Local Government Energy Audit Report

War Memorial

April 3, 2025

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 on 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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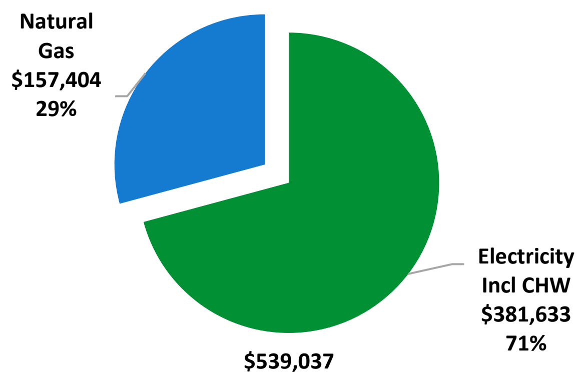
1 Executive Summary

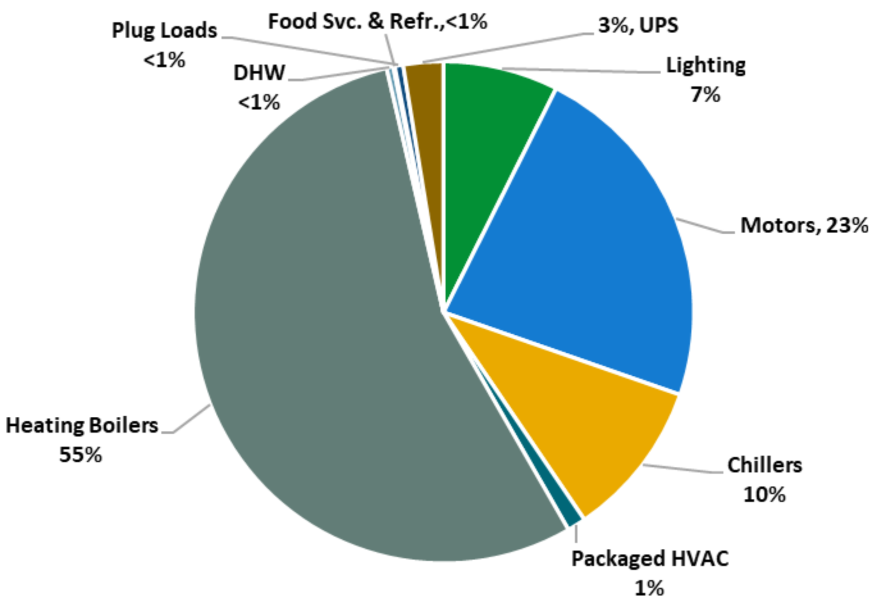
The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for War Memorial. This report provides you with information about your facility's energy use, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information 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 Energy Utilities	Costs: $539,037 Electricity: 1,281,169 kWh Natural Gas: 53,066 Therms Water: 433 Gallons	(see chart below)



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.



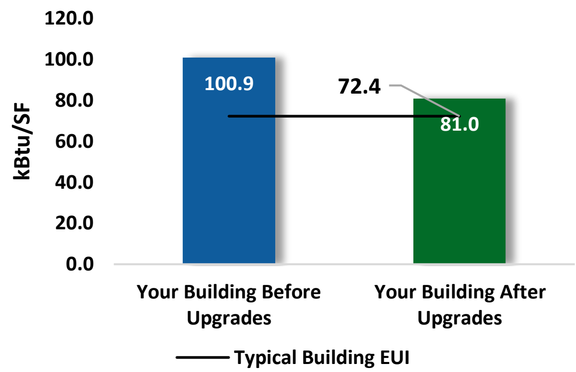
Energy Use by System

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.

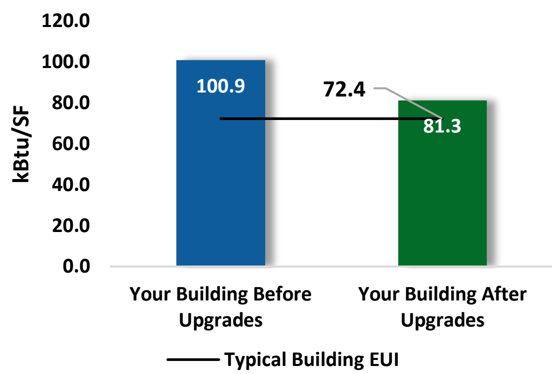
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$749,480
Potential Rebates & Incentives[1]	$32,510
Annual Cost Savings	$151,007
Annual Energy Savings	Electricity: 479,108 kWh Natural Gas: 2,795 Therms
Greenhouse Gas Emission Savings	258 Tons
Simple Payback	4.7 Years
Site Energy Savings (All Utilities)	20%



Scenario 2: Cost Effective Package[2]

Installation Cost	$744,880
Potential Rebates & Incentives	$32,510
Annual Cost Savings	$150,935
Annual Energy Savings	Electricity: 483,047 kWh Natural Gas: 2,375 Therms
Greenhouse Gas Emission Savings	257 Tons
Simple Payback	4.7 Years
Site Energy Savings (all utilities)	19%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**122,776**	**77.8**	**-26**	**$35,797**	**$60,700**	**$5,540**	**$55,160**	**1.5**	**120,575**
ECM 1	Install LED Fixtures	Yes	518	3.5	0	$151	$2,630	$200	$2,430	16.1	509
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	0	0.1	0	$0	$90	$10	$80	0.0	0
ECM 3	Retrofit Fixtures with LED Lamps	Yes	120,811	74.1	-26	$35,224	$56,450	$5,330	$51,120	1.5	118,644
ECM 4	Install LED Exit Signs	Yes	1,448	0.1	0	$422	$1,530	$0	$1,530	3.6	1,422
Lighting Control Measures			**9,352**	**2.5**	**-2**	**$2,729**	**$16,810**	**$4,750**	**$12,060**	**4.4**	**9,192**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	1,821	1.2	0	$531	$6,870	$860	$6,010	11.3	1,788
ECM 6	Install Photocell Controls	Yes	307	0.0	0	$91	$240	$0	$240	2.6	309
ECM 7	Install High/Low Lighting Controls	Yes	7,225	1.3	-2	$2,106	$9,700	$3,890	$5,810	2.8	7,095
Variable Frequency Drive (VFD) Measures			**241,497**	**64.5**	**0**	**$71,937**	**$197,800**	**$20,900**	**$176,900**	**2.5**	**243,186**
ECM 8	Install VFDs on Constant Volume (CV) Fans	Yes	194,539	56.5	0	$57,949	$127,600	$14,600	$113,000	1.9	195,900
ECM 9	Install VFDs on Heating Water Pumps	Yes	46,958	8.0	0	$13,988	$70,200	$6,300	$63,900	4.6	47,286
Unitary HVAC Measures			**5,876**	**2.1**	**0**	**$1,750**	**$22,600**	**$1,100**	**$21,500**	**12.3**	**5,917**
ECM 10	Install High Efficiency Air Conditioning Units	Yes	2,847	1.2	0	$848	$10,800	$500	$10,300	12.1	2,867
ECM 11	Install High Efficiency Heat Pumps	Yes	3,029	0.9	0	$902	$11,800	$600	$11,200	12.4	3,050
Domestic Water Heating Upgrade			**0**	**0.0**	**2**	**$55**	**$470**	**$220**	**$250**	**4.6**	**216**
ECM 12	Install Low-Flow DHW Devices	Yes	0	0.0	2	$55	$470	$220	$250	4.6	216
Custom Measures			**99,606**	**0.0**	**306**	**$38,739**	**$451,100**	**$0**	**$451,100**	**11.6**	**136,102**
ECM 13	Retro-Commissioning Study	Yes	103,545	0.0	264	$38,667	$446,500	$0	$446,500	11.5	135,151
ECM 14	Replace Gas Fired Water Heater with Heat Pump Water Heater	No	-3,939	0.0	42	$72	$4,600	$0	$4,600	63.9	951
TOTALS (COST EFFECTIVE MEASURES)			**483,047**	**147.0**	**238**	**$150,935**	**$744,880**	**$32,510**	**$712,370**	**4.7**	**514,236**
TOTALS (ALL MEASURES)			**479,108**	**147.0**	**280**	**$151,007**	**$749,480**	**$32,510**	**$716,970**	**4.7**	**515,187**

* - 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).

All Evaluated Energy Improvements[3]

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

[3] 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.

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

Options from Your Utility Company

Prescriptive and Custom Rebates

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the Prescriptive and Custom Rebates program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval may be required for some incentives. Contact your utility company for more details prior to project installation.

Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized contractor. This program can provide incentives up to 70% or 80% of the cost of selected measures. A Direct Install contractor will assess and verify individual measure eligibility and perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Engineered Solutions

The Engineered Solutions program provides tailored energy-efficiency assistance and turnkey engineering services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. The program provides all professional services from audit, design, construction administration, to commissioning and measurement and verification for custom whole-building energy-efficiency projects. Engineered Solutions allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs.

For more details on these programs please contact your utility provider.

Options from New Jersey’s Clean Energy Program

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 is designed to promote self-investment in energy efficiency for the largest energy consumers in the state. Customers in this category spend about $5 million a year on energy bills. This program 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.

For more details on these programs please visit New Jersey's Clean Energy Program website.

2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for War Memorial. 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 November 7, 2024, TRC performed an energy audit at War Memorial located in Trenton, New Jersey. TRC met with Ryan Russell to review the facility operations and help focus our investigation on specific energy-using systems.

The War Memorial is a historical, 3-story, 95,892 square foot building built in 1930. Spaces include a main stage, ballroom, dressing rooms, lobbies, corridors, offices, restrooms, stairwells, storage rooms, theater audio visual (A/V) rooms, and mechanical spaces.

The lighting systems consist of a combination of LED, fluorescent, halogen, and Incandescent lighting with linear fluorescent and LED sources most prevalent.

Vicinity Energy provides district heating hot water (HHW) and chilled water (CHW) to the facility. The building is 100% heated by air handling units (AHUs) equipped with HHW coils and supplemented by air source heat pumps (ASHPs) and electric resistance heaters. The building is 100% cooled by AHUs equipped with CHW coils and condensing units and supplemental AHSPs. A building automation system (BAS) controls most of the HVAC equipment.

Recent Improvements and Facility Concerns

The facility has replaced some of the lighting systems with LED and wants to retrofit the remaining fluorescent fixtures with LED fixtures. The site was equipped with a Honeywell BMS system within the last 10 years.

The facility has major concerns about the building shell, including the aging roof and exterior door condition.

2.2 Building Occupancy

The facility is occupied by maintenance workers Monday through Friday from 8:00 AM to 4:30 PM, and by office workers from 9:00 AM to 5:00 PM. The facility also hosts occasional events on weeknights and weekends.

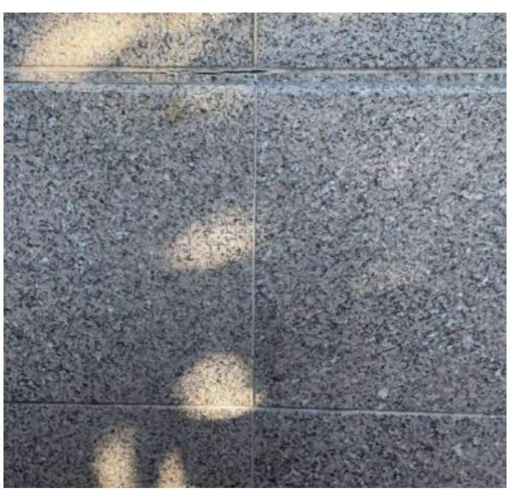
Building Name	Weekday/Weekend	Operating Schedule
War Memorial Maintenance Hours	Weekday	8:00AM - 4:30PM
	Weekend	N/A
War Memorial Office Hours	Weekday	9:00AM - 5:00PM
	Weekend	N/A

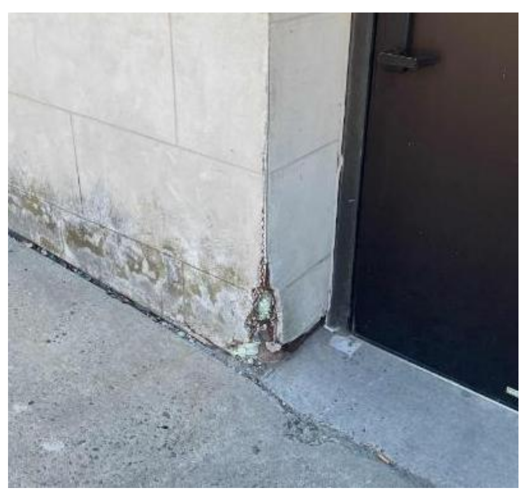
Building Occupancy Schedule

2.3 Building Envelope

The building envelope is reported to be in poor condition. Walls are made of a combination of concrete block and poured concrete. Sections of the building have a stone or stucco façade. Stucco façade sections are in fair condition as some areas are showing damage. The east and west ends of the building have a flat rolled asphalt roof that is in poor condition and appears to be reaching the end of its useful life. A standing seam copper roof covers most of the building including the main stage area. The copper roof was inaccessible at the time of the audit. The building has a mixture of operable and inoperable single pane windows with aluminum frames and without a thermal break. The windows are in fair condition but due to the lack of thermal breaks, and th fact that they are single pane, facility energy loss and outside air infiltration is extremely likely. Entry way doors are a combination of solid and hollow steel and aluminum framed glass doors, with most of the doors being steel. Many doors are in fair condition, however some of the door sills and sweeps are degraded, which increases drafts, outside air infiltration, and energy loss.

Building Envelope





Stone Block Exterior & Damaged Stucco Facade

Rolled Asphalt Roof

Facility Window

Solid Steel Door & Aluminum Framed Glass Doors

Door Sill

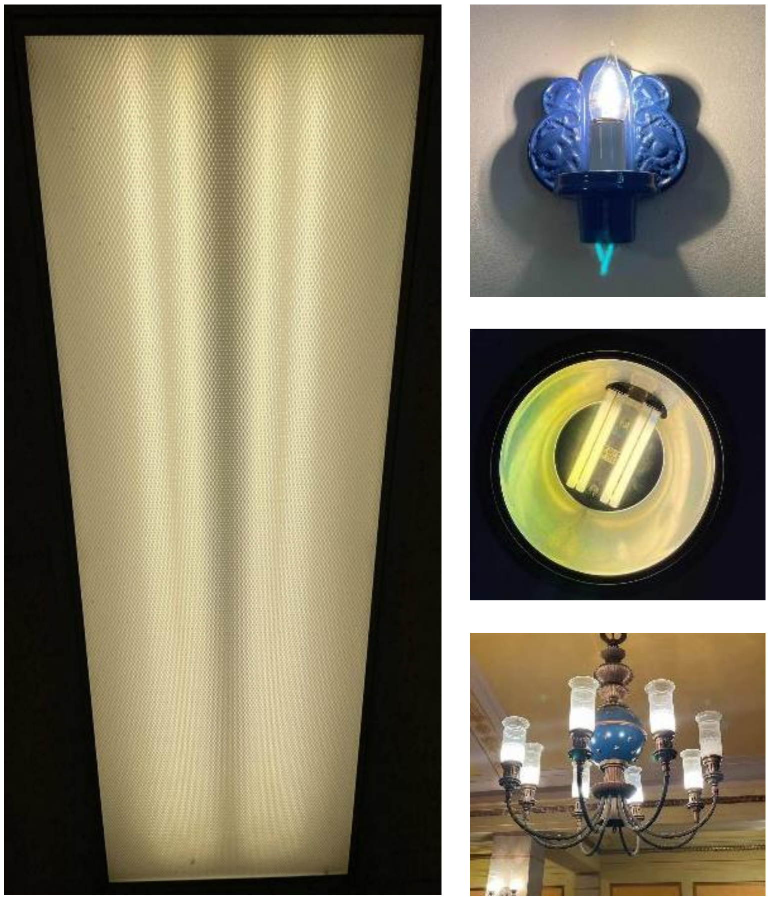
2.4 Lighting Systems

The interior lighting system consists of a combination of LED, fluorescent, halogen, and Incandescent lighting with linear fluorescent and LED sources most prevalent. Most of the back of house areas including mechanical rooms, basement hallways, and storage areas consisted of a mixture of T5 and T8 4-foot linear fluorescent lamps, biaxial plug in recessed can fixtures, and BR30 incandescent track lights. Patron facing areas, including the main and upper floor hallways, meeting rooms, and theater seating areas consisted of a mixture of A15 and C9 incandescent bulbs in decorative wall sconces and a mixture of A19 CFL and A19 LED bulbs in ceiling hung fixtures. Dressing room areas were lit with a combination of drop ceiling recessed linear fluorescent fixtures and wall mounted incandescent G25 bulbs. Most bathrooms were lit with a combination of biaxial CFL and A19 LED bulbs. Wall switches control most interior fixtures.

The main stage utilizes a large number of varying fixtures including halogen incandescent, LED, standard incandescent, and linear fluorescent fixtures. Ceiling mounted track lights equipped with PAR halogen lights along with halogen spotlights located on the theater's second flood illuminate the stage area. Two programmable LED moving head lights supplement the stage lighting system.

Decorative wall sconces along with ceiling mounted fixtures equipped with A19 LED and incandescent lamps partially illuminates the theater. A suspended concrete dome ceiling equipped with screw-in PAR and BR incandescent lamps supplements the theater lighting system. A spotlight and lighting control room, located at the back of the theater control the stage and theater lighting system and house the four 2000 kW stage spotlights.

