Local Government Energy Audit Report

Hepburn Hall

June 6, 2022

Prepared for:

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Disclaimer

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

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

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

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

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

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ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

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

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

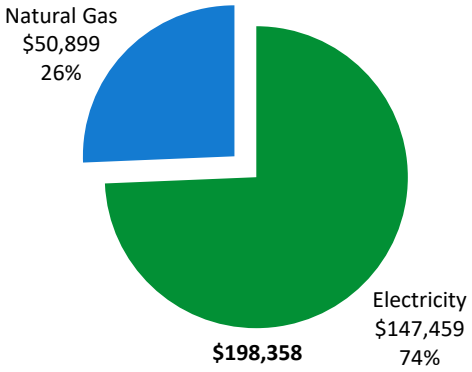
These next generation energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and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

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

1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $198,358 Electricity: 1,325,485 kWh Natural Gas: 76,628 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

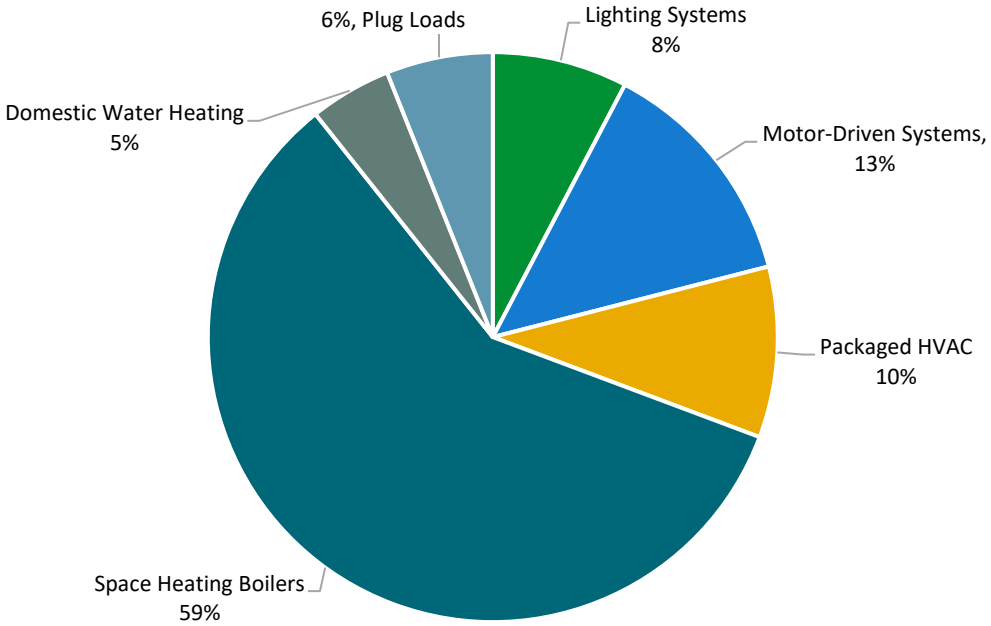


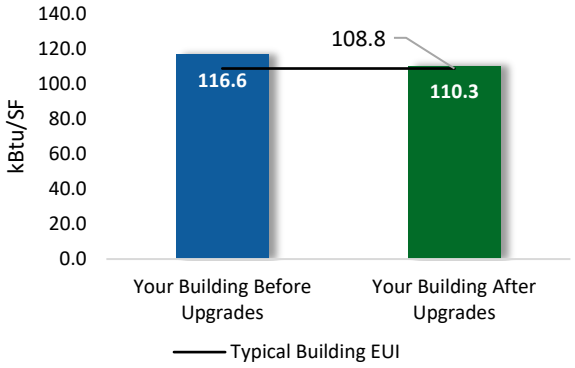
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

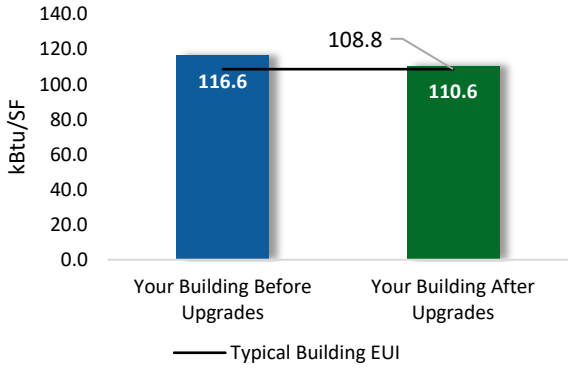
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$145,054
Potential Rebates & Incentives[1]	$14,505
Annual Cost Savings	$22,342
Annual Energy Savings	Electricity: 202,619 kWh Natural Gas: -301 Therms
Greenhouse Gas Emission Savings	100 Tons
Simple Payback	5.8 Years
Site Energy Savings (All Utilities)	5%



Scenario 2: Cost Effective Package[2]

Installation Cost	$113,289
Potential Rebates & Incentives	$13,412
Annual Cost Savings	$21,039
Annual Energy Savings	Electricity: 190,906 kWh Natural Gas: -301 Therms
Greenhouse Gas Emission Savings	94 Tons
Simple Payback	4.7 Years
Site Energy Savings (all utilities)	5%



On-site Generation Potential

Photovoltaic	Low
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**148,704**	**29.9**	**-31**	**$16,339**	**$69,819**	**$9,108**	**$60,711**	**3.7**	**146,151**
ECM 1	Install LED Fixtures	Yes	1,879	0.0	0	$209	$1,037	$150	$887	4.2	1,892
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	13,351	2.9	-3	$1,467	$6,195	$948	$5,247	3.6	13,118
ECM 3	Retrofit Fixtures with LED Lamps	Yes	133,473	26.9	-28	$14,663	$62,587	$8,010	$54,577	3.7	131,141
Lighting Control Measures			**15,134**	**2.8**	**-3**	**$1,663**	**$15,517**	**$3,215**	**$12,302**	**7.4**	**14,869**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	13,805	2.6	-3	$1,517	$13,042	$1,505	$11,537	7.6	13,564
ECM 5	Install High/Low Lighting Controls	Yes	1,328	0.2	0	$146	$2,475	$1,710	$765	5.2	1,305
Motor Upgrades			**6,092**	**1.2**	**0**	**$678**	**$11,396**	**$0**	**$11,396**	**16.8**	**6,135**
ECM 6	Premium Efficiency Motors	No	6,092	1.2	0	$678	$11,396	$0	$11,396	16.8	6,135
Variable Frequency Drive (VFD) Measures			**24,248**	**5.3**	**0**	**$2,698**	**$27,464**	**$975**	**$26,489**	**9.8**	**24,418**
ECM 7	Install VFDs on Constant Volume (CV) Fans	Yes	24,248	5.3	0	$2,698	$27,464	$975	$26,489	9.8	24,418
Unitary HVAC Measures			**5,621**	**2.3**	**0**	**$625**	**$20,369**	**$1,093**	**$19,276**	**30.8**	**5,660**
ECM 8	Install High Efficiency Air Conditioning Units	No	5,621	2.3	0	$625	$20,369	$1,093	$19,276	30.8	5,660
Domestic Water Heating Upgrade			**0**	**0.0**	**4**	**$25**	**$29**	**$14**	**$14**	**0.6**	**444**
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	4	$25	$29	$14	$14	0.6	444
Food Service & Refrigeration Measures			**2,821**	**0.3**	**0**	**$314**	**$460**	**$100**	**$360**	**1.1**	**2,840**
ECM 10	Vending Machine Control	Yes	2,821	0.3	0	$314	$460	$100	$360	1.1	2,840
TOTALS (COST EFFECTIVE MEASURES)			**190,906**	**38.3**	**-30**	**$21,039**	**$113,289**	**$13,412**	**$99,876**	**4.7**	**188,722**
TOTALS (ALL MEASURES)			**202,619**	**41.8**	**-30**	**$22,342**	**$145,054**	**$14,505**	**$130,549**	**5.8**	**200,517**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Options from Around the State

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

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

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

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

Successor Solar Incentive Program (SuSI)

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

Ongoing Electric Savings with Demand Response

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

Large Energy User Program (LEUP)

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

2 EXISTING CONDITIONS

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

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

2.1 Site Overview

On September 29, 2021, TRC performed an energy audit at Hepburn Hall located in Jersey City, New Jersey. TRC met with Andre Pearson to review the facility operations and help focus our investigation on specific energy-using systems.

Hepburn Hall is a three-story, 104,523 square foot building built in 1929. The building is the center of NJCU's administrative operations. Spaces include administrative offices, conference rooms, theater, gothic lounge, TV room, file rooms, college printing spaces, dressing rooms, hallways, lobbies, storage rooms, restrooms, wood shop, electric and mechanical spaces.

Lighting is provided by mainly by linear fluorescent T5 fixtures. The building is electrically fed from the campus main electric meter located at the central plant. It uses steam produced by the central plant. There is one electric chiller that serves both Hepburn Hall and Karnoutsos Hall, located at the central plant. There is a passenger elevator in the building.

Recent improvements and Facility Concerns

Last year, the facility replaced a rented chiller with a magnetic bearing reciprocating chiller that serves both Hepburn Hall and Karnoutsos Hall.

The facility has many concerns including aging heating and cooling equipment (AHUs) which are operating beyond their useful life and are in poor condition.

Theater

2.2 Building Occupancy

Hepburn Hall is the college administrative center and operates on a 12-month schedule. There are no weekend operations. The building is shut down at approximately 9:00 PM. During a typical weekday, the facility is occupied by 300 staff. It should be noted that the energy and economic analysis for this building is based on the use of the building during the utility billing period, and that results will vary based on changes to building use patterns.

Building Name	Weekday/Weekend	Operating Schedule
Hepburn Hall	Weekday	7:00 AM - 9:00 PM
	Weekend	Very Limited

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

The walls are made of concrete masonry units (CMUs) with a brick veneer and gypsum drywall interior finish. The building walls are in good, aging condition with minor interior space restoration issues because of flooding. The interior restoration crews were working during the site visits. The main roof is pitched, supported with wood trusses and wood deck and finished with clay-style roofing materials. There are flat roof sections with reinforced concrete deck and a covering of black membrane.

The windows are single paned and have aluminum frames. The glass-to-frame seals are in fair condition. The weather seals for the fixed windows are in fair condition, showing some signs of outside air infiltration. The building's back entrance doors have aluminum frames with incorporated glass. The building main entrance doors are made of wood frames with incorporated glass. The exit doors are made of metal. Exterior doors are in fair condition with some damaged door seals. Degraded door seals increase drafts and outside air infiltration. Overall, the building envelope appears in an age-appropriate condition.

Building Walls

Building Wall & Roofs

Windows & Entrance Doors

Main Entrance Doors & Pitched Roof

2.4 Lighting Systems

The primary interior lighting system uses linear fluorescent T5 lamps. There are also several LED fixtures and LED replacement tube lamps. The building retains a few 34-Watt T12 lamps, a greater number of 32-Watt linear T8, and some compact fluorescent lamps (CFL). Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts. Fixture types include 2-lamp or 4-lamp, 2-foot, 4-foot or 8-foot-long troffer, recessed, surface mounted fixtures and 2-foot fixtures with U-bend tube lamps.

Spaces including wood shop, catwalk, rooms 148 and 222, and custom room lit with linear T12 lamps. The printing room, locksmith, mail room stairs, TV room, mechanical and electrical rooms, some storage rooms, and some offices are lit with linear T8 fixtures. CFLs are found in the gothic lounge, room 206, backstage area, and in 2nd and 3rd floor hallways. Lighting has been retrofitted to LED sources in rooms 308, 309, 323, stairwells, gothic lounge, the theater and its lobby, and underneath the theater. The remaining locations are illuminated mainly with linear fluorescent T5 lamps.

