |
| ECM 9 | Install VFDs on Heating Water Pumps | 8,580 | 1.0 | 0 | $1,064 | $45,894 | $3,600 | $42,294 | 39.7 | 8,640 |

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 7: Install VFDs on Constant Volume (CV) Fans

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

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

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

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing must be determined during the final project design. The control system programming should maintain the minimum air flow whenever the compressor is operating. 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:** AHU 1-5 and packaged RTUs.

### ECM 8: Install VFDs on Chilled Water Pumps

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

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

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

**Affected pumps**: main chilled water pumps and courtroom chilled water pumps

### ECM 9: Install VFDs on Heating Water Pumps

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

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

**Affected pumps:** heating hot water circulation pumps

## 4.5 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** | | **4,499** | **3.0** | **0** | **$558** | **$34,211** | **$2,100** | **$32,111** | **57.6** | **4,530** |
| ECM 10 | Install High Efficiency Air Conditioning Units | 4,499 | 3.0 | 0 | $558 | $34,211 | $2,100 | $32,111 | 57.6 | 4,530 |

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

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

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

**Affected units:** garage police department radio shop and police department offices.

## 4.6 Electric Chillers

| # | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Electric Chiller Replacement** | | **76,304** | **134.5** | **0** | **$9,463** | **$341,274** | **$8,000** | **$333,274** | **35.2** | **76,838** |
| ECM 11 | Install High Efficiency Chillers | 76,304 | 134.5 | 0 | $9,463 | $341,274 | $8,000 | $333,274 | 35.2 | 76,838 |

### ECM 11: Install High Efficiency Chillers

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

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

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

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

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

## 4.7 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** | | **1,640** | **0.0** | **126** | **$1,225** | **$3,868** | **$796** | **$3,072** | **2.5** | **16,364** |
| ECM 12 | Install Programmable Thermostats | 1,640 | 0.0 | 0 | $203 | $2,309 | $0 | $2,309 | 11.4 | 1,652 |
| ECM 13 | Install Pipe Insulation | 0 | 0.0 | 126 | $1,022 | $1,558 | $796 | $762 | 0.7 | 14,712 |

### ECM 12: Install Programmable Thermostats

Replace manual thermostats with programmable thermostats which provide energy savings by reducing heating and cooling energy usage when a room is unoccupied. Manual thermostats are generally adjusted to a single heating and cooling setpoint and left at that setting regardless of occupancy and they provide the same level of heating and cooling regardless of whether the space is being used. Programmable thermostats can maintain different temperature settings for different times of day and for different days of the week. By reducing heating temperature setpoints and raising cooling temperature setpoints when spaces are unoccupied, the operation of the HVAC equipment is reduced while maintaining comfortable space temperatures for building usage.

**Affected units:** court room administration offices and 2nd floor police department office.

### ECM 13: Install Pipe Insulation

Install insulation on heating water and domestic hot water system piping. Distribution system losses are dependent on system fluid temperature, the size of the distribution system, and the level of insulation of the piping. Significant energy savings can be achieved when insulation has not been well maintained. When the insulation is exposed to water, when the insulation has been removed from some areas of the pipe, or when valves have not been properly insulated system efficiency can be significantly reduced. This measure saves energy by reducing heat transfer in the distribution system.

**Affected Systems:** police headquarters boiler room; AHU4. See Appendix A for details.

## 4.8 Domestic Water Heating

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Domestic Water Heating Upgrade** | | **0** | **0.0** | **24** | **$193** | **$680** | **$430** | **$250** | **1.3** | **2,775** |
| ECM 14 | Install Low-Flow DHW Devices | 0 | 0.0 | 24 | $193 | $680 | $430 | $250 | 1.3 | 2,775 |

### ECM 14: Install Low-Flow DHW Devices

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

| Device | Flow Rate |
|---|---|
| Faucet aerators (lavatory) | 0.5 gpm |
| 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.

**Affected Systems:** rest rooms, kitchenettes, and locker rooms

## 4.9 Food Service & Refrigeration Measures

| # | Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings ($) | Estimated M&L Cost ($) | Estimated Incentive ($)* | Estimated Net M&L Cost ($) | Simple Payback Period (yrs)** | $CO_2e$ Emissions Reduction (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Food Service & Refrigeration Measures** | | **3,969** | **0.5** | **0** | **$492** | **$920** | **$300** | **$620** | **1.3** | **3,997** |
| ECM 15 | Vending Machine Control | 3,969 | 0.5 | 0 | $492 | $920 | $300 | $620 | 1.3 | 3,997 |

### ECM 15: 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 machines at necessary regular intervals or when the surrounding area is occupied. Energy savings are dependent on the vending machine and activity level in the area surrounding the machines.

## 4.10 Measures for Future Consideration

There are additional opportunities for improvement that City of Trenton 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.

City of Trenton 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.

**Installation of an Energy Management System**

Most larger facilities have some type of energy management system (EMS) which provides for centralized, remote control and monitoring of HVAC equipment and sometimes lighting or other building systems. An EMS utilizes a system of temperature and pressure sensors that obtain feedback about field conditions and provide signals to control systems that adjust HVAC system operation for optimal functioning. Thirty years ago, most control systems were pneumatic systems driven by compressed air, with pneumatic thermostats and air driven actuators for valves and dampers. Pneumatics controls have largely been replaced by direct digital control (DDC) systems, but many pneumatic systems remain. Contemporary DDC systems afford tighter controls and enhanced monitoring and trending capabilities as compared to the older systems.

Often smaller facilities are not equipped with central controls. For many small sites, it has been less costly to install distributed local controls, such as programmable thermostats and timeclocks, rather than centralized DDC. Local controls do a reasonably good job of scheduling equipment and maintaining operating conditions by relying on controls integral to HVAC units, such as logic for compressor staging, to manage the equipment operating algorithms.

Even for smaller sites, inefficiencies arise when temperature sensors and thermostat schedules are not maintained, when there are separate systems for heating and cooling, and especially when equipment is added, or the facility is reconfigured or repurposed.

Based on our survey, it appears that the installation of an EMS at your site could increase the efficiency of your building HVAC system operation.

A controls upgrade would enable automated equipment "start" and "stop" times, temperature setpoints, lockouts and deadbands to be programmed remotely using a graphic interface. Controls can be configured to optimize ventilation and outside air intake by adjusting economizer position, damper function and fan speed. Existing chilled and hot water distribution system controls are typically "tied in", including associated pumps and valves. Coordinated control of HVAC systems is dependent on a network of sensors and status points. A comprehensive building control system provides monitoring and control for all HVAC systems so operators can adjust system programming for optimal comfort and energy savings.

It is recommended that an HVAC engineer or contractor who specializes in energy management systems be contacted for a detailed evaluation and implementation costs. For the purposes of this report, the potential energy savings and measure costs were estimated based on industry standards and previous project experience. Further analysis should be conducted for the feasibility of this measure. This is not an investment grade analysis nor should be used as a basis for design and construction.

## Vestibule Revolving Doors

Revolving doors are a free-standing vestibule that are much more energy efficient than traditional doors. The installation of revolving doors increase comfort, improve traffic flow and increase security. This allows for a significant amount of uncontrolled air exchange between the outside and inside of the building. The installation of revolving doors would greatly reduce this and thus reduce the load on the HVAC system which serves these lobby/corridor spaces. However, the design and installation of vestibule doors involve an architectural element and would potentially require a high cost for implementation. The measure would require more evaluation to determine feasibility.

## Window Replacements

Energy efficient windows are an important consideration when improving the building envelope. The heat transfer through the glass panes is responsible for a significant portion of the facility's heating and cooling energy consumption. We recommend replacing single pane windows with double pane windows and considering models that are gas-filled with low-e coatings to reduce heat loss. Windows should be selected with low- U-factors to maximize energy savings. The U-factor is the rate at which the window conducts non-solar heat flow and is a key indicator of performance. The lower the U-factor, the higher the efficiency of the window. Window frames and sashes should be efficient as well. If metal frames are specified or required by code, the frame extrusions should have a thermal break to reduce conduction through the frame. As part of the installation, the window frames should be properly sealed with caulk materials to ensure the mitigation of air infiltration. Building envelopes that limit air infiltration and that have adequate fenestrations play a key role in optimizing heating and cooling efficiency, controlling moisture, and providing occupant comfort. Window system replacement is an expensive upgrade that generally involves architectural elements. We recommend this as a measure for further study.

# 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 between 5% to 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, planned capital upgrades, and 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 will 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 can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[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 and thus providing energy savings and increased occupant comfort.

## 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.

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

## 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 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.

## 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.

## Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save 5 to 10% of the cost of operating your chiller. If you already have a maintenance contract in place, your existing service company should be able to provide these services.

## 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 check for fire dampers or balancing dampers that have failed closed.

Duct leakage in commercial buildings can account for 5% to 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.

## Label HVAC Equipment

For improved coordination in maintenance practices, we recommend labeling or re-labeling the site HVAC equipment. Maintain continuity in labeling by following labeling conventions as indicated in the facility drawings or EMS building equipment list. Use weatherproof or heatproof labeling or stickers for permanence, but do not cover over original equipment nameplates, which should be kept clean and readable whenever possible. Besides equipment, label piping for service and direction of flow when possible. Ideally, maintain a log of HVAC equipment, including nameplate information, asset tag designation, areas served, installation year, service dates, and other pertinent information.

This investment in your equipment will enhance collaboration and communication between your staff and your contracted service providers and may help you with regulatory compliance.