Most fixtures are in good condition. Interior lighting levels were generally sufficient. A majority of the exit signs were lit with incandescent bulbs, with a few being lit by LED sources. Overall, the current lighting system is in good condition.



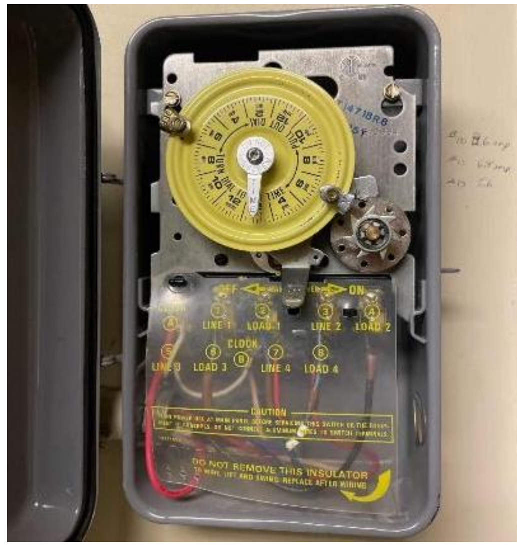
4 Foot T8 Linear Fluorescent Lamps, LED C9 Wall Sconce, Biaxial Recessed Can CFL Lamp, & LED A19 Chandelier

Incandescent BR30 Track Light & Incandescent Exit Sign

Stage Lights & Large Spotlights

Theater Dome Lighting

Exterior lighting includes CFL wall packs and recessed LED downlights. On the perimeter of the building pole mounted fixtures equipped with A19 LED lamps illuminate the exterior grounds. Exterior light fixtures are controlled by a time clock or photocell, depending on the fixture. The LED recessed lights are controlled by switch. At the time of the audit the lights were running during daylight hours.



Pole Lights & Timeclock

Recessed LED Exterior Light

2.5 Air Handling Systems

Unitary Electric HVAC Equipment

Split system AC units and air source heat pumps help meet the building's heating and cooling requirements. Two air source heat pumps, located on the eastern roof, supply 2.5 tons of cooling at a seasonal energy efficiency ratio (SEER) rating of 10.6. The heat pump heating capacity is rated at 19 MBh and operate with a heating seasonal performance factor (HSPF) of 7.1. One of the heat pumps serve organ room one. A split system, 5-ton AC unit operating at an energy efficiency ratio (EER) of 9.8, cools the dimmer room. The west roof area was inaccessible at the time of the audit. According to aerial photos, we estimated one split system AC condensing unit.

Split System Air Source Heat Pump & AC Condensing Unit

Fan Coil Units (FCUs)

Fan coil units are equipped with fractional horsepower supply fans and HHW coils. The units are in good condition. Most can be monitored through the Building Automation System (BAS).

Fan Coil Unit

Air Handling Units (AHUs)

Nine air handing units located throughout the War Memorial serve to meet the building's cooling and heating demands. AHUs are equipped with supply and return fan motors as well as hot water heating coils and chilled water coils for cooling. Vicinity Energy provides the district heating hot water and chilled water which passes through their respective heat exchanger before being distributed to AHUs and fan coil units throughout the facility. Supply and return fan motors vary in horsepower, and all are constant speed units. At the time of the audit, AHU-1 door seals were in poor condition leading to air leakage. Consider replacing the AHU door seals.

AHUs apart from the Trane unit, are equipped with Honeywell controllers that provide temperature control and monitoring through the building's BAS.

The dimmer room is served by a small AHU equipped with a supply fan, DX coils, and an electric resistance heating section. The unit connects to a 5-ton split AC condensing unit located on the east roof and is equipped with electric resistance heating coils rated at 19.65 MBh (5.76 kW).

Unit	Area Served (According to BAS)	Supply Fan (hp)	Return Fan (hp)
AHU-1	Auditorium, MER44	50	25
AHU-2	Auditorium, MER28	50	25
AHU-3	Stage Area, MER311-17	5	N/A
AHU-4	Delaware River Room	5	N/A
AHU-5	Ballroom, MER311-17	5	N/A
AHU-6	Ballroom, MER311-17	5	N/A
AHU-8	Smoking Room, MER09B	7.5	N/A
AHU-9	MER15, Basement, Ground Floor, Toilets, N/E Corridor	5	N/A
Trane Unit	Dimmer Room	0.75	N/A

AHU Inventory[4]

[4] AHU Number Assignments are not an error. AHU-7 is not present.

AHU-3

AHU-1 Door Seal

2.6 General Building Exhaust Air System

Two fractional horsepower exhaust fans are present in mechanical room 1 along with four additional rooftop mounted units. According to facility staff, the BAS controls the exhaust fans.

Mechanical Room Exhaust Fan

2.7 Heating Hot Water Systems

For the purpose of analysis, a proxy boiler has been created to represent the building's HHW consumption according to Vicinity Energy's billing data. This unit is only representational and does not reflect any real equipment found on site.

A total of 19 heating hot water pumps circulate the district hot water to AHUs and fan coil units. The pumps range in horsepower from 0.33 to 25 and are all constant speed units. Most units are in good condition, and around half of the pumps are operating beyond their rated useful life. HHW pipes are insulated, and the insulation is in good condition. The BAS monitors and controls the pumps.

HHW Pumps & Insulated Pipes

2.8 Chilled Water Systems

Similar to the proxy boiler, a proxy chiller has been created for the purpose of analysis. However, the building does have one actual air-cooled reciprocating chiller used to serve the building's drinking fountains. The chiller, located in the water filter room, provides 0.3 tons of cooling. A constant speed, fractional horsepower, chilled water pump circulates water to water fountains throughout the building.

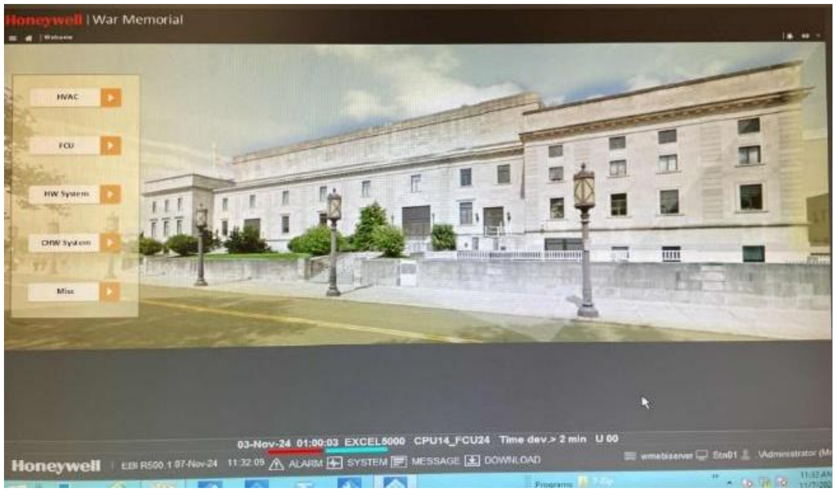
District CHW is circulated by two 3 hp supply motors equipped with variable frequency drives (VFDs). The motors are in good condition and are operating within their rated useful life. CHW pipes are insulated well, and the insulation is in good condition. The BAS monitors and controls the CHW pumps.

Water Fountain Chiller

District CHW Pump & VFD

2.9 Building Automation System (BAS)

A Honeywell BAS controls the HVAC equipment, the HHW pumps, the CHW pumps, the air handlers, and select FCUs. The BAS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, and humidity.



BAS Overview

2.10 Domestic Hot Water

A Rheem, 98-gallon, natural gas fired storage tank water heater supplies the building's domestic hot water demand. Manufactued in 2020, the unit is in good condition and the insulated DHW pipes are in good condition.

DHW Tank

2.11 Food Service Equipment

The kitchen has all electric equipment that is used to prepare meals for special events. Most cooking is done using a half size convection oven. Prepared food is stored in a full-size insulated food holding cabinet. According to facility staff, cooking equipment use is rare.

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

Electric Convection Oven

2.12 Refrigeration

The kitchen uses one solid door stand up refrigerator. Manufactued in 1999 the unit is in good condition and is operating beyond its rated useful life. The unit is not ENERGY STAR rated.

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

Solid Door Refrigerator

2.13 Plug Load and Vending Machines

Plug loads at the War Memorial include general office equipment. Common office equipment includes, desktops, laptops, microwaves, a television, a paper shredder, printers, and server equipment. There is one full sized and one mini sized residential refrigerator throughout the building. A washing machine and electric dryer, found in storage room 1, are used infrequently.

Stage and specialty equipment, including AV equipment, speakers, light controllers, and mixers, also contribute to the plug load.

Stage Speakers & AV Equipment

2.14 Water-Using Systems

Water is provided by Trenton Water Works. Potable water is used for drinking, cleaning, cooking, laundry, and sanitary fixtures. Water leaks were observed in the heating hot water piping located in mechanical room four.

EPA WaterSense® has set maximum flow rates for sanitary fixtures. They are: 1.28 gallons per flush (gpf) for toilets, 0.5 gpf for urinals, 1.5 gallons per minute (gpm) for lavatory faucets, and 2.0 gpm for showerheads. There are 14 restrooms with toilets, urinals, and sinks. Faucet flow rates are at 1.8 gallons per minute (gpm) or lower. Toilets are rated at 1.6 gallons per flush (gpf) and urinals are rated at 1.0 gpf.

Kitchen Style & Restroom Faucet

2.15 Additional Building Motor Systems

A 15 hp air supply motor serves the large pipe organ located in the theater. The facility has three elevators with their motors ranging from 15 to 75 horsepower. Three sewer ejector pumps are located throughout the building and range from 1 to 6 hp.

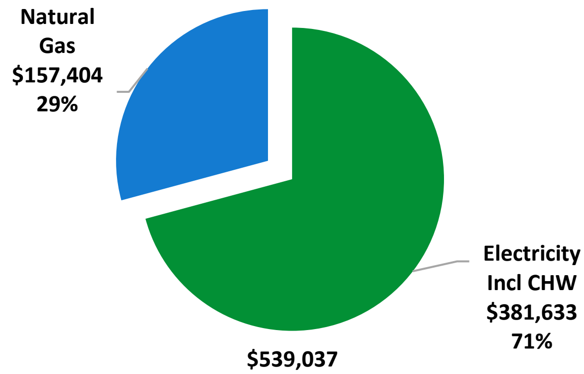
Pipe Organ Air Supply Motor & Elevator Motor

Sewer Ejector Pump

3 ENERGY AND WATER USE AND COSTS

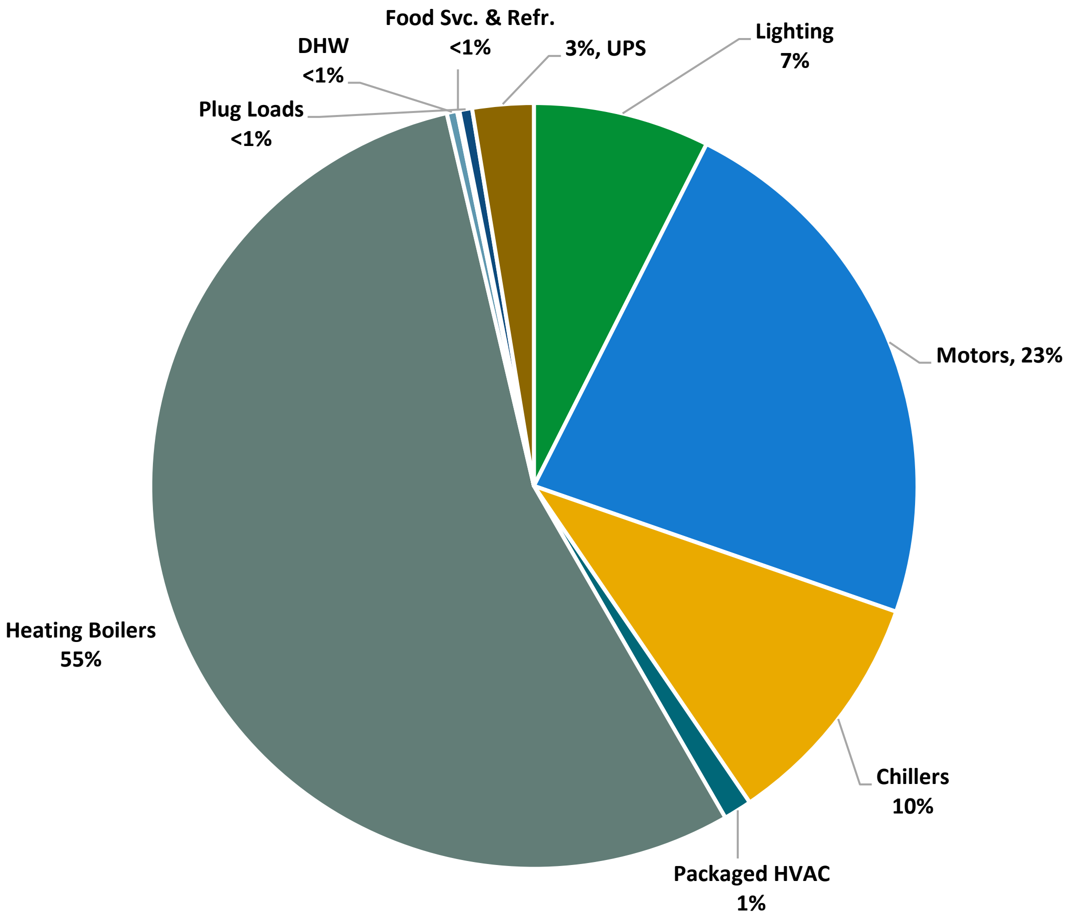
Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	1,281,169 kWh	$381,633
Natural Gas	53,066 Therms	$157,404
Total		**$539,037**



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.

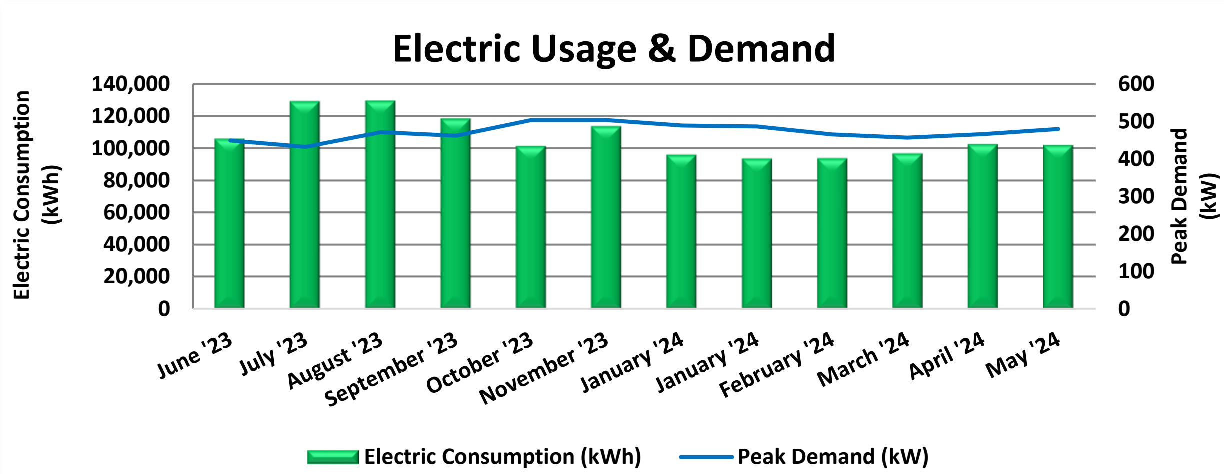
The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated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



Energy Balance by System

3.1 Electricity

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



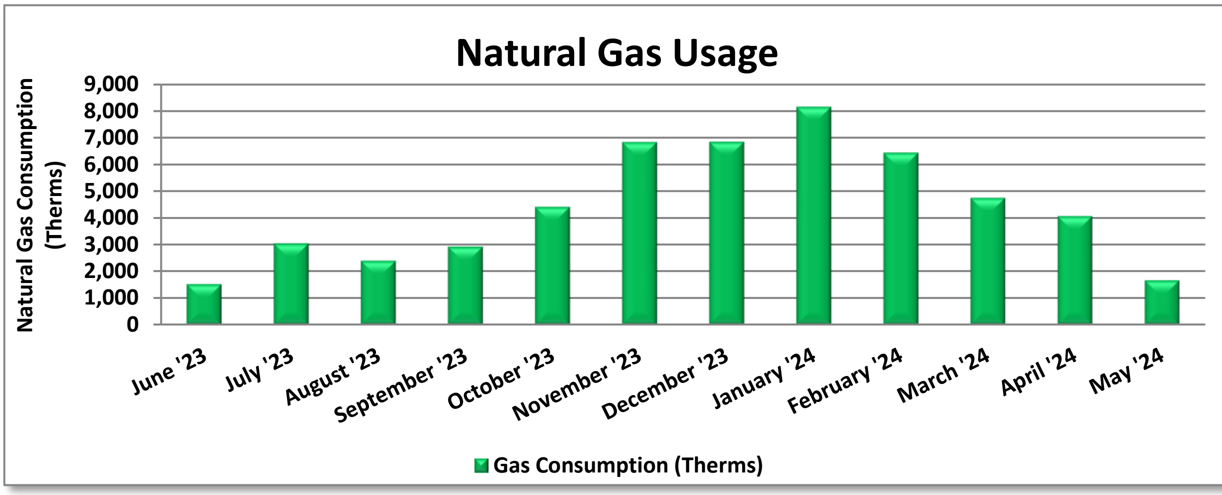
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/13/23	30	105,815	450	$6,262	$38,952
8/11/23	29	129,058	433	$6,233	$62,556
9/12/23	32	129,405	472	$6,786	$60,470
10/11/23	29	118,286	462	$4,616	$49,154
11/8/23	28	101,269	504	$4,825	$21,992
12/12/23	34	113,455	504	$4,827	$22,125
1/16/24	35	95,800	490	$4,756	$18,116
2/12/24	27	93,544	487	$4,743	$17,666
3/13/24	30	93,669	466	$4,636	$17,678
4/12/24	30	96,682	457	$4,592	$18,140
5/13/24	31	102,313	467	$4,642	$19,803
6/12/24	30	101,873	480	$6,943	$34,981
Totals	**365**	**1,281,169**	**504**	**$63,862**	**$381,633**
Annual	**365**	**1,281,169**	**504**	**$63,862**	**$381,633**

Notes:

- Peak demand of 504 kW occurred in October '23.
- Average demand over the past 12 months was 473 kW.
- The average electric cost over the past 12 months was $0.298/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 General Service Gas Heating - GSG (HTG), with natural gas supply provided by UGI, a third-party supplier.