Most fixtures are in good condition. Interior lighting levels were generally sufficient. Light fixtures in most spaces are controlled either by manual wall mounted switches or by occupancy sensors that are either ceiling or wall mounted.

U-Bend, 2x2 Linear T5, & CFL Fixtures

Linear Fluorescent T8, T12, & T5 Fixtures

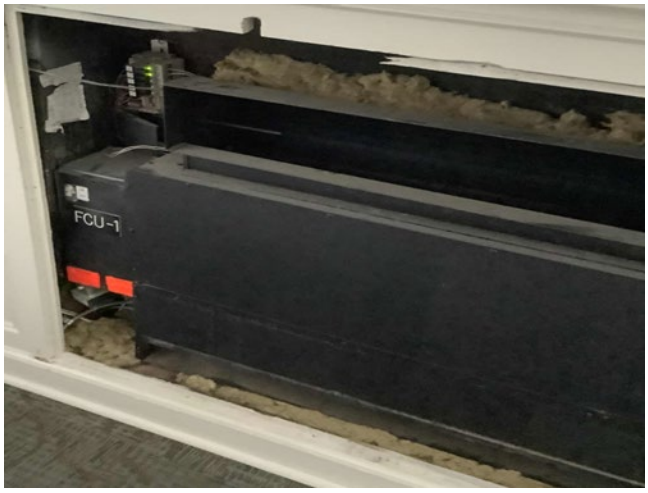
CFL, LED, & LED Exit Sign

HPS & LED Fixtures

2.5 Air Handling Systems

Fan Coil Units (FCUs)

Gothic lounge is conditioned by fan coil units (FCUs) equipped with a supply fan, using hot water coils for heating and direct expansion coils for cooling. The cooling coils are connected to six outdoor condensing units (ACCU). ACCU-1, 2, 3, and 4 are 2-ton units while ACCU-7 and 8 are 1-ton units. Condensing units are in good condition. The FCUs are controlled by the building energy management system (EMS).



Indoor Fan Coil Unit & Outside Condensing Unit

Unitary Electric HVAC Equipment

The gothic lounge is also conditioned by two EMI air source heat pumps (ACCU 5 and 6) with a respective heating and cooling capacities of 18.4 MBh and 2.5 tons. The units are in good condition. Various building spaces including small offices and storage rooms are cooled using window air conditioners that vary in cooling capacity from 0.45 tons to 1.54 tons. These are mostly in good condition.

Typical Window ACs

Outside Condensing Unit & Air Source Heat Pump

Air Handling Units (AHUs)

The building is mainly conditioned by three large air handling units (AHU-1, 3 & 4). Each unit contains steam preheat coils, chilled water coils, steam coils, and a supply fan motor. AHU-1 & 4 also incorporate a return fan. The fans are equipped with variable speed drives. The units have passed their useful lives and appear in poor condition. We recommend replacing the units. Air distribution is provided to supply air registers by ducts concealed above the ceilings. Heated and cooled air for AHU-1 & 4 is distributed through ducts to variable air volume (VAV) terminals concealed above the ceilings. AHU-2 serves the auditorium.

Additionally, there are four air handling units (AC-2, 3, 4 & 5) that serve spaces including the mail room, printing room, areas D112 and E112. Each unit provides direct expansion (DX) cooling through an outside condensing unit varying in size from 1.5 tons to 4 tons. They each contain steam preheat coils, steam coils, and a supply fan motor. The units provide constant volume air except AC-5. They appear in fair condition.

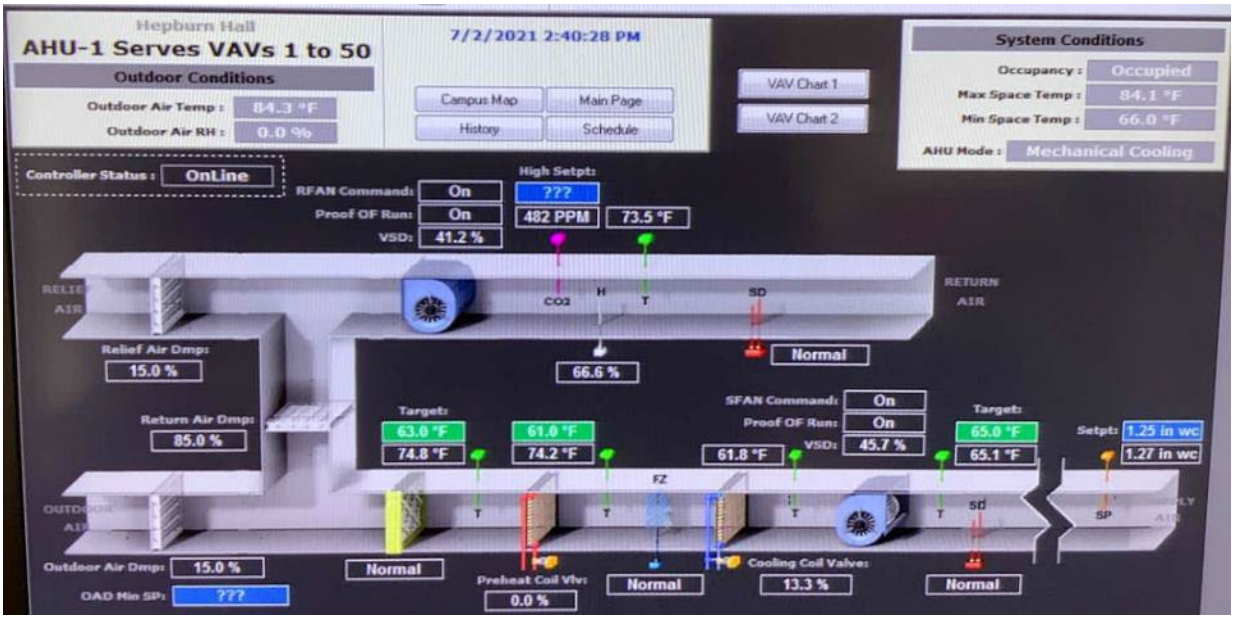
AHUs are controlled by the facility energy management system (EMS). The building air distribution system setpoints are as follows:

- Occupied Cooling Setpoint: 74°F
- Occupied Heating Setpoint: 74°F
- Unoccupied Cooling Setpoint: 80°F
- Unoccupied Heating Setpoint: 60°F

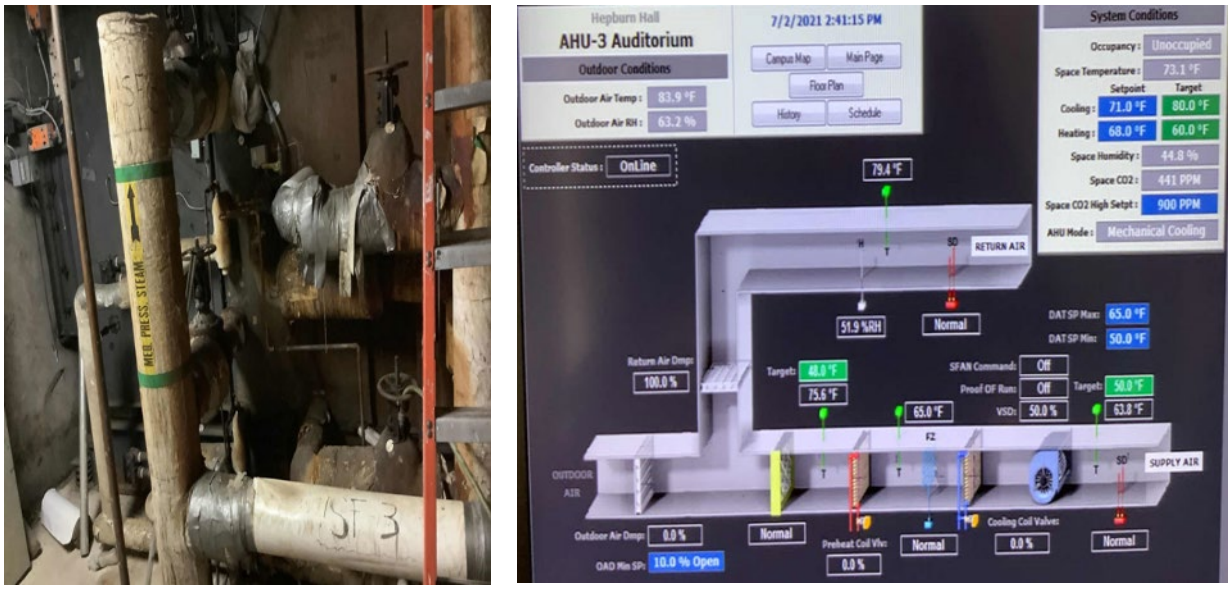
The telecom room is served by a 5-ton Carrier indoor packaged unit (AHU-001) located in the closet. The unit appears to be in fair condition and has been evaluated for replacement.

GAS: NATURAL / L.P.	HEATING: OIL, NO. 2 / OTHER	ELECTRIC				
INPUT	BTU/HR OUTPUT 1 029 800	BTU/HR				
BURNER MANIFOLD PRESSURE AT HIGH FIRE	"WC	GPH				
COOLING CAPACITY 1 298 000	BTU/HR					
TOTAL UNIT RATED LOAD	HP	FLA	LRA	VOLTS	HZ	Ø
CURRENT		124		460	60	3
EXHAUST FAN					60	
SUPPLY BLOWER	75	90	426	460	60	3
RETURN BLOWER	25	34	161	460	60	3
COMPRESSOR 1					60	
COMPRESSOR 2					60	
COMPRESSOR 3					60	
COMPRESSOR 4					60	
CONDENSER FAN 1					60	
CONDENSER FAN 2					60	
CONDENSER FAN 3					60	
CONDENSER FAN 4					60	
CONTROL					60	
ELECTRIC HEAT KW		12		115	60	1
					60	

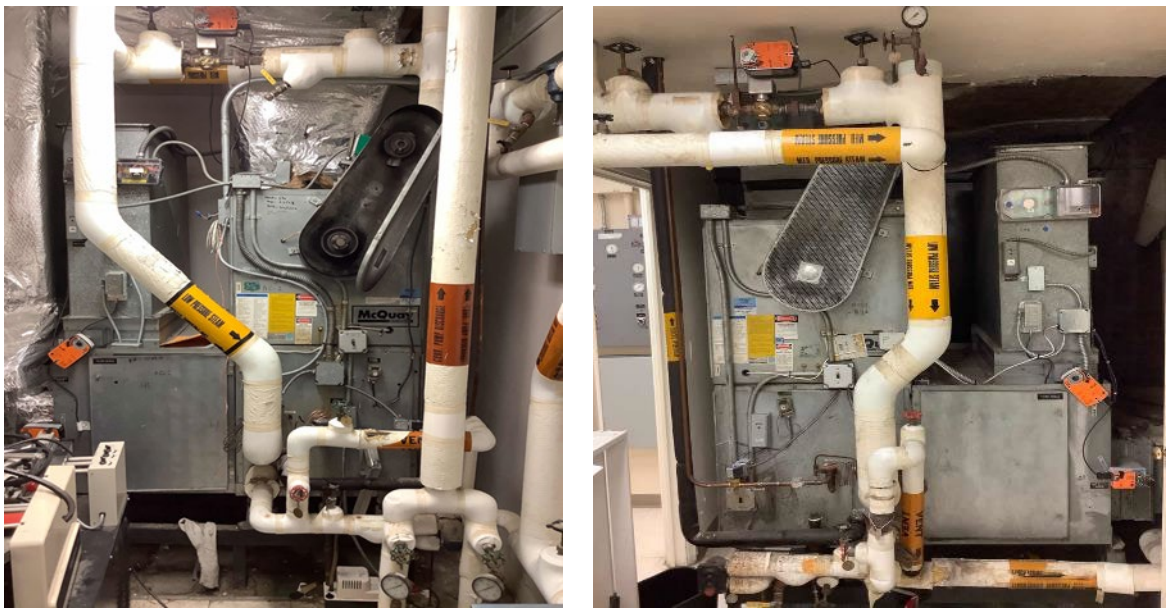
AHU-1



EMS Screenshot - AHU-1


Hepburn Hall
AHU-3 Auditorium
7/2/2021 2:41:15 PM
Outdoor Conditions
Outdoor Air Temp : 83.9 °F
Outdoor Air RH : 63.2 %
Campus Map
Main Page
Floor Plan
History
Schedule
Controller Status : OnLine
System Conditions
Occupancy : Unoccupied
Space Temperature : 73.1 °F
Setpoint
Target
Cooling : 71.0 °F 80.0 °F
Heating : 68.0 °F 60.0 °F
Space Humidity : 44.8 %
Space CO2 : 441 PPM
Space CO2 High Setpt : 900 PPM
AHU Mode : Mechanical Cooling
79.4 °F
RETURN AIR
51.9 %RH
Normal
DAT SP Max: 65.0 °F
DAT SP Min: 50.0 °F
Return Air Dmp: 100.0 %
Target: 48.0 °F
75.6 °F
SFAN Command: Off
Proof Of Run: Off
VSD: 50.0 %
Target: 50.0 °F
63.8 °F
65.0 °F
SUPPLY AIR
OUTDOOR AIR
Outdoor Air Dmp: 0.0 %
OAD Min SP: 10.0 % Open
Normal
Preheat Coil Vlv: 0.0 %
Normal
Cooling Coil Valve: 0.0 %
Normal