## Optimize HVAC Equipment Schedules

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

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

## Water Heater Maintenance

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

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

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

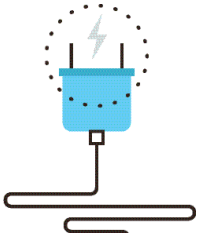
## Compressed Air System Maintenance

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

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

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

## 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.

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] 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.

# 6 On-site Generation

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

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

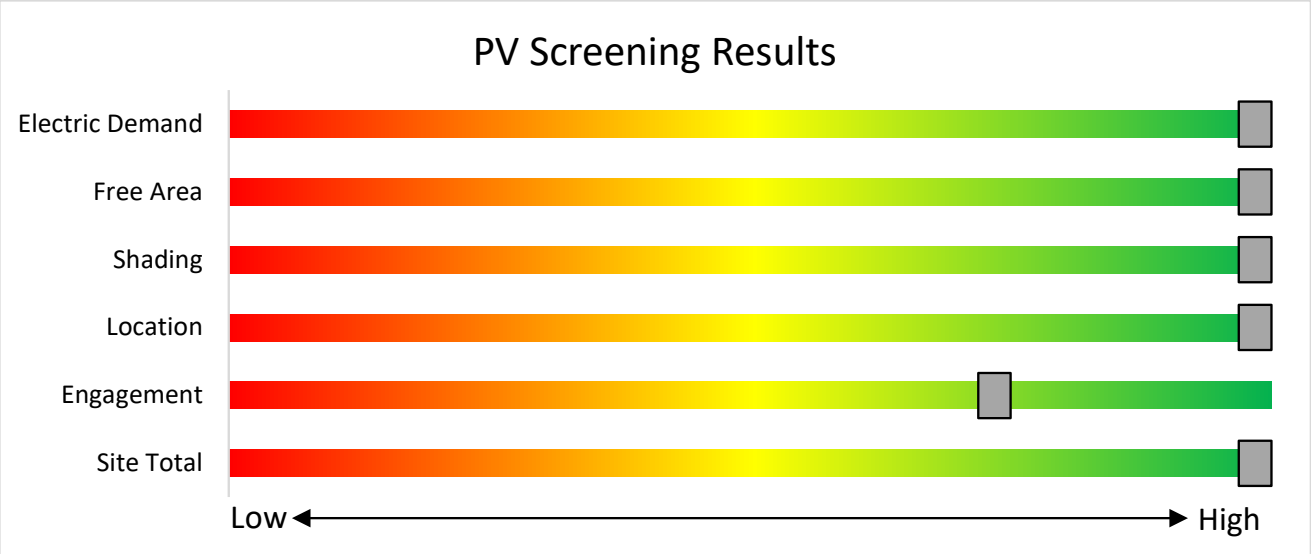
## 6.1 Solar Photovoltaic

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

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

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

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




| | | |
|---|---|---|
| **Potential** | High | |
| **System Potential** | 186 | kW DC STC |
| **Electric Generation** | 221,595 | kWh/yr |
| **Displaced Cost** | $27,480 | /yr |
| **Installed Cost** | $483,600 | |

*Figure 8 - Photovoltaic Screening*

**Transition Incentive (TI) Program**

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installation.

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:

**Transition Incentive (TI) Program:** https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-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) units 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 lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

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

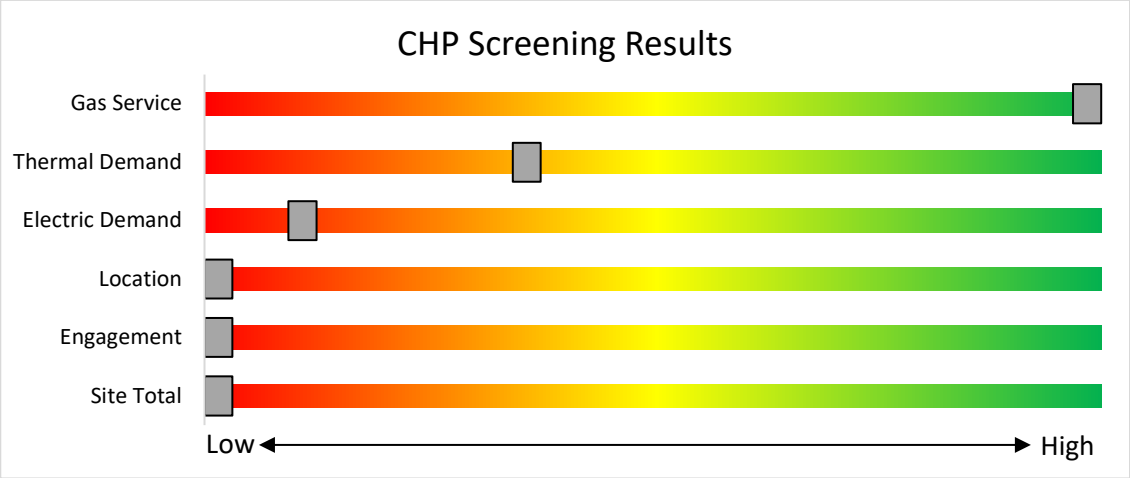



*Figure 9 - Combined Heat and Power Screening*

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

# 7 PROJECT FUNDING AND INCENTIVES

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

## 7.1 Utility Energy Efficiency Programs


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.

# 8 New Jersey's Clean Energy Programs

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

## 8.1 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 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.

## 8.2 Energy Savings Improvement Program

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

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

**How to Participate**

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

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

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

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

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

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

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

## 8.3 Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects *must* register their projects prior to the start of construction to establish the project's eligibility to earn TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installations. NJBPU calculates the value of a Transition Renewable Energy Certificate (TREC) by multiplying the base compensation rate ($152/MWh) by the project's assigned factor (i.e. $152 x 0.85 = $129.20/MWh). The TREC factors are defined based on the chart below:

| Project Type | Factor |
|---|---|
| Subsection (t): landfill, brownfield, areas of historic fill | 1.00 |
| Grid supply (Subsection (r)) rooftop | 1.00 |
| Net metered non-residential rooftop and carport | 1.00 |
| Community solar | 0.85 |
| Grid supply (Subsection (r)) ground mount | 0.60 |
| Net metered residential ground mount | 0.60 |
| Net metered residential rooftop and carport | 0.60 |
| Net metered non-residential ground mount | 0.60 |

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number, which enables it to generate New Jersey TRECs.

Eligible projects may generate TRECs for 15 years following the commencement of commercial operations (also referred to as the "Transition Incentive Qualification Life"). After 15 years, projects may be eligible for a NJ Class I REC.

TRECs will be used by the identified compliance entities to satisfy a compliance obligation tied to a new Transition Incentive Renewable Portfolio Standard ("TI-RPS"), which will exist in parallel with, and completely separate from, the existing Solar RPS for Legacy SRECs. The TI-RPS is a carve-out of the current Class I RPS requirement. The creation of TRECs is based upon metered generation supplied to PJM-EIS General Attribute Tracking System ("GATS") by the owners of eligible facilities or their agents. GATS would create one TREC for each MWh of energy produced from a qualified facility.

TRECs will be purchased monthly by a TREC Administrator who will allocate the TRECs 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.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan. The Transition Incentive Program online portal is now open to new applications effective May 1, 2020. There are instructions on "How and When to Transfer my SRP Registration to the Transition Incentive Program". If you are considering installing solar photovoltaics on your building, visit the following link for more information:

https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

# 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. 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 includes the review of multiple bids for project work, incorporate potential operational & maintenance (O&M) cost savings and maximize your incentive potential.