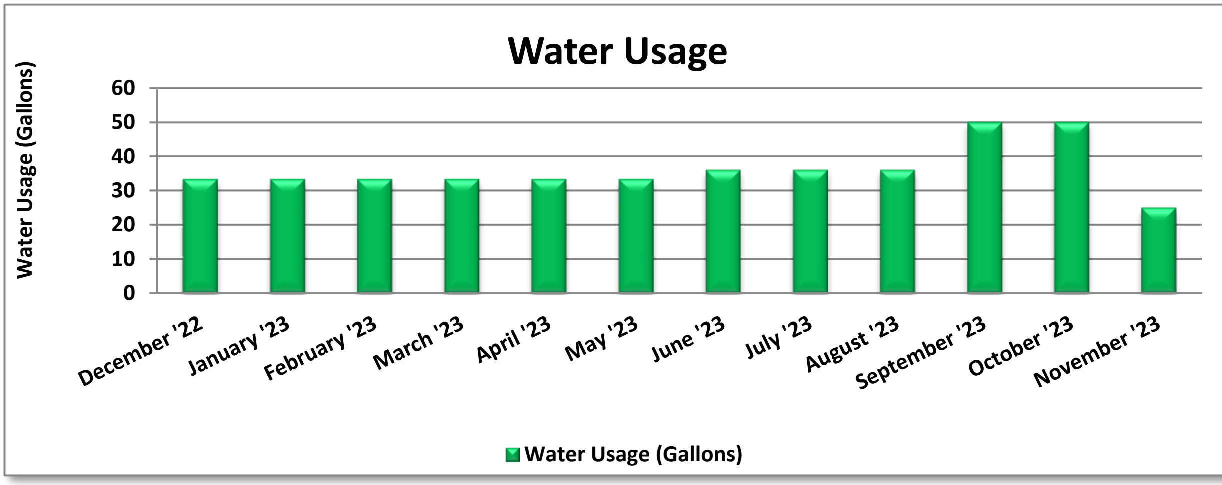
Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
7/15/23	32	1,519	$16,860
8/11/23	27	3,043	$14,829
9/12/23	32	2,398	$11,790
10/11/23	29	2,930	$10,239
11/8/23	28	4,420	$9,664
12/12/23	34	6,835	$8,909
1/12/24	31	6,847	$11,715
2/12/24	31	8,155	$10,660
3/13/24	30	6,445	$11,670
4/12/24	30	4,750	$14,475
5/13/24	31	4,061	$18,198
6/12/24	30	1,667	$18,394
Totals	**365**	**53,066**	**$157,404**
Annual	**365**	**53,066**	**$157,404**

Notes:

- The average gas cost for the past 12 months is $2.966/therm, which is the blended rate used throughout the analysis.

3.3 Water

Trenton Water Works delivers water to the project site.



Water Billing Data			
Period Ending	Days in Period	Water Usage (gallons)	Water Cost
1/1/23	31	33	$947
2/1/23	31	33	$947
3/1/23	28	33	$939
4/1/23	31	33	$939
5/1/23	30	33	$939
6/1/23	31	33	$939
7/1/23	30	36	$961
8/1/23	31	36	$961
9/1/23	31	36	$961
10/1/23	30	50	$1,421
11/1/23	31	50	$1,421
12/1/23	30	25	$711
Totals	**365**	**433**	**$12,088**
Annual	**365**	**433**	**$12,088**

Notes:

- The average cost of water for the past 12 months is $27.9180/gal.

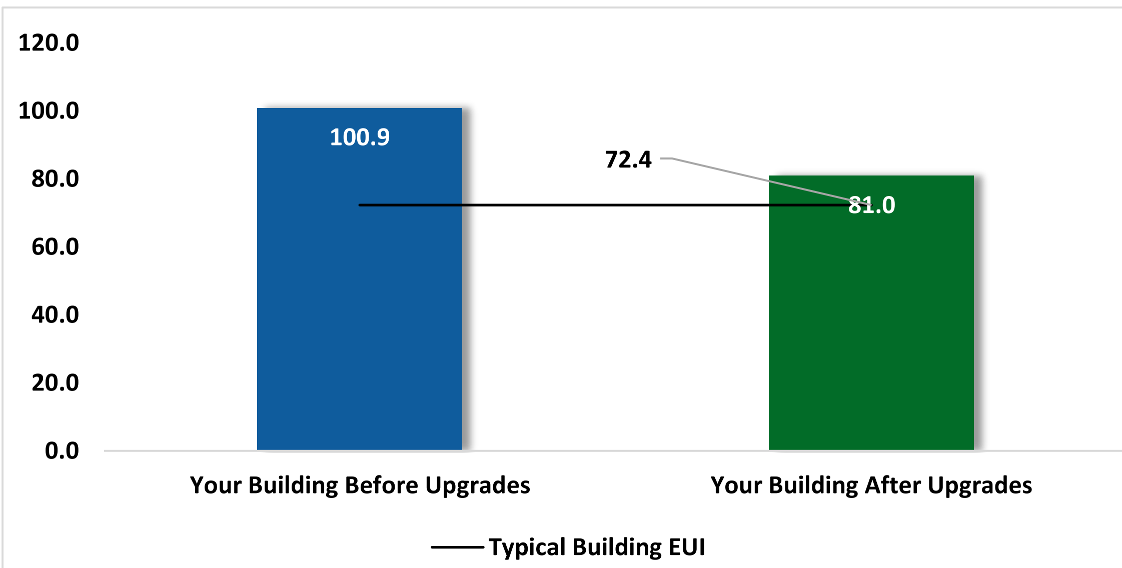
3.4 Benchmarking

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.

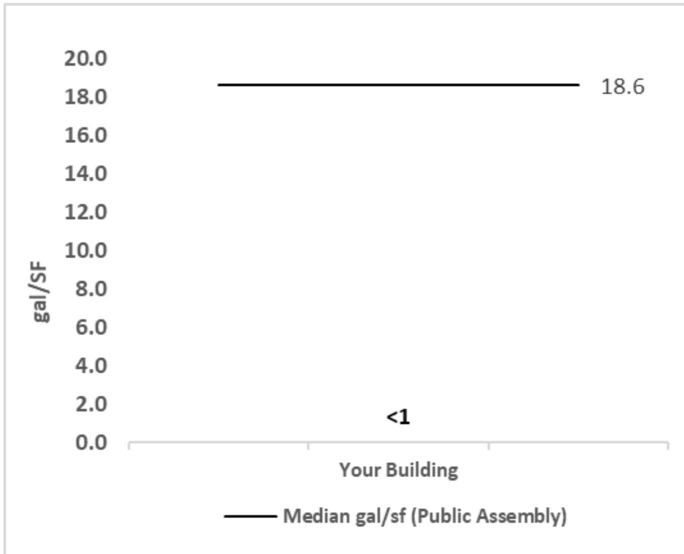


Energy Use Intensity Comparison[5]

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.

[5] Based on all evaluated ECMs

Water Benchmarking



A benchmark is provided for your building's water use based on the annual water use in gallons per square foot of building area (gal/sf-yr). Your building is compared to other similar buildings based on average water usage as available from the 2012 Commercial Buildings Energy Consumption Survey (CBECS) and from the EPA ENERGY STAR DataTrends Water Use Tracking database.

Water use varies considerably depending mainly on the extent of outdoor water use and whether process water is used. Kitchens and sanitary fixtures may use varying amounts of water.

Tracking your Energy Performance

Keeping track of your energy and water use on a monthly basis is one of the best ways to keep utility costs in check and keep your facility operating efficiently. 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 have already entered the monthly utility data shown above for you. Account login information for your account will be sent via email.

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

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

3.5 Understanding Your Utility Bills

The State of New Jersey Department of the Public Advocate provides detailed information on how to read natural gas and electric bills. Your bills contain important information including account numbers, meter numbers, rate schedules, meter readings, and the supply and delivery charges. Gas and electric bills both provide comparisons of current energy consumption with prior usage.

Sample bills, with annotation, may be viewed at:
https://www.nj.gov/rpa/docs/Understanding_Electric_Bill.pdf
https://www.nj.gov/rpa/docs/Understanding_Gas_Bill.pdf

Why Utility Bills Vary

Utility bills vary from one month to another for many reasons. For this reason, assessing the effects of your energy savings efforts can be difficult.

Billing periods vary, typically ranging between 28 and 33 days. Electric bills provide the kilowatt-hours (kWh) used per month while gas bills provide therms (or hundreds of cubic feet - CCF) per month consumption information. Monthly consumption information can be helpful as a tool to assess your efforts to reduce energy, particularly when compared to monthly usage from a similar calendar period in a prior year.

Bills typically vary seasonally, often with more gas consumed in the winter for heating, and more electricity used in the summer when air conditioning is used. Facilities with electric heating may experience higher electricity use in the winter. Seasonal variance will be impacted by the type of heating and cooling systems used. Normal seasonal fluctuations are further impacted by the weather. Extremely cold or hot weathers causes HVAC equipment to run longer, increasing usage. Other monthly fluctuations in usage can be caused by changes in building occupancy. Utility bills provide a comparison of usage between the current period and comparable billing month period of the prior year. Year-to-year monthly use comparisons can point to trends with energy savings for measures/projects that were implemented within the timeframe, but these comparisons do not account for changing weather of occupancy patterns.

The price of fuel and purchased power used to produce and delivery electricity and gas fluctuates. Any increase or decrease in these costs will be reflected in your monthly bill. Additionally, billing rates occasionally change after justification and approval of the NJBPU. For this reason, it is more useful to review energy use rather than cost when assessing energy use trends or the impact of energy conservation measures implemented.

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 in this report are based on the previously run state rebate program SmartStart, which has been retired. Now, all investor-owned gas and electric utility companies are offering complementary energy efficiency programs directly to their customers. Some measures and proposed upgrades may be eligible for higher incentives than those shown below. The incentives in the summary tables should be used for high-level planning purposes. To verify incentives, reach out to your utility provider or visit the NJCEP website for more information.

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			**122,776**	**77.8**	**-26**	**$35,797**	**$60,700**	**$5,540**	**$55,160**	**1.5**	**120,575**
ECM 1	Install LED Fixtures	Yes	518	3.5	0	$151	$2,630	$200	$2,430	16.1	509
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	0	0.1	0	$0	$90	$10	$80	0.0	0
ECM 3	Retrofit Fixtures with LED Lamps	Yes	120,811	74.1	-26	$35,224	$56,450	$5,330	$51,120	1.5	118,644
ECM 4	Install LED Exit Signs	Yes	1,448	0.1	0	$422	$1,530	$0	$1,530	3.6	1,422
Lighting Control Measures			**9,352**	**2.5**	**-2**	**$2,729**	**$16,810**	**$4,750**	**$12,060**	**4.4**	**9,192**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	1,821	1.2	0	$531	$6,870	$860	$6,010	11.3	1,788
ECM 6	Install Photocell Controls	Yes	307	0.0	0	$91	$240	$0	$240	2.6	309
ECM 7	Install High/Low Lighting Controls	Yes	7,225	1.3	-2	$2,106	$9,700	$3,890	$5,810	2.8	7,095
Variable Frequency Drive (VFD) Measures			**241,497**	**64.5**	**0**	**$71,937**	**$197,800**	**$20,900**	**$176,900**	**2.5**	**243,186**
ECM 8	Install VFDs on Constant Volume (CV) Fans	Yes	194,539	56.5	0	$57,949	$127,600	$14,600	$113,000	1.9	195,900
ECM 9	Install VFDs on Heating Water Pumps	Yes	46,958	8.0	0	$13,988	$70,200	$6,300	$63,900	4.6	47,286
Unitary HVAC Measures			**5,876**	**2.1**	**0**	**$1,750**	**$22,600**	**$1,100**	**$21,500**	**12.3**	**5,917**
ECM 10	Install High Efficiency Air Conditioning Units	Yes	2,847	1.2	0	$848	$10,800	$500	$10,300	12.1	2,867
ECM 11	Install High Efficiency Heat Pumps	Yes	3,029	0.9	0	$902	$11,800	$600	$11,200	12.4	3,050
Domestic Water Heating Upgrade			**0**	**0.0**	**2**	**$55**	**$470**	**$220**	**$250**	**4.6**	**216**
ECM 12	Install Low-Flow DHW Devices	Yes	0	0.0	2	$55	$470	$220	$250	4.6	216
Custom Measures			**99,606**	**0.0**	**306**	**$38,739**	**$451,100**	**$0**	**$451,100**	**11.6**	**136,102**
ECM 13	Retro-Commissioning Study	Yes	103,545	0.0	264	$38,667	$446,500	$0	$446,500	11.5	135,151
ECM 14	Replace Gas Fired Water Heater with Heat Pump Water Heater	No	-3,939	0.0	42	$72	$4,600	$0	$4,600	63.9	951
TOTALS			**479,108**	**147.0**	**280**	**$151,007**	**$749,480**	**$32,510**	**$716,970**	**4.7**	**515,187**

* - 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).

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		**122,776**	**77.8**	**-26**	**$35,797**	**$60,700**	**$5,540**	**$55,160**	**1.5**	**120,575**
ECM 1	Install LED Fixtures	518	3.5	0	$151	$2,630	$200	$2,430	16.1	509
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	0	0.1	0	$0	$90	$10	$80	0.0	0
ECM 3	Retrofit Fixtures with LED Lamps	120,811	74.1	-26	$35,224	$56,450	$5,330	$51,120	1.5	118,644
ECM 4	Install LED Exit Signs	1,448	0.1	0	$422	$1,530	$0	$1,530	3.6	1,422
Lighting Control Measures		**9,352**	**2.5**	**-2**	**$2,729**	**$16,810**	**$4,750**	**$12,060**	**4.4**	**9,192**
ECM 5	Install Occupancy Sensor Lighting Controls	1,821	1.2	0	$531	$6,870	$860	$6,010	11.3	1,788
ECM 6	Install Photocell Controls	307	0.0	0	$91	$240	$0	$240	2.6	309
ECM 7	Install High/Low Lighting Controls	7,225	1.3	-2	$2,106	$9,700	$3,890	$5,810	2.8	7,095
Variable Frequency Drive (VFD) Measures		**241,497**	**64.5**	**0**	**$71,937**	**$197,800**	**$20,900**	**$176,900**	**2.5**	**243,186**
ECM 8	Install VFDs on Constant Volume (CV) Fans	194,539	56.5	0	$57,949	$127,600	$14,600	$113,000	1.9	195,900
ECM 9	Install VFDs on Heating Water Pumps	46,958	8.0	0	$13,988	$70,200	$6,300	$63,900	4.6	47,286
Unitary HVAC Measures		**5,876**	**2.1**	**0**	**$1,750**	**$22,600**	**$1,100**	**$21,500**	**12.3**	**5,917**
ECM 10	Install High Efficiency Air Conditioning Units	2,847	1.2	0	$848	$10,800	$500	$10,300	12.1	2,867
ECM 11	Install High Efficiency Heat Pumps	3,029	0.9	0	$902	$11,800	$600	$11,200	12.4	3,050
Domestic Water Heating Upgrade		**0**	**0.0**	**2**	**$55**	**$470**	**$220**	**$250**	**4.6**	**216**
ECM 12	Install Low-Flow DHW Devices	0	0.0	2	$55	$470	$220	$250	4.6	216
Custom Measures		**103,545**	**0.0**	**264**	**$38,667**	**$446,500**	**$0**	**$446,500**	**11.5**	**135,151**
ECM 13	Retro-Commissioning Study	103,545	0.0	264	$38,667	$446,500	$0	$446,500	11.5	135,151
TOTALS		**483,047**	**147.0**	**238**	**$150,935**	**$744,880**	**$32,510**	**$712,370**	**4.7**	**514,236**

* - 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).

