



Local Government Energy Audit: Energy Audit Report



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Building #3 I (E-H Wings)

101 Vera King Farris Drive

Galloway, NJ 08205

Stockton University

July 15, 2019

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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

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I EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBP) has sponsored this Local Government Energy Audit (LGEA) Report for E-H Wings, Building #31 (Building #31).

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey universities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

I.1 Facility Summary

Building #31 is a 232,277 square foot facility comprised of various space types within a single building. The building is three floors and includes classrooms, central open gallery/hall, offices, a bookstore, restrooms, laboratory space, a dance studio, library, gallery, kitchen and mechanical and electrical spaces.

Interior lighting at Building #31 consists primarily of T8 linear fluorescent fixtures but has a variety of other lighting technologies including compact fluorescent, T5 and T12 linear fluorescent, incandescent, metal halide, halogen, and LED lamps. Exterior lighting is primarily CFLs as well as some LED and T5 linear fluorescent fixtures. Cooling is primarily provided by a combination of rooftop package air-conditioning units and some rooftop air-handling units (AHU), which receive chilled water from the campus chilled water loop. Supplementary cooling is provided by a few ductless mini-split air-conditioning and heat pump units as well as a couple split-system heat pumps. Heating is provided primarily by gas heating from the package air-conditioners and condensing hot water boilers which provide hot water to the rooftop air-handlers. Supplementary heating is provided by ductless mini-split and split-system heat pumps. A thorough description of the facility and our observations are located in Section 2.

I.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 11 measures and recommends ten measures which together represent an opportunity for Building #31 to reduce annual energy costs by \$112,600 and annual greenhouse gas emissions by 946,158 lbs CO₂e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 3.4 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Building #31's annual energy use by 11%.

Figure 1 – Previous 12 Month Utility Costs

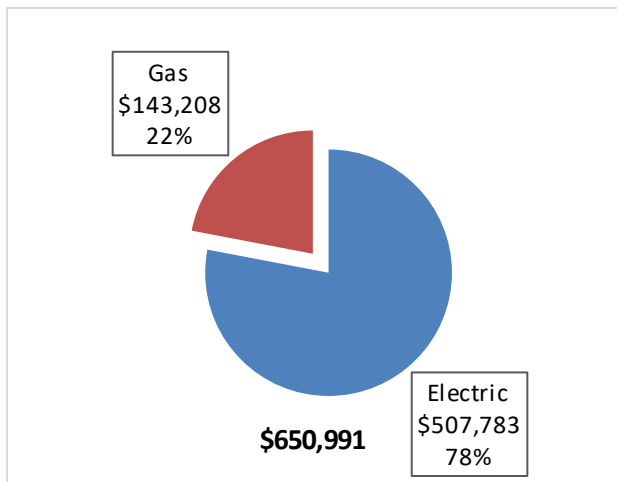
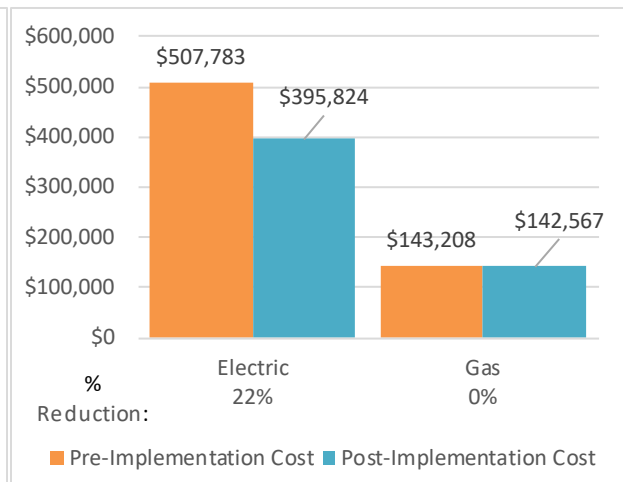


Figure 2 – Potential Post-Implementation Costs



A detailed description of Building #31's existing energy use can be found in Section 3.

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

| Energy Conservation Measure | Recommend? | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Natural Gas Savings (MMBtu) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$)* | Estimated Net Cost (\$) | Simple Payback Period (yr)** | CO ₂ e Emissions Reduction (lbs) |
|--|------------|-------------------------------|--------------------------|------------------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------|-------------------------|------------------------------|---|
| Lighting Upgrades | | 644,059 | 92.6 | 0.0 | 0.0 | \$77,351 | \$209,646 | \$47,830 | \$161,816 | 2.1 | 648,562 |
| ECM 1 Install LED Fixtures | Yes | 43,083 | 6.3 | 0.0 | 0.0 | \$5,174 | \$40,086 | \$3,900 | \$36,186 | 7.0 | 43,385 |
| ECM 2 Retrofit Fluorescent Fixtures with LED Lamps and Drivers | Yes | 30,100 | 4.0 | 0.0 | 0.0 | \$3,615 | \$8,019 | \$975 | \$7,044 | 1.9 | 30,311 |
| ECM 3 Retrofit Fixtures with LED Lamps | Yes | 570,875 | 82.3 | 0.0 | 0.0 | \$68,562 | \$161,541 | \$42,955 | \$118,586 | 1.7 | 574,867 |
| Lighting Control Measures | | 109,366 | 13.9 | 0.0 | 0.0 | \$13,135 | \$94,200 | \$9,100 | \$85,100 | 6.5 | 110,130 |
| ECM 4 Install Occupancy Sensor Lighting Controls | Yes | 86,608 | 11.1 | 0.0 | 0.0 | \$10,402 | \$70,200 | \$9,100 | \$61,100 | 5.9 | 87,213 |
| ECM 5 Install High/Low Lighting Controls | Yes | 22,758 | 2.9 | 0.0 | 0.0 | \$2,733 | \$24,000 | \$0 | \$24,000 | 8.8 | 22,917 |
| Motor Upgrades | | 14,121 | 2.7 | 0.0 | 0.0 | \$1,696 | \$36,415 | \$0 | \$36,415 | 21.5 | 14,220 |
| ECM 6 Premium Efficiency Motors | Yes | 14,121 | 2.7 | 0.0 | 0.0 | \$1,696 | \$36,415 | \$0 | \$36,415 | 21.5 | 14,220 |
| Variable Frequency Drive (VFD) Measures | | 161,442 | 33.3 | 0.0 | 0.0 | \$19,389 | \$113,031 | \$19,000 | \$94,031 | 4.8 | 162,571 |
| ECM 7 Install VFDs on Constant Volume (CV) HVAC | Yes | 129,348 | 31.5 | 0.0 | 0.0 | \$15,535 | \$105,817 | \$19,000 | \$86,817 | 5.6 | 130,252 |
| ECM 8 Install VFDs on Hot Water Pumps | Yes | 32,094 | 1.9 | 0.0 | 0.0 | \$3,855 | \$7,214 | \$0 | \$7,214 | 1.9 | 32,319 |
| Domestic Water Heating Upgrade | | 0 | 0.0 | 63.4 | 63.4 | \$641 | \$222 | \$0 | \$222 | 0.3 | 7,429 |
| ECM 9 Install Low-Flow Domestic Hot Water Devices | Yes | 0 | 0.0 | 63.4 | 63.4 | \$641 | \$222 | \$0 | \$222 | 0.3 | 7,429 |
| Plug Load Equipment Control - Vending Machine | | 3,224 | 0.0 | 0.0 | 0.0 | \$387 | \$460 | \$0 | \$460 | 1.2 | 3,246 |
| ECM 10 Vending Machine Control | Yes | 3,224 | 0.0 | 0.0 | 0.0 | \$387 | \$460 | \$0 | \$460 | 1.2 | 3,246 |
| TOTALS FOR HIGH PRIORITY MEASURES | | 932,211 | 142.6 | 63.4 | 63.4 | \$112,600 | \$453,973 | \$75,930 | \$378,043 | 3.4 | 946,158 |
| TOTALS FOR ALL EVALUATED MEASURES | | 932,211 | 142.6 | 63.4 | 63.4 | \$112,600 | \$453,973 | \$75,930 | \$378,043 | 3.4 | 946,158 |

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient than using a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

Electric Unitary HVAC measures generally involve replacing older inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide equivalent cooling to older air conditioning systems at a reduced energy cost. These measures save energy by reducing the power used by the air conditioning systems, due to improved electrical efficiency.

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

Domestic Hot Water upgrade measures generally involve replacing older inefficient domestic water heating systems with modern energy efficient systems. New domestic hot water heating systems can provide equivalent, or greater, water heating capacity compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel used for domestic hot water heating due to improved heating efficiency or reducing standby losses.

Plug Load Equipment control measures generally involve installing automated devices that limit the power usage or operation of equipment that is plugged into an electric outlet when not in use.

Energy Efficient Practices

TRC also identified six low-cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Building #31 include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Clean Evaporator/Condenser Coils on AC Systems
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Building #31. Based on the configuration of the site and its loads, there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

| | | |
|---------------------|-----------|-----------|
| Potential | High | |
| System Potential | 107 | kW DC STC |
| Electric Generation | 127,477 | kWh/yr |
| Displaced Cost | \$11,090 | /yr |
| Installed Cost | \$361,700 | |

For details on our evaluation and on-site generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart
- Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SmartStart program. More details on this program and others are available in Section 8.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (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. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce 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. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their electric usage 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 DR programs. Program participation is voluntary and facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

| Name | Role | E-Mail | Phone # |
|----------------------------------|--|---------------------------------|----------------|
| Customer | | | |
| Charles (Skip) West , AIA | Director, Office of Facilities Planning & Construction | Charles.West@stockton.edu | (609) 626-5522 |
| Designated Representative | | | |
| Michael J. Ferraro II | Energy Systems Specialist | Michael.Ferraro@stockton.edu | (609) 652-4884 |
| TRC Energy Services | | | |
| Vish Nimbalkar, P.E. | Auditor | VNaikNimbalkar@trcsolutions.com | (732) 855-0033 |

2.2 General Site Information

On September 28, 2018, TRC performed an energy audit at Building #31 located in Galloway, New Jersey. TRC’s team met with Michael J. Ferraro II, Energy Systems Specialist to review the facility operations and help focus our investigation on specific energy-using systems.

Building #31 is a 232,277 square foot facility comprised of various space types within a single building. The building is three floors and includes classrooms, central open gallery/hall, offices, a bookstore, restrooms, laboratory space, performing arts center, atria, a dance studio, library, locker rooms, a gallery, a kitchen and mechanical and electrical spaces.

Interior lighting at Building #31 consists primarily of T8 linear fluorescent fixtures but has a variety of other lighting technologies including compact fluorescent, T5 and T12 linear fluorescent, incandescent, metal halide, halogen, and LED lamps. Exterior lighting is primarily CFLs as well as some LED and T5 linear fluorescent fixtures. Cooling is primarily provided by a combination of rooftop package air conditioning units and some rooftop air-handling units (AHU) which receive chilled water from the campus chilled water loop. Supplementary cooling is provided by a few ductless mini-split air conditioning and heat pump units as well as a couple split-system heat pumps. Heating is provided primarily by gas heating from the package air conditioners and condensing hot water boilers which provide hot water to the rooftop air-handlers. Supplementary heating is provided by ductless mini-split and split-system heat pumps.

The building was constructed in 1973.

2.3 Building Occupancy

The building is open every day. The typical schedule is presented in the table below. The entire facility is used year-round by the campus. During a typical day, the facility is occupied by approximately 2,000 staff and students.

Figure 6 - Building Schedule

| Building Name | Weekday/Weekend | Operating Schedule |
|-------------------------|-----------------|--------------------|
| Building 31 (E-H Wings) | Weekday | 8:00AM to 11:00PM |
| Building 31 (E-H Wings) | Weekend | 8:00AM to 9:00PM |

2.4 Building Envelope

The building is constructed of concrete and structural steel with a metal panel facade. The building has a flat roof with an asphalt membrane that is in adequate condition. The F-wing overbuild roof was recently replaced. The roof over section E, F, and G is need of repair or replacement. We recommend having the roof inspected by a qualified roofing contractor. The buildings have double-pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum with large glass panes.

Figure 7 - Building Envelope



2.5 On-Site Generation

Stockton University installed a 1,200 kW-DC solar energy project in March 2015. The project included photovoltaic (PV) arrays on parking lot canopies, one of which is interconnected near Building 31. The systems provide 6% of the electricity required by the campus.

Marina Energy is the power purchase agreement provider and financier of the solar energy system.

2.6 Energy-Using Systems

Please see Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment.

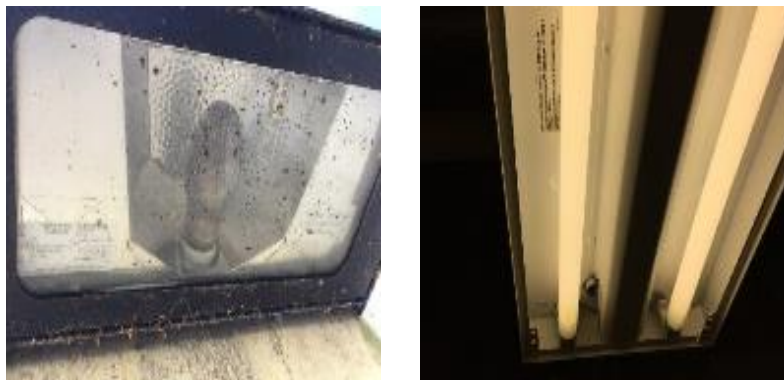
Lighting System

Interior lighting at the facility is provided mostly by linear 32 Watt fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). There are also a variety of other lighting technologies including incandescent, CFL, halogen, T5 and T12 linear fluorescent, and LED fixtures. Most of the T8 linear fluorescent fixtures are 1-lamp or 2-lamp, 4-foot long troffers with diffusers.

Lighting control in most spaces is provided by wall switches, but there are a number of spaces controlled with occupancy sensors. The occupancy sensors are either wall or ceiling mounted depending on the space layout.