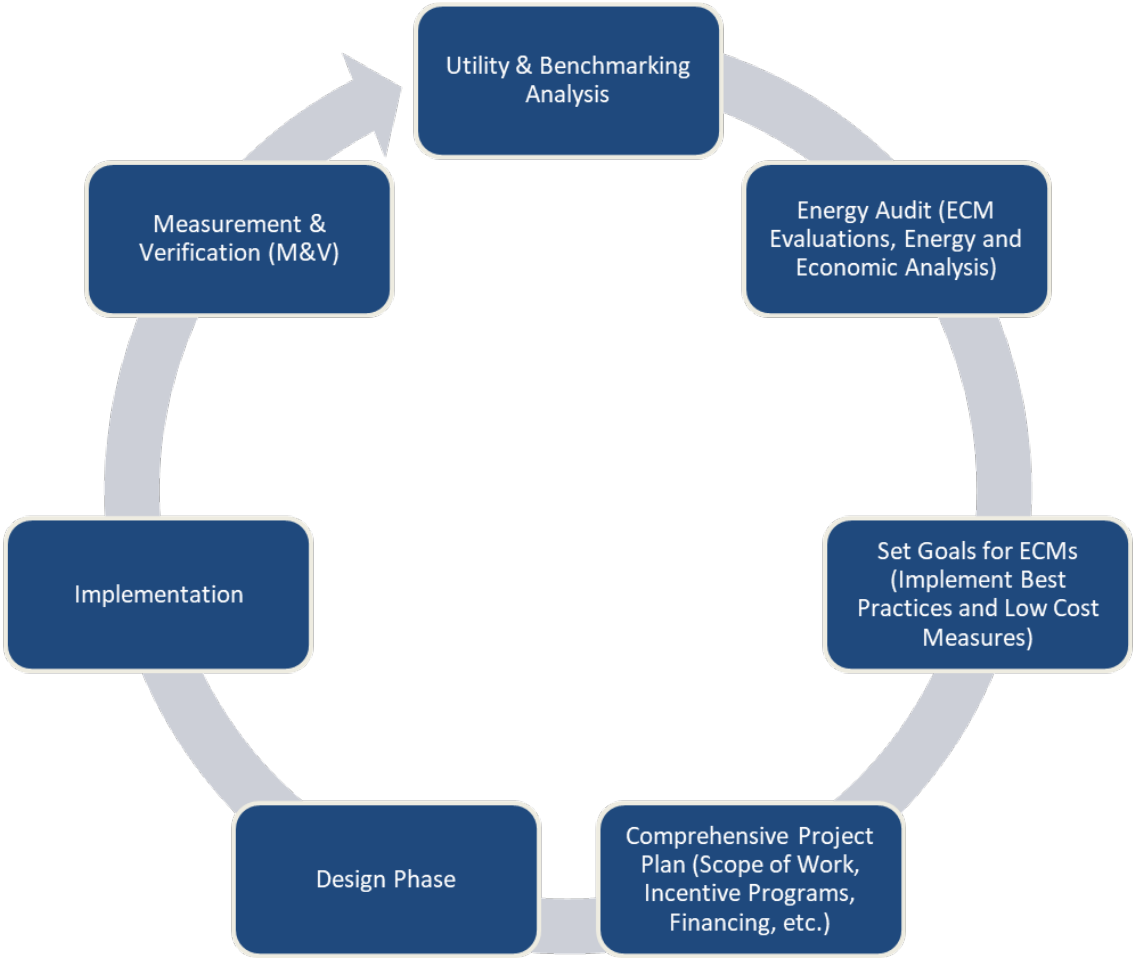



*Figure 30 – Project Development Cycle*

# 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. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

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

A list of licensed third-party electric suppliers is available at the NJBPU website[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 that fluctuate monthly. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[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 |
| Elevator 2 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 8,760 | 0.0 | 312 | 0 | $38 | $37 | $10 | 0.7 |
| Communication back hall | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Communication back hall | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 3 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 6,044 | 0.1 | 1,113 | 0 | $136 | $442 | $135 | 2.3 |
| Communication entrance/waiting room | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Communication entrance/waiting room | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 6,044 | 0.3 | 2,800 | -1 | $342 | $562 | $115 | 1.3 |
| Communication entrance/waiting room | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 6,044 | 0.1 | 742 | 0 | $91 | $415 | $55 | 4.0 |
| Communication hall | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Communication hall | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 3 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 6,044 | 0.1 | 1,113 | 0 | $136 | $442 | $135 | 2.3 |
| Communication locker room men's | 2 | Linear Fluorescent - T8: 3' T8 (25W) - 1L | Wall Switch | S | 27 | 8,760 | 3 | Relamp | No | 2 | LED - Linear Tubes: (1) 3' Lamp | Wall Switch | 11 | 8,760 | 0.0 | 312 | 0 | $38 | $37 | $10 | 0.7 |
| Communication locker room men's | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3 | Relamp | No | 2 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 8,760 | 0.0 | 331 | 0 | $40 | $37 | $10 | 0.7 |
| Communication locker room men's | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 6,044 | 0.1 | 1,400 | 0 | $171 | $146 | $40 | 0.6 |
| Communication locker room men's | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 6,044 | 0.1 | 742 | 0 | $91 | $145 | $20 | 1.4 |
| Communication locker room women's | 3 | Linear Fluorescent - T8: 3' T8 (25W) - 1L | Wall Switch | S | 27 | 8,760 | 3 | Relamp | No | 3 | LED - Linear Tubes: (1) 3' Lamp | Wall Switch | 11 | 8,760 | 0.0 | 468 | 0 | $57 | $55 | $15 | 0.7 |
| Communication locker room women's | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 8,760 | 0.0 | 166 | 0 | $20 | $18 | $5 | 0.7 |
| Communication locker room women's | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 6,044 | 0.1 | 1,400 | 0 | $171 | $416 | $75 | 2.0 |
| Communication locker room women's | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 6,044 | 0.1 | 742 | 0 | $91 | $145 | $20 | 1.4 |
| Corridor PD | 3 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor PD | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor PD | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3, 5 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 6,044 | 0.0 | 201 | 0 | $25 | $33 | $6 | 1.1 |
| Corridor PD | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $73 | $20 | 0.5 |
| Corridor PD | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 7 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.3 | 2,781 | -1 | $340 | $706 | $315 | 1.1 |
| Corridor PD | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 3 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 6,044 | 0.1 | 1,113 | 0 | $136 | $217 | $30 | 1.4 |
| Corridor prosecutors hall | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Corridor prosecutors hall | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3, 5 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 1,615 | 0.0 | 54 | 0 | $7 | $33 | $6 | 4.0 |
| Corridor prosecutors hall | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 2,340 | 3, 5 | Relamp | Yes | 1 | LED - Linear Tubes: (1) 4' Lamp | High/Low Control | 15 | 1,615 | 0.0 | 56 | 0 | $7 | $18 | $5 | 2.0 |

| | 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 prosecutors hall | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $298 | $90 | 8.0 |
| Court lobby storage | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,007 | 0.1 | 124 | 0 | $15 | $261 | $20 | 15.9 |
| Courtroom A | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Courtroom A | 9 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | | None | No | 9 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,340 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Courtroom A | 70 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 2,340 | 3 | Relamp | No | 70 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 2,340 | 1.1 | 3,096 | -1 | $379 | $1,278 | $350 | 2.5 |
| Courtroom admin offices | 10 | Compact Fluorescent: (1) 26W G25 Screw-In Lamp | Wall Switch | S | 26 | 2,340 | 3, 4 | Relamp | Yes | 10 | LED Lamps: G25 Lamps | Occupancy Sensor | 19 | 1,615 | 0.1 | 326 | 0 | $40 | $522 | $55 | 11.7 |
| Courtroom admin offices | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 297 | 0 | $36 | $487 | $65 | 11.6 |
| Courtroom B | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Courtroom B | 9 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | | None | No | 9 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,340 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Courtroom B | 70 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 2,340 | 3 | Relamp | No | 70 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 2,340 | 1.1 | 3,096 | -1 | $379 | $1,278 | $350 | 2.5 |
| Courtroom small hallway | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Courtroom small hallway | 7 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3, 5 | Relamp | Yes | 7 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 1,615 | 0.1 | 376 | 0 | $46 | $453 | $267 | 4.0 |
| Exterior - roof | 2 | Metal Halide: (1) 100W Lamp | Timeclock | | 128 | 4,380 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Architectural Flood/Spot Luminaire | Timeclock | 30 | 4,380 | 0.0 | 858 | 0 | $106 | $1,035 | $100 | 8.8 |
| Exterior 3 ground | 14 | High-Pressure Sodium: (1) 400W Lamp | Timeclock | | 465 | 4,380 | 1 | Fixture Replacement | No | 14 | LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 120 | 4,380 | 0.0 | 21,155 | 0 | $2,624 | $7,839 | $1,400 | 2.5 |
| Exterior 3 ground | 7 | High-Pressure Sodium: (1) 400W Lamp | Timeclock | | 465 | 4,380 | 1 | Fixture Replacement | No | 7 | LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture | Timeclock | 120 | 4,380 | 0.0 | 10,578 | 0 | $1,312 | $3,920 | $700 | 2.5 |
| Exterior 3 ground | 6 | High-Pressure Sodium: (1) 250W Lamp | Timeclock | | 295 | 4,380 | 1 | Fixture Replacement | No | 6 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 75 | 4,380 | 0.0 | 5,782 | 0 | $717 | $2,824 | $300 | 3.5 |
| Exterior 3 ground | 8 | LED Lamps: (1) 10W A19 Screw-In Lamp | Timeclock | | 10 | 4,380 | | None | No | 8 | LED Lamps: (1) 10W A19 Screw-In Lamp | Timeclock | 10 | 4,380 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior 3 ground | 2 | Metal Halide: (1) 150W Lamp | Timeclock | | 190 | 4,380 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 45 | 4,380 | 0.0 | 1,270 | 0 | $158 | $692 | $100 | 3.8 |
| Exterior 3 ground | 4 | Metal Halide: (1) 250W Lamp | Timeclock | | 295 | 4,380 | 1 | Fixture Replacement | No | 4 | LED - Fixtures: Parking Garage Fixture | Timeclock | 75 | 4,380 | 0.0 | 3,854 | 0 | $478 | $1,659 | $400 | 2.6 |
| Exterior 3 ground | 3 | Metal Halide: (1) 400W Lamp | Timeclock | | 458 | 4,380 | 1 | Fixture Replacement | No | 3 | LED - Fixtures: Architectural Flood/Spot Luminaire | Timeclock | 120 | 4,380 | 0.0 | 4,441 | 0 | $551 | $1,552 | $150 | 2.5 |
| Exterior 3 ground | 3 | Metal Halide: (1) 100W Lamp | Timeclock | | 128 | 4,380 | 1 | Fixture Replacement | No | 3 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 30 | 4,380 | 0.0 | 1,288 | 0 | $160 | $788 | $150 | 4.0 |
| Exterior 3 ground | 2 | Metal Halide: (1) 100W Lamp | Timeclock | | 128 | 4,380 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 30 | 4,380 | 0.0 | 858 | 0 | $106 | $525 | $100 | 4.0 |
| Exterior 4 communication tower | 1 | Metal Halide: (1) 100W Lamp | Timeclock | | 128 | 4,380 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Outdoor Wall-Mounted Area Fixture | Timeclock | 30 | 4,380 | 0.0 | 429 | 0 | $53 | $263 | $50 | 4.0 |
| Garage 3-4 | 24 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | | 62 | 2,340 | 3, 5 | Relamp | Yes | 24 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,615 | 0.9 | 2,547 | -1 | $311 | $1,776 | $1,080 | 2.2 |
| Garage 5 | 2 | Incandescent: (1) 75W BR40 Screw-In Lamp | Wall Switch | S | 75 | 2,340 | 3, 5 | Relamp | Yes | 2 | LED Lamps: BR40 Lamps | High/Low Control | 12 | 1,615 | 0.1 | 337 | 0 | $41 | $277 | $76 | 4.9 |