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		**122,776**	**77.8**	**-26**	**$35,797**	**$60,700**	**$5,540**	**$55,160**	**1.5**	**120,575**
ECM 1	Install LED Fixtures	518	3.5	0	$151	$2,630	$200	$2,430	16.1	509
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	0	0.1	0	$0	$90	$10	$80	0.0	0
ECM 3	Retrofit Fixtures with LED Lamps	120,811	74.1	-26	$35,224	$56,450	$5,330	$51,120	1.5	118,644
ECM 4	Install LED Exit Signs	1,448	0.1	0	$422	$1,530	$0	$1,530	3.6	1,422

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

ECM 1: Install LED Fixtures

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

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

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: four metal halide spotlights

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit T12 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: T12 lamps located in meeting room 3

ECM 3: Retrofit Fixtures with LED Lamps

Replace linear fluorescent, CFL, halogen, 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: corridors, offices, restrooms, dressing rooms, stage areas, the theater, basement spaces, exterior wall packs, mechanical rooms, meeting rooms, AV rooms, and storage rooms

ECM 4: Install LED Exit Signs

Replace fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output. Maintenance savings and improved reliability may also be achieved, as the longer-lasting LED lamps will not need to be replaced as often as the existing 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		**9,352**	**2.5**	**-2**	**$2,729**	**$16,810**	**$4,750**	**$12,060**	**4.4**	**9,192**
ECM 5	Install Occupancy Sensor Lighting Controls	1,821	1.2	0	$531	$6,870	$860	$6,010	11.3	1,788
ECM 6	Install Photocell Controls	307	0.0	0	$91	$240	$0	$240	2.6	309
ECM 7	Install High/Low Lighting Controls	7,225	1.3	-2	$2,106	$9,700	$3,890	$5,810	2.8	7,095

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 5: 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, restrooms, dressing rooms, board room, box office, dimmer room, meeting rooms, ticket room, trap room, and veterans room

ECM 6: Install Photocell Controls

Install photocells to eliminate exterior lighting use during daytime periods.

Photocells or photocell sensors are lighting controls used for dusk to dawn applications to automatically turn the fixtures on or off. Photo controls detect the amount of light outside and once the light level reaches a low point, the fixture will switch on. During the day, the photocell will detect higher amounts of light and will turn the fixture off.

Photocells may be fixture mounted or wired externally and connected by line voltage to a single light fixture or to a series of fixtures.

This measure reduces energy use in exterior areas to restrict operation to non-daylight periods.

Affected Building Areas: exterior recessed fixtures

ECM 7: Install High/Low Lighting Controls

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

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

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

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage must be provided to ensure that lights turn on in each area as occupants approach the area. This measure provides energy savings by reducing the light fixture power draw when reduced light output is appropriate.

Affected Building Areas: corridors and lobbies

4.3 Variable Frequency Drives (VFD)

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**241,497**	**64.5**	**0**	**$71,937**	**$197,800**	**$20,900**	**$176,900**	**2.5**	**243,186**
ECM 8	Install VFDs on Constant Volume (CV) Fans	194,539	56.5	0	$57,949	$127,600	$14,600	$113,000	1.9	195,900
ECM 9	Install VFDs on Heating Water Pumps	46,958	8.0	0	$13,988	$70,200	$6,300	$63,900	4.6	47,286

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 8: Install VFDs on Constant Volume (CV) Fans

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

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

For air handlers with chilled water-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. Prior to implementation, verify minimum fan speed in cooling mode with the manufacturer. Note that savings will vary depending on the operating characteristics of each AHU.

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

Affected Air Handlers: AHUs 1-9

ECM 9: Install VFDs on Heating Water Pumps

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

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

Affected Pumps: HHW pumps located in the mechanical pump room.

4.4 Unitary HVAC

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Unitary HVAC Measures		**5,876**	**2.1**	**0**	**$1,750**	**$22,600**	**$1,100**	**$21,500**	**12.3**	**5,917**
ECM 10	Install High Efficiency Air Conditioning Units	2,847	1.2	0	$848	$10,800	$500	$10,300	12.1	2,867
ECM 11	Install High Efficiency Heat Pumps	3,029	0.9	0	$902	$11,800	$600	$11,200	12.4	3,050

ECM 10: Install High Efficiency Air Conditioning Units

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

Affected Units: split system AC unit

ECM 11: Install High Efficiency Heat Pumps

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

Affected Units: Split system air source heat pumps on the eastern roof.

4.5 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**	**2**	**$55**	**$470**	**$220**	**$250**	**4.6**	**216**
ECM 12	Install Low-Flow DHW Devices	0	0.0	2	$55	$470	$220	$250	4.6	216

ECM 12: Install Low-Flow DHW Devices

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

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

Low-flow devices reduce the overall water flow from the fixture, while still providing adequate pressure for washing.

#	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)
Custom Measures		**99,606**	**0.0**	**306**	**$38,739**	**$451,100**	**$0**	**$451,100**	**11.6**	**136,102**
ECM 13	Retro-Commissioning Study	103,545	0.0	264	$38,667	$446,500	$0	$446,500	11.5	135,151
ECM 14	Replace Gas Fired Water Heater with Heat Pump Water Heater	-3,939	0.0	42	$72	$4,600	$0	$4,600	63.9	951

ECM 13: Retro-Commissioning Study

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

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

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

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

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

A high-level evaluation of potential savings and costs is provided for demonstration purposes only. It is a screening evaluation for the potential in HVAC control improvements. Based on industry standards and previous project experience, the potential energy savings may be up to 15% of existing HVAC energy use. We estimate the cost of retro-commissioning studies and control improvements of $4.00 per square foot. Actual savings and costs will need to be outlined by the specific contractor engaged to perform the study. For the purposes of this report, we have conservatively estimated savings to be 7.2% of the HVAC energy consumption baseline.

ECM 14: Replace Gas Fired Water Heater with Heat Pump Water Heater

We evaluated replacing existing the gas water heater with a heat pump water heater (HPWH).

A gas fired water heater uses a burner to heat water. Air source heat pump water heaters use a refrigeration cycle to transfer heat from the surrounding air to the domestic water. Water heater efficiency is rated by the uniform energy factor (UEF). For a relative comparison of water heater UEFs, the criteria for certifying a water heater in the ENERGY STAR program are provided below. These values indicate that HPWH heaters are significantly more efficient than gas fired water heaters.

There are two types of HPWH: those integrated with the heat pump and storage tank in the same unit, and those that are split into two sections (with the storage tank separate from the heat pump). The measure considers an integrated HPWH.

ENERGY STAR Uniform Energy Factor (UEF) Criteria for Certified Water Heaters *

Water Heater Type	*Minimum UEF*	*Other*
Integrated HPWH	3.3	
Integrated HPWH	2.2	120 Volt, 15 Amp circuit
Split System HPWH	2.2	
Gas Fired Storage	0.64	≤ 55 gal, Medium Draw Pattern
Gas Fired Storage	0.68	≤ 55 gal, High Draw Pattern
Gas Fired Storage	0.78	> 55 gal, Medium Draw Pattern
Gas Fired Storage	0.80	> 55 gal, High Draw Pattern
Gas Fired Storage	0.80	Residential Duty
Gas Fired Instantaneous	0.87	

** Note: Uniform Energy Factor (UEF): The newest measure of water heater overall efficiency. The higher the UEF value is, the more efficient the water heater. UEF is determined by the Department of Energy's test method outlined in 10 CFR Part 430, Subpart B, Appendix E.*[6]

HPWH reject cold air. As such, they need to be installed in an unconditioned space of about 750 cubic feet with good ventilation[7]. Ideal locations are garages, large enclosed, unconditioned storage areas, or areas with excess heat such as a furnace or boiler room. The HPWH will also produce condensate so accommodations for draining the condensate need to be provided.

Most HPWH operate effectively down to an air temperature of 40 °F. Below that temperature, an electric resistance booster heater is typically required to achieve full heating capacity. It is critical that the HPWH controls are set up so that the electric resistance heat only engages when the air temperature is too cold for the HPWH to extract heat from it. HPWHs have a slow recovery. During periods of high demand, the electric resistance heating element, if enabled, may be energized to maintain set point, thus reducing the overall efficiency of the unit. It is recommended that a careful analysis of the hot water demand be

[6] https://www.energy.gov/sites/prod/files/2014/06/f17/rwh_tp_final_rule.pdf

[7] https://basc.pnnl.gov/code-compliance/heat-pump-water-heaters-code-compliance-brief#:~:text=HPWH%20must%20have%20unrestricted%20airflow,depending%20on%20size%20of%20system

conducted to determine if the application makes economic sense, and the HPWH heating capacity and storage are properly sized.

HPWH operate most effectively when the temperature difference between the incoming and outgoing water is high. Generally, this means that cold make-up water should be piped to the bottom of the tank and return water should be piped to the top of the tank to maintain stratification within the storage tank. Water should be drawn from the bottom of the tank to be heated. If there is a DHW recirculation pump, it should only be operated during high hot water demand periods.

Switching from a gas fired water heater to a HPWH has the potential to reduce the sites overall greenhouse gas emissions. If the electricity for the HPWH is provided by an on-site photovoltaic (PV) system then there are essentially no greenhouse gas (GHG) emissions. A 2016 study conducted at Cornell[8] calculated the kg of methane (CH_4) and carbon dioxide (CO_2) produced per GJ of water heated. The study compared HPWH to gas and electric fired, storage and tankless water heaters. The study also considered electricity produced from natural gas and coal fired electric plants. In all cases the study found that HPWHs produced less methane than all of the other water heaters. The study also found that HPWH produced less carbon dioxide than electric resistance water heaters but more carbon dioxide than tankless gas water heaters and about the same amount of carbon dioxide as storage gas water heaters. The summary tables provide the reduction in CO2 equivalent emissions based on the typical New Jersey electric utility.

Affected Units: The DHW system.

4.6 Measures for Future Consideration

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

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

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

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

Upgrade to a Heat Pump System

Electric resistance heating units work by passing an electric current through wires to heat them. The system is 100% efficient since for every unit of electricity consumed, one unit of heat is produced.

But there is a way to convert electricity to create heat at better than a 1:1 ratio. Heat pumps operate on a more efficient principle, the refrigeration cycle. Instead of directly converting electricity to heat,

[8] Greenhouse gas emissions from domestic hot water: Heat pumps compared to most commonly used systems. Bongghi Hong, Robert W. Howarth. Department of Ecology and Evolutionary Biology, Cornell University. Energy Science and Engineering 2016.

electricity does the work, via a compressor, of moving refrigerant through a system that transfers heat from a cooler place to a warmer place. That system can move three to five as much energy as is available using electric resistance heating methods. Heat pumps work in a similar manner to an air conditioner, except they reverse the cooling process to circulate warm air instead of cold air. Also, heat pumps are generally capable of dispensing refrigerated air as they can typically be operated in air conditioning mode.

Electric resistance heat, including electric furnaces and baseboard heaters, can be inexpensive to install but often expensive to run. Facilities with these systems can save substantial energy at a moderate cost by installing a heat pump when they replace a central air conditioner.

Even in buildings without central air-conditioning, there are opportunities to save energy when an existing electric furnace needs to be replaced, as well as opportunities to install ductless electric heat pumps in buildings with baseboard electric heaters and electric fan coils. Unit ventilators with built-in electric resistance heaters can be replaced with unit ventilators with integrated heat pumps.

Electric heat pumps have high coefficient of performance (COP) ratings and are substantially more efficient than traditional electric heating systems. Further investigation is required to determine whether installing a heat pump system is a cost-effective solution when replacing existing electrical heating systems.

VRF Systems

Consider variable refrigerant flow (VRF) systems as part of a comprehensive package unit upgrade project. (VRF systems use direct expansion (DX) heat pumps to transport heat between an outdoor condensing unit and a network of indoor evaporators, located near or within the conditioned space, through refrigerant piping installed in the building. Attributes that distinguish VRF from other DX system types are:

- Multiple indoor units connected to a common outdoor unit
- Scalability
- Variable capacity
- Distributed control
- Simultaneous heating and cooling capability

VRF provides flexibility by allowing for many different indoor units (with different capacities and configurations), individual zone control, the unique ability to offer simultaneous heating and cooling in separate zones on a common refrigerant circuit, and heat recovery from one zone to another. VRF systems are equipped with at least one variable-speed and/or variable-capacity compressor.

To match the building's load profiles, energy is transferred from one indoor space to another through the refrigerant line, and only one energy source is necessary to provide both heating and cooling. VRF systems also operate efficiently at part load because of the compressor's variable capacity control. VRF systems are ideal for applications with varying loads or where zoning is required. Some other advantages of VRF systems include consistent comfort, quiet operation, energy efficiency, installation flexibility, zoned heating and cooling, state-of-the-art controls, and reliability.

VRF systems are more expensive than conventional heat pump systems; however, the higher initial cost can be offset by improved cooling efficiency during part load operation—a SEER (cooling) rating of 18.0 is not uncommon for small packaged VRF-equipped heat pumps.

When you are replacing packaged HVAC equipment, we recommend a comprehensive approach. Work with your contractor or design engineer to make sure your systems are sized and zoned according to current space configurations and occupancy. Select high efficiency equipment and controls that match your heating and cooling needs. Commission the system and controls to ensure proper operation, comfort, ventilation, and energy use.

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[9] . 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.

Window Treatments/Coverings

Use high-reflectivity films or cover windows with shades or shutters to reduce solar heat gain and reduce the load on cooling and heating systems. Older, single-pane windows and east- or west-facing windows are especially prone to solar heat gain. In addition, use shades or shutters at night during cold weather to reduce heat loss.

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

Lighting Maintenance

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

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

Lighting Controls

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

Motor Controls

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

Motor Maintenance

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

Fans to Reduce Cooling Load

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

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.

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 BAS 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 (BAS) typically provide advanced controls for building HVAC systems, including chillers, boilers, air handling units, rooftop units and exhaust fans. The BAS 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 BAS features, when in proper adjustment, can improve comfort for building occupants and save substantial energy.

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

Water Heater Maintenance

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

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

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

Compressed Air System Maintenance

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

- Inspection, cleaning, and replacement of inlet filter cartridges.
- Cleaning of drain traps.
- Daily inspection of lubricant levels to reduce unwanted friction.
- Inspection of belt condition and tension.
- Check for leaks and adjust loose connections.
- Overall system cleaning.
- Reduce pressure setting to minimum needed for air operated equipment.
- Turn off compressor if not routinely needed.
- Use low pressure blower air rather than high pressure compressed air.

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

Refrigeration Equipment Maintenance

Preventative maintenance keeps commercial refrigeration equipment running reliably and efficiently. Commercial refrigerators and freezers are mission-critical equipment that can cost a fortune when they go down. Even when they appear to be working properly, refrigeration units can be consuming too much energy. Have walk-in refrigeration and freezer and other commercial systems serviced at least annually. This practice will allow systems to perform to their highest capabilities and will help identify system issues if they exist.

Maintaining your commercial refrigeration equipment can save between five and ten percent on energy costs. When condenser coils are dirty, your commercial refrigerators and freezers work harder to maintain the temperature inside. Worn gaskets, hinges, door handles or faulty seals cause cold air to leak from the unit, forcing the unit to run longer and use more electricity.

Regular cleaning and maintenance also help your commercial refrigeration equipment to last longer.

Procurement Strategies

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

6 WATER BEST PRACTICES

Getting Started

The commercial and institutional sector is the second largest consumer of publicly supplied water in the United States, accounting for 17% of the withdrawals from public water supplies[10]. In New Jersey, excluding water used for power generation, approximately 80% of total water use was attributed to potable supply during the period of 2009 to 2018. Water withdrawals for potable supply have not changed noticeably during the period from 1990 to 2018[11].

Water management planning serves as the foundation for any successful water reduction effort. It is the first step a commercial or institutional facility owner or manager should take to achieve and sustain long-term water savings. Understanding how water is used within a facility is critical for the water management planning process. A water assessment provides a comprehensive account of all known water uses at the facility. It allows the water management team to establish a baseline from which progress and program success can be measured. It also enables the water management team to set achievable goals and identify and prioritize specific projects based on the relative savings opportunities and project cost-effectiveness.

Water conservation devices may significantly reduce your water and sewer usage costs. Any reduction in water use reduces grid-level electricity use since a significant amount of electricity is used to treat and deliver water from reservoirs to end users.

For more information regarding water conservation or additional details regarding the practices shown below go to the EPA's WaterSense website[12] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[13] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Leak Detection and Repair

Identifying and repairing leaks and other water use anomalies within a facility's water distribution system or from processes or equipment can keep a facility from wasting significant quantities of water. Examples of common leaks include leaking toilets and faucets, drip irrigation malfunctions, stuck float valves, and broken distribution lines. Reading meters, installing failure abatement technologies, and conducting visual and auditory inspections are important best practices to detect leaks. Train building occupants, employees, and visitors to report any leaks that they detect. To reduce unnecessary water loss, detected leaks should be repaired quickly. Repairing leaks in water distribution that is pressurized by on-site pumps or in heated or chilled water piping will also reduce energy use.

Toilets and Urinals

Toilets and urinals are considered sanitary fixtures and are found in most facilities. High efficiency fixtures are at least 20% more efficient than available standard products. Leaking or damaged equipment is a substantial source of water waste. Train users to report continuously flushing, leaking, or otherwise improperly operating equipment to the appropriate personnel. Depending on the age of the equipment

[10] Estimated from analyzing data in: Solley, Wayne B,. et al, "Estimated Use of Water in the United States in 1995", U.S Geological Suvey Circular 1200, (1998)

[11] https://dep.nj.gov/wp-content/uploads/dsr/trends-water-supply.pdf

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

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

and the frequency of use, it may be cost effective to replace older inefficient fixtures with current generation WaterSense labeled equipment.

Commercial facilities typically use tank toilets or wall-mount flushometers. Educate and inform users with restroom signage and other means to avoid flushing inappropriate objects. For tank toilets, periodically check to ensure fill valves are working properly and that water level is set correctly. Annually test toilets to ensure the flappers are not worn or allowing water to seep from the tank into the bowl and down the sewer. Control stops and piston valves on flushometer toilets should be checked at least annually.