The building's exterior lighting mostly consists of CFL fixtures, as well as some LED, T5 linear fluorescent, and metal halide lamps. Most fixtures are controlled by timers.

Figure 8 – Lighting Technologies



Chilled Water System

The F-wing of the facility is served by a campus chilled water loop. Two sets of pumps circulate chilled water from the loop to chilled water coils in air handlers in the facility. Two constant flow 3 hp pumps and two 10 hp constant flow pumps deliver the chilled water to the end uses.

Figure 9 – Chiller Water Loop



Hot Water Heating System

The hot water system consists of three Aerco 1,880 kBtu/hr output, condensing boilers. The boilers have a nominal combustion efficiency of 94%. The boilers are configured in primary-secondary distribution with a total of five hot water pumps. Each boiler is supplied by a dedicated variable flow primary 3 hp pump. There are also two variable flow 5 hp and two constant flow 7.5 hp secondary pumps which provide hot water to end uses. There are also two constant flow 1.5 hp circulating pumps. Hot water is supplied to air handlers 1-4, 8, 9, and 10 as well as ERU 2.

The boilers are in good condition and well maintained.

Figure 10 – Heating Hot Water Equipment



Heating, Ventilation and Air-Conditioning (HVAC)

There are seven air handling units (AHU1-4, 8, 9, and 10), an energy recovery unit (ERU 2), 31 packaged air conditioners with gas heat, one packaged AC with electric heat, two ductless mini-split air conditioners, two split-system heat pumps, and a ductless mini-split heat pump that provide heating and cooling to the facility. Most of the package air handlers are Trane units with cooling capacities between 4 tons and 40 tons and heating capacities between about 200 kBtu/hr and 650 kBtu/hr. There are also two large McQuay package air conditioners with a cooling capacity of 105 tons and 125 tons and a heating capacity of 1,000 kBtu/hr and 1,500 kBtu/hr, respectively. Both Mitsubishi ductless mini-split AC units have cooling capacity of 2 tons each. The Trane split-system heat pumps have a cooling capacity of 2 tons and 5 tons and a heating capacity of 31 kBtu/hr and 55 kBtu/hr, respectively. The Fujitsu ductless mini-split heat pump has a cooling capacity of 2 tons and a heating capacity of 19.5 kBtu/hr.

Air-handlers in the facility have supply fans motors ranging from 2 hp to 20 hp. Air-handlers 9 and 10 have variable volume supply fans and 2 hp return fans. The energy recovery units have a constant volume supply and exhaust fans with 7.5 hp motors.

HVAC equipment are controlled by individual thermostats located in their respective zones.

Figure 11 – HVAC Equipment



Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of an AO Smith gas-fired hot water heater with an input rating of 199 kBtu/hr and a nominal efficiency of 80%. The water heater has a 100 gallon storage tank.

Figure 12 – Domestic Hot Water Equipment



Refrigeration

There is a stand-up refrigerated case with a glass door in the coffee shop, three freezer chests in the coffee shop storage area, and an ice making machine in the coffee shop.

Figure 13 – Refrigeration Equipment



Building Plug Load

There are 750 computer work stations throughout the facility.

There are also a number of other plug load appliances including overhead projectors, televisions, mini-fridges, small to large printers/copiers, microwaves, coffee makers, and refrigerators.

There are also two refrigerated beverage vending machines.

Figure 14 – Plug Load Appliances



2.7 Water-Using Systems

There are 31 lavatory faucets in the facility which are rated for 2.2 gallons per minute (gpm) or higher.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the “typical” energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

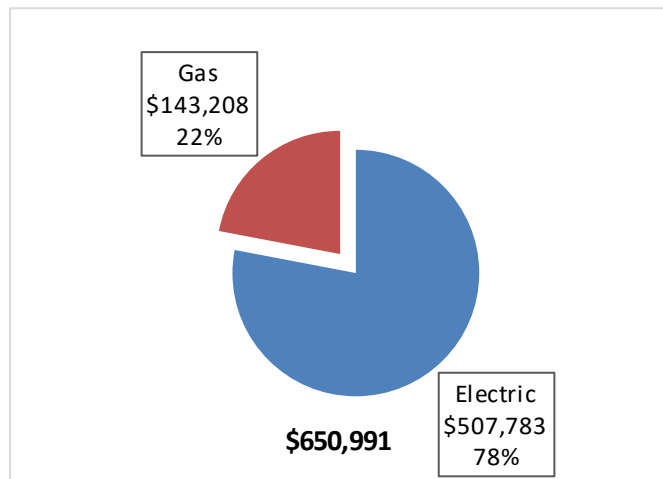
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 15 - Utility Summary

| Utility Summary for Building 31 (E-H Wings) | | |
|---|----------------|-----------|
| Fuel | Usage | Cost |
| Electricity | 4,228,000 kWh | \$507,783 |
| Natural Gas | 141,709 Therms | \$143,208 |
| Total | | \$650,991 |

The current annual energy cost for this facility is \$650,991 as shown in the chart below.

Figure 16 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was \$0.120/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. Electricity demand and consumption is greatest in July and August due to the increased cooling load provided by electric air-conditioning equipment. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 17 - Electric Usage & Demand

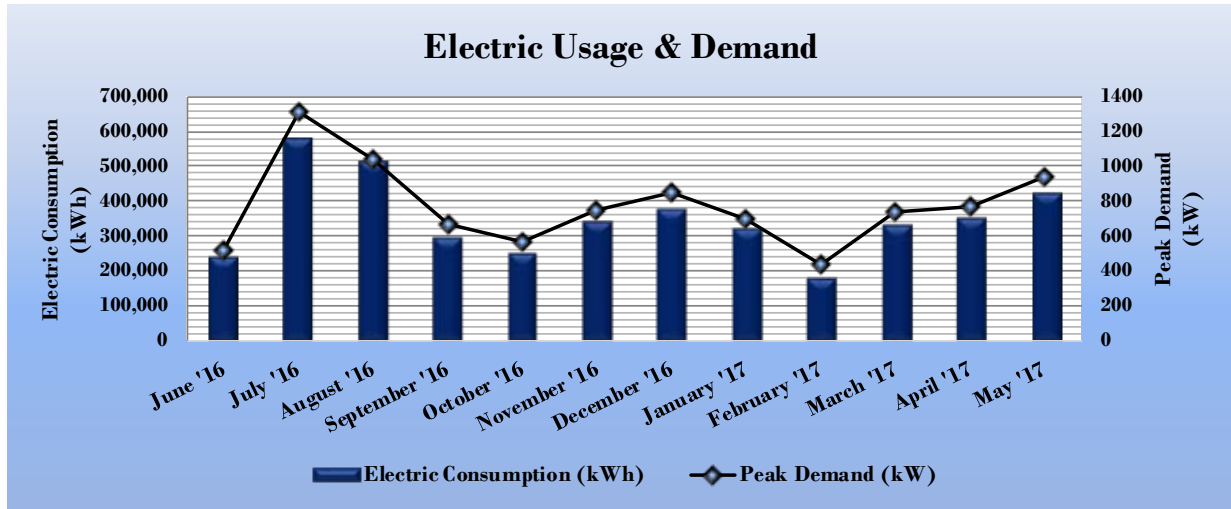


Figure 18 - Electric Usage & Demand

| Electric Billing Data for Building 31 (E-H Wings) | | | | | | |
|---|----------------|----------------------|-------------|-------------|---------------------|----------------------|
| Period Ending | Days in Period | Electric Usage (kWh) | Demand (kW) | Demand Cost | Total Electric Cost | TRC Estimated Usage? |
| 6/30/16 | 30 | 242,000 | 516 | | \$29,064 | Yes |
| 7/31/16 | 31 | 580,000 | 1,312 | | \$69,658 | Yes |
| 8/31/16 | 31 | 514,000 | 1,045 | | \$61,731 | Yes |
| 9/30/16 | 30 | 300,000 | 663 | | \$36,030 | Yes |
| 10/31/16 | 31 | 254,000 | 569 | | \$30,505 | Yes |
| 11/30/16 | 30 | 346,000 | 746 | | \$41,555 | Yes |
| 12/31/16 | 31 | 378,000 | 851 | | \$45,398 | Yes |
| 1/31/17 | 31 | 322,000 | 700 | | \$38,672 | Yes |
| 2/28/17 | 28 | 184,000 | 433 | | \$22,098 | Yes |
| 3/31/17 | 31 | 334,000 | 738 | | \$40,113 | Yes |
| 4/30/17 | 30 | 352,000 | 764 | | \$42,275 | Yes |
| 5/31/17 | 31 | 422,000 | 942 | | \$50,682 | Yes |
| Totals | 365 | 4,228,000 | 1312 | \$0 | \$507,783 | 12 |
| Annual | 365 | 4,228,000 | 1312 | \$0 | \$507,783 | |

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is \$1.011/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 19 - Natural Gas Usage

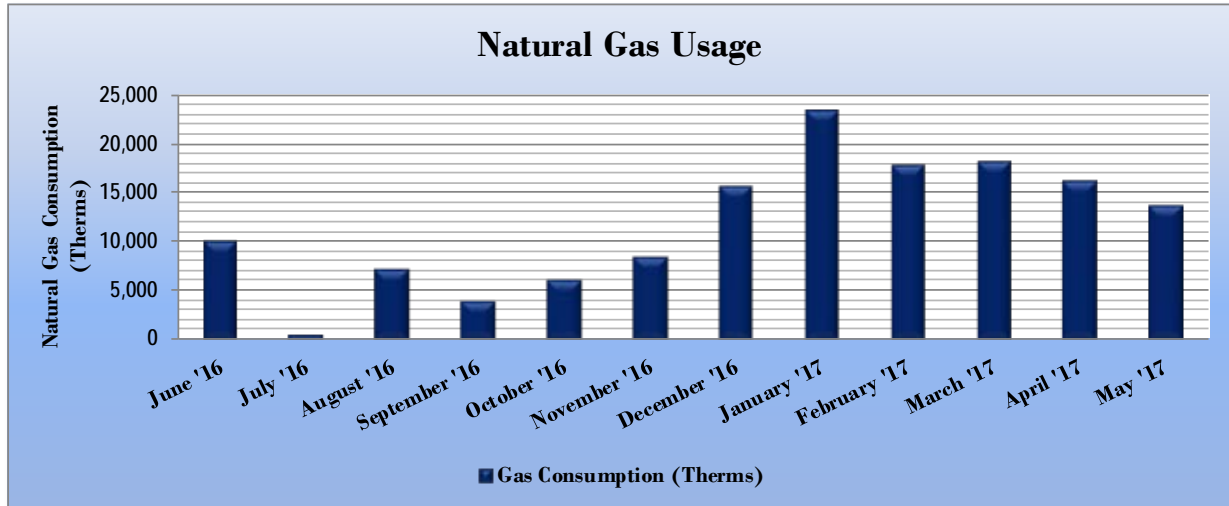


Figure 20 - Natural Gas Usage

| Gas Billing Data for Building 31 (E-H Wings) | | | | |
|--|----------------|----------------------------|------------------|----------------------|
| Period Ending | Days in Period | Natural Gas Usage (Therms) | Natural Gas Cost | TRC Estimated Usage? |
| 6/30/16 | 30 | 10,069 | \$10,176 | Yes |
| 7/31/16 | 31 | 518 | \$523 | Yes |
| 8/31/16 | 31 | 7,249 | \$7,325 | Yes |
| 9/30/16 | 30 | 3,988 | \$4,030 | Yes |
| 10/31/16 | 31 | 6,186 | \$6,252 | Yes |
| 11/30/16 | 30 | 8,574 | \$8,665 | Yes |
| 12/31/16 | 31 | 15,622 | \$15,787 | Yes |
| 1/31/17 | 31 | 23,499 | \$23,747 | Yes |
| 2/28/17 | 28 | 17,846 | \$18,035 | Yes |
| 3/31/17 | 31 | 18,204 | \$18,396 | Yes |
| 4/30/17 | 30 | 16,307 | \$16,480 | Yes |
| 5/31/17 | 31 | 13,647 | \$13,791 | Yes |
| Totals | 365 | 141,709 | \$143,208 | 12 |
| Annual | 365 | 141,709 | \$143,208 | |

3.4 Benchmarking

This facility was benchmarked using *Portfolio Manager*[®], an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR[®] program. *Portfolio Manager*[®] analyzes your building’s consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR[®] score for select building types.

The EUI is a measure of a facility’s energy consumption per square foot, and it is the standard metric for comparing buildings’ energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. 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.

Figure 21 - Energy Use Intensity Comparison – Existing Conditions

| Energy Use Intensity Comparison - Existing Conditions | | |
|---|-------------------------|---|
| | Building 31 (E-H Wings) | National Median Building Type: Higher Education - Public |
| Source Energy Use Intensity (kBtu/ft ²) | 259.1 | 262.6 |
| Site Energy Use Intensity (kBtu/ft ²) | 123.1 | 130.7 |

Implementation of all recommended measures in this report would improve the building’s estimated EUI significantly, as shown in the Table below:

Figure 22 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

| Energy Use Intensity Comparison - Following Installation of Recommended Measures | | |
|--|-------------------------|---|
| | Building 31 (E-H Wings) | National Median Building Type: Higher Education - Public |
| Source Energy Use Intensity (kBtu/ft ²) | 215.8 | 262.6 |
| Site Energy Use Intensity (kBtu/ft ²) | 109.1 | 130.7 |

Many types of commercial buildings are also eligible to receive an ENERGY STAR[®] score. This score is a percentile ranking from 1 to 100. It compares your building’s energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75% of all similar buildings nationwide and may be eligible for ENERGY STAR[®] certification. This building is not eligible to receive a score.

A *Portfolio Manager*[®] Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR[®] Statement of Energy Performance.