| | 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 |
| Garage PD | 17 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 5 | Relamp | Yes | 17 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,615 | 0.6 | 1,804 | 0 | $221 | $1,296 | $765 | 2.4 |
| Garage PD 4 | 2 | High-Pressure Sodium: (1) 250W Lamp | Wall Switch | S | 295 | 2,600 | 1, 5 | Fixture Replacement | Yes | 2 | LED - Fixtures: High-Bay | High/Low Control | 75 | 1,794 | 0.4 | 1,366 | 0 | $167 | $1,235 | $170 | 6.4 |
| Garage PD 4 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 5 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,615 | 0.0 | 106 | 0 | $13 | $37 | $10 | 2.0 |
| Garage PD office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 5 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $371 | $180 | 3.7 |
| Garage PD restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.1 | 167 | 0 | $20 | $73 | $20 | 2.6 |
| Garage sally port | 6 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | 5 | None | Yes | 6 | LED Lamps: (1) 10W A19 Screw-In Lamp | High/Low Control | 10 | 1,615 | 0.0 | 47 | 0 | $6 | $225 | $210 | 2.6 |
| Janitorial communication janitor 1 | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 520 | | None | No | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 520 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Kitchen communication | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 4,380 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,022 | 0.1 | 700 | 0 | $86 | $262 | $60 | 2.4 |
| Kitchen court break room | 5 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 4,380 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,022 | 0.2 | 928 | 0 | $113 | $632 | $85 | 4.8 |
| Lobby court 1 | 4 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Lobby court 1 | 8 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | 5 | None | Yes | 8 | LED Lamps: (1) 10W A19 Screw-In Lamp | High/Low Control | 10 | 1,615 | 0.0 | 63 | 0 | $8 | $450 | $280 | 22.2 |
| Lobby court 1 | 8 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3, 5 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 1,615 | 0.2 | 430 | 0 | $53 | $710 | $328 | 7.3 |
| Lobby court 1 | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 2,340 | 0.0 | 73 | 0 | $9 | $72 | $10 | 7.0 |
| Lobby elevator | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Lobby elevator | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 8,760 | 0.0 | 151 | 0 | $19 | $33 | $6 | 1.4 |
| Lobby elevator | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3 | Relamp | No | 3 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 8,760 | 0.1 | 823 | 0 | $101 | $217 | $30 | 1.9 |
| Lobby Main lobby | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Lobby Main lobby | 6 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3, 5 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 6,044 | 0.1 | 1,207 | 0 | $148 | $420 | $246 | 1.2 |
| Lobby PD | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Lobby PD | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3, 5 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 6,044 | 0.0 | 201 | 0 | $25 | $33 | $6 | 1.1 |
| Lobby PD | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3, 5 | Relamp | Yes | 6 | LED - Linear Tubes: (4) 4' Lamps | High/Low Control | 58 | 6,044 | 0.4 | 4,199 | -1 | $514 | $663 | $330 | 0.6 |
| Lobby PD rear entrance | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Lobby PD rear entrance | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 8,760 | 0.0 | 530 | 0 | $65 | $73 | $20 | 0.8 |
| Locker Room men's officer | 2 | LED - Fixtures: Decorative: Other | Wall Switch | S | 15 | 8,760 | 4 | None | Yes | 2 | LED - Fixtures: Decorative: Other | Occupancy Sensor | 15 | 6,044 | 0.0 | 88 | 0 | $11 | $116 | $20 | 8.9 |
| Locker Room men's officer | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.2 | 1,986 | 0 | $243 | $453 | $85 | 1.5 |

| | 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 |
| Locker Room PD women's | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3, 5 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 6,044 | 0.0 | 201 | 0 | $25 | $33 | $6 | 1.1 |
| Locker Room PD women's | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $298 | $90 | 2.1 |
| Mechanical 3 PD | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | None | S | 32 | 1,040 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | None | 15 | 1,040 | 0.0 | 20 | 0 | $2 | $18 | $5 | 5.5 |
| Mechanical 3 PD | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 1,040 | 3 | Relamp | No | 2 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,040 | 0.0 | 39 | 0 | $5 | $37 | $10 | 5.5 |
| Mechanical 3 PD | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,040 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,040 | 0.0 | 37 | 0 | $5 | $37 | $10 | 5.8 |
| Mechanical 4 boiler room | 1 | LED - Fixtures: Ambient - 4' - Direct Fixture | Wall Switch | S | 20 | 1,040 | | None | No | 1 | LED - Fixtures: Ambient - 4' - Direct Fixture | Wall Switch | 20 | 1,040 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 4 boiler room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 1,040 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,040 | 0.0 | 20 | 0 | $2 | $18 | $5 | 5.5 |
| Mechanical 4 boiler room | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,040 | 3 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,040 | 0.1 | 74 | 0 | $9 | $73 | $20 | 5.8 |
| Mechanical vestibule | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 1,040 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 1,040 | 0.0 | 18 | 0 | $2 | $33 | $6 | 12.1 |
| Office - Communication 1 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 6,044 | 0.3 | 2,800 | -1 | $342 | $562 | $115 | 1.3 |
| Office - Communication 3 | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 6,044 | 0.0 | 402 | 0 | $49 | $181 | $32 | 3.0 |
| Office - Communication office 2 | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | 4 | None | Yes | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Occupancy Sensor | 10 | 6,044 | 0.0 | 59 | 0 | $7 | $116 | $20 | 13.4 |
| Office - Communication office 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 6,044 | 0.1 | 1,400 | 0 | $171 | $262 | $60 | 1.2 |
| Office - Communication room | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Communication room | 1 | Linear Fluorescent - T8: 3' T8 (25W) - 2L | Wall Switch | S | 48 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 3' Lamps | Wall Switch | 21 | 8,760 | 0.0 | 255 | 0 | $31 | $37 | $10 | 0.8 |
| Office - Communication room | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 8,760 | 0.0 | 151 | 0 | $19 | $33 | $6 | 1.4 |
| Office - Communication room | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 6,044 | 0.1 | 742 | 0 | $91 | $415 | $55 | 4.0 |
| Office - Detention - hall cell hall 4 storage 1,2 | 2 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 1,460 | 3, 4 | Relamp | Yes | 2 | LED Lamps: A19 Lamps | Occupancy Sensor | 9 | 1,007 | 0.1 | 170 | 0 | $21 | $304 | $2 | 14.6 |
| Office - Enclosed 1. - training | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 198 | 0 | $24 | $415 | $55 | 14.8 |
| Office - Enclosed 1. - training 2 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - Enclosed admin court 2 | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 1L | Wall Switch | S | 46 | 2,340 | 2 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 2,340 | 0.0 | 80 | 0 | $10 | $51 | $5 | 4.7 |
| Office - Enclosed admin court 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Enclosed chief judge | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | | None | No | 2 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,340 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Enclosed chief judge | 6 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,615 | 0.1 | 323 | 0 | $39 | $465 | $71 | 10.0 |
| Office - Enclosed chief judge restroom | 1 | LED - Linear Tubes: (1) 2' Lamp | Wall Switch | S | 9 | 2,340 | | None | No | 1 | LED - Linear Tubes: (1) 2' Lamp | Wall Switch | 9 | 2,340 | 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 |
| Office - Enclosed chief judge restroom | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 2,340 | 0.0 | 40 | 0 | $5 | $33 | $6 | 5.4 |
| Office - Enclosed communication training | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,615 | 0.3 | 748 | 0 | $91 | $562 | $115 | 4.9 |
| Office - Enclosed community meet up | 4 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 397 | 0 | $48 | $560 | $75 | 10.0 |
| Office - Enclosed court admin | 8 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | 4 | None | Yes | 8 | LED Lamps: (1) 10W A19 Screw-In Lamp | Occupancy Sensor | 10 | 1,615 | 0.0 | 63 | 0 | $8 | $270 | $35 | 30.7 |
| Office - Enclosed court admin | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 2,340 | 0.0 | 142 | 0 | $17 | $73 | $20 | 3.1 |
| Office - Enclosed judge office | 1 | Compact Fluorescent: (1) 22W Circline/T9 Plug-In Lamp | Wall Switch | S | 22 | 2,340 | 1 | Fixture Replacement | No | 1 | LED - Fixtures: Ambient - 2' - Direct Fixture | Wall Switch | 16 | 2,340 | 0.0 | 15 | 0 | $2 | $243 | $15 | 123.2 |
| Office - Enclosed judge office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - Enclosed judge office | 4 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 397 | 0 | $48 | $560 | $75 | 10.0 |
| Office - Enclosed judge office 2 | 4 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 397 | 0 | $48 | $560 | $75 | 10.0 |
| Office - Enclosed prosecutor office | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Enclosed prosecutor office | 6 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.2 | 595 | 0 | $73 | $705 | $95 | 8.4 |
| Office - Enclosed public defender | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 2,340 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Enclosed public defender | 6 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.2 | 595 | 0 | $73 | $705 | $95 | 8.4 |
| Office - Enclosed street crimes | 2 | Incandescent: (1) 100W A19 Screw-In Lamp | Wall Switch | S | 100 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED Lamps: A19 Lamps | Occupancy Sensor | 15 | 1,615 | 0.2 | 453 | 0 | $55 | $150 | $22 | 2.3 |
| Office - Enclosed street crimes | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,615 | 0.0 | 108 | 0 | $13 | $181 | $32 | 11.3 |
| Office - Enclosed street crimes | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.2 | 637 | 0 | $78 | $489 | $95 | 5.1 |
| Office - Enclosed street crimes office 1 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - Enclosed street crimes office 2 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - Enclosed street crimes office 3 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Enclosed towing office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,380 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,022 | 0.1 | 795 | 0 | $97 | $416 | $75 | 3.5 |
| Office - Garage 4 office | 3 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 4,380 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,022 | 0.1 | 557 | 0 | $68 | $487 | $65 | 6.2 |
| Office - Interview PD | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 318 | 0 | $39 | $380 | $65 | 8.1 |
| Office - Open Plan 1 - training office | 20 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 5 | Relamp | Yes | 20 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,615 | 0.7 | 2,122 | 0 | $260 | $1,405 | $875 | 2.0 |
| Office - Operation office | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.2 | 2,384 | -1 | $291 | $489 | $95 | 1.4 |
| Office - Operation office /3 | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 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 |
| Office - Operation office 1 | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 8,760 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 8,760 | 0.0 | 483 | 0 | $59 | $17 | $1 | 0.3 |
| Office - Operation office 1 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $189 | $40 | 1.5 |
| Office - Operation office 2 commander | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 3,650 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,519 | 0.1 | 662 | 0 | $81 | $416 | $75 | 4.2 |
| Office - Operation office 3 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,589 | 0 | $194 | $416 | $75 | 1.8 |
| Office - Parking enforcement | 4 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,615 | 0.1 | 215 | 0 | $26 | $400 | $59 | 13.0 |
| Office - Parking enforcement rr | 3 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 1,615 | 0.1 | 161 | 0 | $20 | $214 | $38 | 8.9 |
| Office - PD briefing | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.3 | 849 | 0 | $104 | $562 | $115 | 4.3 |
| Office - PD information | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | None | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | None | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - PD interview 2/3 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $305 | $60 | 9.4 |
| Office - PD patrol | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.2 | 2,384 | -1 | $291 | $489 | $95 | 1.4 |
| Office - PD patrol supervisor | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.2 | 2,384 | -1 | $291 | $489 | $95 | 1.4 |
| Office - PD patrol supervisor office 2 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,589 | 0 | $194 | $416 | $75 | 1.8 |
| Office - PD patrol supervisor office 3 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,589 | 0 | $194 | $416 | $75 | 1.8 |
| Office PD open 1 | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 6,044 | 0.0 | 402 | 0 | $49 | $290 | $82 | 4.2 |
| Office PD open 1 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.2 | 2,384 | -1 | $291 | $444 | $270 | 0.6 |
| PD storage 1 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,007 | 0.1 | 265 | 0 | $32 | $416 | $40 | 11.6 |
| PD storage 2 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,007 | 0.1 | 199 | 0 | $24 | $380 | $30 | 14.4 |
| PD training | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.2 | 637 | 0 | $78 | $489 | $95 | 5.1 |
| Restroom - Court restroom | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 198 | 0 | $24 | $415 | $55 | 14.8 |
| Restroom - Court restroom | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 198 | 0 | $24 | $415 | $55 | 14.8 |
| Restroom - Court restroom staff | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 2,340 | 0.0 | 40 | 0 | $5 | $33 | $6 | 5.4 |
| Restroom - Female court | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 2,340 | 0.0 | 40 | 0 | $5 | $33 | $6 | 5.4 |
| Restroom - Female PD lobby | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.0 | 416 | 0 | $51 | $307 | $10 | 5.8 |
| Restroom - Male 1 | 1 | Incandescent: (1) 65W BR40 Screw-In Lamp | Wall Switch | S | 65 | 8,760 | 3 | Relamp | No | 1 | LED Lamps: BR40 Lamps | Wall Switch | 10 | 8,760 | 0.0 | 520 | 0 | $64 | $26 | $3 | 0.4 |
| Restroom - Male 1 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 624 | 0 | $76 | $325 | $15 | 4.1 |