AHU-3



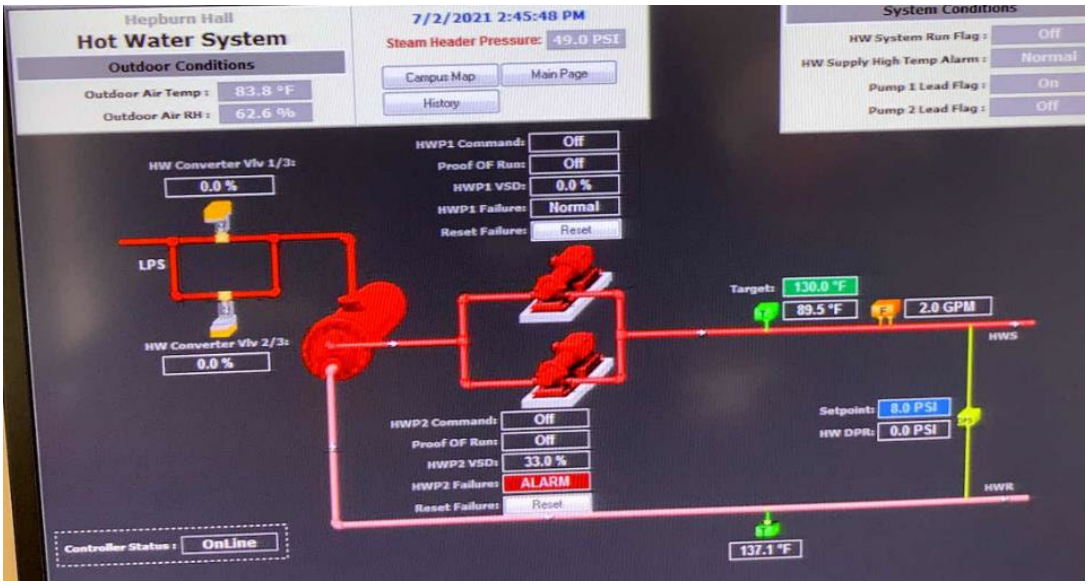
AC-2 & AC-3

2.6 Steam Heating Systems

Steam is supplied by boilers located in the central plant. Steam is used in this building to provide heat and to produce space heating water through a steam to hot water heat exchanger (HX). There are four, 0.5 hp constant speed condensate pumps. Steam is supplied directly to steam coils in the air handling units. Heating hot water is distributed to fan coil units and hydronic baseboards using two hot water pumps (HWP-1 & 2). The heat exchanger and the hot water pumps are located at the central plant. The hydronic distribution system is a two-pipe, heating-only system. The hot water supply temperature is controlled to maintain 160°F when the outside temperature is below 60°F, and this setpoint is reset to 180°F when the outside temperature is below 20°F. The hot water distribution system is controlled by the building management system (EMS).

Energy use associated with producing steam was allocated to individual buildings served by the central plant boilers. Please see the central plant report for details regarding the steam system.

Condensate Pumps



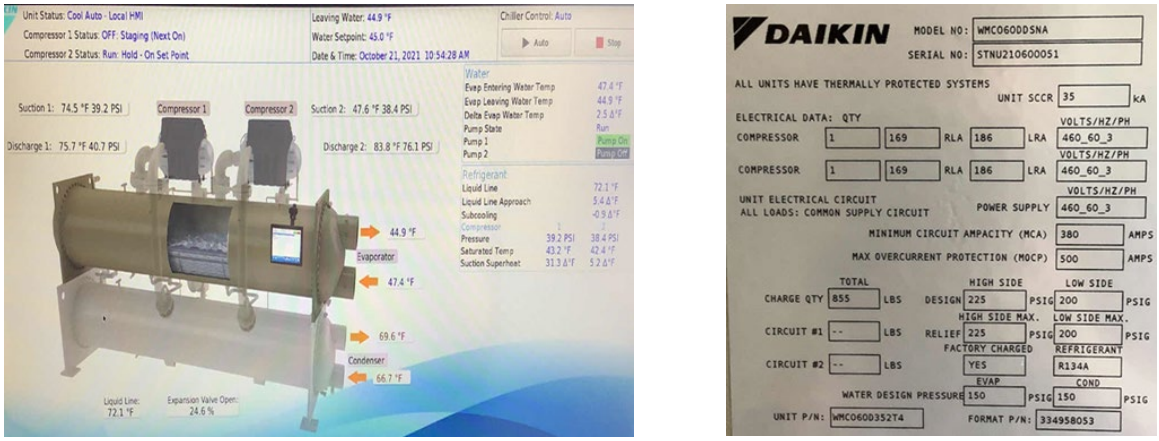
EMS Screenshot - Hot Water System

2.7 Chilled Water Systems

This building, along with Karnoutsos Hall, receives chilled water produced by a 370-ton water-cooled Daikin centrifugal chiller located at the central plant. The chiller is new and uses direct drive technology, integral variable drives, and R134a refrigerant. Chilled water is distributed to AHUs using a 50 hp variable flow pump, CHWP-1H, located at the central plant.

The chilled water setpoint is 45°F. At the time of the audit, the chiller leaving water temperature was 44.9°F while the return water temperature was 47.4°F. The chilled water distribution system is two-pipe, cooling-only. The chilled water system is controlled by the building management system (EMS).

Please see the central plant report for additional details regarding this chiller and the condenser water system.



Daikin Magnetic Bearing Centrifugal Chiller

2.8 Building Energy Management Systems (EMS)

An Andover Triumph building EMS controls the HVAC equipment, chillers, and air handlers. The EMS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, humidity, heating water loop temperatures, and chilled water loop temperatures.

EMS Screenshot - Main Page

2.9 Domestic Hot Water

Hot water is produced by a heat exchanger using steam from the space heating boiler and stored in a 300-gallon tank located at the central plant.

Please see the central plant report for additional details regarding this domestic hot water system.

2.10 Plug Load and Vending Machines

There are 261 computer workstations throughout the facility. Plug loads include general café and office equipment.

There are four residential-style refrigerators throughout the building. There are also typical office loads such as copiers, small printers, televisions, microwaves, coffee machines, and mini fridges. The building plug load equipment accounts for approximately 6% of the building's total electric consumption.

There are two refrigerated vending machines and two non-refrigerated vending machines located in the first-floor hallway and second floor elevator lobby. They are not equipped with a control sensor.

Copier & Residential Style Refrigerator

Vending Machines

2.11 Water-Using Systems

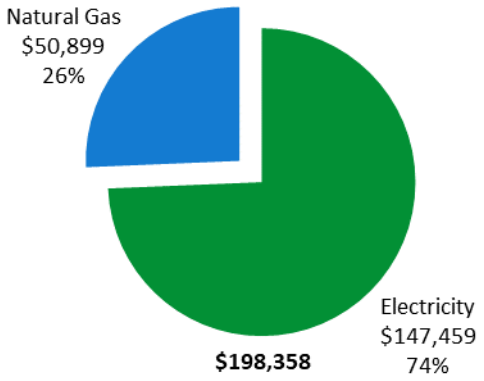
Most of the restrooms have low-flow devices except two restrooms that have faucets that are rated at 2.2 gallons per minute (gpm).

Low & High Flow Sinks

3 Energy Use and Costs

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

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	1,325,485 kWh	$147,459
Natural Gas	76,628 Therms	$50,899
Total		**$198,358**



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

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

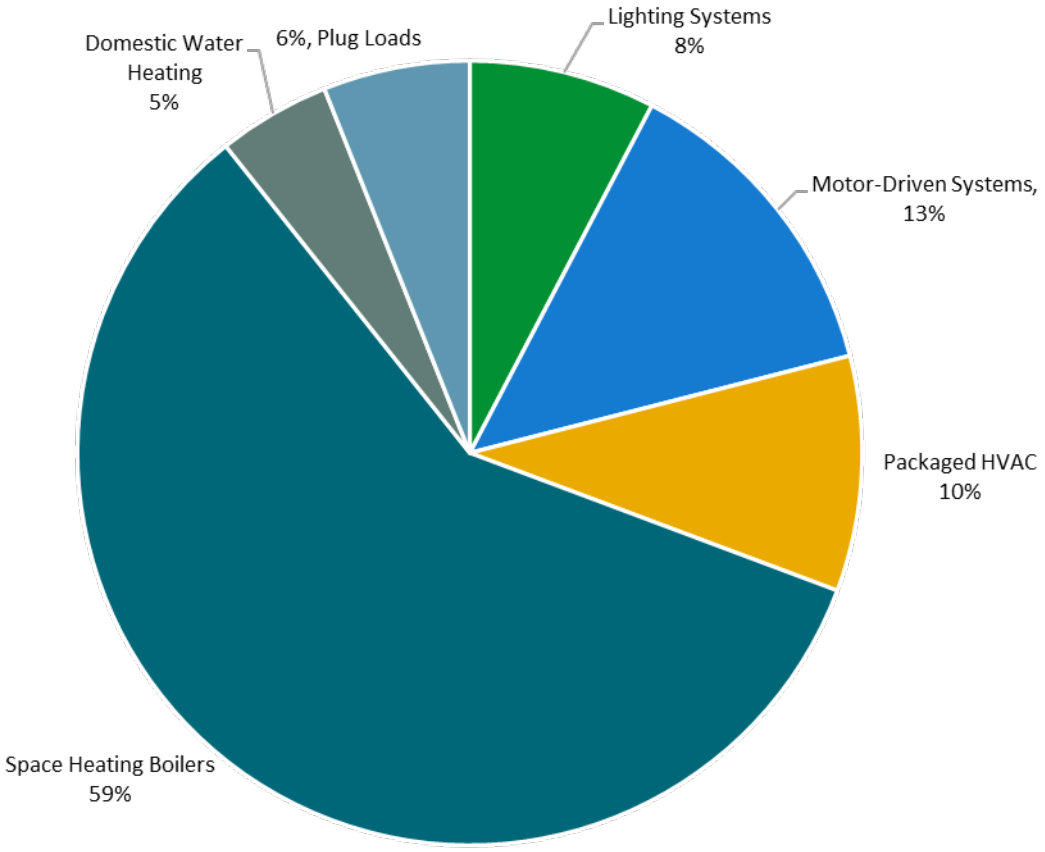
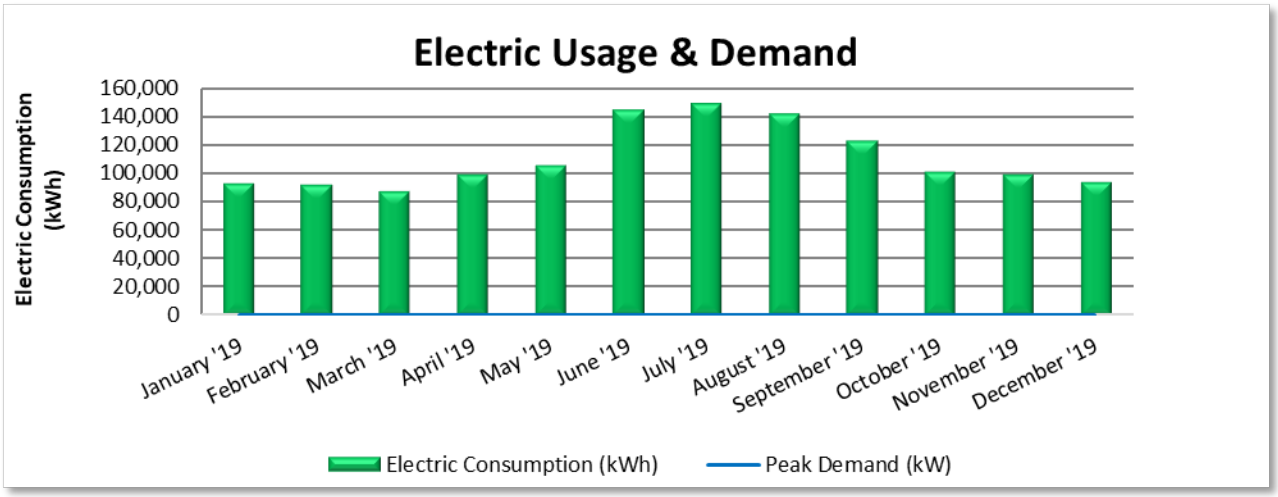