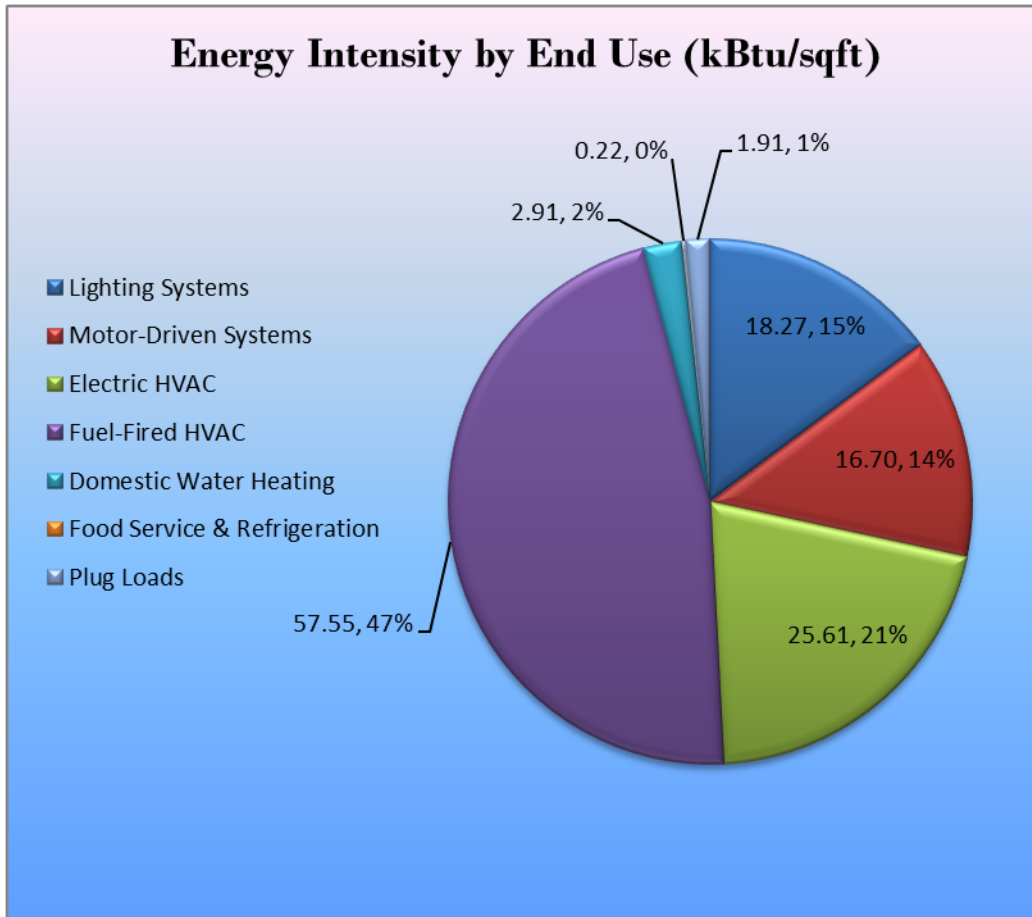
For more information on ENERGY STAR[®] certification go to: <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1>.

A *Portfolio Manager*[®] account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in *Portfolio Manager*[®] regularly, so that you can keep track of your building’s performance. 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>.

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 23 - Energy Balance (kBtu/SF)



4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to Building #31 regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 24 – Summary of Recommended ECMs

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$)* | Estimated Net Cost (\$) | Simple Payback Period (yrs)** | CO ₂ e Emissions Reduction (lbs) |
|--|--|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------|-------------------------|-------------------------------|---|
| Lighting Upgrades | | 644,059 | 92.6 | 0.0 | \$77,351.44 | \$209,645.93 | \$47,830.00 | \$161,815.93 | 2.1 | 648,562 |
| ECM 1 | Install LED Fixtures | 43,083 | 6.3 | 0.0 | \$5,174.32 | \$40,086.45 | \$3,900.00 | \$36,186.45 | 7.0 | 43,385 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 30,100 | 4.0 | 0.0 | \$3,615.04 | \$8,018.74 | \$975.00 | \$7,043.74 | 1.9 | 30,311 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 570,875 | 82.3 | 0.0 | \$68,562.08 | \$161,540.75 | \$42,955.00 | \$118,585.75 | 1.7 | 574,867 |
| Lighting Control Measures | | 109,366 | 13.9 | 0.0 | \$13,134.82 | \$94,200.00 | \$9,100.00 | \$85,100.00 | 6.5 | 110,130 |
| ECM 4 | Install Occupancy Sensor Lighting Controls | 86,608 | 11.1 | 0.0 | \$10,401.57 | \$70,200.00 | \$9,100.00 | \$61,100.00 | 5.9 | 87,213 |
| ECM 5 | Install High/Low Lighting Controls | 22,758 | 2.9 | 0.0 | \$2,733.25 | \$24,000.00 | \$0.00 | \$24,000.00 | 8.8 | 22,917 |
| Motor Upgrades | | 14,121 | 2.7 | 0.0 | \$1,695.92 | \$36,414.64 | \$0.00 | \$36,414.64 | 21.5 | 14,220 |
| ECM 6 | Premium Efficiency Motors | 14,121 | 2.7 | 0.0 | \$1,695.92 | \$36,414.64 | \$0.00 | \$36,414.64 | 21.5 | 14,220 |
| Variable Frequency Drive (VFD) Measures | | 161,442 | 33.3 | 0.0 | \$19,389.18 | \$113,030.60 | \$19,000.00 | \$94,030.60 | 4.8 | 162,571 |
| ECM 7 | Install VFDs on Constant Volume (CV) HVAC | 129,348 | 31.5 | 0.0 | \$15,534.64 | \$105,817.00 | \$19,000.00 | \$86,817.00 | 5.6 | 130,252 |
| ECM 8 | Install VFDs on Hot Water Pumps | 32,094 | 1.9 | 0.0 | \$3,854.54 | \$7,213.60 | \$0.00 | \$7,213.60 | 1.9 | 32,319 |
| Domestic Water Heating Upgrade | | 0 | 0.0 | 63.4 | \$641.18 | \$222.27 | \$0.00 | \$222.27 | 0.3 | 7,429 |
| ECM 9 | Install Low-Flow Domestic Hot Water Devices | 0 | 0.0 | 63.4 | \$641.18 | \$222.27 | \$0.00 | \$222.27 | 0.3 | 7,429 |
| Plug Load Equipment Control - Vending Machine | | 3,224 | 0.0 | 0.0 | \$387.16 | \$460.00 | \$0.00 | \$460.00 | 1.2 | 3,246 |
| ECM 10 | Vending Machine Control | 3,224 | 0.0 | 0.0 | \$387.16 | \$460.00 | \$0.00 | \$460.00 | 1.2 | 3,246 |
| TOTALS | | 932,211 | 142.6 | 63.4 | \$112,599.70 | \$453,973.44 | \$75,930.00 | \$378,043.44 | 3.4 | 946,158 |

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 25 below.

Figure 25 – Summary of Lighting Upgrade ECMs

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-----------------------------|--|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| Lighting Upgrades | | 644,059 | 92.6 | 0.0 | \$77,351.44 | \$209,645.93 | \$47,830.00 | \$161,815.93 | 2.1 | 648,562 |
| ECM 1 | Install LED Fixtures | 43,083 | 6.3 | 0.0 | \$5,174.32 | \$40,086.45 | \$3,900.00 | \$36,186.45 | 7.0 | 43,385 |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | 30,100 | 4.0 | 0.0 | \$3,615.04 | \$8,018.74 | \$975.00 | \$7,043.74 | 1.9 | 30,311 |
| ECM 3 | Retrofit Fixtures with LED Lamps | 570,875 | 82.3 | 0.0 | \$68,562.08 | \$161,540.75 | \$42,955.00 | \$118,585.75 | 1.7 | 574,867 |

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM I: Install LED Fixtures

Summary of Measure Economics

| Interior/ Exterior | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-----------------------|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| Interior | 38,448 | 5.6 | 0.0 | \$4,617.56 | \$34,152.72 | \$3,300.00 | \$30,852.72 | 6.7 | 38,716 |
| Exterior | 4,636 | 0.7 | 0.0 | \$556.76 | \$5,933.72 | \$600.00 | \$5,333.72 | 9.6 | 4,668 |

Measure Description

We recommend replacing existing fixtures containing metal halide and high pressure sodium lamps with new high performance LED light fixtures. Interior fixtures recommended for replacement are located in the F-wing Atrium; other fixtures are exterior to the building. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of existing sources.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

| Interior/ Exterior | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-----------------------|--|-----------------------------------|--------------------------------------|--|-----------------------------------|--------------------------------|-------------------------------|--------------------------------------|--|
| Interior | 30,100 | 4.0 | 0.0 | \$3,615.04 | \$8,018.74 | \$975.00 | \$7,043.74 | 1.9 | 30,311 |
| Exterior | 0 | 0.0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | \$0.00 | 0.0 | 0 |

Measure Description

We recommend retrofitting existing T12 fluorescent fixtures by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes.

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

| Interior/ Exterior | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-----------------------|--|-----------------------------------|--------------------------------------|--|-----------------------------------|--------------------------------|-------------------------------|--------------------------------------|--|
| Interior | 562,203 | 81.0 | 0.0 | \$67,520.57 | \$157,477.06 | \$41,825.00 | \$115,652.06 | 1.7 | 566,134 |
| Exterior | 8,672 | 1.3 | 0.0 | \$1,041.51 | \$4,063.69 | \$1,130.00 | \$2,933.69 | 2.8 | 8,733 |

Measure Description

We recommend retrofitting existing incandescent, halogen, metal halide, CFL, and linear fluorescent lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs 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.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent sources and more than ten times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Our recommendations for upgrades to existing lighting controls are summarized in Figure 26 below.

Figure 26 – Summary of Lighting Control ECMs

| Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$)* | Estimated Net Cost (\$) | Simple Payback Period (yrs)** | CO ₂ e Emissions Reduction (lbs) |
|-----------------------------------|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------|-------------------------|-------------------------------|---|
| Motor Upgrades | 14,121 | 2.7 | 0.0 | \$1,696 | \$36,415 | \$0 | \$36,415 | 21.5 | 14,220 |
| ECM 6 Premium Efficiency Motors | 14,121 | 2.7 | 0.0 | \$1,696 | \$36,415 | \$0 | \$36,415 | 21.5 | 14,220 |

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| 86,608 | 11.1 | 0.0 | \$10,401.57 | \$70,200.00 | \$9,100.00 | \$61,100.00 | 5.9 | 87,213 |

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in restrooms, classrooms, offices areas, bookstore, computer lab, and laboratories. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| 22,758 | 2.9 | 0.0 | \$2,733.25 | \$24,000.00 | \$0.00 | \$24,000.00 | 8.8 | 22,917 |

Measure Description

We recommend installing 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. Recommended areas for such lighting control are interior corridors, lobbies and vestibules.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

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

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Motor Upgrades

Our recommendations for upgrades to premium efficiency motors is summarized in Figure 27 below.

Figure 27 – Summary of Motor Upgrades ECMs

| Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Natural Gas Savings (MMBtu) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$)* | Estimated Net Cost (\$) | Simple Payback Period (yrs)** | CO ₂ e Emissions Reduction (lbs) |
|-----------------------------------|-------------------------------|--------------------------|------------------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------|-------------------------|-------------------------------|---|
| Motor Upgrades | 14,121 | 2.7 | 0.0 | 0.0 | \$1,696 | \$36,415 | \$0 | \$36,415 | 21.5 | 14,220 |
| ECM 6 Premium Efficiency Motors | 14,121 | 2.7 | 0.0 | 0.0 | \$1,696 | \$36,415 | \$0 | \$36,415 | 21.5 | 14,220 |

ECM 6: Premium Efficiency Motors

Summary of Measure Economics

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| 14,121 | 2.7 | 0.0 | \$1,695.92 | \$36,414.64 | \$0.00 | \$36,414.64 | 21.5 | 14,220 |

Measure Description

The replacement of standard efficiency motors with NEMA Premium™ efficiency motors has been proposed primarily to account for costs associated with the requirement for upgrading to inverter duty rated motors when installing variable frequency drives (see related ECMs, below). Due to the marginal payback of this measure, motor replacement should be reconsidered if variable frequency drives are not going to be installed. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor’s current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the New Jersey’s Clean Energy Program Protocols to Measure Resource Savings. Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours.

Please see discussion below regarding the requirement for inverter duty motors with variable frequency drives. It should be noted that the premium efficiency motor replacements discussed above would not be cost effective on the basis of energy savings alone because the project payback exceeds the expected life of the replacement equipment.

4.1.4 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 28 below.

Figure 28 – Summary of Variable Frequency Drive ECMs

| Energy Conservation Measure | | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|--|---|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| Variable Frequency Drive (VFD) Measures | | 161,442 | 33.3 | 0.0 | \$19,389.18 | \$113,030.60 | \$19,000.00 | \$94,030.60 | 4.8 | 162,571 |
| ECM 7 | Install VFDs on Constant Volume (CV) HVAC | 129,348 | 31.5 | 0.0 | \$15,534.64 | \$105,817.00 | \$19,000.00 | \$86,817.00 | 5.6 | 130,252 |
| ECM 8 | Install VFDs on Hot Water Pumps | 32,094 | 1.9 | 0.0 | \$3,854.54 | \$7,213.60 | \$0.00 | \$7,213.60 | 1.9 | 32,319 |

ECM 7: Install VFDs on Constant Volume (CV) HVAC

Summary of Measure Economics

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| 129,348 | 31.5 | 0.0 | \$15,534.64 | \$105,817.00 | \$19,000.00 | \$86,817.00 | 5.6 | 130,252 |

Measure Description

We recommend installing variable frequency drives (VFDs) to control supply fan motor speeds to convert constant-volume, single-zone air handling systems into variable-air-volume (VAV) systems. 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 will cause the VFD to modulate fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature. Energy savings results from reducing fan speed (and power) when there is a reduced load required for the zone. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

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

ECM 8: Install VFDs on Hot Water Pumps

Summary of Measure Economics

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| 32,094 | 1.9 | 0.0 | \$3,854.54 | \$7,213.60 | \$0.00 | \$7,213.60 | 1.9 | 32,319 |

Measure Description

We recommend installing variable frequency drives (VFDs) to control the two 7.5 hp constant flow hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results 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.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendation for domestic water heating system improvements is summarized in Figure 29 below.