| | 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 PD | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 624 | 0 | $76 | $325 | $15 | 4.1 |
| Restroom - Male Pd lobby | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 8,760 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 8,760 | 0.0 | 483 | 0 | $59 | $17 | $1 | 0.3 |
| Restroom - Male Pd lobby | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 624 | 0 | $76 | $325 | $15 | 4.1 |
| Restroom - PD female 1 | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 8,760 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 8,760 | 0.0 | 483 | 0 | $59 | $17 | $1 | 0.3 |
| Restroom - PD female 1 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 8,760 | 0.0 | 166 | 0 | $20 | $18 | $5 | 0.7 |
| Restroom - PD female 1 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 8,760 | 0.0 | 166 | 0 | $20 | $18 | $5 | 0.7 |
| Restroom - Unisex judge B restroom | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Unisex judge restroom | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom -Female 1 | 2 | Compact Fluorescent: (1) 22W Circline/T9 Plug-In Lamp | Wall Switch | S | 22 | 8,760 | 1 | Fixture Replacement | No | 2 | LED - Fixtures: Ambient - 2' - Direct Fixture | Wall Switch | 16 | 8,760 | 0.0 | 114 | 0 | $14 | $487 | $30 | 32.9 |
| Restroom -Female 1 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 624 | 0 | $76 | $325 | $15 | 4.1 |
| Server Room 1 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,589 | 0 | $194 | $416 | $75 | 1.8 |
| Server Room communication | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 2,340 | 0.0 | 40 | 0 | $5 | $33 | $6 | 5.4 |
| Server Room communication office 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $73 | $20 | 2.0 |
| Server Room communication office 2 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,340 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 1,615 | 0.2 | 561 | 0 | $69 | $489 | $95 | 5.7 |
| Storage 1 | 1 | Linear Fluorescent - T12: 8' T12 (75W) - 2L | Wall Switch | S | 158 | 1,460 | 2 | Relamp & Reballast | No | 1 | LED - Linear Tubes: (2) 8' Lamps | Wall Switch | 72 | 1,460 | 0.1 | 136 | 0 | $17 | $129 | $20 | 6.6 |
| Storage 5 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,007 | 0.1 | 132 | 0 | $16 | $189 | $20 | 10.4 |
| Storage 5 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,007 | 0.1 | 132 | 0 | $16 | $189 | $20 | 10.4 |
| Storage 7 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,007 | 0.1 | 132 | 0 | $16 | $189 | $20 | 10.4 |
| Copy room | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 2,340 | 0.0 | 40 | 0 | $5 | $33 | $6 | 5.4 |
| Stairs 1 | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stairs 1 | 5 | Linear Fluorescent - T8: 2' T8 (17W) - 4L | Wall Switch | | 63 | 8,760 | 3, 5 | Relamp | Yes | 5 | LED - Linear Tubes: (4) 2' Lamps | High/Low Control | 34 | 6,044 | 0.2 | 1,870 | 0 | $229 | $550 | $235 | 1.4 |
| Stairs 1 | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | | 62 | 8,760 | 3, 5 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.2 | 1,986 | 0 | $243 | $408 | $225 | 0.8 |
| Stairs 2 | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Stairs 2 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | | 62 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 8,760 | 0.0 | 312 | 0 | $38 | $37 | $10 | 0.7 |
| office of police director - 1 | 1 | Compact Fluorescent: (1) 26W G25 Screw-In Lamp | Wall Switch | S | 26 | 2,340 | 3 | Relamp | No | 1 | LED Lamps: G25 Lamps | Wall Switch | 19 | 2,340 | 0.0 | 18 | 0 | $2 | $25 | $2 | 10.7 |