Figure 4 - Energy Balance

3.1 Electricity

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



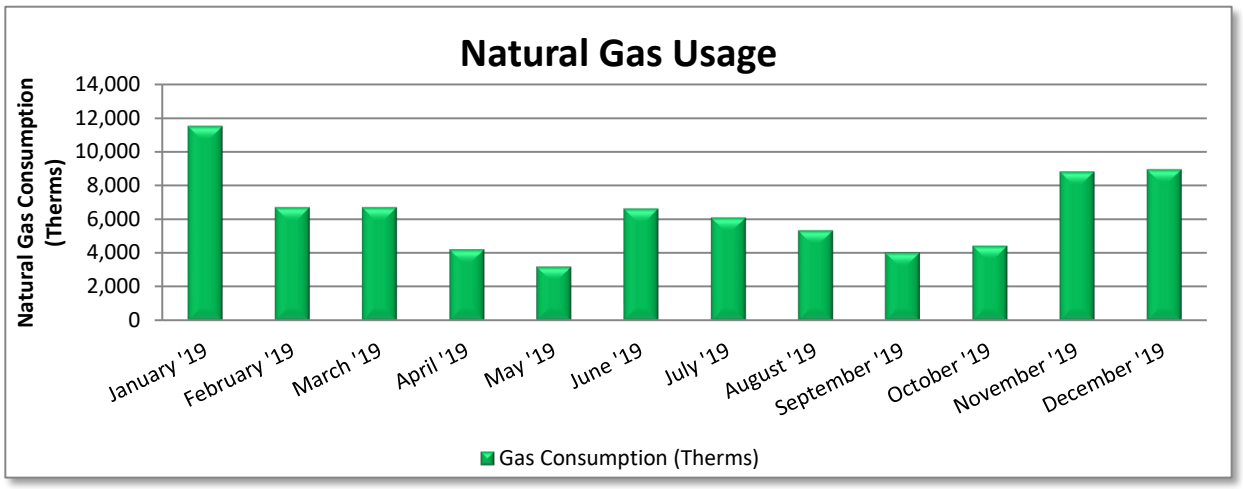
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
2/12/19	29	92,759	0	$0	$9,180
3/14/19	30	91,818	0	$0	$9,075
4/12/19	29	87,288	0	$0	$8,638
5/14/19	32	98,530	0	$0	$10,097
6/13/19	30	105,236	0	$0	$13,293
7/15/19	32	144,017	0	$0	$17,733
8/13/19	29	148,847	0	$0	$18,696
9/12/19	30	141,196	0	$0	$17,615
10/11/19	29	122,536	0	$0	$12,780
11/11/19	31	101,184	0	$0	$10,491
12/12/19	31	98,736	0	$0	$10,224
1/14/20	33	93,338	0	$0	$9,637
Totals	**365**	**1,325,485**	**0**	**$0**	**$147,459**
Annual	**365**	**1,325,485**	**0**	**$0**	**$147,459**

Notes:

- Electric data has been estimated based on a campus wide approach and utilization of the Central plant metered data.
- The peak demand for this facility was unavailable because the building is served with electricity from the Central plant master meter.
- The average purchased electric cost over the past 12 months was $0.111/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

PSE&G delivers natural gas under rate class Large Volume Gas (LVG), with natural gas supply provided by Direct Energy, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
2/12/19	29	11,513	$8,249
3/14/19	30	6,702	$5,600
4/12/19	29	6,702	$3,664
5/14/19	32	4,230	$2,318
6/13/19	30	3,192	$1,753
7/15/19	32	6,627	$3,614
8/13/19	29	6,098	$3,316
9/12/19	30	5,338	$2,910
10/11/19	29	4,030	$2,209
11/11/19	31	4,428	$3,929
12/12/19	31	8,817	$6,641
1/14/20	33	8,951	$6,696
Totals	**365**	**76,628**	**$50,899**
Annual	**365**	**76,628**	**$50,899**

Notes:

• Natural gas data for steam production has been estimated based on a campus wide approach, allocated to the buildings that receive steam.

• The utility graph above comprises an estimate of total building gas use.

• The average gas cost for the past 12 months is $0.664 therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**N/A**

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

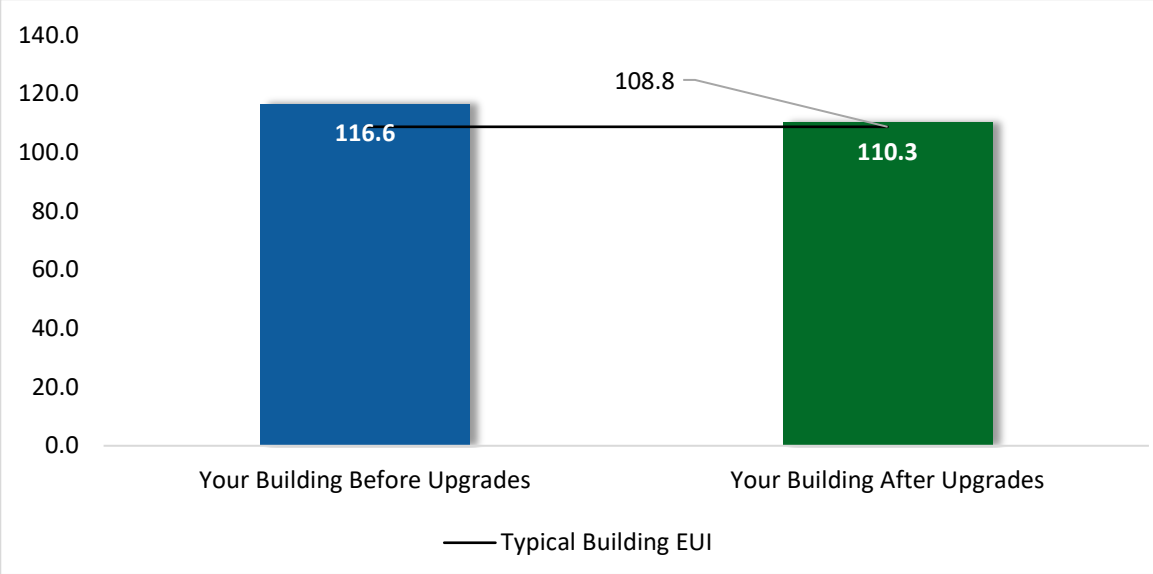


Figure 5 - Energy Use Intensity Comparison[3]

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

4 Energy Conservation Measures

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

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

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

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**148,704**	**29.9**	**-31**	**$16,339**	**$69,819**	**$9,108**	**$60,711**	**3.7**	**146,151**
ECM 1	Install LED Fixtures	Yes	1,879	0.0	0	$209	$1,037	$150	$887	4.2	1,892
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	13,351	2.9	-3	$1,467	$6,195	$948	$5,247	3.6	13,118
ECM 3	Retrofit Fixtures with LED Lamps	Yes	133,473	26.9	-28	$14,663	$62,587	$8,010	$54,577	3.7	131,141
Lighting Control Measures			**15,134**	**2.8**	**-3**	**$1,663**	**$15,517**	**$3,215**	**$12,302**	**7.4**	**14,869**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	13,805	2.6	-3	$1,517	$13,042	$1,505	$11,537	7.6	13,564
ECM 5	Install High/Low Lighting Controls	Yes	1,328	0.2	0	$146	$2,475	$1,710	$765	5.2	1,305
Motor Upgrades			**6,092**	**1.2**	**0**	**$678**	**$11,396**	**$0**	**$11,396**	**16.8**	**6,135**
ECM 6	Premium Efficiency Motors	No	6,092	1.2	0	$678	$11,396	$0	$11,396	16.8	6,135
Variable Frequency Drive (VFD) Measures			**24,248**	**5.3**	**0**	**$2,698**	**$27,464**	**$975**	**$26,489**	**9.8**	**24,418**
ECM 7	Install VFDs on Constant Volume (CV) Fans	Yes	24,248	5.3	0	$2,698	$27,464	$975	$26,489	9.8	24,418
Unitary HVAC Measures			**5,621**	**2.3**	**0**	**$625**	**$20,369**	**$1,093**	**$19,276**	**30.8**	**5,660**
ECM 8	Install High Efficiency Air Conditioning Units	No	5,621	2.3	0	$625	$20,369	$1,093	$19,276	30.8	5,660
Domestic Water Heating Upgrade			**0**	**0.0**	**4**	**$25**	**$29**	**$14**	**$14**	**0.6**	**444**
ECM 9	Install Low-Flow DHW Devices	Yes	0	0.0	4	$25	$29	$14	$14	0.6	444
Food Service & Refrigeration Measures			**2,821**	**0.3**	**0**	**$314**	**$460**	**$100**	**$360**	**1.1**	**2,840**
ECM 10	Vending Machine Control	Yes	2,821	0.3	0	$314	$460	$100	$360	1.1	2,840
TOTALS			**202,619**	**41.8**	**-30**	**$22,342**	**$145,054**	**$14,505**	**$130,549**	**5.8**	**200,517**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**148,704**	**29.9**	**-31**	**$16,339**	**$69,819**	**$9,108**	**$60,711**	**3.7**	**146,151**
ECM 1	Install LED Fixtures	1,879	0.0	0	$209	$1,037	$150	$887	4.2	1,892
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	13,351	2.9	-3	$1,467	$6,195	$948	$5,247	3.6	13,118
ECM 3	Retrofit Fixtures with LED Lamps	133,473	26.9	-28	$14,663	$62,587	$8,010	$54,577	3.7	131,141
Lighting Control Measures		**15,134**	**2.8**	**-3**	**$1,663**	**$15,517**	**$3,215**	**$12,302**	**7.4**	**14,869**
ECM 4	Install Occupancy Sensor Lighting Controls	13,805	2.6	-3	$1,517	$13,042	$1,505	$11,537	7.6	13,564
ECM 5	Install High/Low Lighting Controls	1,328	0.2	0	$146	$2,475	$1,710	$765	5.2	1,305
Variable Frequency Drive (VFD) Measures		**24,248**	**5.3**	**0**	**$2,698**	**$27,464**	**$975**	**$26,489**	**9.8**	**24,418**
ECM 7	Install VFDs on Constant Volume (CV) Fans	24,248	5.3	0	$2,698	$27,464	$975	$26,489	9.8	24,418
Domestic Water Heating Upgrade		**0**	**0.0**	**4**	**$25**	**$29**	**$14**	**$14**	**0.6**	**444**
ECM 9	Install Low-Flow DHW Devices	0	0.0	4	$25	$29	$14	$14	0.6	444
Food Service & Refrigeration Measures		**2,821**	**0.3**	**0**	**$314**	**$460**	**$100**	**$360**	**1.1**	**2,840**
ECM 10	Vending Machine Control	2,821	0.3	0	$314	$460	$100	$360	1.1	2,840
TOTALS		**190,906**	**38.3**	**-30**	**$21,039**	**$113,289**	**$13,412**	**$99,876**	**4.7**	**188,722**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**148,704**	**29.9**	**-31**	**$16,339**	**$69,819**	**$9,108**	**$60,711**	**3.7**	**146,151**
ECM 1	Install LED Fixtures	1,879	0.0	0	$209	$1,037	$150	$887	4.2	1,892
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	13,351	2.9	-3	$1,467	$6,195	$948	$5,247	3.6	13,118
ECM 3	Retrofit Fixtures with LED Lamps	133,473	26.9	-28	$14,663	$62,587	$8,010	$54,577	3.7	131,141