Most urinals use water to flush liquid. These standard single-user fixtures are present in most facilities. Non-water urinals use a specially designed trap that allows liquid waste to drain out of the fixture through a trap seal, and into the drainage system. Flushing urinals should be inspected at least annually for proper valve and sensor operation. For non-water urinals, follow maintenance practices as directed by the manufacturer to ensure products perform as expected. Non-water urinals can be considered during urinal replacement, however, review the condition and design of the existing plumbing system and the expected usage patterns to ensure that these products will provide the anticipated performance.

Faucets and Showerheads

Faucets and showerheads are sanitary fixtures that generally dispense heated water. Reducing water use by these fixtures translates into a reduction of site fuel or electric use depending on how water is heated. High efficiency fixtures are at least 20% more efficient than available standard products. Leaking or damaged equipment is a substantial source of water waste. Train users to report continuously dripping, leaking, or otherwise improperly operating equipment to the appropriate personnel. Depending on the age of the equipment and the frequency of use, it may be cost effective to replace older fixtures with current generation WaterSense labeled equipment.

Faucets are used for a variety of purposes, and standard flow rates are dictated by the intended use. Public use lavatory faucets and kitchen faucets are subject to maximum flow rates while service sinks are not. Periodically inspect faucet aerators for scale buildup to ensure flow is not being restricted. Clean or replace the aerator or other spout end device as needed. Check and adjust automatic sensors (where installed) to ensure they are operating properly to avoid faucets running longer than necessary. Post materials in restrooms and kitchens to ensure user awareness of the facility's water-efficiency goals. Remind users to turn off the tap when they are done and to consider turning the tap off during sanitation activities when it is not being used. Consider installing lavatory and kitchen faucet fixtures with reduced flow. Federal standards limit kitchen and restroom faucet flows to 2.2 gpm. To qualify for a WaterSense label a faucet cannot exceed 1.5 gpm.

Effective in 1992, the maximum allowable flow rate for all showerheads sold in the United States is 2.5 gpm. Since this standard was enacted, many showerheads have been designed to use even less water. WaterSense labeled equipment is designed to use 2.0 gpm, or less. For optimum showerhead efficiency, the system pressure should be tested to make sure that it is between 20 and 80 pounds per square inch (psi). Verify that plumbing lines are routed through a shower valve to prevent water pressure fluctuations. Periodically inspect showerheads for scale buildup to ensure flow is not being restricted. In general, replace showerheads with 2.5 gpm flow rates or higher with WaterSense labeled models. Note: Use of poor performing replacement reduced flow showerheads may result in increased use if the duration of use is increased to compensate for reduced performance. WaterSense labeled showerheads are independently certified to meet or exceed minimum performance requirements for spray coverage and force.

7 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.

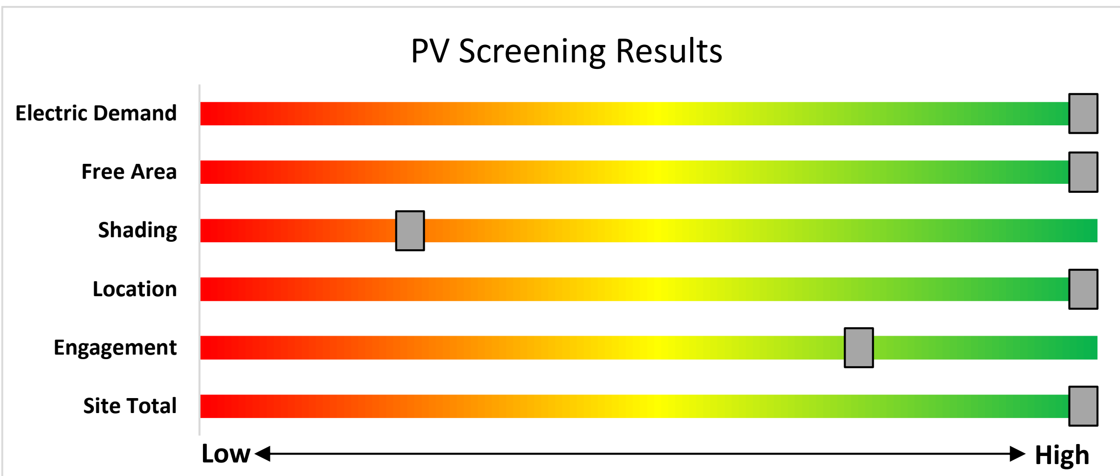
7.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	161	kW DC STC
Electric Generation	121,144	kWh/yr
Displaced Cost	$36,090	/yr
Installed Cost	$418,600	

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

7.2 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.

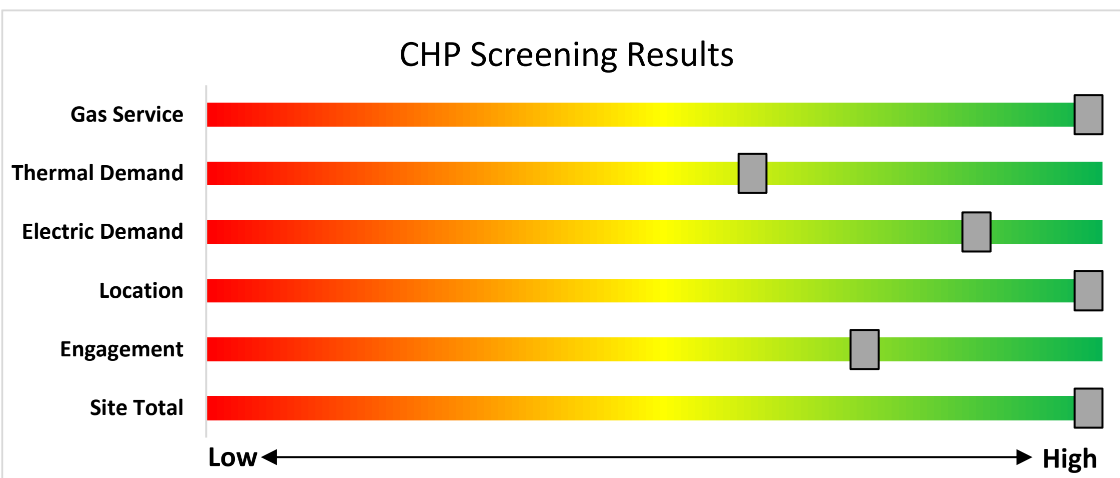
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be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

The magnitude, type, and duration of the thermal demand, the coincident electric load, and the ease of interconnection contribute to the potential for CHP at the site. Based on the amount of hot water used throughout the year and the concurrent electric demand a Microturbine may be feasible. If you are interested in pursuing CHP, we recommend performing a detailed feasibility study, which will provide a thorough understanding of the costs and savings associated with this technology.

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.



Potential	High	
System Type	Microturbine	
System Potential	90	kW
Electric Generation	693,260	kWh/yr
Thermal Generation	4,078,000	MBtu/yr
Displaced Cost	$100,235	/yr
Installed Cost	$321,000	

Combined Heat and Power Screening

The highest screening result is a 90 kW microturbine system. Currently, Capstone does not produce 30 kW units to allow for a three, 30 kW modular arrangement. For this reason, we are recommending two C65 (65 kW) with a lower heating value (LHV) efficiency of 28 percent. CHP efficiency of 90% can meet the site needs with flexible loading. Capstone also has the C65 ICHP microturbine (producing both electricity and thermal power) that can provide up to an additional 150 kW of thermal power for CHP and combined cooling, heating and power (CCHP).

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/

8 Electric Vehicles

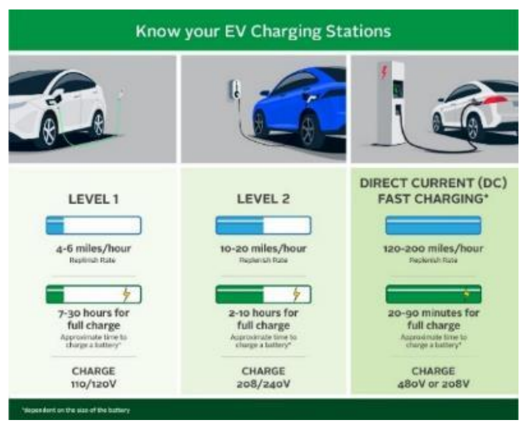
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes all-electric vehicles as zero-emission vehicles because they produce no direct exhaust or tailpipe emissions.

EVs are typically more expensive than similar conventional and hybrid vehicles, although some cost can be recovered through fuel savings, federal tax credit, or state incentives

8.1 EV Charging

EV charging stations provide a means for electric vehicle operators to recharge their batteries at a facility. While many EV drivers charge at home, others do not have access to regular home charging, and the ability to charge at work or in public locations is critical to making EVs practical for more drivers. Charging can also be used for electric fleet vehicles, which can reduce fuel and maintenance costs for fleets that replace gas or diesel vehicles with EVs.

EV charging comes in three main types. For this assessment, the screening considers addition of Level 2 charging, which is most common at workplaces and other public locations. Depending on the site type and usage, other levels of charging power may be more appropriate.



The preliminary assessment of EV charging at the facility shows that there is no potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

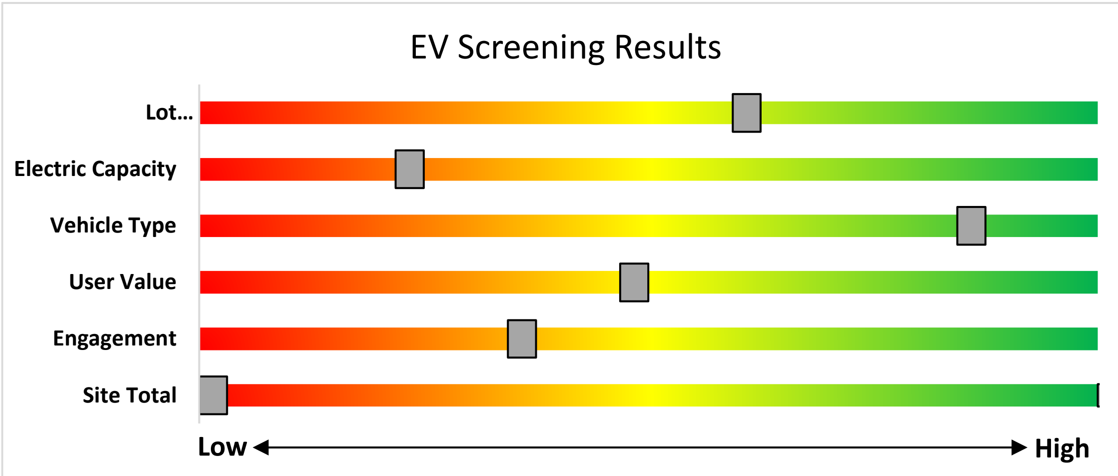
The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

The type and size of the parking area impact the costs and feasibility of adding EV charging. Parking structure installations can be less costly than surface lot installations as power may be readily available, and equipment and wiring can be surface mounted. Parking lot installations often require trenching through concrete or asphalt surface. Large parking areas provide greater flexibility in charger siting than smaller lots.

The location and capacity of facility electric panels also impact charger installation costs. A Level 2 charger generally requires a dedicated 208-240V, 40 Amp circuit. The electric panel nearest the planned installation may not have available capacity and may need to be upgraded to serve new EV charging loads. Alternatively, chargers could be powered from a more distant panel. The distance from the panel to the location of charging stations ties directly to costs, as conduits, cables, and potential trenching costs all increase on a per-foot basis. The more charging stations planned, the more likely it is that additional electrical capacity will be needed.

Other factors to consider when planning for EV charging at a facility include who the intended users are, how long they park vehicles at the site, and whether they will need to pay for the electricity they use.

The graphic below displays the results of the EV charging assessment conducted as part of this audit. The position of each slider indicates the impact each factor has on the feasibility of installing EV charging at the site.



EV Charger Screening

Electric Vehicle Programs Available

New Jersey is leading the way on electric vehicle (EV) adoption on the East Coast. There are several programs designed to encourage EV adoption in New Jersey, which is crucial to reaching a 100% clean energy future.

NJCEP offers a variety of EV programs for vehicles, charging stations, and fleets. Certain EV charging stations that receive electric utility service from Atlantic City Electric Company (ACE), Public Service Electric and Gas Company (PSE&G) or Jersey Central Power and Light (JCP&L), may be eligible for additional electric vehicle charging incentives directly from the utility. Projects may be eligible for both the incentives offered by this BPU program and incentives offered by ACE, PSE&G or JCP&L, up to 90% of the combined charger purchase and installation costs. Please check ACE, PSE&G or JCP&L program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

EV Charging incentive information is available from Atlantic City Electric, PSE&G and JCP&L.For more information and to keep up to date on all EV programs please visit https://www.njcleanenergy.com/commercial-industrial/programs/electric-vehicle-programs

9 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? New Jersey's Clean Energy Programs and Utility Energy Efficiency Programs can help. Pick the program that works best for you. This section provides an overview of currently available incentive programs in New Jersey.

NJBPU and NJCEP Administered Programs

New Jersey's cleanenergy program™

- New Construction (residential, commercial, industrial, government)
- Large Energy Users
- Energy Savings Improvement Program (financing)
- State Facilities Initiative*
- Local Government Energy Audits
- Combined Heat & Power & Fuel Cells

*State facilities are also eligible for utility programs

Utility Administered Programs

atlantic city electric – An Exelon Company; Jersey Central Power & Light – A FirstEnergy Company; PSEG; Rockland Electric Company; Elizabethtown Gas; South Jersey Gas; New Jersey Natural Gas

- Existing buildings (residential, commercial, industrial, government)
- Efficient Products
  - Lighting & Marketplace
  - HVAC
  - Appliance Rebates
  - Appliance Recycling

9.1 New Jersey's Clean Energy Program

Save money while saving the planet! New Jersey's Clean Energy Program is a statewide program that offers incentives, programs, and services that benefit New Jersey residents, businesses, educational, non-profit, and government entities to help them save energy, money, and the environment.

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. To qualify entities must have incurred at least $5 million in total 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 http://www.njcleanenergy.com/LEUP.

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[14]

Eligible Technology	Size (Installed Rated Capacity)	Incentive ($/Watt)[5]	% of Total Cost Cap per Project	$ Cap per Project
CHPs powered by non-renewable or renewable fuel source, or a combination:[4] - Gas Internal Combustion Engine - Gas Combustion Turbine - Microturbine Fuel Cells ≥60%	≤500 kW[1]	$2.00	30-40%[2]	$2 million
	>500 kW - 1 MW[1]	$1.00		
	> 1 MW - 3 MW[1]	$0.55	30%	$3 million
	>3 MW[1]	$0.35		
Fuel Cells ≥40%	Same as above[1]	Applicable amount above	30%	$1 million
Waste Heat to Power (WHP)[3] Powered by non-renewable fuel source. Heat recovery or other mechanical recovery from existing equipment utilizing new electric generation equipment (e.g. steam turbine)	≤1MW[1]	$1.00	30%	$2 million
	> 1MW[1]	$.50	30%	$3 million

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1 Incentives are tiered, which means the incentive levels vary based upon the installed rated capacity, as listed in the chart above. For example, a 4 MW CHP system would receive $2.00/watt for the first 500 kW, $1.00/watt for the second 500 kW, $0.55/watt for the next 2 MW and $0.35/watt for the last 1 MW (up to the caps listed).

2 The maximum incentive will be limited to 30% of total project. For CHP projects up to 1 MW, this cap will be increased to 40% where a cooling application is used or included with the CHP system (e.g. absorption chiller).

3 Projects will be eligible for incentives shown above, not to exceed the lesser of % of total project cost per project cap or maximum $ per project cap. Projects installing CHP or FC with WHP will be eligible for incentive shown above, not to exceed the lesser caps of the CHP or FC incentive. Minimum efficiency will be calculated based on annual total electricity generated, utilized waste heat at the host site (i.e. not lost/rejected), and energy input.

4 Systems fueled by a Class 1 Renewable Fuel Source, as defined by N.J.A.C. 14:8-2.5, are eligible for a 30% incentive bonus. If the fuel is mixed, the bonus will be prorated accordingly. For example, if the mix is 60/40 (60% being a Class 1 renewable), the bonus will be 18%. This bonus will be included in the final performance incentive payment, based on system performance and fuel mix consumption data. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

5 CHP-FC systems located at Critical Facility and incorporating blackstart and islanding technology are eligible for a 25% incentive bonus. This bonus incentive will be paid with the second/Installation incentive payment. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

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 http://www.njcleanenergy.com/CHP.

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.

Competitive Solar Incentive (CSI) Program

The CSI Program opened on April 15, 2023, and will serve as the permanent program within the SuSI Program providing incentives to larger solar facilities. The CSI Program is open to qualifying grid supply solar facilities, non-residential net metered solar installations with a capacity greater than five (5) megawatts ("MW"), and to eligible grid supply solar facilities installed in combination with energy storage.

CSI eligible facilities will only be allowed to register in the CSI program upon award of a bid pursuant to N.J.A.C. 14:8-11.10.

The CSI program structure has separate categories, or tranches, to ensure that a range of solar project types, including those on preferred sites, are able to participate despite potentially different project cost profiles. The Board has approved four tranches for grid supply and large net metered solar and an additional fifth tranche for storage in combination with grid supply solar. The following table lists procurement targets for the first solicitation:

Tranche	Project Type	MW (dc) Targets
Tranche 1.	Basic Grid Supply	140
Tranche 2.	Grid Supply on the Built Environment	80
Tranche 3.	Grid Supply on Contaminated Sites and Landfills	40
Tranche 4.	Net Metered Non- Residential	40
Tranche 5.	*Storage Paired with Grid	160 MWh

*The storage tranche of 160 MWh corresponds to a 4-hour storage pairing of 40 MW of solar

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 on your building, visit the following link for more information: https://njcleanenergy.com/renewable-energy/programs/susi-program

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 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.