| | 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 of police director - 1 | 15 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 2,340 | 4 | None | Yes | 15 | LED Lamps: (1) 10W A19 Screw-In Lamp | Occupancy Sensor | 10 | 1,615 | 0.0 | 118 | 0 | $14 | $270 | $35 | 16.4 |
| office of police director - 1 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 2,340 | 3, 4 | Relamp | Yes | 16 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 1,615 | 0.3 | 889 | 0 | $109 | $562 | $115 | 4.1 |
| Locker Room 1 elevator lobby | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Locker Room 1 elevator lobby | 1 | LED - Fixtures: Decorative: Other | Wall Switch | S | 15 | 8,760 | | None | No | 1 | LED - Fixtures: Decorative: Other | Wall Switch | 15 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Locker Room 1 elevator lobby | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $189 | $40 | 1.5 |
| Locker Room 2 men's LT | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $343 | $20 | 3.3 |
| Locker Room men's | 21 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 21 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.8 | 8,342 | -2 | $1,020 | $1,307 | $280 | 1.0 |
| Mechanical 2 court side | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 1,040 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 1,040 | 0.0 | 20 | 0 | $2 | $18 | $5 | 5.5 |
| Mechanical 2 court side | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,040 | 3 | Relamp | No | 8 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,040 | 0.2 | 297 | 0 | $36 | $292 | $80 | 5.8 |
| Office - Detention - hall | 4 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | 5 | None | Yes | 4 | LED Lamps: (1) 10W A19 Screw-In Lamp | High/Low Control | 10 | 6,044 | 0.0 | 117 | 0 | $14 | $0 | $0 | 0.0 |
| Office - Detention - hall | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.2 | 2,384 | -1 | $291 | $444 | $270 | 0.6 |
| Office - Detention - hall (1) | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | S | 33 | 8,760 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 6,044 | 0.0 | 402 | 0 | $49 | $290 | $82 | 4.2 |
| Office - Detention - hall (1) | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.2 | 2,384 | -1 | $291 | $444 | $270 | 0.6 |
| Office - Detention - hall cell hall 1,2 (1) | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,192 | 0 | $146 | $380 | $65 | 2.2 |
| Office - Detention - hall cell hall 3 (1) | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Detention - hall cell hall 3 (1) | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 1,040 | 0 | $127 | $361 | $60 | 2.4 |
| Office - Detention - intake restroom (1) | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 8,760 | 0.0 | 312 | 0 | $38 | $37 | $10 | 0.7 |
| Office - Detention - intake restroom (1) | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 8,760 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 8,760 | 0.0 | 483 | 0 | $59 | $17 | $1 | 0.3 |
| Office - Detention - processing | 2 | Incandescent: (1) 75W BR40 Screw-In Lamp | Wall Switch | S | 75 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED Lamps: BR40 Lamps | Occupancy Sensor | 12 | 6,044 | 0.1 | 1,262 | 0 | $154 | $52 | $6 | 0.3 |
| Office - Detention - processing | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,589 | 0 | $194 | $416 | $75 | 1.8 |
| Office - Detention - processing office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $189 | $40 | 1.5 |
| Office - Detention - processing office (1) | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 8,760 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 8,760 | 0.0 | 483 | 0 | $59 | $17 | $1 | 0.3 |
| Office - Detention - processing office (1) | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $189 | $40 | 1.5 |
| Office - Detention - processing storage (1) | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 1,460 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 1,460 | 0.0 | 80 | 0 | $10 | $17 | $1 | 1.6 |
| Office - Detention - processing storage (1) | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,460 | 0.0 | 52 | 0 | $6 | $37 | $10 | 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 - Records - hr unit office 1 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - Records - hr unit office 2 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 318 | 0 | $39 | $380 | $65 | 8.1 |
| Office - Records - office 1/server room | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.3 | 955 | 0 | $117 | $599 | $125 | 4.1 |
| Office - Records - office 1/server room closet | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 2,340 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 2,340 | 0.0 | 129 | 0 | $16 | $17 | $1 | 1.0 |
| Office - Records - office 1/server room office | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - Records - office 2 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - Records - office 3 | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Records - office 3 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office dir - kitchen 1 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | None | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | None | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office dir office 1 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office dir office 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office dir office 3 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office dir office 4 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 318 | 0 | $39 | $380 | $65 | 8.1 |
| Office dir office 5 directors office | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.3 | 849 | 0 | $104 | $562 | $115 | 4.3 |
| Office dir office 6 reception | 3 | Incandescent: (1) 50W PAR20 Screw-In Lamp | Wall Switch | S | 50 | 2,340 | 3, 4 | Relamp | Yes | 3 | LED Lamps: PAR20 Lamps | Occupancy Sensor | 8 | 1,615 | 0.1 | 337 | 0 | $41 | $182 | $26 | 3.8 |
| Office dir office 6 reception | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 2,340 | 0.0 | 142 | 0 | $17 | $73 | $20 | 3.1 |
| Office dir office open 1 | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office dir office open 1 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.2 | 637 | 0 | $78 | $489 | $95 | 5.1 |
| Office dir storage - 2 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,007 | 0.1 | 265 | 0 | $32 | $416 | $40 | 11.6 |
| PBA | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.4 | 4,767 | -1 | $583 | $708 | $155 | 0.9 |
| Restroom - Female 1 | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Female 1 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 8,760 | 0.0 | 166 | 0 | $20 | $18 | $5 | 0.7 |
| Restroom - Male 1 | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Male 1 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 624 | 0 | $76 | $325 | $15 | 4.1 |
| Restroom - Male locker | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $343 | $20 | 3.3 |

| | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Fixture Quantity | Fixture Description | Control System | Light Level | Watts per Fixture | Annual Operating Hours | ECM # | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Restroom - Male locker shower room | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Office dir rr | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Server 1 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Storage finger print | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,460 | 0.0 | 52 | 0 | $6 | $37 | $10 | 4.2 |
| Cell hall | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.2 | 2,384 | -1 | $291 | $444 | $270 | 0.6 |
| Corridor by office 5&6 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,380 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 4,380 | 0.0 | 156 | 0 | $19 | $37 | $10 | 1.4 |
| Corridor near a/v room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,380 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 4,380 | 0.0 | 156 | 0 | $19 | $37 | $10 | 1.4 |
| Kitchen 1 youth services break room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 4,380 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 4,380 | 0.0 | 156 | 0 | $19 | $37 | $10 | 1.4 |
| Lobby elevator | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Lobby elevator | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3 | Relamp | No | 4 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 8,760 | 0.2 | 2,119 | 0 | $259 | $292 | $80 | 0.8 |
| Lobby elevator lobby | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Lobby elevator lobby | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.1 | 1,192 | 0 | $146 | $335 | $135 | 1.4 |
| Office - 1 - Youth services | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - 2 - Youth services | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - 3 - Youth services | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - 4 - Youth services | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - 7 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - 7 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - Audio/video | 4 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.1 | 397 | 0 | $48 | $560 | $75 | 10.0 |
| Office - CIB | 6 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 6 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.2 | 595 | 0 | $73 | $705 | $95 | 8.4 |
| Office - CIB interview | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - CIB office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Enclosed 2 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - Enclosed 3 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - Enclosed 4 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |

| | 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 - Enclosed 5 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Enclosed 6 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - fmu- 1 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - fmu- 2 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.3 | 849 | 0 | $104 | $562 | $115 | 4.3 |
| Office - fmu- 3 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Major | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Major interview 1 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Major interview 2 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Major interview 3 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 212 | 0 | $26 | $189 | $40 | 5.7 |
| Office - Open Plan | 4 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Office - Open Plan | 41 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 5 | Relamp | Yes | 41 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 1,615 | 1.5 | 4,351 | -1 | $532 | $2,172 | $1,085 | 2.0 |
| Office - Open Plan Fiscal mgmt unit | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.1 | 424 | 0 | $52 | $416 | $75 | 6.6 |
| Office - SRT | 8 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 1,615 | 0.3 | 793 | 0 | $97 | $850 | $115 | 7.6 |
| Office - Youth services | 19 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 19 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.7 | 2,016 | 0 | $247 | $1,234 | $260 | 3.9 |
| Office - Youth services cell | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 795 | 0 | $97 | $189 | $40 | 1.5 |
| Office - Youth services interview 1 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,340 | 0.0 | 83 | 0 | $10 | $37 | $10 | 2.6 |
| Office - Youth services unit | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.3 | 849 | 0 | $104 | $562 | $115 | 4.3 |
| Office dir - 1 | 1 | Incandescent: (1) 60W A19 Screw-In Lamp | Wall Switch | S | 60 | 2,340 | 3 | Relamp | No | 1 | LED Lamps: A19 Lamps | Wall Switch | 9 | 2,340 | 0.0 | 129 | 0 | $16 | $17 | $1 | 1.0 |
| Restroom - Female 1 | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Female 1 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3 | Relamp | No | 1 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 8,760 | 0.0 | 166 | 0 | $20 | $18 | $5 | 0.7 |
| Restroom - Male 1 | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Restroom - Male 1 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 624 | 0 | $76 | $325 | $15 | 4.1 |
| Restroom - Office 6 | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | | None | No | 1 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Hallway near office 2-3 | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 6,044 | 0.1 | 742 | 0 | $91 | $370 | $90 | 3.1 |
| Storage flu 1 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,460 | 3, 4 | Relamp | Yes | 9 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,007 | 0.3 | 596 | 0 | $73 | $599 | $90 | 7.0 |

| | 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 |
| Waiting room major | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Waiting room major | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,589 | 0 | $194 | $416 | $75 | 1.8 |
| Mechanical - attic | 1 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical - attic | 3 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 1,040 | | None | No | 3 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | 10 | 1,040 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical - attic | 1 | LED Lamps: (1) 18W Corn Bulb Screw-In Lamp | Wall Switch | S | 18 | 1,040 | | None | No | 1 | LED Lamps: (1) 18W Corn Bulb Screw-In Lamp | Wall Switch | 18 | 1,040 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical - attic | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 1,040 | 3 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 1,040 | 0.1 | 148 | 0 | $18 | $146 | $40 | 5.8 |
| Basement PD training lobby | 3 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 3 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Basement PD training lobby | 3 | LED Lamps: (1) 10W A19 Screw-In Lamp | Wall Switch | S | 10 | 8,760 | 5 | None | Yes | 3 | LED Lamps: (1) 10W A19 Screw-In Lamp | High/Low Control | 10 | 6,044 | 0.0 | 88 | 0 | $11 | $225 | $105 | 11.2 |
| Basement PD training lobby | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | S | 114 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 6,044 | 0.2 | 2,100 | 0 | $257 | $489 | $95 | 1.5 |
| Basement PD training lobby | 5 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 5 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 6,044 | 0.2 | 1,856 | 0 | $227 | $632 | $85 | 2.4 |
| Classroom 1 | 20 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 20 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.7 | 2,122 | 0 | $260 | $1,270 | $270 | 3.9 |
| Classroom 2 milo | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.3 | 849 | 0 | $104 | $562 | $115 | 4.3 |
| Classroom 3 | 2 | Exit Signs: LED - 2 W Lamp | None | | 6 | 8,760 | | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Classroom 3 | 25 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 2,340 | 3, 4 | Relamp | Yes | 25 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,615 | 0.9 | 2,653 | -1 | $324 | $1,453 | $320 | 3.5 |
| Classroom 3 hall | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 6,044 | 0.1 | 742 | 0 | $91 | $261 | $40 | 2.4 |
| Electrical Room 1 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | S | 32 | 8,760 | 3, 4 | Relamp | Yes | 3 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 6,044 | 0.1 | 624 | 0 | $76 | $171 | $35 | 1.8 |
| GYM hall | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 5 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 6,044 | 0.1 | 1,192 | 0 | $146 | $335 | $135 | 1.4 |
| Gymnasium 1 | 30 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 3,650 | 3, 4 | Relamp | Yes | 30 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 2,519 | 1.1 | 4,966 | -1 | $607 | $1,635 | $370 | 2.1 |
| Kitchen 1 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | S | 62 | 8,760 | 3, 4 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 6,044 | 0.1 | 1,589 | 0 | $194 | $416 | $75 | 1.8 |