Figure 29 - Summary of Domestic Water Heating ECMs

| Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|---|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| Domestic Water Heating Upgrade | 0 | 0.0 | 63.4 | \$641.18 | \$222.27 | \$0.00 | \$222.27 | 0.3 | 7,429 |
| ECM 9 Install Low-Flow Domestic Hot Water Devices | 0 | 0.0 | 63.4 | \$641.18 | \$222.27 | \$0.00 | \$222.27 | 0.3 | 7,429 |

ECM 9: Install Low-Flow DHW Devices

Summary of Measure Economics

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| 0 | 0.0 | 63.4 | \$641.18 | \$222.27 | \$0.00 | \$222.27 | 0.3 | 7,429 |

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy.

Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.6 Plug Load Equipment Control - Vending Machines

Our recommendation for plug load equipment control improvements is summarized in Figure 30 below.

Figure 30 - Summary of Plug Load Equipment Control ECMs

| Energy Conservation Measure | Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$)* | Estimated Net Cost (\$) | Simple Payback Period (yrs)** | CO ₂ e Emissions Reduction (lbs) |
|--|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|---------------------------|-------------------------|-------------------------------|---|
| Plug Load Equipment Control - Vending Machine | 3,224 | 0.0 | 0.0 | \$387 | \$460 | \$0 | \$460 | 1.2 | 3,246 |
| ECM 10 Vending Machine Control | 3,224 | 0.0 | 0.0 | \$387 | \$460 | \$0 | \$460 | 1.2 | 3,246 |

ECM 10: Vending Machine Control

Summary of Measure Economics

| Annual Electric Savings (kWh) | Peak Demand Savings (kW) | Annual Fuel Savings (MMBtu) | Annual Energy Cost Savings (\$) | Estimated Install Cost (\$) | Estimated Incentive (\$) | Estimated Net Cost (\$) | Simple Payback Period (yrs) | CO ₂ e Emissions Reduction (lbs) |
|-------------------------------|--------------------------|-----------------------------|---------------------------------|-----------------------------|--------------------------|-------------------------|-----------------------------|---|
| 3,224 | 0.0 | 0.0 | \$387.16 | \$460.00 | \$0.00 | \$460.00 | 1.2 | 3,246 |

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20%-60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6–12 months.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Perform Proper Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to retain proper functionality and efficiency of the heating system. Fuel burning equipment should undergo yearly tune-ups to ensure they are operating as safely and efficiently as possible from a combustion standpoint. A tune-up should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Buildup of dirt, dust, or deposits on the internal surfaces of a boiler can greatly affect its heat transfer efficiency. These deposits can accumulate on the water side or fire side of the boiler. Boilers should be cleaned regularly according to the manufacturer's instructions to remove this build up in order to sustain efficiency and equipment life.

Perform Proper Water Heater Maintenance

At least once a year, 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. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the

pipng. 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 any 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 over three to four years old have a technician inspect the sacrificial anode annually.

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (<http://www3.epa.gov/watersense/products>) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. 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. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.5 for any low-flow ECM recommendations.

6 ON-SITE GENERATION MEASURES

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey’s Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State’s electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at 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.

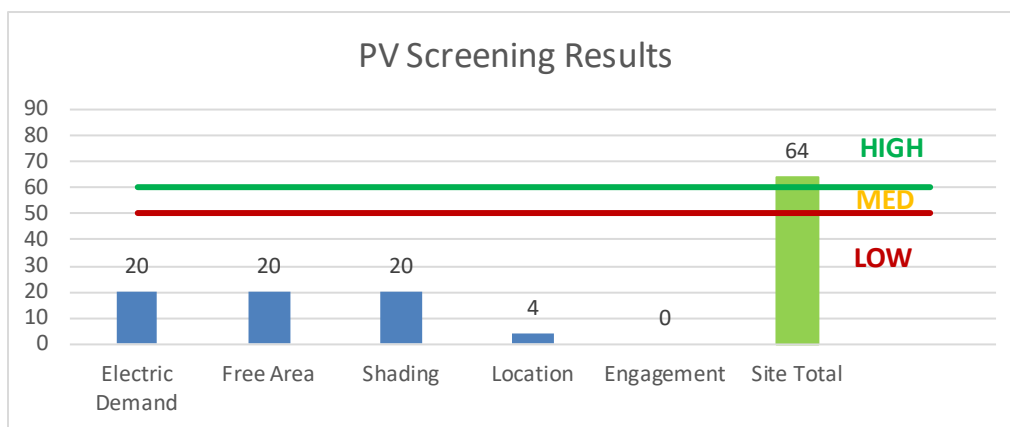
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility’s electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

A preliminary screening based on the facility’s electric demand, size and location of free area, and shading elements shows that the facility has a **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 for additional PV at the site. An additional PV array located over the main parking lot may be feasible. If Building #31 is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 31 - Photovoltaic Screening



Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.6 for additional information.

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

- **Basic Info on Solar PV in NJ:** <http://www.njcleanenergy.com/whysolar>
- **NJ Solar Market FAQs:** <http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs>
- **Approved Solar Installers in the NJ Market:** http://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

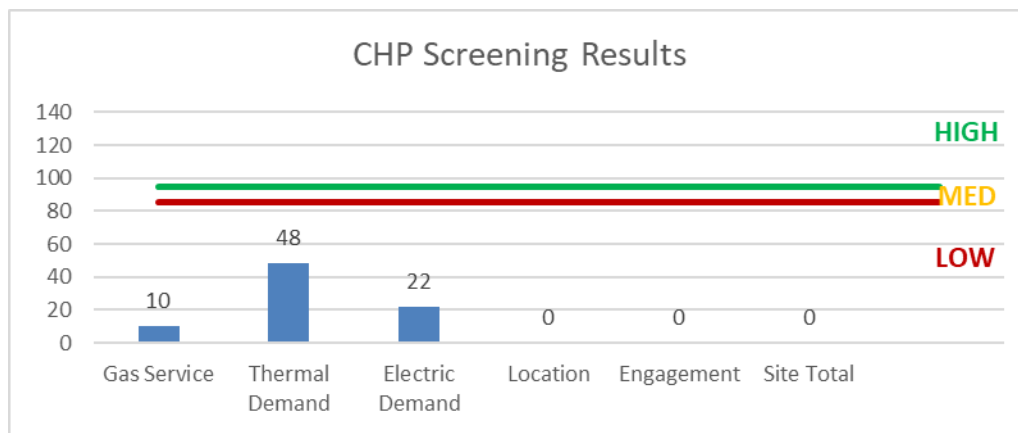
Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use 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 a **Low** potential for installing a cost-effective CHP system.

Low and infrequent thermal load, and lack of space near the existing boilers are the most significant factors contributing to the potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

Figure 322 – Combined Heat & Power



7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage 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 DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats, so that air conditioning units run less frequently, or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (<http://www.pjm.com/markets-and-operations/demand-response/csps.aspx>). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (<http://www.pjm.com/training/training%20material.aspx>), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

All Stockton University buildings participate in electricity demand response since 2012. Curtailment service provider is awarded by bid. The Program meets or exceeds goal every year.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey’s Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 31 for a list of the eligible programs identified for each recommended ECM.

Figure 33 - ECM Incentive Program Eligibility

| Energy Conservation Measure | | SmartStart Prescriptive | SmartStart Custom | Direct Install | Pay For Performance Existing Buildings | Large Energy Users Program | Combined Heat & Power and Fuel Cell |
|-----------------------------|--|-------------------------|-------------------|----------------|--|----------------------------|-------------------------------------|
| ECM 1 | Install LED Fixtures | X | | | | | |
| ECM 2 | Retrofit Fluorescent Fixtures with LED Lamps and Drivers | X | | | | | |
| ECM 3 | Retrofit Fixtures with LED Lamps | X | | | | | |
| ECM 4 | Install Occupancy Sensor Lighting Controls | X | | | | | |
| ECM 5 | Install High/Low Lighting Controls | | | | | | |
| ECM 6 | Premium Efficiency Motors | | | | | | |
| ECM 7 | Install VFDs on Constant Volume (CV) HVAC | X | | | | | |
| ECM 8 | Install VFDs on Hot Water Pumps | | | | | | |
| ECM 9 | Install Low-Flow Domestic Hot Water Devices | | | | | | |
| ECM 10 | Vending Machine Control | | | | | | |

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a “whole-building” energy improvement program designed for larger facilities. It requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey’s largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity’s annual energy consumption. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers

Electric Unitary HVAC

Gas Cooling

Gas Heating

Gas Water Heating

Ground Source Heat Pumps

Lighting

Lighting Controls

Refrigeration Doors

Refrigeration Controls

Refrigerator/Freezer Motors

Food Service Equipment

Variable Frequency Drives

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom measure incentives are calculated at \$0.16/kWh and \$1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less). Program incentives are capped at \$500,000 per electric account and \$500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

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

8.2 SREC Registration Program

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

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

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

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

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

8.3 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. 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 can be leveraged to help further reduce the total project cost of eligible measures.

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 utilized 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. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program description and application can be found at: www.njcleanenergy.com/ESIP.

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize NJCEP incentive programs to help further reduce costs when developing the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e., non-utility) energy supplier.