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

ECM 1: Install LED Fixtures

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

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

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

Affected Building Areas: exterior HPS fixtures.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected Building Areas: all interior areas with fluorescent fixtures with T12 tubes.

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent T5 and T8, CFL and incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies. Be sure to specify replacement lamps that are compatible with existing dimming controls, where applicable. In some circumstances, you may need to upgrade your dimming system for optimum performance.

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

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

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**15,134**	**2.8**	**-3**	**$1,663**	**$15,517**	**$3,215**	**$12,302**	**7.4**	**14,869**
ECM 4	Install Occupancy Sensor Lighting Controls	13,805	2.6	-3	$1,517	$13,042	$1,505	$11,537	7.6	13,564
ECM 5	Install High/Low Lighting Controls	1,328	0.2	0	$146	$2,475	$1,710	$765	5.2	1,305

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected Building Areas: offices, conference rooms, restrooms, and storage rooms.

ECM 5: Install High/Low Lighting Controls

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

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

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

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

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

Affected Building Areas: hallways, stairwells, and lobbies.

4.3 Motors

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**6,092**	**1.2**	**0**	**$678**	**$11,396**	**$0**	**$11,396**	**16.8**	**6,135**
ECM 6	Premium Efficiency Motors	6,092	1.2	0	$678	$11,396	$0	$11,396	16.8	6,135

ECM 6: Premium Efficiency Motors

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

Affected Motors: AHU-1

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

4.4 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**24,248**	**5.3**	**0**	**$2,698**	**$27,464**	**$975**	**$26,489**	**9.8**	**24,418**
ECM 7	Install VFDs on Constant Volume (CV) Fans	24,248	5.3	0	$2,698	$27,464	$975	$26,489	9.8	24,418

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

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

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

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

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

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

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

Note: we recommend you assess this measure in the context of implementing ECM-8, which evaluates replacing some of these air handling units.

Affected Air Handlers: AHUs labeled as “AC.”

4.5 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**5,621**	**2.3**	**0**	**$625**	**$20,369**	**$1,093**	**$19,276**	**30.8**	**5,660**
ECM 8	Install High Efficiency Air Conditioning Units	5,621	2.3	0	$625	$20,369	$1,093	$19,276	30.8	5,660

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

ECM 8: Install High Efficiency Air Conditioning Units

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

Affected Units: AC-4 and AC-5 condensing units and an indoor Carrier packaged unit.

4.6 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**4**	**$25**	**$29**	**$14**	**$14**	**0.6**	**444**
ECM 9	Install Low-Flow DHW Devices	0	0.0	4	$25	$29	$14	$14	0.6	444

ECM 9: Install Low-Flow DHW Devices

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

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm

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

4.7 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**2,821**	**0.3**	**0**	**$314**	**$460**	**$100**	**$360**	**1.1**	**2,840**
ECM 10	Vending Machine Control	2,821	0.3	0	$314	$460	$100	$360	1.1	2,840

ECM 10: Vending Machine Control

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

5 Energy Efficient Best Practices

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

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

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

Energy Tracking with ENERGY STAR® Portfolio Manager®

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

Weatherization

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

Doors and Windows

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

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

Lighting Maintenance

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

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

Lighting Controls

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

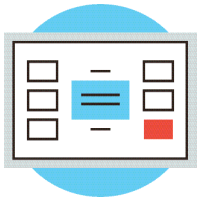
Motor Maintenance

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

Fans to Reduce Cooling Load

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

Thermostat Schedules and Temperature Resets



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

Chiller Maintenance

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

Ductwork Maintenance

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

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

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

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

Steam Trap Repair and Replacement

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

Label HVAC Equipment

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

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

Optimize HVAC Equipment Schedules

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

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

Water Conservation

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

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

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water

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

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

use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

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

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

Procurement Strategies

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

6 On-site Generation

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

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

6.1 Solar Photovoltaic

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

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

This facility does not appear to meet the minimum criteria for a cost-effective solar PV installation. To be cost-effective, a solar PV array needs certain minimum criteria, such as sufficient and sustained electric demand and sufficient flat or south-facing rooftop or other unshaded space on which to place the PV panels.