## Motor Inventory & Recommendations

| | | Existing Conditions | | | | | | | | | Proposed Conditions | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | Motor Quantity | Motor Application | HP Per Motor | Full Load Efficiency | VFD Control? | Manufacturer | Model | Remaining Useful Life | Annual Operating Hours | ECM # | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| Mechanical 3 PD | Police Headquarters | 2 | Air Compressor | 0.8 | 78.5% | No | Baldor | 127466F036 | B | 1,095 | | No | 78.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 4 boiler room | Police Headquarters | 2 | Chilled Water Pump | 7.5 | 88.5% | No | Dayton/Baldor | **KX07G/ | B | 1,500 | 8 | No | 91.7% | Yes | 2 | 3.0 | 7,559 | 0 | $937 | $32,021 | $4,000 | 29.9 |
| Mechanical 2 near court room | Police Headquarters | 2 | Chilled Water Pump | 1.5 | 75.5% | No | US Electric Motors | unkown | B | 1,500 | 8 | No | 86.5% | Yes | 2 | 0.7 | 2,049 | 0 | $254 | $11,260 | $300 | 43.1 |
| Mechanical 4 boiler room | Police Headquarters | 1 | Condenser Water Pump | 7.5 | 84.0% | No | Marathon | 1YK213TTDR7026GP | B | 1,500 | 6 | Yes | 91.0% | No | | 0.3 | 576 | 0 | $71 | $1,131 | $0 | 15.8 |
| Mechanical 4 boiler room | Police Headquarters | 1 | Condenser Water Pump | 7.5 | 88.5% | No | Baldor | M3311T | B | 1,500 | | No | 88.5% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - PD roof | Cooling tower | 1 | Cooling Tower Fan | 20.0 | 91.0% | No | Evapco | LSTE-5112 | W | 3,000 | | No | 91.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - PD roof | 2nd floor holding cells | 1 | Exhaust Fan | 0.3 | 65.0% | No | unknown | unknown | B | 2,745 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - PD roof | 3rd floor holding cells | 1 | Exhaust Fan | 0.3 | 65.0% | No | unknown | unknown | B | 2,745 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - PD roof | Restrooms | 1 | Exhaust Fan | 0.3 | 65.0% | No | unknown | unknown | B | 2,745 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - PD roof | Restrooms | 2 | Exhaust Fan | 0.3 | 65.0% | No | unknown | unknown | B | 2,745 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| PD offices | PD offices | 48 | Fan Coil Unit | 0.3 | 65.0% | No | unknown | unknown | B | 2,745 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 4 boiler room | Police Headquarters | 1 | Heating Hot Water Pump | 0.5 | 65.0% | No | Bell & Gossett | UQM Q56A170581 | W | 2,745 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 4 boiler room | Police Headquarters | 2 | Heating Hot Water Pump | 5.0 | 89.5% | No | Baldor | EM3218T | W | 2,745 | 9 | No | 89.5% | Yes | 2 | 1.0 | 8,580 | 0 | $1,064 | $45,894 | $3,600 | 39.7 |
| Mechanical 4 boiler room | Police Headquarters | 1 | DHW Circulation Pump | 0.1 | 65.0% | No | Taco | 009-BF5-3 | W | 8,760 | | No | 65.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 4 boiler room | Police Headquarters | 4 | Water Supply Pump | 1.5 | 70.0% | No | Grundfos | UPS 80-80F | W | 2,745 | | No | 70.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 3 PD | Police Headquarters | 3 | Other | 25.0 | 77.0% | No | unkown | unkown | B | 730 | | No | 77.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Mechanical 3 PD | AHU 3 | 1 | Supply Fan | 5.0 | 80.0% | No | Beldor | M3311T | W | 8,760 | 7 | No | 89.5% | Yes | 1 | 1.7 | 13,091 | 0 | $1,624 | $4,197 | $1,800 | 1.5 |
| Mechanical 3 PD | AHU 3 | 1 | Return Fan | 2.0 | 80.0% | No | unkown | unkown | W | 8,760 | 7 | No | 86.5% | Yes | 1 | 0.7 | 4,405 | 0 | $546 | $3,623 | $200 | 6.3 |
| Mechanical 3 PD | AHU 1 | 1 | Supply Fan | 5.0 | 87.5% | No | Taco | unkown | W | 8,760 | 7 | No | 89.5% | Yes | 1 | 1.5 | 10,728 | 0 | $1,330 | $4,076 | $1,800 | 1.7 |
| Mechanical 3 PD | AHU 1 | 1 | Return Fan | 2.0 | 80.0% | No | unkown | unkown | W | 8,760 | 7 | No | 86.5% | Yes | 1 | 0.7 | 4,405 | 0 | $546 | $3,623 | $200 | 6.3 |

| | | 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 3 PD | AHU 2 | 1 | Supply Fan | 5.0 | 89.5% | No | Century | PJ4AA15A01C | W | 8,760 | 7 | No | 89.5% | Yes | 1 | 1.4 | 10,165 | 0 | $1,261 | $4,076 | $1,800 | 1.8 |
| Mechanical 3 PD | AHU 2 | 1 | Return Fan | 2.0 | 80.0% | No | unkown | unkown | W | 8,760 | 7 | No | 86.5% | Yes | 1 | 0.7 | 4,405 | 0 | $546 | $3,623 | $200 | 6.3 |
| Mechanical 2 near court room | AHU 5 | 1 | Supply Fan | 10.0 | 80.0% | No | Century | 6-339073-02 | B | 3,391 | 7 | No | 91.7% | Yes | 1 | 3.5 | 14,581 | 0 | $1,808 | $5,375 | $2,200 | 1.8 |
| Mechanical 2 near court room | AHU 5 | 1 | Supply Fan | 7.5 | 81.5% | No | Century | 7-850115-01-0J | W | 3,391 | 7 | No | 91.7% | Yes | 1 | 2.5 | 10,478 | 0 | $1,299 | $4,761 | $2,000 | 2.1 |
| Mechanical 1 attic | AHU 4 | 1 | Supply Fan | 15.0 | 69.5% | No | Dayton | 3KW468 | W | 8,760 | 7 | No | 93.0% | Yes | 1 | 6.3 | 54,552 | 0 | $6,765 | $7,041 | $2,400 | 0.7 |
| Mechanical 1 attic | AHU 4 | 1 | Return Fan | 7.5 | 86.0% | No | Beldor | M3311T | W | 8,760 | 7 | No | 91.7% | Yes | 1 | 2.4 | 15,801 | 0 | $1,960 | $4,761 | $2,000 | 1.4 |
| Exterior - MC roof | AHU 5 | 1 | Supply Fan | 1.3 | 80.0% | No | unknown | unknown | W | 2,745 | | No | 80.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - MC roof | AHU 5 | 1 | Supply Fan | 1.3 | 80.0% | Yes | unknown | unknown | W | 2,745 | | No | 80.0% | No | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Exterior - MC roof | Packaged RTU | 2 | Supply Fan | 3.0 | 80.0% | No | unknown | unknown | B | 2,745 | 7 | No | 88.5% | Yes | 2 | 2.0 | 6,755 | 0 | $838 | $8,161 | $800 | 8.8 |

## 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 |
| garage PD 4 | garage PD 4 | 1 | Split-System | 5.00 | | 11.00 | | unkown | unknown | B | 10 | Yes | 1 | Split-System | 5.00 | | 16.00 | | 0.9 | 1,295 | 0 | $161 | $6,521 | $1,050 | 34.1 |
| PD roof | 2nd floor office | 1 | Split-System | 3.00 | | 13.00 | | Sure Comfort | RCU13022A36J757 | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| MC roof | radio shop | 1 | Split-System | 5.00 | | 11.00 | | York | unknown | B | 10 | Yes | 1 | Split-System | 5.00 | | 16.00 | | 0.9 | 1,295 | 0 | $161 | $6,521 | $1,050 | 34.1 |
| court room admin office | court room admin office | 4 | Electric Resistance Heat | | 3.41 | | 1 COP | unkown | unknown | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| MC roof | detention-processing | 1 | Ductless Mini-Split AC | 2.00 | | 11.00 | | Fujitsu | AOU24CL | B | 10 | Yes | 1 | Ductless Mini-Split AC | 2.00 | | 18.00 | | 0.4 | 645 | 0 | $80 | $5,642 | $0 | 70.5 |
| MC roof | detention-processing | 1 | Ductless Mini-Split AC | 1.50 | | 11.00 | | Fujitsu | AOU18CL | B | 10 | Yes | 1 | Ductless Mini-Split AC | 1.50 | | 18.00 | | 0.3 | 484 | 0 | $60 | $5,193 | $0 | 86.6 |
| MC roof | Court room admin offices | 1 | Ductless Mini-Split AC | 1.42 | | 11.00 | | Sanyo | C1822 | B | 10 | Yes | 1 | Ductless Mini-Split AC | 1.42 | | 18.00 | | 0.3 | 457 | 0 | $57 | $5,160 | $0 | 91.1 |
| MC roof | Court room admin offices | 1 | Ductless Mini-Split AC | 1.00 | | 11.00 | | York | DCPM12CSM41Q1A | B | 10 | Yes | 1 | Ductless Mini-Split AC | 1.00 | | 18.00 | | 0.2 | 322 | 0 | $40 | $5,175 | $0 | 129.4 |
| garage PD 4 | garage PD 4 | 1 | Electric Resistance Heat | | 3.41 | | 1 COP | unkown | unkown | B | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| MC roof | communication center | 2 | Package Unit | 7.50 | | 12.20 | | York | ZJ090C00P2TAA5A | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| MC roof | garage IT 2nd | 1 | Ductless Mini-Split HP | 1.00 | 14.00 | 16.00 | 9 HSPF | Fujitsu | AOU12RL2 | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| MC roof | prosecutor/garage IT | 2 | Ductless Mini-Split HP | 1.50 | 21.60 | 20.00 | 10.6 HSPF | Fujitsu | AOU18RLXFW1 | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| garage PD 4 | garage PD 4 | 1 | Unit Heater | | 25.00 | | | Trane | unkown | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| womens locker room | womens locker room | 1 | Unit Heater | | 25.00 | | | unkown | unkown | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| PD office - street crimes | PD office - street crimes | 4 | Window AC | 1.00 | | 10.00 | | unkown | unkown | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| PD offices | PD briefing room, PD patrol supervisor, open office | 3 | Window AC | 1.00 | | 10.00 | | LG | unkown | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Youth services | Youth services | 1 | Window AC | 0.75 | | 10.00 | | Commercial Cool | CPRB08XCJ | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Electric Chiller Inventory & Recommendations