Demand Response (DR) Energy Aggregator

Demand Response Energy Aggregator is a program designed to reduce the electric load when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Grid operators call upon curtailment service providers and commercial facilities to reduce electric usage during times of peak demand, making the grid more reliable and reducing transmission costs for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail its electric usage.

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

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

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

The first step toward participation in a DR program is to contact a curtailment service provider. A list of these providers is available on the website of the independent system operator, PJM, and it includes contact information for each company, as well as the states where they have active business[15]. PJM also posts training materials for program members interested in specific rules and requirements regarding DR activity along with a variety of other DR program information[16].

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

[15] http://www.pjm.com/markets-and-operations/demand-response.aspx.

[16] http://www.pjm.com/training/training-events.aspx.

9.2 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.

Prescriptive and Custom

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

Equipment Examples

Lighting
Lighting Controls
HVAC Equipment
Refrigeration
Gas Heating
Gas Cooling
Commercial Kitchen Equipment
Food Service Equipment
Variable Frequency Drives
Electronically Commutate Motors
Variable Frequency Drives
Plug Loads Controls
Washers and Dryers
Agricultural
Water Heating

The Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type. The Custom program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives.

Direct Install

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW or less over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives, and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures.

How to Participate

To participate in Direct Install, you will work with a participating contractor. The contractor will be paid the measure incentives directly by the program, which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the Direct Install program, subject to program rules and eligibility, while the remaining percent of the cost is paid to the contractor by the customer.

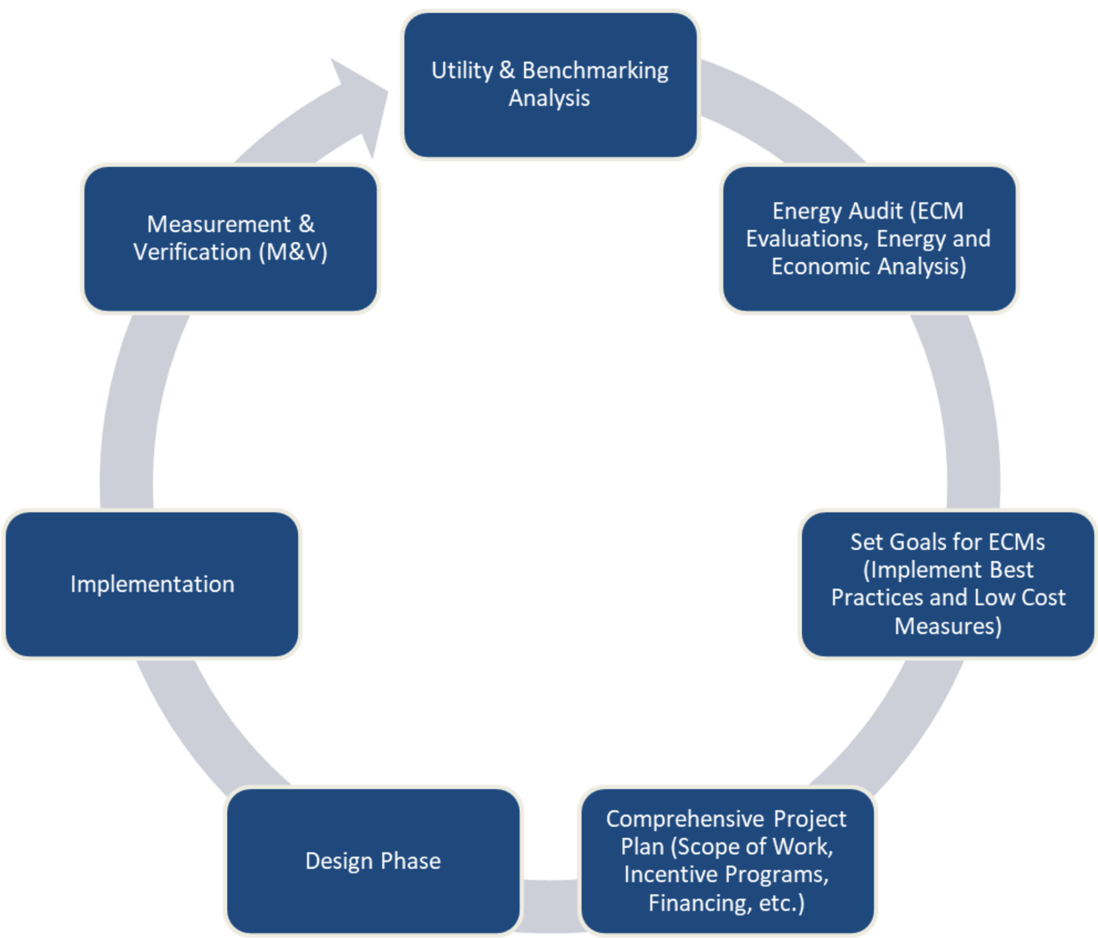
Engineered Solutions

The Engineered Solutions Program provides tailored energy-efficiency assistance and services to municipalities, universities, schools, hospitals, and healthcare facilities (MUSH), non-profit entities, and multifamily buildings. Customers receive expert guided services, including investment-grade energy auditing, engineering design, installation assistance, construction administration, commissioning, and measurement and verification (M&V) services to support the implementation of cost-effective and comprehensive efficiency projects. Engineered Solutions is generally a good option for medium to large sized facilities with a peak demand over 200 kW looking to implement as many measures as possible under a single project to achieve deep energy savings. Engineered Solutions has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program. Incentives for this program are based on project scope and energy savings achieved.

For more information on any of these programs, contact your local utility provider or visit https://www.njcleanenergy.com/transition.

10 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.



Project Development Cycle

11 Energy Purchasing and Procurement Strategies

11.1 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[17].

11.2 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[18].

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

[18] 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
Corridor 3rd Floor West	19	Incandescent: (1) 50W C9 Screw-In Lamp	Wall Switch	S	50	3,000	3, 7	Relamp	Yes	19	LED Lamps: (1) 8W Screw-In Lamp	High/Low Control	8	2,070	0.7	2,738	-1	$798	$1,320	$160	1.5
Corridor 3rd Floor West	5	Incandescent: (2) 50W C9 Screw-In Lamps	Wall Switch	S	100	3,000	3, 7	Relamp	Yes	5	LED Lamps: (2) 8W Screw-In Lamp	High/Low Control	15	2,070	0.4	1,452	0	$423	$330	$50	0.7
Corridor 3rd Floor West	1	LED Lamps: (5) 10W A15 Screw-In Lamps	None	S	50	3,000		None	No	1	LED Lamps: (5) 10W A15 Screw-In Lamps	None	50	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (2) 7W A15 Screw-In Lamps	Wall Switch	S	14	3,000		None	No	1	LED Lamps: (2) 7W A15 Screw-In Lamps	Wall Switch	14	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	5	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,000		None	No	5	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	4	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	3,000	7	None	Yes	4	LED Lamps: (4) 10W A19 Screw-In Lamps	High/Low Control	40	2,070	0.0	161	0	$47	$270	$40	4.9
Corridor 3rd Floor West	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	3,000	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	3,000	0.0	49	0	$14	$40	$0	2.8
Corridor 3rd Floor West	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6
Corridor 3rd Floor West	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	Halogen Incandescent: (1) 100W Screw-in Lamps	Wall Switch	S	100	3,000	3	Relamp	No	1	LED Lamps: (1) 15W Plug-In Lamp	Wall Switch	15	3,000	0.1	275	0	$80	$30	$0	0.4
Corridor 3rd Floor West	16	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch	S	80	3,000	7	None	Yes	16	LED Lamps: (8) 10W A19 Screw-In Lamps	High/Low Control	80	2,070	0.4	1,286	0	$375	$560	$560	0.0
Corridor 3rd Floor West	6	LED Lamps: (1) 10W PAR36 Screw-In Lamp	Wall Switch	S	10	3,000	7	None	Yes	6	LED Lamps: (1) 10W PAR36 Screw-In Lamp	High/Low Control	10	2,070	0.0	60	0	$18	$280	$210	4.0
Corridor 3rd Floor West	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6
Corridor 3rd Floor West	17	Halogen Incandescent: (1) 100W Screw-in Lamps	Wall Switch	S	100	3,000	3	Relamp	No	17	LED Lamps: (1) 15W Plug-In Lamp	Wall Switch	15	3,000	1.3	4,682	-1	$1,365	$430	$50	0.3
Corridor 3rd Floor West	1	LED Lamps: (11) 7W A15 Screw-In Lamps	None	S	77	3,000		None	No	1	LED Lamps: (11) 7W A15 Screw-In Lamps	None	77	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (2) 7W A15 Screw-In Lamps	None	S	14	3,000		None	No	1	LED Lamps: (2) 7W A15 Screw-In Lamps	None	14	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (3) 7W A15 Screw-In Lamps	None	S	21	3,000		None	No	1	LED Lamps: (3) 7W A15 Screw-In Lamps	None	21	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (4) 7W A15 Screw-In Lamps	None	S	28	3,000		None	No	1	LED Lamps: (4) 7W A15 Screw-In Lamps	None	28	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (4) 7W A15 Screw-In Lamps	None	S	28	3,000		None	No	1	LED Lamps: (4) 7W A15 Screw-In Lamps	None	28	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (6) 7W A15 Screw-In Lamps	None	S	42	3,000		None	No	1	LED Lamps: (6) 7W A15 Screw-In Lamps	None	42	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (6) 7W A15 Screw-In Lamps	Wall Switch	S	42	3,000		None	No	1	LED Lamps: (6) 7W A15 Screw-In Lamps	Wall Switch	42	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (10) 10W A19 Screw-In Lamps	None	S	100	3,000		None	No	1	LED Lamps: (10) 10W A19 Screw-In Lamps	None	100	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (10) 10W A19 Screw-In Lamps	Wall Switch	S	100	3,000		None	No	1	LED Lamps: (10) 10W A19 Screw-In Lamps	Wall Switch	100	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (11) 10W A19 Screw-In Lamps	None	S	110	3,000		None	No	1	LED Lamps: (11) 10W A19 Screw-In Lamps	None	110	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (12) 10W A19 Screw-In Lamps	None	S	120	3,000		None	No	1	LED Lamps: (12) 10W A19 Screw-In Lamps	None	120	3,000	0.0	0	0	$0	$0	$0	0.0

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor 3rd Floor West	1	LED Lamps: (13) 10W A19 Screw-In Lamps	None	S	130	3,000		None	No	1	LED Lamps: (13) 10W A19 Screw-In Lamps	None	130	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	1	LED Lamps: (14) 10W A19 Screw-In Lamps	None	S	140	3,000		None	No	1	LED Lamps: (14) 10W A19 Screw-In Lamps	None	140	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,000		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	8	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,000		None	No	8	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,000	3, 7	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,070	0.1	408	0	$119	$710	$140	4.8
Corridor 3rd Floor West	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	3,000	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	3,000	0.0	165	0	$48	$30	$0	0.6
Corridor 3rd Floor West	3	Incandescent: (1) 60W BR30 Screw-In Lamp	Wall Switch	S	60	3,000	3, 7	Relamp	Yes	3	LED Lamps: BR30 Lamps	High/Low Control	9	2,070	0.1	523	0	$152	$360	$120	1.6
Corridor 3rd Floor West	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,000	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,000	0.1	214	0	$62	$100	$20	1.3
Corridor 3rd Floor West	2	Exit Signs: LED - 5 W Lamp	None		5	8,760		None	No	2	Exit Signs: LED - 5 W Lamp	None	5	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	3,000		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	3,000	0.0	0	0	$0	$0	$0	0.0
Corridor 3rd Floor West	4	LED Lamps: (3) 10W A19 Screw-In Lamps	Wall Switch	S	30	3,000	7	None	Yes	4	LED Lamps: (3) 10W A19 Screw-In Lamps	High/Low Control	30	2,070	0.0	121	0	$35	$280	$140	4.0
Corridor 3rd Floor West	2	LED Lamps: (3) 10W A19 Screw-In Lamps	Wall Switch	S	30	3,000	7	None	Yes	2	LED Lamps: (3) 10W A19 Screw-In Lamps	High/Low Control	30	2,070	0.0	60	0	$18	$280	$70	12.0
Corridor 3rd Floor West	2	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	S	20	3,000	7	None	Yes	2	LED Lamps: (2) 10W A19 Screw-In Lamps	High/Low Control	20	2,070	0.0	40	0	$12	$280	$70	17.9
Corridor 3rd Floor West	3	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch		10	3,000	7	None	Yes	3	LED Lamps: (1) 10W A19 Screw-In Lamp	High/Low Control	10	2,070	0.0	30	0	$9	$270	$40	26.2
Corridor 3rd Floor West	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch		40	3,000		None	No	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	3,000	0.0	0	0	$0	$0	$0	0.0
Ballroom Women's Restroom	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,000		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,000	0.0	0	0	$0	$0	$0	0.0
Ballroom Women's Restroom	1	LED Lamps: (3) 10W A19 Screw-In Lamps	None	S	30	1,000		None	No	1	LED Lamps: (3) 10W A19 Screw-In Lamps	None	30	1,000	0.0	0	0	$0	$0	$0	0.0
Ballroom Women's Restroom	2	LED Lamps: (1) 7W CA10 Screw-In Lamp	Wall Switch	S	7	1,000		None	No	2	LED Lamps: (1) 7W CA10 Screw-In Lamp	Wall Switch	7	1,000	0.0	0	0	$0	$0	$0	0.0
Ballroom Women's Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,000	0.0	17	0	$5	$40	$10	6.0
Board Room	6	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch	S	80	1,200	5	None	Yes	6	LED Lamps: (8) 10W A19 Screw-In Lamps	Occupancy Sensor	80	828	0.1	193	0	$56	$330	$40	5.2
Box Office	4	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	200	3, 5	Relamp	Yes	4	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	138	0.1	23	0	$7	$300	$30	40.5
Box Office	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	200		None	No	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	200	0.0	0	0	$0	$0	$0	0.0
Catering 2	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,500	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.2	428	0	$125	$400	$80	2.6
Catering 2 Entry Way	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.0	53	0	$16	$50	$10	2.6
Corridor	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6