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

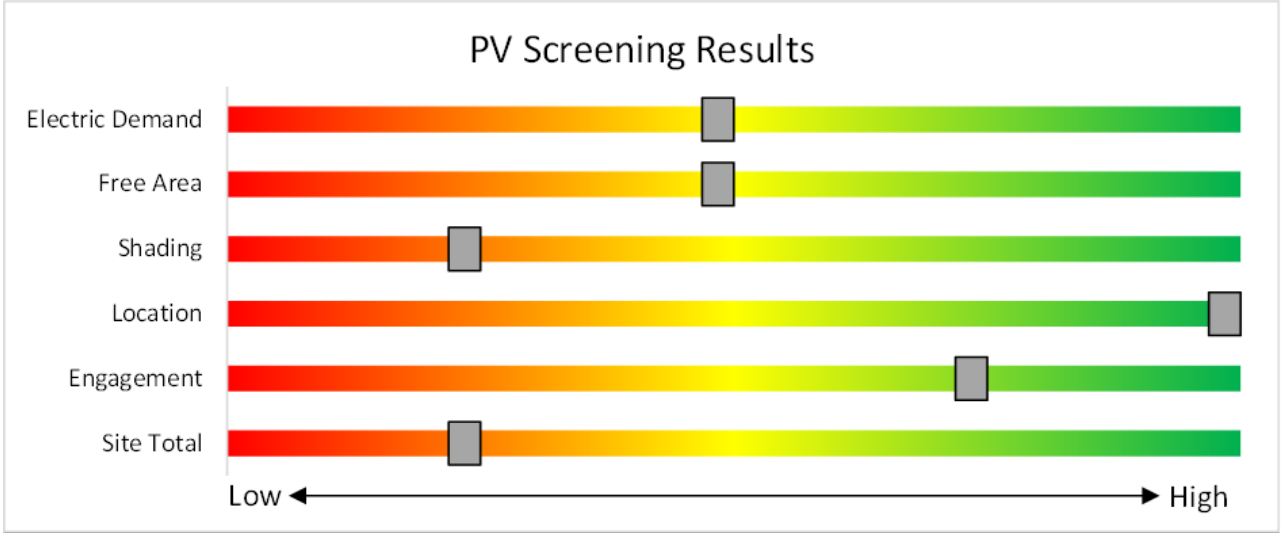


Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

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

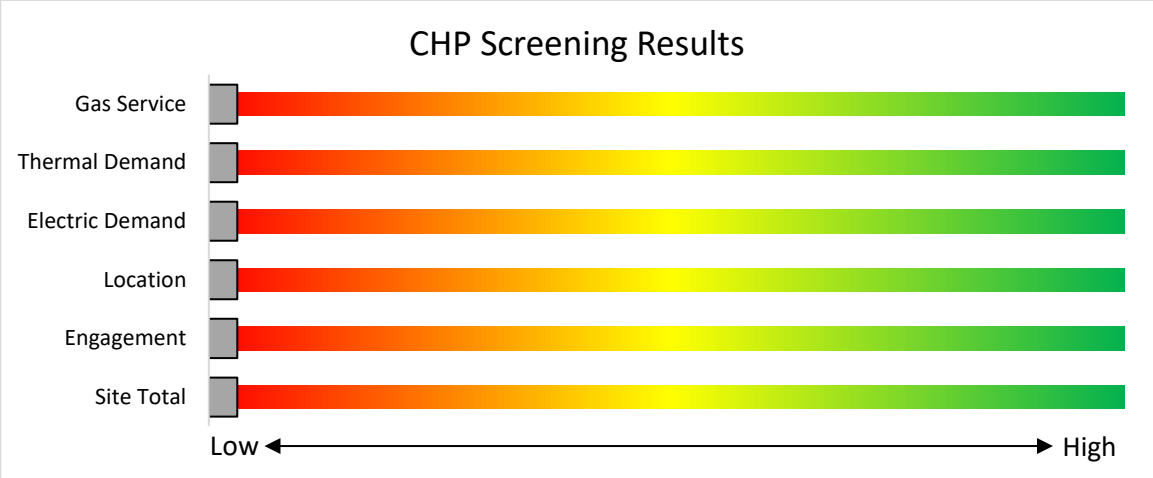


Figure 9 - Combined Heat and Power Screening

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

7 PROJECT FUNDING AND INCENTIVES

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

7.1 Utility Energy Efficiency Programs

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

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

https://www.njcleanenergy.com/transition

8 New Jersey's Clean Energy Programs

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

8.1 Large Energy Users

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

Incentives

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

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

How to Participate

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

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

8.2 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

8.3 Successor Solar Incentive Program (SuSI)

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

Administratively Determined Incentive (ADI) Program

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

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

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

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

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

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

Competitive Solar Incentive Program

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

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

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

8.4 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

9 PROJECT DEVELOPMENT

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

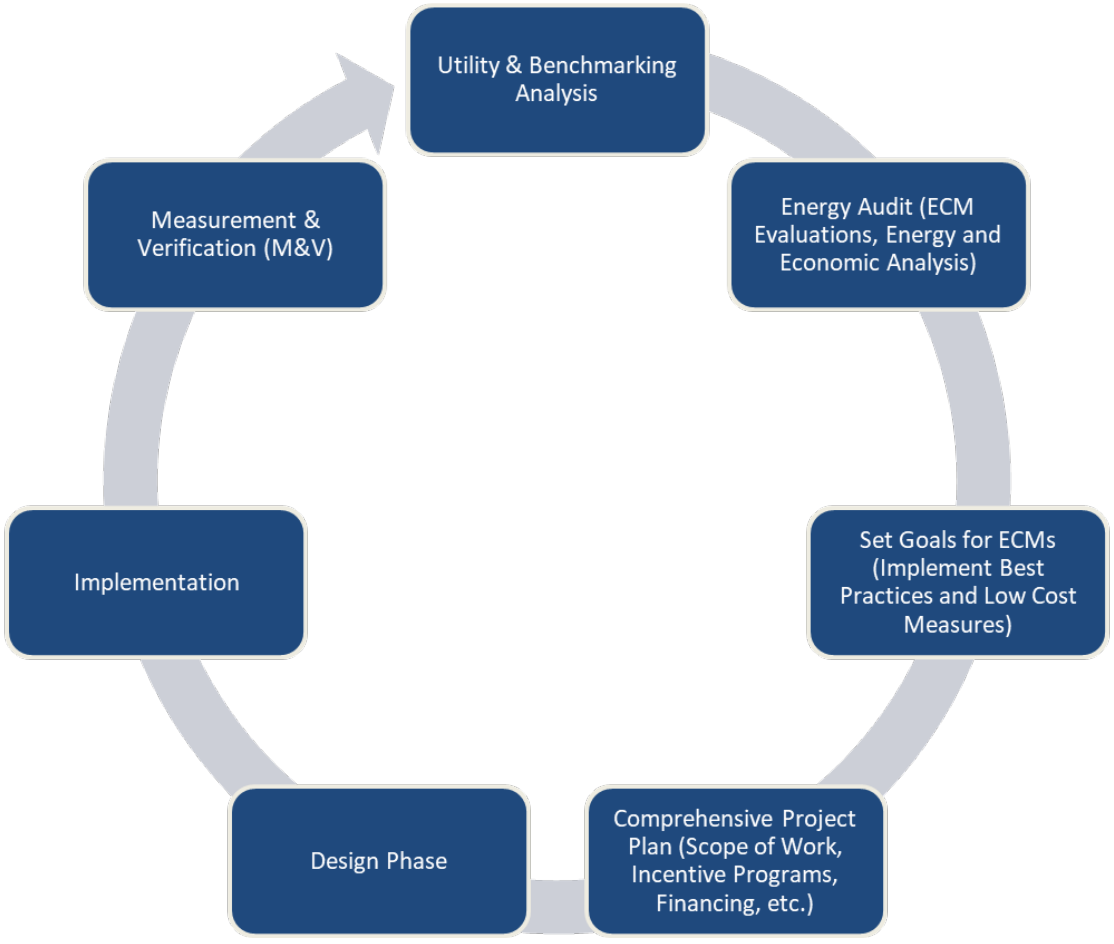


Figure 10 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

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

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

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

10.2 Retail Natural Gas Supply Options

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

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

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

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
1st Floor Elevator Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Elevator Lobby	3	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	3	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	269	0	$30	$160	$18	4.8
1st Floor Hallway	1	Compact Fluorescent: (1) 32W G25 Screw-In Lamp	Occupancy Sensor	S	32	3,014	3	Relamp	No	1	LED Lamps: G25 Lamps	Occupancy Sensor	23	3,014	0.0	30	0	$3	$25	$2	7.1
1st Floor Hallway	9	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	9	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
1st Floor Hallway	51	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	51	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	1.0	4,565	-1	$502	$2,717	$306	4.8
2nd Floor Electrical Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,600	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,794	0.1	360	0	$40	$380	$65	7.9
2nd Floor Elevator Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
2nd Floor Elevator Lobby	3	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	3	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	269	0	$30	$160	$18	4.8
2nd Floor Hallway	6	Compact Fluorescent: (1) 32W G25 Screw-In Lamp	Occupancy Sensor	S	32	3,014	3	Relamp	No	6	LED Lamps: G25 Lamps	Occupancy Sensor	23	3,014	0.0	179	0	$20	$151	$12	7.1
2nd Floor Hallway	9	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	9	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
2nd Floor Hallway	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Occupancy Sensor	S	20	3,014		None	No	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Occupancy Sensor	20	3,014	0.0	0	0	$0	$0	$0	0.0
2nd Floor Hallway	48	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	48	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.9	4,297	-1	$472	$2,557	$288	4.8
2nd Floor Men Restroom	7	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	7	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	627	0	$69	$373	$42	4.8
2nd Floor Women Restroom	7	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	7	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	627	0	$69	$373	$42	4.8
Room 326A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 326B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 326C	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
3rd Floor Elevator Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
3rd Floor Elevator Lobby	3	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	3	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	269	0	$30	$160	$18	4.8
3rd Floor Hallway	5	Compact Fluorescent: (1) 32W G25 Screw-In Lamp	Occupancy Sensor	S	32	3,014	3	Relamp	No	5	LED Lamps: G25 Lamps	Occupancy Sensor	23	3,014	0.0	149	0	$16	$126	$10	7.1
3rd Floor 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	0.0	0	0	$0	$0	$0	0.0
3rd Floor Hallway	58	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	58	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	1.1	5,192	-1	$570	$3,089	$348	4.8
3rd Floor Hallway	15	Linear Fluorescent - T5HO: 4' T5HO (54W) - 1L	Occupancy Sensor	S	62	3,014	3	Relamp	No	15	LED - Linear Tubes: (1) 4' T5HO (25W) Lamp	Occupancy Sensor	26	3,014	0.4	1,815	0	$199	$492	$75	2.1
3rd Floor Men Restroom	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
3rd Floor Women Restroom	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Back Stage	3	Compact Fluorescent: (2) 23W A19 Screw-In Lamps	Wall Switch	S	46	3,822	3, 4	Relamp	Yes	3	LED Lamps: A19 Lamps	Occupancy Sensor	33	2,637	0.1	293	0	$32	$103	$6	3.0
Back Stage	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Back Stage	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Wall Switch	S	52	3,822	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	2,637	0.2	877	0	$96	$590	$71	5.4
Basement Electrical Room	1	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	2,600	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,600	0.0	123	0	$14	$69	$10	4.4
Basement Electrical Room	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,600	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	2,600	0.1	246	0	$27	$129	$20	4.0
Break Room	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Catwalk	5	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	3,822	2	Relamp & Reballast	No	5	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	3,822	0.3	1,808	0	$199	$643	$100	2.7
Catwalk Auditorium	5	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	3,822	3	Relamp	No	5	LED Lamps: A19 Lamps	Wall Switch	9	3,822	0.2	1,072	0	$118	$86	$5	0.7
Catwalk Auditorium	2	Linear Fluorescent - EST12: 4' T12 (34W) - 4L	Wall Switch	S	144	3,822	2	Relamp & Reballast	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,822	0.1	723	0	$79	$237	$40	2.5
Classroom	15	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	15	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.3	1,343	0	$148	$799	$90	4.8
Classroom 2	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Classroom 2	20	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	20	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.4	1,790	0	$197	$1,065	$120	4.8
Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,040	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,040	0.0	64	0	$7	$73	$20	7.5
Conference Room 207	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Conference Room 312	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	716	0	$79	$426	$48	4.8
Corridor 144	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 5	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,637	0.2	933	0	$103	$444	$165	2.7
Corridor Exit	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	2,512	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	2,512	0.1	298	0	$33	$213	$24	5.8
Custom Room	1	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	S	25	3,822	2, 4	Relamp & Reballast	Yes	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	2,637	0.0	80	0	$9	$49	$3	5.1
Custom Room	3	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	3,822	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	656	0	$72	$476	$65	5.7
Custom Room	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	3,822	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	2,637	0.2	911	0	$100	$373	$60	3.1
Dressing Room 228	1	Compact Fluorescent: (2) 23W A19 Screw-In Lamps	Wall Switch	S	46	3,822	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	33	3,822	0.0	55	0	$6	$34	$2	5.4
Dressing Room 228	2	Incandescent: (1) 25W A21 Screw-In Lamp	Wall Switch	S	25	3,822	3, 4	Relamp	Yes	2	LED Lamps: A21 Lamps	Occupancy Sensor	4	2,637	0.0	187	0	$21	$186	$22	8.0
Dressing Room 230	3	Compact Fluorescent: (2) 23W A19 Screw-In Lamps	Wall Switch	S	46	3,822	3, 4	Relamp	Yes	3	LED Lamps: A19 Lamps	Occupancy Sensor	33	2,637	0.1	293	0	$32	$219	$26	6.0
Dressing Room 230	38	Incandescent: (1) 25W A21 Screw-In Lamp	Wall Switch	S	25	3,822	3, 4	Relamp	Yes	38	LED Lamps: A21 Lamps	Occupancy Sensor	4	2,637	0.6	3,553	-1	$390	$2,147	$143	5.1
Elevator Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,822	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,822	0.0	74	0	$8	$18	$5	1.6

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Elevator Closet 2nd Floor	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,822	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,822	0.0	74	0	$8	$18	$5	1.6
Exterior Main Entrance	1	Compact Fluorescent: (1) 14W A19 Screw-In Lamp	Wall Switch		14	3,822	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	10	3,822	0.0	15	0	$2	$17	$1	9.5
Exterior Main Entrance	4	LED - Fixtures: Downlight Recessed	Timeclock		11	4,380		None	No	4	LED - Fixtures: Downlight Recessed	Timeclock	11	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Recessed	1	Compact Fluorescent: (2) 26W A19 Screw-In Lamps	Photocell		52	4,380	3	Relamp	No	1	LED Lamps: A19 Lamps	Photocell	37	4,380	0.0	66	0	$7	$34	$2	4.4
Exterior Walkway Lights	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock		10	4,380		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Timeclock	10	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Walkway Lights	2	LED Lamps: (1) 45W A23 Screw-In Lamp	Timeclock		45	4,380		None	No	2	LED Lamps: (1) 45W A23 Screw-In Lamp	Timeclock	45	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wallpack	3	High-Pressure Sodium: (1) 150W Lamp	Photocell		188	4,380	1	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	45	4,380	0.0	1,879	0	$209	$1,037	$150	4.2
Exterior Wallpack	3	LED - Fixtures: Wall Pack	Timeclock		45	4,380		None	No	3	LED - Fixtures: Wall Pack	Timeclock	45	4,380	0.0	0	0	$0	$0	$0	0.0
Hallway Mail Services	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Hallway Mail Services	14	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	14	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.3	1,253	0	$138	$746	$84	4.8
Hallway Room D112	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Hallway Room D112	11	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	11	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	985	0	$108	$586	$66	4.8
Housekeeping	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,822		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,822	0.0	0	0	$0	$0	$0	0.0
Janitorial	1	Linear Fluorescent - EST12: 4' T12 (34W) - 1L	Wall Switch	S	43	1,300	2	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,300	0.0	41	0	$4	$51	$5	10.2
Janitorial	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,300	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,300	0.0	25	0	$3	$18	$5	4.8
Janitorial	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	1,300	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	1,300	0.0	25	0	$3	$18	$5	4.8
Main Entrance	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,822	5	None	Yes	1	LED Lamps: (1) 10W A19 Screw-In Lamp	High/Low Control	10	2,637	0.0	13	0	$1	$0	$0	0.0
Main Entrance	4	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	S	32	3,822	3, 5	Relamp	Yes	4	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,637	0.1	370	0	$41	$298	$160	3.4
Main Entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,637	0.1	353	0	$39	$73	$20	1.4
Maintenance Shop Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.3	1,866	0	$205	$708	$120	2.9
Mechanical Room 305	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,014	0.1	438	0	$48	$146	$40	2.2
Mechanical Room 321	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,822	0.1	694	0	$76	$183	$50	1.7
Men's Restroom	7	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	7	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	627	0	$69	$373	$42	4.8
Men's Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	353	0	$39	$343	$20	8.3
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.1	622	0	$68	$262	$60	3.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office	4	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	S	15	3,822	4	None	Yes	4	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,637	0.0	76	0	$8	$116	$20	11.6
Office	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Wall Switch	S	52	3,822	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	2,637	0.1	584	0	$64	$483	$59	6.6
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	353	0	$39	$189	$40	3.8
Office	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,637	0.1	330	0	$36	$261	$40	6.1
Office	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,637	0.1	330	0	$36	$261	$40	6.1
Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.1	622	0	$68	$262	$60	3.0
Office	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,637	0.1	330	0	$36	$261	$40	6.1
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.2	1,244	0	$137	$562	$115	3.3
Office	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,637	0.1	330	0	$36	$261	$40	6.1
Office	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	3,014	3	Relamp	No	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,014	0.1	481	0	$53	$362	$50	5.9
Office	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	S	62	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,014	0.2	769	0	$84	$580	$80	5.9
Office 232	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.1	622	0	$68	$262	$60	3.0
Penthouse	3	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	3,822	2, 4	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	656	0	$72	$476	$65	5.7
Restroom	2	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	3,822	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	437	0	$48	$408	$55	7.3
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,822	0.0	139	0	$15	$37	$10	1.7
Restroom	1	Compact Fluorescent: (2) 23W A19 Screw-In Lamps	Wall Switch	S	46	3,822	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	33	3,822	0.0	55	0	$6	$34	$2	5.4
Restroom	1	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	1	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	90	0	$10	$53	$6	4.8
Restroom	1	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	1	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	90	0	$10	$53	$6	4.8
Room 101	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 102A	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 102B	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 102C	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 104	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 105	3	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	3	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	269	0	$30	$160	$18	4.8
Room 105A	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Room 105B	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 105D	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	716	0	$79	$426	$48	4.8
Room 105E	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 105F	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 105G	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 105H	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 106	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 106	36	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	36	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.7	3,222	-1	$354	$1,918	$216	4.8
Room 106 File Room	5	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	5	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	448	0	$49	$266	$30	4.8
Room 106A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 106B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 106C	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 106D	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 106E	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 106F	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 106H	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	716	0	$79	$426	$48	4.8
Room 106I	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 108	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 108	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 108B	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 108C	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 108C	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 108D	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 108F	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 108G	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8