| | | Existing Conditions | | | | | | Proposed Conditions | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | Chiller Quantity | System Type | Cooling Capacity per Unit (Tons) | Manufacturer | Model | Remaining Useful Life | ECM # | Install High Efficiency Chillers? | Chiller Quantity | System Type | Constant/ Variable Speed | Cooling Capacity (Tons) | Full Load Efficiency (kW/Ton) | IPLV Efficiency (kW/Ton) | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| MC roof | AHU 5 | 1 | Air-Cooled Scroll Chiller | 26.00 | Trane | CGAM 026A 2002 AXD2 A1A1 A1AX XA1C 1A4X XXXX XA1A 3A1D 1XXL XX | W | | No | | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| mechanical 4 boiler room | Police Headquarters | 2 | Water-Cooled Reciprocating Chiller | 200.00 | Trane | VES102913 | B | 11 | Yes | 2 | Water-Cooled Centrifugal Chiller | Constant | 200.00 | 0.60 | 0.55 | 134.5 | 76,304 | 0 | $9,463 | $341,274 | $8,000 | 35.2 |

## Space Heating Boiler Inventory & Recommendations

| | | Existing Conditions | | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Output Capacity per Unit (MBh) | Manufacturer | Model | Remaining Useful Life | ECM # | Install High Efficiency System? | System Quantity | System Type | Output Capacity per Unit (MBh) | Heating Efficiency | Heating Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| mechanical 4 boiler room | mechanical 4 boiler room | 4 | Non-Condensing Hot Water Boiler | 1,700 | P-K Thermific | N-2000-2 | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |

## Programmable Thermostat Recommendations

| | | Recommendation Inputs | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Affected | ECM # | Thermostat Quantity | 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 |
| PD roof | 2nd floor office | 12 | 1.00 | 3.00 | 0.00 | | 0.0 | 189 | 0 | $23 | $330 | $0 | 14.0 |
| MC roof | Court room admin offices | 12 | 1.00 | 2.00 | 0.00 | | 0.0 | 149 | 0 | $19 | $330 | $0 | 17.8 |
| MC roof | Court room admin offices | 12 | 1.00 | 1.50 | 0.00 | | 0.0 | 112 | 0 | $14 | $330 | $0 | 23.8 |
| MC roof | Court room admin offices | 12 | 1.00 | 1.42 | 0.00 | | 0.0 | 106 | 0 | $13 | $330 | $0 | 25.2 |
| MC roof | Court room admin offices | 12 | 1.00 | 1.00 | 0.00 | | 0.0 | 75 | 0 | $9 | $330 | $0 | 35.6 |
| MC roof | Court room admin offices | 12 | 2.00 | 15.00 | 0.00 | | 0.0 | 1,009 | 0 | $125 | $660 | $0 | 5.3 |

## Pipe Insulation Recommendations

| | | Recommendation Inputs | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Affected | ECM # | Length of Uninsulated Pipe (ft) | Pipe Diameter (in) | 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 | Police Headquarters | 13 | 120 | 2.00 | 0.0 | 0 | 43 | $348 | $864 | $480 | 1.1 |
| Mechanical - attic | AHU - 4 | 13 | 4 | 2.50 | 0.0 | 0 | 4 | $32 | $35 | $16 | 0.6 |
| Boiler room | Police Headquarters | 13 | 9 | 4.00 | 0.0 | 0 | 14 | $110 | $79 | $36 | 0.4 |
| Boiler room | Police Headquarters | 13 | 66 | 2.50 | 0.0 | 0 | 65 | $531 | $580 | $264 | 0.6 |

## DHW Inventory & Recommendations

| | | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area(s)/System(s) Served | System Quantity | System Type | Manufacturer | Model | Remaining Useful Life | ECM # | Replace? | System Quantity | System Type | Fuel Type | System Efficiency | Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Estimated M&L Cost ($) | Total Incentives | Simple Payback w/ Incentives in Years |
| mechanical 4 boiler room | Police Headquarters | 1 | Boiler | AO Smith | HW-670 | W | | No | | | | | | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| janitorial - communication | Communication offices | 1 | Storage Tank Water Heater (≤ 50 Gal) | Rheem | PROE38 S2 RH95 8 | N | | 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 |
| Police Headquarters | 14 | 4 | Faucet Aerator (Kitchen) | 2.50 | 1.50 | 0.0 | 0 | 1 | $9 | $29 | $16 | 1.4 |
| Police Headquarters | 14 | 41 | Faucet Aerator (Lavatory) | 2.20 | 0.50 | 0.0 | 0 | 19 | $158 | $294 | $294 | 0.0 |
| Police Headquarters | 14 | 4 | Showerhead | 2.50 | 1.50 | 0.0 | 0 | 3 | $25 | $357 | $120 | 9.3 |

**Plug Load Inventory**

| | Existing Conditions | | | | | |
|---|---|---|---|---|---|---|
| Location | Quantity | Equipment Description | Energy Rate (W) | ENERGY STAR Qualified? | Manufacturer | Model |
| offices | 29 | Coffee machine | 800 | No | various | various |
| court room A & B | 2 | Dehumidifier | 200 | No | Sun Pure | unknown |
| offices | 220 | Desktop | 200 | No | Dell | unknown |
| offices | 23 | Electric space heater | 600 | No | various | various |
| Police Headquarters | 7 | Large fan | 300 | No | various | unknown |
| Police Headquarters | 39 | Portable fan | 200 | No | various | various |
| Police Headquarters | 29 | Microwave | 800 | No | various | various |
| Police Headquarters | 63 | Printer | 200 | No | various | various |
| Police Headquarters | 32 | Copier | 600 | No | various | various |
| Police Headquarters | 2 | Projector | 200 | No | various | various |
| Police Headquarters | 19 | Min refrigerator | 45 | No | various | various |
| Police Headquarters | 12 | Refrigerator | 126 | No | various | various |
| Police Headquarters | 8 | Scanner | 120 | No | various | various |
| Police Headquarters | 24 | Television | 133 | No | various | various |
| Police Headquarters | 12 | Toaster | 750 | No | various | various |
| Police Headquarters | 4 | Toaster oven | 400 | No | various | various |
| Police Headquarters | 9 | Water cooler | 90 | No | various | various |

**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 |
| Police Headquarters | 3 | Glass Fronted Refrigerated | 15 | Yes | 0.4 | 3,627 | 0 | $450 | $690 | $300 | 0.9 |
| Police Headquarters | 1 | Refrigerated | N/A | No | 0.0 | 0 | 0 | $0 | $0 | $0 | 0.0 |
| Police Headquarters | 1 | Non-Refrigerated | 15 | Yes | 0.0 | 343 | 0 | $42 | $230 | $0 | 5.4 |

# APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

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## ENERGY STAR® Statement of Energy Performance

**N/A**

**ENERGY STAR® Score**[1]

### City of Trenton Police Headquarters

**Primary Property Type:** Police Station
**Gross Floor Area (ft²):** 77,500
**Built:** 1972

**For Year Ending:** March 31, 2020
**Date Generated:** April 26, 2021

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 |
|---|---|---|
| City of Trenton Police Headquarters<br>225 North Clinton Avenue<br>Trenton, New Jersey 08609 | City of Trenton<br>319 East State Street<br>Trenton, NJ 08618<br>(609) 989-3615 | Hoggarth Stephen<br>319 East State Street<br>Trenton, NJ 08618<br>(609) 989-3615<br>hstephen@trentonnj.org |

**Property ID**: 5992168

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

**Site EUI**
80.1 kBtu/ft²

**Source EUI**
179.7 kBtu/ft²

| Annual Energy by Fuel | |
|---|---|
| Natural Gas (kBtu) | 1,974,776 (32%) |
| Electric - Grid (kBtu) | 4,233,809 (68%) |

| National Median Comparison | |
|---|---|
| National Median Site EUI (kBtu/ft²) | 55.7 |
| National Median Source EUI (kBtu/ft²) | 124.9 |
| % Diff from National Median Source EUI | 44% |
| **Annual Emissions** | |
| Greenhouse Gas Emissions (Metric Tons CO2e/year) | 510 |

#### 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. |