	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
Corridor	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	7,500	3, 7	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	5,175	0.3	2,381	-1	$694	$910	$320	0.8
Corridor Back Loading Dock	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6
Corridor Back Loading Dock	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Back Loading Dock	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,500	3, 7	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,725	0.3	794	0	$231	$910	$320	2.5
Corridor Catering 2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	3,000	3, 7	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,070	0.1	408	0	$119	$430	$140	2.4
Corridor Basement Electrical Room	3	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	255	0	$74	$270	$0	3.6
Corridor Basement Electrical Room	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,500	3, 7	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,725	0.5	1,474	0	$430	$1,510	$590	2.1
Corridor Meeting Room 2	2	Compact Fluorescent: (2) 26W A19 Screw-In Lamps	Wall Switch	S	52	2,500	3, 7	Relamp	Yes	2	LED Lamps: A19 Lamps	High/Low Control	37	1,725	0.0	143	0	$42	$360	$70	7.0
Corridor Meeting Room 2	2	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	170	0	$50	$180	$0	3.6
Corridor Meeting Room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,500	0.0	89	0	$26	$50	$10	1.5
Corridor Northwest	3	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	7,500	3, 7	Relamp	Yes	3	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	37	5,175	0.1	643	0	$188	$390	$120	1.4
Corridor Northwest	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Northwest	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	S	50	7,500		None	No	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	50	7,500	0.0	0	0	$0	$0	$0	0.0
Corridor Organ Room 2	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	3,500		None	No	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	3,500	0.0	0	0	$0	$0	$0	0.0
Corridor Security	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,500	3, 7	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,725	0.1	453	0	$132	$480	$180	2.3
Corridor South East Office Suite	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	7,500	3, 7	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	5,175	0.2	1,701	0	$496	$530	$230	0.6
Corridor To Accessibility Entrance	6	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	7,500	7	None	Yes	6	LED Lamps: (1) 10W A19 Screw-In Lamp	High/Low Control	10	5,175	0.0	151	0	$44	$280	$210	1.6
Dimmer Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	800	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	552	0.1	145	0	$42	$530	$80	10.6
Dressing Room 1 Upstairs	26	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	1,000	3	Relamp	No	26	LED Lamps: G25 Lamps	Wall Switch	9	1,000	1.2	1,432	0	$418	$990	$50	2.3
Dressing Room 1 Upstairs	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	136	0	$40	$300	$50	6.3
Dressing Room 2	72	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	400	3	Relamp	No	72	LED Lamps: G25 Lamps	Wall Switch	9	400	3.2	1,586	0	$463	$2,730	$140	5.6
Dressing Room 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	36	0	$11	$250	$40	19.9
Dressing Room 3	72	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	400	3	Relamp	No	72	LED Lamps: G25 Lamps	Wall Switch	9	400	3.2	1,586	0	$463	$2,730	$140	5.6
Dressing Room 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	36	0	$11	$250	$40	19.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dressing Room 4	27	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	400	3	Relamp	No	27	LED Lamps: G25 Lamps	Wall Switch	9	400	1.2	595	0	$173	$1,020	$50	5.6
Dressing Room 4	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	36	0	$11	$250	$40	19.9
Dressing Room 5	38	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	400	3	Relamp	No	38	LED Lamps: G25 Lamps	Wall Switch	9	400	1.7	837	0	$244	$1,440	$80	5.6
Dressing Room 5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	36	0	$11	$250	$40	19.9
Dressing Room 6	72	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	400	3	Relamp	No	72	LED Lamps: G25 Lamps	Wall Switch	9	400	3.2	1,586	0	$463	$2,730	$140	5.6
Dressing Room 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	36	0	$11	$250	$40	19.9
Dressing Room 7	38	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	400	3	Relamp	No	38	LED Lamps: G25 Lamps	Wall Switch	9	400	1.7	837	0	$244	$1,440	$80	5.6
Dressing Room 7	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	36	0	$11	$250	$40	19.9
Dressing Room 8	20	Incandescent: (1) 60W G25 Screw-In Lamp	Wall Switch	S	60	400	3	Relamp	No	20	LED Lamps: G25 Lamps	Wall Switch	9	400	0.9	441	0	$128	$760	$40	5.6
Dressing Room 8	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	400	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	276	0.1	54	0	$16	$480	$70	25.8
Elevator Machine Room 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	91	0	$26	$250	$40	7.9
Elevator Machine Room 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	91	0	$26	$250	$40	7.9
Exterior CFL Wallpack	1	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Timeclock		52	4,380	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Timeclock	37	4,380	0.0	66	0	$20	$40	$0	2.0
Exterior Recessed	2	LED - Fixtures: Ambient - 2' - Indirect/Direct Fixture	Wall Switch		70	6,570	6	None	Yes	2	LED - Fixtures: Ambient - 2' - Indirect/Direct Fixture	Photocell	70	4,380	0.0	307	0	$91	$240	$0	2.6
Exterior Walkway Light Poles	24	LED Lamps: (2) 10W Screw-in Lamps	Timeclock		120	4,380		None	No	24	LED Lamps: (2) 10W Screw-in Lamps	Timeclock	120	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Walkway Light Poles	19	LED Lamps: (2) 10W Screw-in Lamps	Timeclock		120	4,380		None	No	19	LED Lamps: (2) 10W Screw-in Lamps	Timeclock	120	4,380	0.0	0	0	$0	$0	$0	0.0
Basement Foyer Near Exhibition Room	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,500		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,500	0.0	0	0	$0	$0	$0	0.0
Basement Foyer Near Exhibition Room	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,500		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,500	0.0	0	0	$0	$0	$0	0.0
Basement Foyer Near Exhibition Room	1	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch	S	80	1,500		None	No	1	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch	80	1,500	0.0	0	0	$0	$0	$0	0.0
Janitor's Closet 3rd Floor	1	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	S	60	3,276	3	Relamp	No	1	LED - Linear Tubes: (2) 4' T5 (14.5W) Lamps	Wall Switch	30	3,276	0.0	106	0	$31	$80	$10	2.3
Janitor's Closet Basement	1	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	S	30	3,276	3	Relamp	No	1	LED - Linear Tubes: (1) 4' T5 (14.5W) Lamp	Wall Switch	15	3,276	0.0	53	0	$15	$40	$10	1.9
Janitor's Closet Near Women's Room Basement Lobby	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$10	$50	$10	3.8
Lower Lobby	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6
Lower Lobby	1	LED Lamps: (11) 7W A15 Screw-In Lamps	Wall Switch	S	77	1,800		None	No	1	LED Lamps: (11) 7W A15 Screw-In Lamps	Wall Switch	77	1,800	0.0	0	0	$0	$0	$0	0.0
Lower Lobby	4	LED Lamps: (1) 7W A15 Screw-In Lamp	None	S	7	1,800		None	No	4	LED Lamps: (1) 7W A15 Screw-In Lamp	None	7	1,800	0.0	0	0	$0	$0	$0	0.0

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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
Lower Lobby	2	LED Lamps: (2) 7W A15 Screw-In Lamps	Wall Switch	S	14	1,800		None	No	2	LED Lamps: (2) 7W A15 Screw-In Lamps	Wall Switch	14	1,800	0.0	0	0	$0	$0	$0	0.0
Lower Lobby	12	LED Lamps: (2) 7W A15 Screw-In Lamps	Wall Switch	S	14	1,800	7	None	Yes	12	LED Lamps: (2) 7W A15 Screw-In Lamps	High/Low Control	14	1,242	0.0	101	0	$30	$280	$280	0.0
Lower Lobby	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,800		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,800	0.0	0	0	$0	$0	$0	0.0
Lower Lobby	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,800		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,800	0.0	0	0	$0	$0	$0	0.0
Lower Lobby	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,800	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,800	0.1	257	0	$75	$200	$40	2.1
Machine Room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	800	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.0	29	0	$8	$50	$10	4.8
Main Stage	5	Halogen Incandescent: (12) 100W BR30 Screw-In Lamps	High/Low Control	S	1,200	1,200	3	Relamp	No	5	LED Lamps: BR30 Lamps	High/Low Control	180	1,200	4.5	6,610	-1	$1,927	$1,830	$180	0.9
Main Stage	68	Halogen Incandescent: (1) 60W PAR36 Screw-In Lamp	Wall Switch	S	60	1,200	3	Relamp	No	68	LED Lamps: (1) 10W Screw-In Lamp	Wall Switch	9	1,200	3.1	4,495	-1	$1,310	$2,580	$200	1.8
Main Stage	5	Halogen Incandescent: (15) 70W PAR38 Screw-In Lamps	None	S	1,050	1,200	3	Relamp	No	5	LED Lamps: PAR38 Lamps	None	158	1,200	3.9	5,780	-1	$1,685	$2,840	$230	1.5
Main Stage	184	Halogen Incandescent: (1) 70W PAR38 Screw-In Lamp	Wall Switch	S	70	1,200	3	Relamp	No	184	LED Lamps: PAR38 Lamps	Wall Switch	11	1,200	9.6	14,069	-3	$4,102	$6,980	$550	1.6
Main Stage	30	Halogen Incandescent: (2) 70W PAR38 Screw-In Lamps	None	S	140	1,200	3	Relamp	No	30	LED Lamps: PAR38 Lamps	None	21	1,200	3.2	4,627	-1	$1,349	$2,280	$180	1.6
Main Stage	11	Halogen Incandescent: (1) 120W PAR56 Plug-In Lamp	Wall Switch	S	120	1,200	3	Relamp	No	11	LED Lamps: (1) 20W Screw-In Lamp	Wall Switch	18	1,200	1.0	1,454	0	$424	$420	$30	0.9
Main Stage	10	Halogen Incandescent: (1) 140W PAR64 Plug-In Lamp	Wall Switch	S	140	1,200	3	Relamp	No	10	LED Lamps: (1) 21W Screw-In Lamp	Wall Switch	21	1,200	1.1	1,542	0	$450	$380	$30	0.8
Main Stage	1	Incandescent: (1) 10W A15 Screw-In Lamp	Wall Switch	S	10	1,200	3	Relamp	No	1	LED Lamps: A15 Lamps	Wall Switch	2	1,200	0.0	10	0	$3	$40	$0	13.2
Main Stage	30	Incandescent: (1) 25W A15 Screw-In Lamp	Wall Switch	S	10	1,200	3	Relamp	No	30	LED Lamps: A15 Lamps	Wall Switch	4	1,200	0.2	233	0	$68	$1,140	$90	15.4
Main Stage	4	Incandescent: (1) 60W PAR30 Screw-In Lamp	Wall Switch	S	60	1,200	3	Relamp	No	4	LED Lamps: PAR30 Lamps	Wall Switch	9	1,200	0.2	264	0	$77	$150	$10	1.8
Main Stage	1	LED Lamps: (12) 10W A19 Screw-In Lamps	Wall Switch	S	120	1,200		None	No	1	LED Lamps: (12) 10W A19 Screw-In Lamps	Wall Switch	120	1,200	0.0	0	0	$0	$0	$0	0.0
Main Stage	7	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,200		None	No	7	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,200	0.0	0	0	$0	$0	$0	0.0
Main Stage	4	LED - Fixtures: Linear Strip	Wall Switch	S	150	3,276		None	No	4	LED - Fixtures: Linear Strip	Wall Switch	150	3,276	0.0	0	0	$0	$0	$0	0.0
Main Stage	4	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	S	150	3,276		None	No	4	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	150	3,276	0.0	0	0	$0	$0	$0	0.0
Main Stage	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,200	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,200	0.2	342	0	$100	$400	$80	3.2
Main Theater	3	Incandescent: (2) 60W C9 Screw-In Lamps	Wall Switch	S	120	2,000	3	Relamp	No	3	LED Lamps: (2) 10W Screw-In Lamp	Wall Switch	18	2,000	0.3	661	0	$193	$110	$10	0.5
Main Theater	7	Incandescent: (3) 60W C9 Screw-In Lamps	Wall Switch	S	180	1,500	3	Relamp	No	7	LED Lamps: (3) 10W Screw-In Lamp	Wall Switch	27	1,500	0.9	1,735	0	$506	$440	$20	0.8
Main Theater	1	Incandescent: (4) 60W C9 Screw-In Lamps	None	S	240	1,500	3	Relamp	No	1	LED Lamps: (4) 10W Screw-In Lamp	None	36	1,500	0.2	330	0	$96	$90	$0	0.9
Main Theater	51	Incandescent: (1) 60W PAR30 Screw-In Lamp	Wall Switch	S	60	2,000	3	Relamp	No	51	LED Lamps: PAR30 Lamps	Wall Switch	9	2,000	2.3	5,618	-1	$1,638	$1,290	$50	0.8

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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
Main Theater	8	Incandescent: (6) 150W PAR38 Screw-In Lamps	Wall Switch	S	900	1,500	3	Relamp	No	8	LED Lamps: PAR38 Lamps	Wall Switch	135	1,500	5.4	9,914	-2	$2,891	$1,010	$50	0.3
Main Theater	7	LED Lamps: (1) 5W A15 Screw-In Lamp	Wall Switch	S	5	2,000		None	No	7	LED Lamps: (1) 5W A15 Screw-In Lamp	Wall Switch	5	2,000	0.0	0	0	$0	$0	$0	0.0
Main Theater	3	LED Lamps: (2) 5W A15 Screw-In Lamps	Wall Switch	S	10	2,000		None	No	3	LED Lamps: (2) 5W A15 Screw-In Lamps	Wall Switch	10	2,000	0.0	0	0	$0	$0	$0	0.0
Main Theater	5	LED Lamps: (11) 10W A19 Screw-In Lamps	Wall Switch	S	110	2,000		None	No	5	LED Lamps: (11) 10W A19 Screw-In Lamps	Wall Switch	110	2,000	0.0	0	0	$0	$0	$0	0.0
Main Theater	11	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	2,000		None	No	11	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	2,000	0.0	0	0	$0	$0	$0	0.0
Maintenance Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,500	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,725	0.1	453	0	$132	$530	$80	3.4
Mechanical Pump Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.1	1,069	0	$312	$250	$50	0.6
Mechanical Room 1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.1	855	0	$249	$200	$40	0.6
Mechanical Room 1 Back	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.4	3,208	-1	$935	$760	$150	0.7
Mechanical Room 2	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.1	1,069	0	$312	$250	$50	0.6
Mechanical Room 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.0	214	0	$62	$50	$10	0.6
Mechanical Room 3 B	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.1	1,069	0	$312	$250	$50	0.6
Mechanical Room 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.0	214	0	$62	$50	$10	0.6
Mechanical Room 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.0	214	0	$62	$50	$10	0.6
Mechanical Room 6	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.4	2,566	-1	$748	$610	$120	0.7
Mechanical Room 7	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	6,000	3	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	6,000	0.3	1,925	0	$561	$460	$90	0.7
Meeting Room 1	1	Exit Signs: LED - 5 W Lamp	None		5	8,760		None	No	1	Exit Signs: LED - 5 W Lamp	None	5	8,760	0.0	0	0	$0	$0	$0	0.0
Meeting Room 1	6	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch	S	80	500	5	None	Yes	6	LED Lamps: (8) 10W A19 Screw-In Lamps	Occupancy Sensor	80	345	0.1	80	0	$23	$330	$40	12.4
Meeting Room 1 Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	500	0.0	18	0	$5	$50	$10	7.7
Meeting Room 2	4	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	500	3, 5	Relamp	Yes	4	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	345	0.1	57	0	$17	$250	$20	13.8
Meeting Room 2	8	Halogen Incandescent: (1) 60W PAR36 Screw-In Lamp	Wall Switch	S	60	500	3, 5	Relamp	Yes	8	LED Lamps: (1) 10W Screw-In Lamps	Occupancy Sensor	9	345	0.4	232	0	$68	$530	$50	7.1
Meeting Room 2	21	Incandescent: (1) 60W BR30 Screw-In Lamp	Wall Switch	S	60	500	3, 5	Relamp	Yes	21	LED Lamps: BR30 Lamps	Occupancy Sensor	9	345	1.0	610	0	$178	$860	$60	4.5
Meeting room 3	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6
Meeting Room 3	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	0	2	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	0	0.1	0	0	$0	$90	$10	0.0
Meeting Room 3	3	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	S	60	500	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) 4' T5 (14.5W) Lamps	Occupancy Sensor	30	345	0.1	64	0	$19	$230	$30	10.8

	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
Meeting Room 3	3	Linear Fluorescent - T5: 4' T5 (28W) - 3L	None	S	90	500	3, 5	Relamp	Yes	3	LED - Linear Tubes: (3) 4' T5 (14.5W) Lamps	Occupancy Sensor	45	345	0.2	95	0	$28	$630	$90	19.4
Men's Restroom Basement Foyer	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,000		None	No	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,000	0.0	0	0	$0	$0	$0	0.0
Men's Restroom Dressing Room Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 5	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	690	0.1	91	0	$26	$250	$40	7.9
Men's Restroom Basement Lobby	2	Incandescent: (2) 25W A15 Screw-In Lamps	Occupancy Sensor	S	50	1,000	3	Relamp	No	2	LED Lamps: A15 Lamps	Occupancy Sensor	2	1,000	0.1	104	0	$30	$80	$0	2.6
Men's Restroom Basement Lobby	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	1,000		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,000	0.0	0	0	$0	$0	$0	0.0
Men's Restroom Corridor Northwest	2	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	7,500	3, 5	Relamp	Yes	2	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	5,175	0.0	429	0	$125	$230	$20	1.7
Men's Restroom Corridor Northwest	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	S	50	7,500		None	No	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	50	7,500	0.0	0	0	$0	$0	$0	0.0
Men's Restroom West 3rd Floor	1	Incandescent: (1) 50W C9 Screw-In Lamp	Wall Switch	S	50	1,000	3	Relamp	No	1	LED Lamps: (1) 8W Screw-In Lamp	Wall Switch	8	1,000	0.0	45	0	$13	$30	$0	2.3
Men's Restroom West 3rd Floor	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	S	20	1,000		None	No	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	20	1,000	0.0	0	0	$0	$0	$0	0.0
Men's Restroom West 3rd Floor	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	1,000		None	No	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	1,000	0.0	0	0	$0	$0	$0	0.0
North Corridor	1	LED Lamps: (3) 5W A15 Screw-In Lamps	Wall Switch	S	15	7,500	7	None	Yes	1	LED Lamps: (3) 5W A15 Screw-In Lamps	High/Low Control	15	5,175	0.0	38	0	$11	$0	$0	0.0
North Corridor	6	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	7,500	7	None	Yes	6	LED Lamps: (4) 10W A19 Screw-In Lamps	High/Low Control	40	5,175	0.1	603	0	$176	$270	$40	1.3
North Corridor Third Floor	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
North Corridor Third Floor	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	7,500		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	7,500	0.0	0	0	$0	$0	$0	0.0
North Corridor Third Floor	5	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	7,500	7	None	Yes	5	LED Lamps: (4) 10W A19 Screw-In Lamps	High/Low Control	40	5,175	0.1	502	0	$146	$270	$40	1.6
North Staircase Third Floor Foyer	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch		20	7,500		None	No	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	20	7,500	0.0	0	0	$0	$0	$0	0.0
Northwest Elevator Lobby	2	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	500	3	Relamp	No	2	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	500	0.0	16	0	$5	$80	$0	16.9
Northwest Elevator Lobby 2nd Floor	2	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	500	3	Relamp	No	2	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	500	0.0	16	0	$5	$80	$0	16.9
Northwest Stair	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch		40	7,500		None	No	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	7,500	0.0	0	0	$0	$0	$0	0.0
Northwest Stair	1	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch		80	7,500		None	No	1	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch	80	7,500	0.0	0	0	$0	$0	$0	0.0
Northwest Stair Closet	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	200		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	200	0.0	0	0	$0	$0	$0	0.0
Office Suite	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	3, 5	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	345	0.4	272	0	$79	$940	$160	9.8
Office Suite Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Daylight Dimming	S	62	100	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Daylight Dimming	29	100	0.0	4	0	$1	$50	$10	38.5
Organ Chamber 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.1	14	0	$4	$100	$20	19.2
Organ Chamber 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.1	14	0	$4	$100	$20	19.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Projection Room	2	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	170	0	$50	$180	$0	3.6
Projection Room	6	Halogen Incandescent: (1) 70W PAR38 Screw-In Lamp	Wall Switch	S	70	1,500	3	Relamp	No	6	LED Lamps: PAR38 Lamps	Wall Switch	11	1,500	0.3	573	0	$167	$150	$10	0.8
Projection Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,500	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.1	267	0	$78	$250	$50	2.6
Projection Room	4	Metal Halide: (1) 2000W Lamp	Wall Switch	S	2,000	120	1	Fixture Replacement	No	4	LED - Fixtures: Architectural Flood/Spot Luminaire	Wall Switch	1,000	120	3.5	518	0	$151	$2,630	$200	16.1
Projection Room Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	800	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.0	29	0	$8	$50	$10	4.8
Rack Room Mechanical Room 1	2	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	S	30	7,500	3	Relamp	No	2	LED - Linear Tubes: (1) 4' T5 (14.5W) Lamp	Wall Switch	15	7,500	0.0	243	0	$71	$80	$10	1.0
Second Floor Back Office	6	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	2,080	3, 5	Relamp	Yes	6	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	1,435	0.1	357	0	$104	$560	$50	4.9
Second Floor Back Office	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	S	50	2,080		None	No	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	50	2,080	0.0	0	0	$0	$0	$0	0.0
Security Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,000	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,000	0.0	121	0	$35	$90	$20	2.0
Shower 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	100	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	100	0.0	4	0	$1	$50	$10	38.5
Shower 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	100	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	100	0.0	4	0	$1	$50	$10	38.5
Side Entrance Foyer	2	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	S	20	6,000		None	No	2	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	20	6,000	0.0	0	0	$0	$0	$0	0.0
Side Entrance Lobby	3	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	6,000	7	None	Yes	3	LED Lamps: (1) 10W A19 Screw-In Lamp	High/Low Control	10	4,140	0.0	60	0	$18	$0	$0	0.0
Side Entrance Lobby	4	LED Lamps: (8) 10W A19 Screw-In Lamps	Wall Switch	S	80	6,000	7	None	Yes	4	LED Lamps: (8) 10W A19 Screw-In Lamps	High/Low Control	80	4,140	0.1	643	0	$187	$280	$140	0.7
Side Entrance Lobby Janitor Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,000	0.0	17	0	$5	$40	$10	6.0
Side Entrance Office Corridor	4	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	7,500	3, 5	Relamp	Yes	4	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	5,175	0.1	858	0	$250	$480	$50	1.7
Side Entrance Office Corridor	3	Exit Signs: LED - 5 W Lamp	None		5	8,760		None	No	3	Exit Signs: LED - 5 W Lamp	None	5	8,760	0.0	0	0	$0	$0	$0	0.0
Side Entrance Office Corridor	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	7,500		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	7,500	0.0	0	0	$0	$0	$0	0.0
Side Entrance Office Corridor	2	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	7,500		None	No	2	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	7,500	0.0	0	0	$0	$0	$0	0.0
Side Entrance Ticket Booth 1	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	800		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	800	0.0	0	0	$0	$0	$0	0.0
Side Entrance Ticket Booth 2	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	800		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	800	0.0	0	0	$0	$0	$0	0.0
Side Lobby Closet	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	500	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	500	0.0	9	0	$3	$40	$10	11.9
Side Lobby Men's Restroom	2	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	800	3, 5	Relamp	Yes	2	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	37	552	0.0	46	0	$13	$230	$20	15.7
Side Lobby Men's Restroom	2	LED Lamps: (3) 10W A19 Screw-In Lamps	Wall Switch	S	30	800		None	No	2	LED Lamps: (3) 10W A19 Screw-In Lamps	Wall Switch	30	800	0.0	0	0	$0	$0	$0	0.0
Side Lobby Women's Restroom	1	Compact Fluorescent: (2) 26W Double Biaxial Plug-In Lamps	Wall Switch	S	52	800	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	800	0.0	13	0	$4	$40	$0	10.6