Location	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Room 108H	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 108I	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 111	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 111	27	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	27	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.5	2,417	-1	$266	$1,438	$162	4.8
Room 111 File Room	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 111A	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 111A	7	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	7	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	627	0	$69	$373	$42	4.8
Room 111B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 111C	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 112A	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 112A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	353	0	$39	$189	$40	3.8
Room 112D	2	Compact Fluorescent: (2) 13W G25 Screw-In Lamps	Occupancy Sensor	S	26	3,014	3	Relamp	No	2	LED Lamps: G25 Lamps	Occupancy Sensor	19	3,014	0.0	46	0	$5	$101	$8	18.2
Room 112D	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 112D	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 112E	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 112E	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 114	14	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	14	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.3	1,253	0	$138	$746	$84	4.8
Room 143 Locksmiths	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.2	1,244	0	$137	$562	$115	3.3
Room 145 Printing	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 145 Printing	28	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	28	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	1.5	8,709	-2	$957	$2,585	$630	2.0
Room 145 Printing	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,637	0.1	660	0	$72	$560	$75	6.7
Room 146	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.3	1,866	0	$205	$708	$155	2.7
Room 148	6	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	3,822	2, 4	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	2,637	0.5	2,732	-1	$300	$1,042	$155	3.0
Room 150	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,822	0.0	139	0	$15	$37	$10	1.7
Room 201	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.4	2,118	0	$233	$708	$155	2.4

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Room 206	12	Compact Fluorescent: (1) 14W A19 Screw-In Lamp	Wall Switch	S	14	3,822	3, 4	Relamp	Yes	12	LED Lamps: A19 Lamps	Occupancy Sensor	10	2,637	0.1	358	0	$39	$477	$47	10.9
Room 206	6	Compact Fluorescent: (1) 39W G25 Screw-In Lamp	Wall Switch	S	39	3,822	3, 4	Relamp	Yes	6	LED Lamps: G25 Lamps	Occupancy Sensor	28	2,637	0.1	496	0	$55	$421	$47	6.9
Room 206	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 206	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.2	1,059	0	$116	$489	$95	3.4
Room 207	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 207	38	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	38	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.7	3,402	-1	$374	$2,024	$228	4.8
Room 207 File Room	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 207 File Room	9	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	9	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	806	0	$89	$479	$54	4.8
Room 207A	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 207B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 207C	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 207D	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 207E	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 207F	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 207G	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 207G	3	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	3	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	269	0	$30	$160	$18	4.8
Room 213A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 214	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 214	44	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	44	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.9	3,939	-1	$433	$2,344	$264	4.8
Room 214A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 214B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 215	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 215	36	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	36	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.7	3,222	-1	$354	$1,918	$216	4.8
Room 215A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 216A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Room 216B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 222	2	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	3,822	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	437	0	$48	$254	$40	4.4
Room 303	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 303A	5	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	5	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	448	0	$49	$266	$30	4.8
Room 303B	3	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	3	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	269	0	$30	$160	$18	4.8
Room 303C	5	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	5	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	448	0	$49	$266	$30	4.8
Room 303D	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 306	9	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	9	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	806	0	$89	$479	$54	4.8
Room 306A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 308	8	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	32	3,014		None	No	8	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	32	3,014	0.0	0	0	$0	$0	$0	0.0
Room 308A	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	32	3,014		None	No	4	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	32	3,014	0.0	0	0	$0	$0	$0	0.0
Room 308B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 309	10	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	S	32	3,014		None	No	10	LED - Fixtures: Ambient 2x2 Fixture	Occupancy Sensor	32	3,014	0.0	0	0	$0	$0	$0	0.0
Room 309A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 309B	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	716	0	$79	$426	$48	4.8
Room 313	9	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Wall Switch	S	52	3,822	3, 4	Relamp	Yes	9	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	2,637	0.2	1,315	0	$144	$749	$89	4.6
Room 313A	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Wall Switch	S	52	3,822	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	2,637	0.2	1,169	0	$128	$696	$83	4.8
Room 314	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	716	0	$79	$426	$48	4.8
Room 314A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 314B	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 315	10	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	10	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	895	0	$98	$533	$60	4.8
Room 315A	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 315B	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 315C	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8
Room 315D	4	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	4	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	358	0	$39	$213	$24	4.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Room 315E	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 317	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 317	15	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	15	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.3	1,343	0	$148	$799	$90	4.8
Room 321	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	716	0	$79	$426	$48	4.8
Room 321A	2	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	2	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.0	179	0	$20	$107	$12	4.8
Room 321B	6	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	6	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	537	0	$59	$320	$36	4.8
Room 321C	3	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	3	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	269	0	$30	$160	$18	4.8
Room 323	3	LED Lamps: (12) 6W A15 Screw-In Lamps	Occupancy Sensor	S	72	3,014		None	No	3	LED Lamps: (12) 6W A15 Screw-In Lamps	Occupancy Sensor	72	3,014	0.0	0	0	$0	$0	$0	0.0
Room 323	20	LED - Fixtures: Display Case Lighting	Occupancy Sensor	S	13	3,014		None	No	20	LED - Fixtures: Display Case Lighting	Occupancy Sensor	13	3,014	0.0	0	0	$0	$0	$0	0.0
Room 326H	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room 326H	8	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	8	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.2	716	0	$79	$426	$48	4.8
Room H102	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Room H102	24	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	24	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.5	2,148	0	$236	$1,278	$144	4.8
Room H113	21	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	21	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.4	1,880	0	$207	$1,119	$126	4.8
Stage	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stage	4	Incandescent: (1) 1000W A23 Screw-In Lamp	Wall Switch	S	1,000	3,822	3	Relamp	No	4	LED Lamps: LED Lamp	Wall Switch	150	3,822	2.4	14,294	-3	$1,570	$141	$4	0.1
Stage	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,822		None	No	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,822	0.0	0	0	$0	$0	$0	0.0
Stage	8	LED - Fixtures: Decorative: Other	Wall Switch	S	45	3,822		None	No	8	LED - Fixtures: Decorative: Other	Wall Switch	45	3,822	0.0	0	0	$0	$0	$0	0.0
Stairs Mail room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Stairs Mail room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None		62	3,640	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,512	0.1	673	0	$74	$371	$180	2.6
Stairs North	11	LED - Fixtures: Downlight Recessed	None		10	3,640	5	None	Yes	11	LED - Fixtures: Downlight Recessed	High/Low Control	10	2,512	0.0	137	0	$15	$450	$385	4.3
Stairs South	10	LED - Fixtures: Downlight Recessed	None		10	3,640	5	None	Yes	10	LED - Fixtures: Downlight Recessed	High/Low Control	10	2,512	0.0	124	0	$14	$450	$350	7.3
Stairs Stage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	3,822	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,822	0.0	139	0	$15	$37	$10	1.7
Stairs West	2	LED - Fixtures: Downlight Recessed	None		13	3,640	5	None	Yes	2	LED - Fixtures: Downlight Recessed	High/Low Control	13	2,512	0.0	32	0	$4	$225	$70	43.7
Stairs West	10	LED - Fixtures: Downlight Recessed	None		10	3,640	5	None	Yes	10	LED - Fixtures: Downlight Recessed	High/Low Control	10	2,512	0.0	124	0	$14	$225	$225	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Stairs West 2	2	LED - Fixtures: Downlight Recessed	None		13	8,760	5	None	Yes	2	LED - Fixtures: Downlight Recessed	High/Low Control	13	6,044	0.0	78	0	$9	$225	$70	18.2
Stairs West 2	10	LED - Fixtures: Downlight Recessed	None		10	8,760	5	None	Yes	10	LED - Fixtures: Downlight Recessed	High/Low Control	10	6,044	0.0	299	0	$33	$225	$225	0.0
Storage	2	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	1,300	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	897	0.1	149	0	$16	$254	$20	14.3
Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,300	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	897	0.1	240	0	$26	$416	$40	14.3
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,300	3, 4	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	897	0.1	120	0	$13	$189	$20	12.8
Storage Room	8	Linear Fluorescent - EST12: 4' T12 (34W) - 4L	Wall Switch	S	144	1,300	2, 4	Relamp & Reballast	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	897	0.6	1,190	0	$131	$1,217	$160	8.1
Storage Room	1	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	1,040	3	Relamp	No	1	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	1,040	0.0	31	0	$3	$53	$6	13.9
Storage Room 231	4	Compact Fluorescent: (2) 23W A19 Screw-In Lamps	Wall Switch	S	46	1,300	3, 4	Relamp	Yes	4	LED Lamps: A19 Lamps	Occupancy Sensor	33	897	0.1	133	0	$15	$254	$8	16.8
Storage Stage	6	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	1,300	2, 4	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	897	0.5	929	0	$102	$1,042	$120	9.0
Telephone Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,822	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	706	0	$78	$416	$75	4.4
The Gothic Lounge	8	Compact Fluorescent: (4) 32W G25 Screw-In Lamps	Wall Switch	S	128	3,822	3, 4	Relamp	Yes	8	LED Lamps: G25 Lamps	Occupancy Sensor	90	2,637	0.4	2,216	0	$244	$1,077	$99	4.0
The Gothic Lounge	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
The Gothic Lounge	16	LED - Fixtures: Downlight Recessed	Wall Switch	S	17	3,822	4	None	Yes	16	LED - Fixtures: Downlight Recessed	Occupancy Sensor	17	2,637	0.1	354	0	$39	$540	$70	12.1
Theater	5	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Theater	29	LED Lamps: (1) 19W A21 Screw-In Lamp	Wall Switch	S	19	3,822	4	None	Yes	29	LED Lamps: (1) 19W A21 Screw-In Lamp	Occupancy Sensor	19	2,637	0.1	718	0	$79	$540	$70	6.0
Theater	39	LED Lamps: (1) 25W A21 Screw-In Lamp	Wall Switch	S	25	3,822	4	None	Yes	39	LED Lamps: (1) 25W A21 Screw-In Lamp	Occupancy Sensor	25	2,637	0.2	1,271	0	$140	$810	$105	5.1
Theater Lobby	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Theater Lobby	6	LED Lamps: (3) 10W A19 Screw-In Lamps	None		30	3,640	4	None	Yes	6	LED Lamps: (3) 10W A19 Screw-In Lamps	Occupancy Sensor	30	2,512	0.0	223	0	$25	$270	$35	9.6
Theater Lobby	1	LED - Linear Tubes: (1) 4' Lamp	None		15	3,640		None	No	1	LED - Linear Tubes: (1) 4' Lamp	None	15	3,640	0.0	0	0	$0	$0	$0	0.0
Tunnel	4	Incandescent: (1) 65W A21 Screw-In Lamp	Wall Switch	S	65	3,822	3, 4	Relamp	Yes	4	LED Lamps: A21 Lamps	Occupancy Sensor	10	2,637	0.2	977	0	$107	$411	$4	3.8
TV Room	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
TV Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	3,822	3, 4	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,637	0.4	2,488	-1	$273	$854	$195	2.4
Underneath Theater	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Underneath Theater	10	LED Lamps: (1) 25W A21 Screw-In Lamp	Wall Switch	S	25	3,822	4	None	Yes	10	LED Lamps: (1) 25W A21 Screw-In Lamp	Occupancy Sensor	25	2,637	0.1	326	0	$36	$270	$35	6.6
Women's Restroom	7	Linear Fluorescent - T5HO: 2' T5HO (24W) - 2L	Occupancy Sensor	S	52	3,014	3	Relamp	No	7	LED - Linear Tubes: (2) 2' T5HO (12W) Lamps	Occupancy Sensor	25	3,014	0.1	627	0	$69	$373	$42	4.8