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 is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. 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 is typically dependent upon whether a customer seeks 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 is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|--------------------------|---------------------|---|----------------|-------------------|------------------------|------------------------|---------------|------------------|------------------------------------|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Basement Mechanical Room | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 8 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.17 | 1,320 | 0.0 | \$158.53 | \$292.12 | \$80.00 | 1.34 |
| Basement Mechanical Room | 5 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 5 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.06 | 460 | 0.0 | \$55.25 | \$162.58 | \$50.00 | 2.04 |
| Electric Room | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 2,000 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.10 | 304 | 0.0 | \$36.46 | \$146.06 | \$40.00 | 2.91 |
| Electric Room | 6 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 2,000 | Relamp | No | 6 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 2,000 | 0.07 | 221 | 0.0 | \$26.52 | \$195.09 | \$60.00 | 5.09 |
| Stairwell | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| Stairwell | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| Stairwell | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Elevator Room | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 2,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.02 | 76 | 0.0 | \$9.12 | \$36.52 | \$10.00 | 2.91 |
| Hall | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 18 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.55 | 4,316 | 0.0 | \$518.35 | \$1,257.27 | \$180.00 | 2.08 |
| 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 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mens Restroom | 4 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.20 | 1,557 | 0.0 | \$187.01 | \$545.09 | \$75.00 | 2.51 |
| Hall | 25 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 25 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.77 | 5,994 | 0.0 | \$719.92 | \$1,912.88 | \$250.00 | 2.31 |
| F016b | 4 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 3,500 | 0.06 | 485 | 0.0 | \$58.28 | \$400.06 | \$75.00 | 5.58 |
| F016b | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.03 | 240 | 0.0 | \$28.80 | \$36.52 | \$45.00 | -0.29 |
| F015 | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.27 | 2,110 | 0.0 | \$253.44 | \$635.15 | \$135.00 | 1.97 |
| F015d | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.16 | 1,266 | 0.0 | \$152.06 | \$489.09 | \$95.00 | 2.59 |
| F015c | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.16 | 1,266 | 0.0 | \$152.06 | \$489.09 | \$95.00 | 2.59 |
| F015d (heat lamps) | 10 | Incandescent: Terrarium Heat Lamps | None | 150 | 5,000 | None | No | 10 | Incandescent: Terrarium Heat Lamps | None | 150 | 5,000 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| F015c (heat lamps) | 1 | Incandescent: Terrarium Heat Lamps | None | 150 | 5,000 | None | No | 1 | Incandescent: Terrarium Heat Lamps | None | 150 | 5,000 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| F015b | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.16 | 1,266 | 0.0 | \$152.06 | \$489.09 | \$95.00 | 2.59 |
| F015a | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F015g | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.11 | 844 | 0.0 | \$101.38 | \$416.06 | \$75.00 | 3.36 |
| F015f | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.11 | 844 | 0.0 | \$101.38 | \$416.06 | \$75.00 | 3.36 |
| F015e | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.16 | 1,266 | 0.0 | \$152.06 | \$489.09 | \$95.00 | 2.59 |
| Hallway | 55 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 55 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 1.69 | 13,188 | 0.0 | \$1,583.83 | \$4,008.33 | \$550.00 | 2.18 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---------------|---------------------|---|----------------|-------------------|------------------------|------------------------|---------------|------------------|----------------------------------|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| F022Printshop | 40 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 40 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 1.23 | 9,591 | 0.0 | \$1,151.88 | \$2,270.60 | \$505.00 | 1.53 |
| F025 | 30 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 30 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.48 | 3,769 | 0.0 | \$452.67 | \$1,087.73 | \$220.00 | 1.92 |
| F026 | 11 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 11 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.34 | 2,638 | 0.0 | \$316.77 | \$671.67 | \$145.00 | 1.66 |
| Science Labs | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.43 | 3,357 | 0.0 | \$403.16 | \$781.21 | \$175.00 | 1.50 |
| Science Labs | 8 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 8 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| F001a | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.15 | 1,199 | 0.0 | \$143.98 | \$452.58 | \$85.00 | 2.55 |
| F001 | 51 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 51 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 1.57 | 12,229 | 0.0 | \$1,468.65 | \$2,942.27 | \$650.00 | 1.56 |
| F017 | 11 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 11 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.34 | 2,638 | 0.0 | \$316.77 | \$671.67 | \$145.00 | 1.66 |
| F015 | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 10 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.31 | 2,398 | 0.0 | \$287.97 | \$635.15 | \$135.00 | 1.74 |
| F015 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 15 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.46 | 3,597 | 0.0 | \$431.95 | \$817.73 | \$185.00 | 1.46 |
| F016a | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.01 | 92 | 0.0 | \$11.05 | \$32.52 | \$10.00 | 2.04 |
| F004d | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 5,000 | 0.03 | 201 | 0.0 | \$24.17 | \$36.52 | \$10.00 | 1.10 |
| F004d | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 5,000 | 0.03 | 201 | 0.0 | \$24.17 | \$36.52 | \$10.00 | 1.10 |
| F004c | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.15 | 1,199 | 0.0 | \$143.98 | \$452.58 | \$85.00 | 2.55 |
| F004c | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 1 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| F004b | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | No | 4 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 5,000 | 0.05 | 403 | 0.0 | \$48.34 | \$73.03 | \$20.00 | 1.10 |
| F005 | 23 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 23 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.71 | 5,515 | 0.0 | \$662.33 | \$1,379.85 | \$300.00 | 1.63 |
| F005 | 1 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 389 | 0.0 | \$46.75 | \$68.77 | \$45.00 | 0.51 |
| F006 | 25 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 25 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.77 | 5,994 | 0.0 | \$719.92 | \$1,452.88 | \$320.00 | 1.57 |
| F007 | 37 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 37 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 1.14 | 8,872 | 0.0 | \$1,065.49 | \$2,161.06 | \$475.00 | 1.58 |
| F009 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.25 | 1,918 | 0.0 | \$230.38 | \$562.12 | \$115.00 | 1.94 |
| F009a | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| Hall | 13 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 13 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.40 | 3,117 | 0.0 | \$374.36 | \$1,074.70 | \$130.00 | 2.52 |
| Hall | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| F012 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 15 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.46 | 3,597 | 0.0 | \$431.95 | \$817.73 | \$185.00 | 1.46 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-------------------|---------------------|---|----------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| F013 | 13 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 13 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.40 | 3,117 | 0.0 | \$374.36 | \$744.70 | \$165.00 | 1.55 |
| Greenhouse | 24 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | Yes | 24 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 3,500 | 0.37 | 2,912 | 0.0 | \$349.71 | \$1,320.36 | \$310.00 | 2.89 |
| F014 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| Womens Restroom | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.18 | 1,439 | 0.0 | \$172.78 | \$489.09 | \$95.00 | 2.28 |
| Womens Restroom | 3 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.15 | 1,168 | 0.0 | \$140.26 | \$206.32 | \$65.00 | 1.01 |
| F002a | 67 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 67 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 2.06 | 16,065 | 0.0 | \$1,929.40 | \$3,796.51 | \$845.00 | 1.53 |
| F003a | 48 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 48 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 1.47 | 11,509 | 0.0 | \$1,382.25 | \$2,832.72 | \$620.00 | 1.60 |
| F010 | 24 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 24 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.74 | 5,755 | 0.0 | \$691.13 | \$1,416.36 | \$310.00 | 1.60 |
| Mens Restroom | 5 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,500 | 0.14 | 1,118 | 0.0 | \$134.32 | \$632.30 | \$35.00 | 4.45 |
| Womens Restroom | 5 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,500 | 0.14 | 1,118 | 0.0 | \$134.32 | \$632.30 | \$35.00 | 4.45 |
| Hall | 5 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 3,500 | 0.14 | 1,118 | 0.0 | \$134.32 | \$562.30 | \$0.00 | 4.19 |
| EE001 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| F028 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.25 | 1,918 | 0.0 | \$230.38 | \$562.12 | \$115.00 | 1.94 |
| Book Store | 93 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 93 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 1.50 | 11,684 | 0.0 | \$1,403.28 | \$3,587.95 | \$710.00 | 2.05 |
| Book Store | 9 | LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures | Wall Switch | 15 | 5,000 | None | Yes | 9 | LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures | Occupancy Sensor | 15 | 3,500 | 0.03 | 233 | 0.0 | \$27.97 | \$0.00 | \$35.00 | -1.25 |
| Book Store Office | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.18 | 1,439 | 0.0 | \$172.78 | \$489.09 | \$95.00 | 2.28 |
| E021b | 3 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 3 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.04 | 276 | 0.0 | \$33.15 | \$97.55 | \$30.00 | 2.04 |
| E097a | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.01 | 92 | 0.0 | \$11.05 | \$32.52 | \$10.00 | 2.04 |
| E097a | 2 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.02 | 184 | 0.0 | \$22.10 | \$65.03 | \$20.00 | 2.04 |
| E012 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.37 | 2,877 | 0.0 | \$345.56 | \$708.18 | \$155.00 | 1.60 |
| E013 | 4 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.20 | 1,557 | 0.0 | \$187.01 | \$545.09 | \$75.00 | 2.51 |
| E013 | 2 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 2 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.02 | 152 | 0.0 | \$18.31 | \$68.90 | \$55.00 | 0.76 |
| E014 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| E014 | 2 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 779 | 0.0 | \$93.50 | \$137.55 | \$55.00 | 0.88 |
| Hallway | 18 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 18 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.90 | 7,007 | 0.0 | \$841.53 | \$1,837.91 | \$180.00 | 1.97 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------------|---------------------|---|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Hallway | 4 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 4 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 18 | 3,500 | 0.04 | 305 | 0.0 | \$36.63 | \$337.80 | \$40.00 | 8.13 |
| Hallway | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 3,500 | 0.06 | 447 | 0.0 | \$53.73 | \$144.92 | \$0.00 | 2.70 |
| Mens Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.02 | 126 | 0.0 | \$15.09 | \$18.26 | \$40.00 | -1.44 |
| Mens Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.06 | 480 | 0.0 | \$57.59 | \$73.03 | \$55.00 | 0.31 |
| Mens Restroom | 2 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 2 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.02 | 152 | 0.0 | \$18.31 | \$338.90 | \$55.00 | 15.50 |
| Womens Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.02 | 126 | 0.0 | \$15.09 | \$18.26 | \$40.00 | -1.44 |
| Womens Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.06 | 480 | 0.0 | \$57.59 | \$73.03 | \$55.00 | 0.31 |
| Womens Restroom | 2 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 2 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.02 | 152 | 0.0 | \$18.31 | \$338.90 | \$55.00 | 15.50 |
| E021c | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$109.55 | \$65.00 | 0.52 |
| E021c | 28 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 28 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.86 | 6,714 | 0.0 | \$806.32 | \$1,562.42 | \$350.00 | 1.50 |
| E007 | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.43 | 3,357 | 0.0 | \$403.16 | \$781.21 | \$175.00 | 1.50 |
| E006 | 25 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 25 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.61 | 3,321 | 0.0 | \$398.81 | \$912.88 | \$250.00 | 1.66 |
| E006 | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| E031 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| E031 | 1 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) U-Lamp | Wall Switch | 33 | 5,000 | 0.02 | 167 | 0.0 | \$20.03 | \$72.46 | \$0.00 | 3.62 |
| E043 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.19 | 1,063 | 0.0 | \$127.62 | \$292.12 | \$80.00 | 1.66 |
| E042 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.18 | 1,439 | 0.0 | \$172.78 | \$489.09 | \$95.00 | 2.28 |
| E041 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| E040 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| E039 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| E035 | 3 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 3 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.04 | 276 | 0.0 | \$33.15 | \$97.55 | \$30.00 | 2.04 |
| E034 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.25 | 1,918 | 0.0 | \$230.38 | \$562.12 | \$115.00 | 1.94 |
| E032 | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 7 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.21 | 1,678 | 0.0 | \$201.58 | \$525.61 | \$105.00 | 2.09 |
| E002 | 36 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 36 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 1.79 | 14,014 | 0.0 | \$1,683.07 | \$3,285.81 | \$465.00 | 1.68 |
| E002 | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---------------------------|---------------------|---|----------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| E005 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.18 | 1,439 | 0.0 | \$172.78 | \$489.09 | \$95.00 | 2.28 |
| Library (basement) | 128 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 128 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 2.06 | 16,082 | 0.0 | \$1,931.40 | \$4,766.96 | \$955.00 | 1.97 |
| Library (basement) | 4 | Linear Fluorescent - T5: 4' T5 (28W) - 2L | Wall Switch | 60 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 913 | 0.0 | \$109.66 | \$146.06 | \$75.00 | 0.65 |
| Library (basement) | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$146.06 | \$75.00 | 0.62 |
| Library (basement) | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Library (basement) | 39 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 39 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.38 | 2,974 | 0.0 | \$357.12 | \$2,153.55 | \$495.00 | 4.64 |
| Stairwell | 9 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | No | 9 | LED Screw-In Lamps: Two Lamp Screw-in LED | Wall Switch | 18 | 5,000 | 0.05 | 404 | 0.0 | \$48.48 | \$310.05 | \$90.00 | 4.54 |
| E056 | 12 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 12 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.12 | 915 | 0.0 | \$109.88 | \$683.40 | \$155.00 | 4.81 |
| E056a | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.06 | 480 | 0.0 | \$57.59 | \$73.03 | \$55.00 | 0.31 |
| E056a | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.25 | 1,918 | 0.0 | \$230.38 | \$562.12 | \$115.00 | 1.94 |
| E061 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 3,500 | 0.02 | 121 | 0.0 | \$14.57 | \$32.52 | \$45.00 | -0.86 |
| E061 | 6 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 6 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.06 | 457 | 0.0 | \$54.94 | \$476.70 | \$95.00 | 6.95 |
| Stairwell | 12 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | No | 12 | LED Screw-In Lamps: Two Lamp Screw-in LED | Wall Switch | 18 | 5,000 | 0.07 | 538 | 0.0 | \$64.64 | \$413.40 | \$120.00 | 4.54 |
| Library 1st Flr-Vestibule | 7 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 7 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 18 | 3,500 | 0.07 | 534 | 0.0 | \$64.10 | \$441.15 | \$70.00 | 5.79 |
| Library 1st Flr-Vestibule | 2 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.10 | 779 | 0.0 | \$93.50 | \$337.55 | \$20.00 | 3.40 |
| Reception | 43 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 43 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.42 | 3,279 | 0.0 | \$393.75 | \$2,291.35 | \$535.00 | 4.46 |
| Back Office | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.43 | 3,357 | 0.0 | \$403.16 | \$781.21 | \$175.00 | 1.50 |
| Hall | 10 | Compact Fluorescent: Two Lamp Pin-based CFL | Wall Switch | 60 | 5,000 | Relamp | Yes | 10 | LED Screw-In Lamps: Two Lamp Pin-base LED | High/Low Control | 42 | 3,500 | 0.23 | 1,760 | 0.0 | \$211.32 | \$800.00 | \$0.00 | 3.79 |
| Hall | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.25 | 1,918 | 0.0 | \$230.38 | \$692.12 | \$80.00 | 2.66 |
| Conference Room | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| Main Area | 126 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 126 | LED - Linear Tubes: (1) 4' Lamp | High/Low Control | 15 | 3,500 | 2.03 | 15,830 | 0.0 | \$1,901.22 | \$6,500.45 | \$630.00 | 3.09 |
| Main Area | 5 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 5 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Main Area | 15 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 15 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 18 | 3,500 | 0.15 | 1,144 | 0.0 | \$137.36 | \$1,116.75 | \$150.00 | 7.04 |
| Library | 6 | Linear Fluorescent - T12: 4' T12 (40W) - 2L | Wall Switch | 88 | 5,000 | Relamp & Reballast | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.30 | 2,336 | 0.0 | \$280.51 | \$682.64 | \$95.00 | 2.09 |
| Library | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.06 | 480 | 0.0 | \$57.59 | \$73.03 | \$55.00 | 0.31 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------------|---------------------|---|------------------|-------------------|------------------------|------------------------|---------------|------------------|--|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Library E108 | 31 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 31 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.95 | 7,433 | 0.0 | \$892.71 | \$1,671.97 | \$380.00 | 1.45 |
| E110 | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 7 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.21 | 1,678 | 0.0 | \$201.58 | \$255.61 | \$105.00 | 0.75 |
| E110 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.13 | 1,005 | 0.0 | \$120.71 | \$416.06 | \$75.00 | 2.83 |
| E153 | 114 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 114 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 1.83 | 14,323 | 0.0 | \$1,720.15 | \$4,241.36 | \$850.00 | 1.97 |
| E153 | 44 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 44 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.43 | 3,355 | 0.0 | \$402.91 | \$2,325.80 | \$545.00 | 4.42 |
| E153 | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| E162 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.06 | 480 | 0.0 | \$57.59 | \$73.03 | \$55.00 | 0.31 |
| E162 | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.43 | 3,357 | 0.0 | \$403.16 | \$781.21 | \$175.00 | 1.50 |
| E154 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.01 | 92 | 0.0 | \$11.05 | \$32.52 | \$10.00 | 2.04 |
| E163 | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.01 | 92 | 0.0 | \$11.05 | \$32.52 | \$10.00 | 2.04 |
| Elevator Lobby | 26 | Compact Fluorescent: One Lamp Pin-based CFL | Wall Switch | 40 | 5,000 | Relamp | Yes | 26 | LED Screw-In Lamps: One Lamp Pin-base LED | High/Low Control | 28 | 3,500 | 0.39 | 3,050 | 0.0 | \$366.28 | \$1,494.00 | \$0.00 | 4.08 |
| Computer Lab | 34 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 34 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.55 | 4,272 | 0.0 | \$513.03 | \$1,430.76 | \$275.00 | 2.25 |
| Computer Lab | 12 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 12 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.12 | 915 | 0.0 | \$109.88 | \$413.40 | \$155.00 | 2.35 |
| Computer Lab | 4 | Halogen Incandescent: One MR50 Lamp Halogen Fixture | Wall Switch | 50 | 5,000 | Relamp | Yes | 4 | LED Screw-In Lamps: One Lamp Screw-in MR LED | Occupancy Sensor | 8 | 3,500 | 0.13 | 1,029 | 0.0 | \$123.61 | \$108.72 | \$55.00 | 0.43 |
| E117 | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 18 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.55 | 4,316 | 0.0 | \$518.35 | \$1,197.27 | \$250.00 | 1.83 |
| E117e | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.05 | 380 | 0.0 | \$45.58 | \$73.03 | \$20.00 | 1.16 |
| E117d | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| E117d | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.01 | 92 | 0.0 | \$11.05 | \$32.52 | \$10.00 | 2.04 |
| E117b | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| E117c | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.15 | 1,199 | 0.0 | \$143.98 | \$452.58 | \$85.00 | 2.55 |
| E117f | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| E117f | 1 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 2' Lamps | Wall Switch | 17 | 5,000 | 0.01 | 92 | 0.0 | \$11.05 | \$32.52 | \$10.00 | 2.04 |
| E116 Conference | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.18 | 1,439 | 0.0 | \$172.78 | \$489.09 | \$95.00 | 2.28 |
| Closet | 1 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 2,000 | Relamp | No | 1 | LED Screw-In Lamps: Two Lamp Screw-in LED | Wall Switch | 18 | 2,000 | 0.01 | 18 | 0.0 | \$2.15 | \$34.45 | \$10.00 | 11.35 |
| E114 Admin | 11 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 11 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.27 | 1,461 | 0.0 | \$175.48 | \$401.67 | \$110.00 | 1.66 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| E114e | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| E114d | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| E114c | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| E114b | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.15 | 1,199 | 0.0 | \$143.98 | \$452.58 | \$85.00 | 2.55 |
| E114a | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| Mens Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.06 | 480 | 0.0 | \$57.59 | \$343.03 | \$55.00 | 5.00 |
| Mens Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.02 | 126 | 0.0 | \$15.09 | \$18.26 | \$40.00 | -1.44 |
| Mens Restroom | 1 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 1 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.01 | 76 | 0.0 | \$9.16 | \$34.45 | \$45.00 | -1.15 |
| Womens Restroom | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.06 | 480 | 0.0 | \$57.59 | \$343.03 | \$55.00 | 5.00 |
| Womens Restroom | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.02 | 126 | 0.0 | \$15.09 | \$18.26 | \$40.00 | -1.44 |
| Womens Restroom | 1 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 1 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.01 | 76 | 0.0 | \$9.16 | \$34.45 | \$45.00 | -1.15 |
| F111 | 20 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 20 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.49 | 2,657 | 0.0 | \$319.05 | \$730.30 | \$200.00 | 1.66 |
| F111 | 13 | Compact Fluorescent: Two Lamp Screw-in CFL | Occupancy Sensor | 26 | 3,500 | Relamp | No | 13 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.07 | 408 | 0.0 | \$49.02 | \$447.85 | \$130.00 | 6.48 |
| F111 | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| F115 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.29 | 1,594 | 0.0 | \$191.43 | \$438.18 | \$120.00 | 1.66 |
| F118 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.39 | 2,125 | 0.0 | \$255.24 | \$584.24 | \$160.00 | 1.66 |
| F119 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.39 | 2,125 | 0.0 | \$255.24 | \$584.24 | \$160.00 | 1.66 |