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Women's Restroom	1	Compact Fluorescent: (1) 14W A19 Screw-In Lamp	Wall Switch	S	14	3,822	3, 4	Relamp	Yes	1	LED Lamps: A19 Lamps	Occupancy Sensor	10	2,637	0.0	30	0	$3	$17	$1	4.9
Women's Restroom	2	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	3,822	2, 4	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,637	0.1	437	0	$48	$408	$55	7.3
Wood Shop	19	Linear Fluorescent - EST12: 4' T12 (34W) - 2L	Wall Switch	S	72	3,822	2	Relamp & Reballast	No	19	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,822	0.6	3,435	-1	$377	$1,307	$190	3.0

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
2nd Floor Electrical Room	EF-4	1	Exhaust Fan	3.0	86.0%	No			W	3,900	7	No	89.5%	Yes	1	0.9	4,074	0	$453	$3,884	$200	8.1
Closet	Condensate Pumps	2	Condensate Pump	0.5	70.0%	No			W	3,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Corridor Room 144	Mail Rom 148 - AC-2	1	Supply Fan	2.0	84.0%	No			W	3,900	7	No	86.5%	Yes	1	0.6	2,733	0	$304	$3,261	$100	10.4
Corridor Room 144	Condensate Pumps	2	Condensate Pump	0.5	70.0%	No			W	3,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
The Gothic Lounge	Fan Coil Units	16	Fan Coil Unit	0.1	65.0%	No			W	3,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Hepburn Hall	Hepburn Hall	2	Supply Fan	0.5	70.0%	No			W	3,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
2nd FloorElevator Closet	2nd Floor Elevator Closet - AC-1	1	Supply Fan	3.0	84.0%	No			W	3,900	7	No	89.5%	Yes	1	0.9	4,328	0	$481	$3,884	$200	7.7
Mechanical Room 321	SF-4 - AHU-4 - VAVAs 51 to 98	1	Supply Fan	75.0	95.4%	Yes			W	3,900		No	95.4%	No		0.0	0	0	$0	$0	$0	0.0
Penthouse	SF-3 - AHU-3 - Auditorium	1	Supply Fan	20.0	93.0%	Yes			W	3,900		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Telephone Room	Hepburn Hall	1	Supply Fan	2.0	84.0%	No			W	3,900	7	No	86.5%	Yes	1	0.6	2,733	0	$304	$3,261	$100	10.4
Room 150	Telecom Closet -AHU-001	1	Supply Fan	1.5	82.0%	No			W	3,900	7	No	86.5%	Yes	1	0.5	2,183	0	$243	$3,391	$75	13.7
Printing Room 147	Printing Room 147 - AC-3	1	Supply Fan	2.0	84.0%	No			W	3,900	7	No	86.5%	Yes	1	0.6	2,733	0	$304	$3,261	$100	10.4
Area D-112	Area D-112 - AC-4	1	Supply Fan	2.0	84.0%	No			W	3,900	7	No	86.5%	Yes	1	0.6	2,733	0	$304	$3,261	$100	10.4
Area E-112	Area E-112 - AC-5	1	Supply Fan	2.0	84.0%	No			W	3,900	7	No	86.5%	Yes	1	0.6	2,733	0	$304	$3,261	$100	10.4
Roof	AHU-1 - VAVAs 1 to 50	1	Supply Fan	75.0	93.0%	Yes			B	3,900	6	Yes	95.4%	No		0.8	4,427	0	$492	$7,928	$0	16.1
Roof	AHU-1 - VAVAs 1 to 50	1	Return Fan	25.0	91.0%	Yes			B	3,900	6	Yes	93.6%	No		0.3	1,665	0	$185	$3,468	$0	18.7
Mechanical Room 321	SF-4 - AHU-4 - VAVAs 51 to 98	1	Return Fan	25.0	93.0%	Yes			W	3,900		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator Closet	Elevator	1	Other	10.0	70.0%	No			W	400		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior Ground	The Gothic Lounge - ACCU-1,2,3,4	4	Split-System	2.00		14.00		EMI	S1CG4000D00	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	The Gothic Lounge - ACCU-7,8	2	Split-System	1.00		14.00		EMI	S1CG2000D00	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	The Gothic Lounge - ACCU-5,6	2	Split-System Air-Source HP	2.50	18.40	14.00	8.5 HSPF	EMI	S1CH3000D00	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior Ground	AC-2 (Mail Rm 148, AC-3 (Printing Rm 147)	2	Split-System	4.00		12.00		Lennox	HS29-048-11Y	W		No							0.0	0	0	$0	$0	$0	0.0
Telephone Room	Telephone Room	1	Split-System	2.50		12.00		Air Rover		W		No							0.0	0	0	$0	$0	$0	0.0
Roof	AC-5 Room 112E)	1	Split-System	1.50		10.70		Rheem	13AJA18A01	B	8	Yes	1	Split-System	1.50		16.00		0.3	673	0	$75	$5,678	$158	73.7
326A	326A	1	Window AC	0.67		10.30				W		No							0.0	0	0	$0	$0	$0	0.0
Offices	Offices	3	Window AC	0.67		11.30				W		No							0.0	0	0	$0	$0	$0	0.0
Office	Office	1	Window AC	0.65		10.00				W		No							0.0	0	0	$0	$0	$0	0.0
Office,Room 308,308A	Office,Room 308,308A	3	Window AC	0.67		10.80				W		No							0.0	0	0	$0	$0	$0	0.0
Room 111A	Room 111A	2	Window AC	0.83		10.30				W		No							0.0	0	0	$0	$0	$0	0.0
Room 206	Room 206	3	Window AC	1.54		10.70				W		No							0.0	0	0	$0	$0	$0	0.0
Room 222	Room 222	1	Window AC	1.00		9.80				W		No							0.0	0	0	$0	$0	$0	0.0
Room 303, 303A	Room 303, 303A	2	Window AC	1.00		10.70				W		No							0.0	0	0	$0	$0	$0	0.0
Room 306,306A,303C, 303D	Room 306,306A,303C, 303D	4	Window AC	0.46		10.10				W		No							0.0	0	0	$0	$0	$0	0.0
Room 309, 309B	Room 309, 309B	2	Window AC	0.85		12.10				W		No							0.0	0	0	$0	$0	$0	0.0
Room 313, 309A,317	Room 313, 309A,317	3	Window AC	1.50		10.70				W		No							0.0	0	0	$0	$0	$0	0.0
Storage Room	Storage Room	1	Window AC	0.67		10.80				W		No							0.0	0	0	$0	$0	$0	0.0
2nd Floor Elevator Closet	2nd Floor Elevator Closet - AC-1	1	Package Unit		25.60		1 COP	Trane		B		No							0.0	0	0	$0	$0	$0	0.0
Room 150	Telecom Closet -AHU-001	1	Package Unit	5.00		9.70		Carrier	50BZN006	B	8	Yes	1	Package Unit	5.00		16.00		1.2	2,942	0	$327	$8,205	$515	23.5

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/ EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	AC-4 (Room 112D)	1	Split-System	4.00		10.30		Trane	TTA042A	B	8	Yes	1	Split-System	4.00		16.00		0.8	2,006	0	$223	$6,486	$420	27.2

Electric Chiller Inventory & Recommendations

		Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Chiller Room	Chilled Water System	1	Water-Cooled Centrifugal Chiller	207.00	Daikin	WMC060DDSNA	N		No							0.0	0	0	$0	$0	$0	0.0

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Central Plant	Steam Boiler (Proxy Boiler)	1	Forced Draft Steam Boiler	3,600	TRANE		B		No						0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room South	Domestic Hot Water System	1	Indirect System	Central Plant	Proxy Boiler	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restrooms	9	4	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	4	$25	$29	$14	0.6

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Room 101	1	Combo Clothes Washer/Dryer	2,000	No		
Hepburn Hall	10	Coffee Machine	600	No		
Hepburn Hall	261	Desktop	270	No		
Hepburn Hall	19	Microwave	1,000	No		
Hepburn Hall	4	Paper Shredder	200	No		
Hepburn Hall	80	Printer (Medium/Small)	120	No		
Hepburn Hall	44	Printer/Copier (Large)	600	No		
Hepburn Hall	19	Refrigerator (Mini)	112	No		
Hepburn Hall	4	Refrigerator (Residential)	250	No		
Hepburn Hall	4	Television	220	No		
Hepburn Hall	2	Toaster	400	No		
Hepburn Hall	4	Water Cooler	192	No		
Hepburn Hall	3	Water Fountain	200	No		
Hepburn Hall	5	Misc Plug Load	500	No		
Hepburn Hall	3	Server Closets	3,000	No		

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
1st Floor Hallway	1	Glass Fronted Refrigerated	10	Yes	0.1	1,209	0	$134	$230	$50	1.3
1st Floor Hallway	1	Non-Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0
2nd Floor Elevator Lobby	1	Non-Refrigerated	N/A	No	0.0	0	0	$0	$0	$0	0.0
2nd Floor Elevator Lobby	1	Refrigerated	10	Yes	0.2	1,612	0	$179	$230	$50	1.0

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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

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ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Central Plant Buildings (10 Buildings + Plant)

Primary Property Type: College/University
Gross Floor Area (ft²): 928,185
Built: 1929

For Year Ending: December 31, 2019
Date Generated: December 12, 2021

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Central Plant Buildings (10 Buildings + Plant) 2039 Kennedy Boulevard Jersey City, New Jersey 07305	New Jersey City University 2039 Kennedy Boulevard Grossnickle Hall, Suite 327 Jersey City, NJ 07305 (631) 334-1812	Andre Pearson 2039 Kennedy Boulevard Grossnickle Hall, Suite 327 Jersey City, NJ 07305 (631) 334-1812 apearson@njcu.edu

Property ID: 16905054

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
131.7 kBtu/ft²

Source EUI
218.7 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	42,641,944 (35%)
Natural Gas (kBtu)	79,599,191 (65%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	108.8
National Median Source EUI (kBtu/ft²)	180.6
% Diff from National Median Source EUI	21%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	8,187

Signature & Stamp of Verifying Professional

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

LP Signature: _____ Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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