| F120 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.37 | 2,877 | 0.0 | \$345.56 | \$708.18 | \$155.00 | 1.60 |
| F121 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.39 | 2,125 | 0.0 | \$255.24 | \$584.24 | \$160.00 | 1.66 |
| Conference Room | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 7 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.21 | 1,678 | 0.0 | \$201.58 | \$525.61 | \$105.00 | 2.09 |
| Hallway | 7 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 7 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 18 | 3,500 | 0.07 | 534 | 0.0 | \$64.10 | \$641.15 | \$70.00 | 8.91 |
| Hallway | 21 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 21 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.64 | 5,035 | 0.0 | \$604.74 | \$1,566.82 | \$210.00 | 2.24 |
| Hallway | 1 | Compact Fluorescent: Two Lamp Screw-in CFL | Occupancy Sensor | 26 | 3,500 | Relamp | No | 1 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.01 | 31 | 0.0 | \$3.77 | \$34.45 | \$10.00 | 6.48 |
| Office F124 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| Restroom | 3 | Linear Fluorescent - T5: 4' T5 (28W) - 2L | Wall Switch | 60 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 685 | 0.0 | \$82.25 | \$379.55 | \$65.00 | 3.82 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-------------|---------------------|---|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Restroom | 2 | Compact Fluorescent: One Lamp Pin-based CFL | Wall Switch | 40 | 5,000 | Relamp | Yes | 2 | LED Screw-In Lamps: One Lamp Pin-base LED | Occupancy Sensor | 28 | 3,500 | 0.03 | 235 | 0.0 | \$28.18 | \$38.00 | \$35.00 | 0.11 |
| Office F123 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| Office F125 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| Office F126 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F128 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F127 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F130 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F129 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F132 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F131 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F134 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F133 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F136 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F135 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F138 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F137 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (4) 4' Lamps | Wall Switch | 58 | 5,000 | 0.04 | 322 | 0.0 | \$38.67 | \$73.03 | \$20.00 | 1.37 |
| F199 Closet | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 2,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.02 | 76 | 0.0 | \$9.12 | \$36.52 | \$10.00 | 2.91 |
| F198 Closet | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 2,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.05 | 152 | 0.0 | \$18.23 | \$73.03 | \$20.00 | 2.91 |
| Hallway | 8 | Compact Fluorescent: One Lamp Pin-based CFL | Wall Switch | 40 | 5,000 | Relamp | Yes | 8 | LED Screw-In Lamps: One Lamp Pin-base LED | High/Low Control | 28 | 3,500 | 0.12 | 938 | 0.0 | \$112.70 | \$552.00 | \$0.00 | 4.90 |
| Hallway | 23 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 26 | 5,000 | Relamp | Yes | 23 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 18 | 3,500 | 0.22 | 1,754 | 0.0 | \$210.61 | \$1,592.35 | \$230.00 | 6.47 |
| F114 | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 18 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.44 | 2,391 | 0.0 | \$287.14 | \$657.27 | \$180.00 | 1.66 |
| F114 | 8 | Compact Fluorescent: Two Lamp Screw-in CFL | Occupancy Sensor | 26 | 3,500 | Relamp | No | 8 | LED Screw-In Lamps: Two Lamp Screw-in LED | Occupancy Sensor | 18 | 3,500 | 0.05 | 251 | 0.0 | \$30.16 | \$275.60 | \$80.00 | 6.48 |
| Hallway | 12 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | None | 33 | 8,760 | Relamp | Yes | 12 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 6,132 | 0.19 | 2,551 | 0.0 | \$306.34 | \$790.18 | \$120.00 | 2.19 |
| Hallway | 8 | Compact Fluorescent: One Lamp Screw-in CFL | None | 23 | 8,760 | Relamp | Yes | 8 | LED Screw-In Lamps: One Lamp Screw-in LED | High/Low Control | 16 | 6,132 | 0.07 | 945 | 0.0 | \$113.54 | \$537.80 | \$40.00 | 4.38 |
| Hallway | 8 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 8 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-------------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Hallway | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | None | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$346.06 | \$40.00 | 2.66 |
| Hallway | 10 | Compact Fluorescent: One Lamp Screw-in CFL | None | 23 | 5,000 | Relamp | Yes | 10 | LED Screw-In Lamps: One Lamp Screw-in LED | High/Low Control | 16 | 3,500 | 0.09 | 674 | 0.0 | \$81.00 | \$572.25 | \$50.00 | 6.45 |
| G108a | 21 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 21 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.51 | 2,789 | 0.0 | \$335.00 | \$766.82 | \$210.00 | 1.66 |
| G110 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| Hallway | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 5 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 664 | 0.0 | \$79.76 | \$182.58 | \$50.00 | 1.66 |
| Hallway | 19 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 19 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.10 | 528 | 0.0 | \$63.37 | \$327.28 | \$95.00 | 3.67 |
| Hallway | 12 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 3,500 | Relamp | No | 12 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 3,500 | 0.14 | 773 | 0.0 | \$92.81 | \$390.18 | \$120.00 | 2.91 |
| G108a | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Occupancy Sensor | 32 | 3,500 | Relamp | No | 8 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.10 | 564 | 0.0 | \$67.68 | \$146.06 | \$40.00 | 1.57 |
| G108a | 4 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 4 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.02 | 111 | 0.0 | \$13.34 | \$68.90 | \$20.00 | 3.67 |
| G108a | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Hallway | 7 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 3,500 | Relamp | No | 7 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 3,500 | 0.08 | 451 | 0.0 | \$54.14 | \$227.61 | \$70.00 | 2.91 |
| Hallway | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 9 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.22 | 1,195 | 0.0 | \$143.57 | \$328.64 | \$90.00 | 1.66 |
| Hallway | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 6 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| G124 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G112 Office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| G115 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G117 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G118 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G119 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G120 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G121 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.05 | 380 | 0.0 | \$45.58 | \$73.03 | \$20.00 | 1.16 |
| G122 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G123 Closet | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 2,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 2,000 | 0.05 | 152 | 0.0 | \$18.23 | \$73.03 | \$20.00 | 2.91 |
| G128 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G129 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|--------------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| G130 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G131 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G125 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G126 Office | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G132 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G133 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G134 Lounge | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G137b | 21 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 21 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.51 | 2,789 | 0.0 | \$335.00 | \$766.82 | \$210.00 | 1.66 |
| G137b | 2 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 2 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.01 | 56 | 0.0 | \$6.67 | \$34.45 | \$10.00 | 3.67 |
| G106 | 1 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 1 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.01 | 28 | 0.0 | \$3.34 | \$17.23 | \$5.00 | 3.67 |
| G138 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.29 | 1,594 | 0.0 | \$191.43 | \$438.18 | \$120.00 | 1.66 |
| G138 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Occupancy Sensor | 32 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.03 | 141 | 0.0 | \$16.92 | \$36.52 | \$10.00 | 1.57 |
| G138 | 2 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 2 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.01 | 56 | 0.0 | \$6.67 | \$34.45 | \$10.00 | 3.67 |
| G139 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| G139 | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Hallway | 12 | Compact Fluorescent: One Lamp Screw-in CFL | Wall Switch | 23 | 5,000 | Relamp | Yes | 12 | LED Screw-In Lamps: One Lamp Screw-in LED | High/Low Control | 16 | 3,500 | 0.10 | 809 | 0.0 | \$97.21 | \$606.70 | \$60.00 | 5.62 |
| H118 Offices | 24 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 24 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.74 | 5,755 | 0.0 | \$691.13 | \$1,416.36 | \$310.00 | 1.60 |
| H118a | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| H118b | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| H118c | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| H118d | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.05 | 380 | 0.0 | \$45.58 | \$73.03 | \$20.00 | 1.16 |
| H118e | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.05 | 380 | 0.0 | \$45.58 | \$73.03 | \$20.00 | 1.16 |
| H116 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 15 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.46 | 3,597 | 0.0 | \$431.95 | \$817.73 | \$185.00 | 1.46 |
| H115 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.37 | 2,877 | 0.0 | \$345.56 | \$708.18 | \$155.00 | 1.60 |
| Vestibule | 4 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 46 | 5,000 | Relamp | Yes | 4 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 32 | 3,500 | 0.07 | 540 | 0.0 | \$64.80 | \$337.80 | \$40.00 | 4.60 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|---------------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Hallway | 18 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 18 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.44 | 2,391 | 0.0 | \$287.14 | \$657.27 | \$180.00 | 1.66 |
| 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 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mens Lockers | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.32 | 2,532 | 0.0 | \$304.13 | \$708.18 | \$155.00 | 1.82 |
| Mens Lockers | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.03 | 240 | 0.0 | \$28.80 | \$36.52 | \$45.00 | -0.29 |
| Mens Lockers | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 1 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.02 | 126 | 0.0 | \$15.09 | \$18.26 | \$40.00 | -1.44 |
| H114 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.25 | 1,918 | 0.0 | \$230.38 | \$562.12 | \$115.00 | 1.94 |
| H113 | 9 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 9 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.28 | 2,158 | 0.0 | \$259.17 | \$598.64 | \$125.00 | 1.83 |
| Hallway | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.25 | 1,918 | 0.0 | \$230.38 | \$692.12 | \$80.00 | 2.66 |
| H109 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.16 | 1,266 | 0.0 | \$152.06 | \$489.09 | \$95.00 | 2.59 |
| H108 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 4L | Wall Switch | 114 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (4) 4' Lamps | Occupancy Sensor | 58 | 3,500 | 0.16 | 1,266 | 0.0 | \$152.06 | \$489.09 | \$95.00 | 2.59 |
| H102 | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.43 | 3,357 | 0.0 | \$403.16 | \$781.21 | \$175.00 | 1.50 |
| H101 Lab | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.19 | 1,063 | 0.0 | \$127.62 | \$292.12 | \$80.00 | 1.66 |
| H218 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| Hallway | 38 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 38 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 1.17 | 9,111 | 0.0 | \$1,094.29 | \$2,787.57 | \$380.00 | 2.20 |
| Hallway | 2 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 46 | 5,000 | Relamp | Yes | 2 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 32 | 3,500 | 0.03 | 270 | 0.0 | \$32.40 | \$68.90 | \$20.00 | 1.51 |
| Outdoor Patio | 9 | Compact Fluorescent: One Lamp Screw-in CFL | Wall Switch | 23 | 2,000 | Relamp | No | 9 | LED Screw-In Lamps: One Lamp Screw-in LED | Wall Switch | 16 | 2,000 | 0.05 | 143 | 0.0 | \$17.15 | \$155.03 | \$45.00 | 6.41 |
| H204 Office | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.15 | 797 | 0.0 | \$95.71 | \$219.09 | \$60.00 | 1.66 |
| H203 Office | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| Hallway | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 15 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.46 | 3,597 | 0.0 | \$431.95 | \$1,147.73 | \$150.00 | 2.31 |
| H202l Office | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| H202k | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| H202j | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| H202i | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| H202h | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| H202g | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| H202f | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| H202e | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| H202b | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| H202c | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.02 | 133 | 0.0 | \$15.95 | \$36.52 | \$10.00 | 1.66 |
| H202c | 2 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,500 | 0.04 | 233 | 0.0 | \$28.04 | \$144.92 | \$0.00 | 5.17 |
| H202b | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| H202m | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| H202n | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| H202a | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| H230 | 11 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 11 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.27 | 1,461 | 0.0 | \$175.48 | \$401.67 | \$110.00 | 1.66 |
| H201 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.49 | 3,836 | 0.0 | \$460.75 | \$1,124.24 | \$230.00 | 1.94 |
| H201g | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| H201f | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 8 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.19 | 1,063 | 0.0 | \$127.62 | \$292.12 | \$80.00 | 1.66 |
| H201e | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.10 | 531 | 0.0 | \$63.81 | \$146.06 | \$40.00 | 1.66 |
| H201d | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| H201c | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$416.06 | \$75.00 | 2.96 |
| H201b | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| H201b | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 4 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Copy Room | 7 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 7 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.17 | 930 | 0.0 | \$111.67 | \$255.61 | \$70.00 | 1.66 |
| Hallway | 14 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 14 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.07 | 389 | 0.0 | \$46.70 | \$241.15 | \$70.00 | 3.67 |
| Hallway | 5 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 5 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Hallway | 13 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Wall Switch | 33 | 5,000 | Relamp | Yes | 13 | LED - Linear Tubes: (2) 2' Lamps | High/Low Control | 17 | 3,500 | 0.20 | 1,577 | 0.0 | \$189.42 | \$1,022.70 | \$130.00 | 4.71 |
| Hallway | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 4 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.12 | 959 | 0.0 | \$115.19 | \$146.06 | \$40.00 | 0.92 |
| G203 | 15 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 15 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.36 | 1,992 | 0.0 | \$239.28 | \$547.73 | \$150.00 | 1.66 |
| G203 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Occupancy Sensor | 32 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.05 | 282 | 0.0 | \$33.84 | \$73.03 | \$20.00 | 1.57 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|----------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| G206 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G207 | 10 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 10 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.24 | 1,328 | 0.0 | \$159.52 | \$365.15 | \$100.00 | 1.66 |
| G207 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Occupancy Sensor | 32 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.05 | 282 | 0.0 | \$33.84 | \$73.03 | \$20.00 | 1.57 |
| G207 | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 2 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| G208 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G209 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G210 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| Closet | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 1,400 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 1,400 | 0.04 | 80 | 0.0 | \$9.57 | \$54.77 | \$15.00 | 4.16 |
| G216 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G217 | 4 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 3,500 | 0.05 | 258 | 0.0 | \$30.94 | \$130.06 | \$40.00 | 2.91 |
| G217 | 3 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 3 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.02 | 83 | 0.0 | \$10.01 | \$51.68 | \$15.00 | 3.67 |
| Hallway | 19 | Linear Fluorescent - T8: 2' T8 (17W) - 2L | Occupancy Sensor | 33 | 3,500 | Relamp | No | 19 | LED - Linear Tubes: (2) 2' Lamps | Occupancy Sensor | 17 | 3,500 | 0.22 | 1,224 | 0.0 | \$146.95 | \$617.79 | \$190.00 | 2.91 |
| Hallway' | 13 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 13 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.07 | 361 | 0.0 | \$43.36 | \$223.93 | \$65.00 | 3.67 |
| Hallway | 7 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | None | No | 7 | Exit Signs: LED - 2 W Lamp | None | 6 | 8,760 | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| G230 | 1 | Compact Fluorescent: One Lamp Screw-in CFL | Wall Switch | 23 | 5,000 | Relamp | No | 1 | LED Screw-In Lamps: One Lamp Screw-in LED | Wall Switch | 16 | 5,000 | 0.01 | 40 | 0.0 | \$4.76 | \$17.23 | \$5.00 | 2.57 |
| G232 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| G234 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| G236 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| G238 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G240 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G242 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G244 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G246 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G245 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| G243 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|----------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| G241 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| G239 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G237 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| G235 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G233 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G231 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| Hallway | 15 | Compact Fluorescent: Two Lamp Screw-in CFL | Wall Switch | 46 | 5,000 | Relamp | Yes | 15 | LED Screw-In Lamps: Two Lamp Screw-in LED | High/Low Control | 32 | 3,500 | 0.26 | 2,023 | 0.0 | \$243.01 | \$1,116.75 | \$150.00 | 3.98 |
| G218 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G215 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G219 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G212 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 6 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.15 | 797 | 0.0 | \$95.71 | \$219.09 | \$60.00 | 1.66 |
| G220 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G222 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G213 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.04 | 199 | 0.0 | \$23.93 | \$54.77 | \$15.00 | 1.66 |
| G223 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G228 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.05 | 380 | 0.0 | \$45.58 | \$73.03 | \$20.00 | 1.16 |
| G251 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G252 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G253 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.05 | 266 | 0.0 | \$31.90 | \$73.03 | \$20.00 | 1.66 |
| G255 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G226 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.22 | 1,195 | 0.0 | \$143.57 | \$328.64 | \$90.00 | 1.66 |
| Closet | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 1,400 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 1,400 | 0.02 | 53 | 0.0 | \$6.38 | \$36.52 | \$10.00 | 4.16 |
| G256 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G257 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G258 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.15 | 797 | 0.0 | \$95.71 | \$219.09 | \$60.00 | 1.66 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------------|---------------------|--|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Stairwell | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | No | 12 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 5,000 | 0.15 | 1,208 | 0.0 | \$145.02 | \$219.09 | \$60.00 | 1.10 |
| G260 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G261 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G262 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G214 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 1 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.04 | 199 | 0.0 | \$23.93 | \$54.77 | \$15.00 | 1.66 |
| G263 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G265 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.07 | 398 | 0.0 | \$47.86 | \$109.55 | \$30.00 | 1.66 |
| G205 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.11 | 598 | 0.0 | \$71.79 | \$164.32 | \$45.00 | 1.66 |
| G266 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 3 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.11 | 598 | 0.0 | \$71.79 | \$164.32 | \$45.00 | 1.66 |
| G202 | 4 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 4 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.15 | 797 | 0.0 | \$95.71 | \$219.09 | \$60.00 | 1.66 |
| Mens Restroom | 6 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,500 | 0.17 | 1,342 | 0.0 | \$161.18 | \$704.76 | \$35.00 | 4.16 |
| Womens Restroom | 6 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,500 | 0.17 | 1,342 | 0.0 | \$161.18 | \$704.76 | \$35.00 | 4.16 |
| Hallway | 5 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 5 | LED - Linear Tubes: (1) 4' Lamp | High/Low Control | 15 | 3,500 | 0.08 | 628 | 0.0 | \$75.45 | \$291.29 | \$25.00 | 3.53 |
| Hallway | 10 | Compact Fluorescent: One Lamp Screw-in CFL | Wall Switch | 23 | 5,000 | Relamp | Yes | 10 | LED Screw-In Lamps: One Lamp Screw-in LED | High/Low Control | 16 | 3,500 | 0.09 | 674 | 0.0 | \$81.00 | \$572.25 | \$50.00 | 6.45 |
| Dance Studio | 51 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 51 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.26 | 1,416 | 0.0 | \$170.11 | \$878.48 | \$255.00 | 3.67 |
| F224 | 14 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 14 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.34 | 1,860 | 0.0 | \$223.33 | \$511.21 | \$140.00 | 1.66 |
| F225 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.39 | 2,125 | 0.0 | \$255.24 | \$584.24 | \$160.00 | 1.66 |
| F226 | 16 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 16 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.39 | 2,125 | 0.0 | \$255.24 | \$584.24 | \$160.00 | 1.66 |
| Faculty Lounge | 9 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 9 | LED - Linear Tubes: (2) U-Lamp | Occupancy Sensor | 33 | 3,500 | 0.19 | 1,051 | 0.0 | \$126.17 | \$652.14 | \$0.00 | 5.17 |
| F201 | 1 | Compact Fluorescent: One Lamp Screw-in CFL | Wall Switch | 23 | 5,000 | Relamp | Yes | 1 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.01 | 67 | 0.0 | \$8.10 | \$287.23 | \$40.00 | 30.52 |
| Stairwell | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Wall Switch | 44 | 5,000 | 0.44 | 3,416 | 0.0 | \$410.20 | \$657.27 | \$180.00 | 1.16 |
| F229 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F231 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F232 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F233 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |

| Location | Existing Conditions | | | | | Proposed Conditions | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|----------|---------------------|---|------------------|-------------------|------------------------|------------------------|---------------|------------------|---|------------------|-------------------|------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Fixture Recommendation | Add Controls? | Fixture Quantity | Fixture Description | Control System | Watts per Fixture | Annual Operating Hours | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| F234 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F236 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F235 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F238 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F237 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F240 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F239 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F241 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F243 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.09 | 719 | 0.0 | \$86.39 | \$379.55 | \$65.00 | 3.64 |
| F296 | 1 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 1 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.02 | 190 | 0.0 | \$22.79 | \$36.52 | \$10.00 | 1.16 |
| F244 | 6 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Wall Switch | 93 | 5,000 | Relamp | Yes | 6 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.28 | 2,158 | 0.0 | \$259.17 | \$598.64 | \$125.00 | 1.83 |
| F297 | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | No | 2 | LED - Linear Tubes: (2) 4' Lamps | Wall Switch | 29 | 5,000 | 0.05 | 380 | 0.0 | \$45.58 | \$73.03 | \$20.00 | 1.16 |
| Hallway | 8 | U-Bend Fluorescent - T8: U T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 8 | LED - Linear Tubes: (2) U-Lamp | High/Low Control | 33 | 3,500 | 0.23 | 1,789 | 0.0 | \$214.91 | \$979.68 | \$0.00 | 4.56 |
| Hallway | 10 | Compact Fluorescent: One Lamp Screw-in CFL | Wall Switch | 23 | 5,000 | Relamp | Yes | 10 | LED Screw-In Lamps: One Lamp Screw-in LED | High/Low Control | 16 | 3,500 | 0.09 | 674 | 0.0 | \$81.00 | \$572.25 | \$50.00 | 6.45 |
| Hallway | 20 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Wall Switch | 62 | 5,000 | Relamp | Yes | 20 | LED - Linear Tubes: (2) 4' Lamps | High/Low Control | 29 | 3,500 | 0.61 | 4,796 | 0.0 | \$575.94 | \$1,530.30 | \$200.00 | 2.31 |
| F227 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 2L | Occupancy Sensor | 62 | 3,500 | Relamp | No | 12 | LED - Linear Tubes: (2) 4' Lamps | Occupancy Sensor | 29 | 3,500 | 0.29 | 1,594 | 0.0 | \$191.43 | \$438.18 | \$120.00 | 1.66 |
| F225 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.44 | 2,391 | 0.0 | \$287.14 | \$657.27 | \$180.00 | 1.66 |
| F223 | 12 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 12 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.44 | 2,391 | 0.0 | \$287.14 | \$657.27 | \$180.00 | 1.66 |
| F223 | 5 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 5 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.03 | 139 | 0.0 | \$16.68 | \$86.13 | \$25.00 | 3.67 |
| F223 | 8 | Linear Fluorescent - T8: 4' T8 (32W) - 3L | Occupancy Sensor | 93 | 3,500 | Relamp | No | 8 | LED - Linear Tubes: (3) 4' Lamps | Occupancy Sensor | 44 | 3,500 | 0.29 | 1,594 | 0.0 | \$191.43 | \$438.18 | \$120.00 | 1.66 |
| F223 | 10 | Compact Fluorescent: One Lamp Screw-in CFL | Occupancy Sensor | 23 | 3,500 | Relamp | No | 10 | LED Screw-In Lamps: One Lamp Screw-in LED | Occupancy Sensor | 16 | 3,500 | 0.05 | 278 | 0.0 | \$33.35 | \$172.25 | \$50.00 | 3.67 |
| F226 | 3 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | No | 3 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 5,000 | 0.04 | 302 | 0.0 | \$36.26 | \$54.77 | \$15.00 | 1.10 |
| F226d | 2 | Linear Fluorescent - T8: 4' T8 (32W) - 1L | Wall Switch | 32 | 5,000 | Relamp | Yes | 2 | LED - Linear Tubes: (1) 4' Lamp | Occupancy Sensor | 15 | 3,500 | 0.03 | 251 | 0.0 | \$30.18 | \$36.52 | \$45.00 | -0.28 |
| F226c | 2 | Linear Fluorescent - T12: 4' T12 (40W) - 1L | Wall Switch | 46 | 5,000 | Relamp & Reballast | No | 2 | LED - Linear Tubes: (1) 4' Lamp | Wall Switch | 15 | 5,000 | 0.05 | 362 | 0.0 | \$43.51 | \$101.03 | \$10.00 | 2.09 |

Motor Inventory & Recommendations

| Location | Area(s)/System(s) Served | Existing Conditions | | | | | | Proposed Conditions | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------------|--------------------------|---------------------|-------------------|--------------|----------------------|--------------|------------------------|---------------------------------|----------------------|---------------|----------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | | Motor Quantity | Motor Application | HP Per Motor | Full Load Efficiency | VFD Control? | Annual Operating Hours | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Roof | Fume Hoods | 8 | Exhaust Fan | 1.0 | 80.0% | No | 2,745 | No | 80.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | AHU 1 | 1 | Supply Fan | 5.0 | 87.5% | No | 3,700 | No | 87.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | AHU 2 | 1 | Supply Fan | 5.0 | 87.5% | No | 3,700 | No | 87.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | AHU 3 | 1 | Supply Fan | 15.0 | 91.0% | No | 3,700 | No | 91.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | ERU 2 | 1 | Supply Fan | 7.5 | 88.5% | No | 3,700 | No | 88.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | ERU 2 | 1 | Exhaust Fan | 7.5 | 88.5% | No | 3,700 | No | 88.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Ceiling | AHU 4 | 1 | Supply Fan | 5.0 | 89.5% | No | 3,700 | No | 89.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | AHU 3 | 1 | Supply Fan | 20.0 | 93.0% | No | 3,700 | No | 93.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | AHU 10 | 1 | Supply Fan | 15.0 | 93.0% | Yes | 3,700 | No | 93.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | AHU 10 | 1 | Return Fan | 2.0 | 86.5% | Yes | 3,700 | No | 86.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | AHU 9 | 1 | Supply Fan | 20.0 | 93.0% | Yes | 3,700 | No | 93.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | AHU 9 | 1 | Return Fan | 2.0 | 86.5% | Yes | 3,700 | No | 86.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | AHU 8 | 1 | Supply Fan | 10.0 | 91.7% | No | 3,700 | No | 91.7% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD241 | 2 | Supply Fan | 7.5 | 88.5% | No | 3,700 | Yes | 91.0% | Yes | 2 | 2.17 | 9,057 | 0.0 | \$1,087.76 | \$9,476.48 | \$1,200.00 | 7.61 |
| Roof | Trane YCD420 | 7 | Supply Fan | 10.0 | 89.5% | No | 3,700 | Yes | 91.7% | Yes | 7 | 9.92 | 41,422 | 0.0 | \$4,974.83 | \$36,060.50 | \$5,600.00 | 6.12 |
| Roof | Trane YCD480 | 2 | Supply Fan | 10.0 | 89.5% | No | 3,700 | Yes | 91.7% | Yes | 2 | 2.84 | 11,835 | 0.0 | \$1,421.38 | \$10,303.00 | \$1,600.00 | 6.12 |
| Roof | Trane YCD210 | 1 | Supply Fan | 7.5 | 88.5% | No | 3,700 | Yes | 91.0% | Yes | 1 | 1.08 | 4,529 | 0.0 | \$543.88 | \$4,738.24 | \$600.00 | 7.61 |
| Roof | Trane THC043 | 1 | Supply Fan | 1.5 | 84.0% | No | 3,700 | No | 84.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD301 | 5 | Supply Fan | 7.5 | 88.5% | No | 3,700 | Yes | 91.0% | Yes | 5 | 5.41 | 22,643 | 0.0 | \$2,719.41 | \$23,691.20 | \$3,000.00 | 7.61 |
| Roof | Trane YCD330 | 1 | Supply Fan | 7.5 | 88.5% | No | 3,700 | Yes | 91.0% | Yes | 1 | 1.08 | 4,529 | 0.0 | \$543.88 | \$4,738.24 | \$600.00 | 7.61 |

| | | 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? | Annual Operating Hours | Install High Efficiency Motors? | Full Load Efficiency | Install VFDs? | Number of VFDs | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Roof | McQuay RPS105CSA | 1 | Supply Fan | 20.0 | 91.0% | No | 3,700 | No | 91.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | McQuay RPS125CLA | 1 | Supply Fan | 30.0 | 92.4% | No | 3,700 | No | 92.4% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD420 | 2 | Supply Fan | 10.0 | 89.5% | No | 3,700 | Yes | 91.7% | Yes | 2 | 2.84 | 11,835 | 0.0 | \$1,421.38 | \$10,303.00 | \$1,600.00 | 6.12 |
| Roof | Trane YCD301 | 2 | Supply Fan | 7.5 | 88.5% | No | 3,700 | Yes | 91.0% | Yes | 2 | 2.17 | 9,057 | 0.0 | \$1,087.76 | \$9,476.48 | \$1,200.00 | 7.61 |
| Roof | Trane YCD330 | 2 | Supply Fan | 7.5 | 88.5% | No | 3,700 | Yes | 91.0% | Yes | 2 | 2.17 | 9,057 | 0.0 | \$1,087.76 | \$9,476.48 | \$1,200.00 | 7.61 |
| Roof | Trane YCD181 | 3 | Supply Fan | 5.0 | 87.5% | No | 3,700 | Yes | 89.5% | Yes | 3 | 2.17 | 9,041 | 0.0 | \$1,085.78 | \$12,228.66 | \$1,200.00 | 10.16 |
| Roof | Trane YCD301 | 2 | Supply Fan | 7.5 | 88.5% | No | 3,700 | Yes | 91.0% | Yes | 2 | 2.17 | 9,057 | 0.0 | \$1,087.76 | \$9,476.48 | \$1,200.00 | 7.61 |
| Mechanical Room | Primary Hot Water Loop | 3 | Heating Hot Water Pump | 3.0 | 89.5% | Yes | 3,000 | No | 89.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | Secondary Hot Water Loop | 2 | Heating Hot Water Pump | 5.0 | 89.5% | Yes | 3,000 | No | 89.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | Heating Hot Water | 2 | Heating Hot Water Pump | 7.5 | 88.5% | No | 6,000 | Yes | 91.0% | Yes | 2 | 2.03 | 33,501 | 0.0 | \$4,023.50 | \$9,476.48 | \$0.00 | 2.36 |
| Mechanical Room | Hot Water Circulation | 2 | Heating Hot Water Pump | 1.5 | 84.0% | No | 6,000 | No | 84.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Ceiling | AHU 4 | 1 | Return Fan | 1.5 | 84.0% | No | 3,400 | No | 84.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Elevator Room | Elevators | 1 | Other | 15.0 | 91.0% | No | 1,000 | No | 91.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | Chilled Water Circulation | 2 | Chilled Water Pump | 3.0 | 84.0% | No | 6,000 | No | 84.0% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Mechanical Room | Chilled Water Circulation | 2 | Chilled Water Pump | 10.0 | 89.5% | No | 6,000 | No | 89.5% | No | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

Electric HVAC Inventory & Recommendations

| Location | Area(s)/System(s) Served | Existing Conditions | | Proposed Conditions | | | | | | | | | | Energy Impact & Financial Analysis | | | | | | |
|----------|--------------------------|---------------------|----------------------------|----------------------------------|-------------------------------------|---------------------------------|-----------------|-------------|----------------------------------|-------------------------------------|------------------------------------|-------------------------------|-----------------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (kBtu/hr) | Install High Efficiency System? | System Quantity | System Type | Cooling Capacity per Unit (Tons) | Heating Capacity per Unit (kBtu/hr) | Cooling Mode Efficiency (SEER/EER) | Heating Mode Efficiency (COP) | Install Dual Enthalpy Economizer? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Roof | Gallery | 2 | Packaged AC | 20.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Library | 7 | Packaged AC | 35.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | E-wing | 2 | Packaged AC | 40.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Gallery | 1 | Packaged AC | 17.50 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | F-wing | 1 | Packaged AC | 4.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | F-wing | 5 | Packaged AC | 25.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | F-wing | 1 | Packaged AC | 27.50 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | F-wing | 1 | Packaged AC | 105.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | F-wing | 1 | Packaged AC | 125.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | G-wing | 2 | Packaged AC | 35.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | G-wing | 2 | Packaged AC | 25.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Gallery | 2 | Packaged AC | 27.50 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | H-wing | 3 | Packaged AC | 15.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | H-wing | 2 | Packaged AC | 25.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Multiple Areas | 2 | Ductless Mini-Split AC | 2.00 | | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Multiple Areas | 1 | Split-System Air-Source HP | 3.00 | 31.00 | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Multiple Areas | 1 | Split-System Air-Source HP | 5.00 | 55.00 | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane THC043 Unit | 1 | Electric Resistance Heat | | 40.94 | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Outside | IT Room | 1 | Ductless Mini-Split HP | 2.00 | 19.50 | No | | | | | | | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

Fuel Heating Inventory & Recommendations

| Location | Area(s)/System(s) Served | Existing Conditions | | | Proposed Conditions | | | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------------|--------------------------|---------------------|-----------------------------|--------------------------------|---------------------------------|-----------------|-------------|--------------------------------|--------------------|--------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | | System Quantity | System Type | Output Capacity per Unit (MBh) | Install High Efficiency System? | System Quantity | System Type | Output Capacity per Unit (MBh) | Heating Efficiency | Heating Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Mechanical Room | Heating Hot Water | 3 | Condensing Hot Water Boiler | 1,880.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD241 | 2 | Furnace | 203.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD420 | 7 | Furnace | 486.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD480 | 2 | Furnace | 648.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD210 | 1 | Furnace | 203.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD301 | 5 | Furnace | 324.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD330 | 1 | Furnace | 283.50 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | McQuay RPS105CSA | 1 | Furnace | 1,000.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | McQuay RPS125CLA | 1 | Furnace | 1,500.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD420 | 2 | Furnace | 486.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD301 | 2 | Furnace | 324.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD330 | 2 | Furnace | 283.50 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD181 | 3 | Furnace | 203.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Roof | Trane YCD301 | 2 | Furnace | 324.00 | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

DHW Inventory & Recommendations

| Location | Area(s)/System(s) Served | Existing Conditions | | | Proposed Conditions | | | | | Energy Impact & Financial Analysis | | | | | | |
|-----------------|--------------------------|---------------------|--------------------------------------|----------|---------------------|-------------|-----------|-------------------|------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | | System Quantity | System Type | Replace? | System Quantity | System Type | Fuel Type | System Efficiency | Efficiency Units | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Mechanical Room | Entire Facility | 1 | Storage Tank Water Heater (> 50 Gal) | No | | | | | | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

Low-Flow Device Recommendations

| Location | Recommendation Inputs | | | | Energy Impact & Financial Analysis | | | | | | |
|--------------------|-----------------------|---------------------------|--------------------------|--------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Device Quantity | Device Type | Existing Flow Rate (gpm) | Proposed Flow Rate (gpm) | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Multiple Locations | 31 | Faucet Aerator (Lavatory) | 2.20 | 1.00 | 0.00 | 0 | 63.4 | \$641.18 | \$222.27 | \$0.00 | 0.35 |

Commercial Refrigerator/Freezer Inventory & Recommendations

| Location | Existing Conditions | | | Proposed Condi | Energy Impact & Financial Analysis | | | | | | |
|--------------|---------------------|---|------------------------|--------------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Quantity | Refrigerator/ Freezer Type | ENERGY STAR Qualified? | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Coffee Shop | 1 | Stand-Up Refrigerator, Glass Door (31 - 50 cu. ft.) | No | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |
| Storage Area | 3 | Freezer Chest | Yes | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

Commercial Ice Maker Inventory & Recommendations

| Location | Existing Conditions | | | Proposed Condi | Energy Impact & Financial Analysis | | | | | | |
|-------------|---------------------|--|------------------------|--------------------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| | Quantity | Ice Maker Type | ENERGY STAR Qualified? | Install ENERGY STAR Equipment? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Coffee Shop | 1 | Ice Making Head (<450 lbs/day), Continuous | Yes | No | 0.00 | 0 | 0.0 | \$0.00 | \$0.00 | \$0.00 | 0.00 |

Plug Load Inventory

| Existing Conditions | | | | |
|---------------------|----------|-----------------------|-----------------|------------------------|
| Location | Quantity | Equipment Description | Energy Rate (W) | ENERGY STAR Qualified? |
| Multiple Locations | 46 | OH Projectors | 200.0 | |
| Multiple Locations | 9 | TVs (40") | 120.0 | |
| Multiple Locations | 36 | Mini Fridge | 30.0 | |
| Multiple Locations | 55 | Printer/Copiers (S) | 20.0 | |
| Multiple Locations | 42 | Printer/Copiers (M) | 250.0 | |
| Multiple Locations | 21 | Printer/Copiers (L) | 515.0 | |
| Multiple Locations | 30 | Microwaves | 1,000.0 | |
| Multiple Locations | 13 | TVs (50") | 150.0 | |
| Multiple Locations | 14 | Refrigerators | 600.0 | |
| Multiple Locations | 20 | Coffee Makers | 400.0 | |
| Multiple Locations | 750 | Desktop Computers | 75.0 | |

Vending Machine Inventory & Recommendations

| Existing Conditions | | | Proposed Conditions | Energy Impact & Financial Analysis | | | | | | |
|---------------------|----------|----------------------|---------------------|------------------------------------|--------------------------|----------------------------|----------------------------------|-------------------------|------------------|---------------------------------------|
| Location | Quantity | Vending Machine Type | Install Controls? | Total Peak kW Savings | Total Annual kWh Savings | Total Annual MMBtu Savings | Total Annual Energy Cost Savings | Total Installation Cost | Total Incentives | Simple Payback w/ Incentives in Years |
| Multiple Locations | 2 | Refrigerated | Yes | 0.00 | 3,224 | 0.0 | \$387.16 | \$460.00 | \$0.00 | 1.19 |

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A Building 31 - E-H Wings

Primary Property Type: College/University
Gross Floor Area (ft²): 232,277
Built: 1973

For Year Ending: April 30, 2017
Date Generated: December 03, 2018

ENERGY STAR® Score¹

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
 Building 31 - E-H Wings
 101 Vera King Farris Drive
 Galloway, New Jersey 08205

Property Owner
 Stockton University
 101 Vera King Farris Drive
 Galloway, NJ 08205
 () - _____

Primary Contact
 Dan Cordle
 101 Vera King Farris Drive
 Galloway, NJ 08205
 809-852-4221
 Dan.Cordle@stockton.edu

Property ID: 6628730

Energy Consumption and Energy Use Intensity (EUI)

| Site EUI | Annual Energy by Fuel | | National Median Comparison | |
|----------------|------------------------|------------------|--|-------|
| 133.2 kBtu/ft² | Electric - Grid (kBtu) | 14,773,960 (48%) | National Median Site EUI (kBtu/ft²) | 95.8 |
| | Natural Gas (kBtu) | 16,160,403 (52%) | National Median Source EUI (kBtu/ft²) | 180.6 |
| | | | % Diff from National Median Source EUI | 39% |
| Source EUI | | | Annual Emissions | |
| 251.1 kBtu/ft² | | | Greenhouse Gas Emissions (Metric Tons CO2e/year) | 2,355 |

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

 () - _____



Professional Engineer Stamp (if applicable)