	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**
Side Lobby Women's Restroom	4	Incandescent: (4) 60W A19 Screw-In Lamps	Wall Switch	S	240	800	3, 5	Relamp	Yes	4	LED Lamps: A19 Lamps	Occupancy Sensor	36	552	0.8	744	0	$217	$500	$40	2.1
Sound Room	6	Halogen Incandescent: (1) 70W PAR38 Screw-In Lamp	Wall Switch	S	70	1,500	3	Relamp	No	6	LED Lamps: PAR38 Lamps	Wall Switch	11	1,500	0.3	573	0	$167	$150	$10	0.8
Sound Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,500	3	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,500	0.1	267	0	$78	$250	$50	2.6
South Corridor	1	LED Lamps: (3) 5W A15 Screw-In Lamps	Wall Switch	S	15	7,500	7	None	Yes	1	LED Lamps: (3) 5W A15 Screw-In Lamps	High/Low Control	15	5,175	0.0	38	0	$11	$0	$0	0.0
South Corridor	6	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	7,500	7	None	Yes	6	LED Lamps: (4) 10W A19 Screw-In Lamps	High/Low Control	40	5,175	0.1	603	0	$176	$270	$40	1.3
South Corridor Third Floor	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
South Corridor Third Floor	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	7,500		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	7,500	0.0	0	0	$0	$0	$0	0.0
South Corridor Third Floor	5	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	7,500	7	None	Yes	5	LED Lamps: (4) 10W A19 Screw-In Lamps	High/Low Control	40	5,175	0.1	502	0	$146	$270	$40	1.6
South Stage Left	6	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	S	60	500	3	Relamp	No	6	LED - Linear Tubes: (2) 4' T5 (14.5W) Lamps	Wall Switch	30	500	0.2	97	0	$28	$460	$60	14.1
Southwest Stair	1	Exit Signs: LED - 5 W Lamp	None		5	8,760		None	No	1	Exit Signs: LED - 5 W Lamp	None	5	8,760	0.0	0	0	$0	$0	$0	0.0
Southwest Stair	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch		60	7,500	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	7,500	0.0	413	0	$120	$30	$0	0.2
Southwest Stair	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch		40	7,500		None	No	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	7,500	0.0	0	0	$0	$0	$0	0.0
Southwest Stair Closet	1	Incandescent: (1) 60W A19 Screw-In Lamp	Wall Switch	S	60	200	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	9	200	0.0	11	0	$3	$30	$0	9.3
Southwest Stair Closet 3rd Floor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.0	7	0	$2	$50	$10	19.2
Sprinkler Pump Control Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	7,500	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	7,500	0.1	802	0	$234	$150	$30	0.5
Stage AV Room	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6
Stage AV Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,200	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,200	0.1	86	0	$25	$100	$20	3.2
Staircase Ballroom Mezzanine	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch		10	1,000		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	1,000	0.0	0	0	$0	$0	$0	0.0
Staircase Ballroom Mezzanine	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch		20	1,000		None	No	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	20	1,000	0.0	0	0	$0	$0	$0	0.0
Staircase Ballroom Mezzanine	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.0	36	0	$10	$50	$10	3.8
Storage 1	2	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	S	60	200	3	Relamp	No	2	LED - Linear Tubes: (2) 4' T5 (14.5W) Lamps	Wall Switch	30	200	0.1	13	0	$4	$150	$20	34.4
Storage 4	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.2	57	0	$17	$400	$80	19.2
Storage 4 Right	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.1	14	0	$4	$100	$20	19.2
Storage 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.0	7	0	$2	$50	$10	19.2
Storage 6	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.1	14	0	$4	$100	$20	19.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Storage 7	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	200	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	200	0.0	7	0	$2	$50	$10	19.2
Sump Pit	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	100	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	100	0.0	4	0	$1	$50	$10	38.5
Theater Ceiling	35	Incandescent: (1) 60W BR30 Screw-In Lamp	Wall Switch	S	60	2,000	3	Relamp	No	35	LED Lamps: BR30 Lamps	Wall Switch	9	2,000	1.6	3,856	-1	$1,124	$880	$40	0.7
Theater Ceiling	26	Incandescent: (1) 60W PAR30 Screw-In Lamp	Wall Switch	S	60	2,000	3	Relamp	No	26	LED Lamps: PAR30 Lamps	Wall Switch	9	2,000	1.2	2,864	-1	$835	$660	$30	0.8
Theater Ceiling	16	Incandescent: (1) 60W PAR30 Screw-In Lamp	None	S	60	2,000	3	Relamp	No	16	LED Lamps: PAR30 Lamps	None	9	2,000	0.7	1,763	0	$514	$400	$20	0.7
Theater Ceiling	15	Incandescent: (1) 250W PAR38 Screw-In Lamp	Wall Switch	S	250	1,500	3	Relamp	No	15	LED Lamps: PAR38 Lamps	Wall Switch	38	1,500	2.8	5,152	-1	$1,502	$380	$20	0.2
Theater Mezzanine	3	Compact Fluorescent: (1) 26W Biaxial Plug-In Lamp	None	S	26	2,000	3	Relamp	No	3	LED Lamps: GX23 (Plug-In) Lamps	None	19	2,000	0.0	45	0	$13	$80	$0	6.0
Theater Mezzanine	1	Compact Fluorescent: (2) 26W Biaxial Plug-In Lamps	Wall Switch	S	52	2,000	3	Relamp	No	1	LED Lamps: GX23 (Plug-In) Lamps	Wall Switch	37	2,000	0.0	32	0	$9	$40	$0	4.2
Theater Mezzanine	8	Incandescent: (1) 25W A15 Screw-In Lamp	Wall Switch	S	5	2,000	3	Relamp	No	8	LED Lamps: A15 Lamps	Wall Switch	4	2,000	0.0	17	0	$5	$200	$10	37.7
Theater Mezzanine	3	Incandescent: (1) 60W C9 Screw-In Lamp	None	S	60	2,000	3	Relamp	No	3	LED Lamps: (1) 10W Screw-In Lamp	None	9	2,000	0.1	330	0	$96	$80	$0	0.8
Theater Mezzanine	3	Incandescent: (2) 60W C9 Screw-In Lamps	Timeclock	S	120	2,000	3	Relamp	No	3	LED Lamps: (2) 10W Screw-In Lamp	Timeclock	18	2,000	0.3	661	0	$193	$110	$10	0.5
Theater Mezzanine	3	Incandescent: (2) 60W C9 Screw-In Lamps	None	S	120	2,000	3	Relamp	No	3	LED Lamps: (2) 10W Screw-In Lamp	None	18	2,000	0.3	661	0	$193	$110	$10	0.5
Theater Mezzanine	44	LED Lamps: Other	Wall Switch	S	2	2,000		None	No	44	LED Lamps: Other	Wall Switch	2	2,000	0.0	0	0	$0	$0	$0	0.0
Theater Mezzanine	3	LED Lamps: (1) 5W A15 Screw-In Lamp	Timeclock	S	5	2,000		None	No	3	LED Lamps: (1) 5W A15 Screw-In Lamp	Timeclock	5	2,000	0.0	0	0	$0	$0	$0	0.0
Ticket Room	3	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	800	5	None	Yes	3	LED Lamps: (1) 10W A19 Screw-In Lamp	Occupancy Sensor	10	552	0.0	8	0	$2	$0	$0	0.0
Trap Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	3, 5	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	345	0.2	136	0	$40	$630	$100	13.4
Trap Room	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	500	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	345	0.2	113	0	$33	$250	$50	6.1
Trash Room Basement	1	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	S	60	200	3	Relamp	No	1	LED - Linear Tubes: (2) 4' T5 (14.5W) Lamps	Wall Switch	30	200	0.0	6	0	$2	$80	$10	37.1
Understage	1	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	85	0	$25	$90	$0	3.6
Understage	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,200	3	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,200	0.2	299	0	$87	$350	$70	3.2
Understage Stairwell Left	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	1,200	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,200	0.0	43	0	$12	$50	$10	3.2
Understage Stairwell Right	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	1,200	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,200	0.0	43	0	$12	$50	$10	3.2
Veterans Memorial Room Lobby	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	200		None	No	2	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	200	0.0	0	0	$0	$0	$0	0.0
Veterans Room	2	Exit Signs: Fluorescent	None		15	8,760	4	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	170	0	$50	$180	$0	3.6
Veterans Room	21	Incandescent: (1) 75W BR30 Screw-In Lamp	Wall Switch	S	75	200	3, 5	Relamp	Yes	21	LED Lamps: BR30 Lamps	Occupancy Sensor	12	138	1.2	303	0	$88	$860	$100	8.6

	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
Veterans Room	3	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	200		None	No	3	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	200	0.0	0	0	$0	$0	$0	0.0
Water Filter Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	800	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.0	29	0	$8	$50	$10	4.8
Women's Restroom Basement Lobby 2	7	Incandescent: (2) 25W A15 Screw-In Lamps	Occupancy Sensor	S	50	800	3	Relamp	No	7	LED Lamps: A15 Lamps	Occupancy Sensor	8	800	0.3	254	0	$74	$440	$10	5.8
Women's Restroom Basement Lobby 2	2	LED Lamps: (3) 10W A19 Screw-In Lamps	Wall Switch	S	30	800		None	No	2	LED Lamps: (3) 10W A19 Screw-In Lamps	Wall Switch	30	800	0.0	0	0	$0	$0	$0	0.0
Women's Restroom Basement Foyer	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	800		None	No	4	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	800	0.0	0	0	$0	$0	$0	0.0
Women's Room Basement Lobby	2	Incandescent: (2) 25W A15 Screw-In Lamps	Occupancy Sensor	S	50	800	3	Relamp	No	2	LED Lamps: A15 Lamps	Occupancy Sensor	8	800	0.1	73	0	$21	$130	$0	6.1
Women's Room Basement Lobby	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	S	10	800		None	No	1	LED Lamps: (1) 10W A19 Screw-In Lamp	Wall Switch	10	800	0.0	0	0	$0	$0	$0	0.0
Women’s Restroom Corridor Northwest	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Wall Switch	S	50	7,500	5	None	Yes	2	LED Lamps: (5) 10W A19 Screw-In Lamps	Occupancy Sensor	50	5,175	0.0	251	0	$73	$330	$40	4.0
Women’s Restroom West 3rd Floor	1	Incandescent: (1) 50W C9 Screw-In Lamp	Wall Switch	S	50	800	3	Relamp	No	1	LED Lamps: (1) 8W Screw-In Lamp	Wall Switch	8	800	0.0	36	0	$11	$30	$0	2.8
Women’s Restroom West 3rd Floor	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	S	20	800		None	No	1	LED Lamps: (2) 10W A19 Screw-In Lamps	Wall Switch	20	800	0.0	0	0	$0	$0	$0	0.0
Women’s Restroom West 3rd Floor	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	S	40	800		None	No	1	LED Lamps: (4) 10W A19 Screw-In Lamps	Wall Switch	40	800	0.0	0	0	$0	$0	$0	0.0

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	**Motor Quantity**	**Motor Application**	**HP Per Motor**	**Full Load Efficiency**	**VFD Control?**	**Manufacturer**	**Model**	**Remaining Useful Life**	**Annual Operating Hours**	**ECM #**	**Install High Efficiency Motors?**	**Full Load Efficiency**	**Install VFDs?**	**Number of VFDs**	**Total Peak kW Savings**	**Total Annual kWh Savings**	**Total Annual MMBtu Savings**	**Total Annual Energy Cost Savings**	**Estimated M&L Cost ($)**	**Total Incentives**	**Simple Payback w/ Incentives in Years**
Mechanical Room 1 Back	AHU-1 Auditorium, MER44	1	Supply Fan	50.00	93.0%	No			B	3,200	8	No	94.5%	Yes	1	14.6	49,504	0	$14,746	$24,600	$3,000	1.5
Mechanical Room 1 Back	AHU-1 Auditorium, MER44	1	Return Fan	25.00	91.7%	No			B	3,200	8	No	93.6%	Yes	1	7.6	25,297	0	$7,536	$14,800	$1,400	1.8
Mechanical Room 3	AHU-2 Auditorium, MER28	1	Supply Fan	50.00	93.0%	No			B	3,200	8	No	94.5%	Yes	1	14.6	49,504	0	$14,746	$24,600	$3,000	1.5
Mechanical Room 3	AHU-2 Auditorium, MER28	1	Return Fan	25.00	91.7%	No			B	3,200	8	No	93.6%	Yes	1	7.6	25,297	0	$7,536	$14,800	$1,400	1.8
Mechanical Room 6	AHU-3 Stage Area, MER311-17	1	Supply Fan	5.00	84.0%	No			B	3,200	8	No	89.5%	Yes	1	1.6	5,918	0	$1,763	$5,600	$900	2.7
Mechanical Room 1	AHU-4 Delaware River Room	1	Supply Fan	5.00	84.0%	No	MagneTek	390548	B	3,200	8	No	89.5%	Yes	1	1.6	5,918	0	$1,763	$5,600	$900	2.7
Mechanical Room 6	AHU-5 Ballroom, MER311-17	1	Supply Fan	5.00	84.0%	No			B	3,200	8	No	89.5%	Yes	1	1.6	5,918	0	$1,763	$5,600	$900	2.7
Mechanical Room 6	AHU-6 Ballroom, MER311-17	1	Supply Fan	5.00	84.0%	No			B	3,200	8	No	89.5%	Yes	1	1.6	5,918	0	$1,763	$5,600	$900	2.7
Mechanical Room 4	AHU-8 Smoking Room, MER09B	1	Supply Fan	7.50	89.5%	No			B	3,200	8	No	91.0%	Yes	1	2.2	7,724	0	$2,301	$6,700	$1,000	2.5
Mechanical Room 1	AHU-9 MER15, Basement, Ground Floor, Toilets, N/E Corridor	1	Supply Fan	5.00	84.0%	No			B	3,200	8	No	89.5%	Yes	1	1.6	5,918	0	$1,763	$5,600	$900	2.7
Side Entrance Ticket Booth 1	FCU 6-1	1	Fan Coil Unit	0.33	65.0%	No			B	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Side Entrance Ticket Booth 2	FCU 6-2	1	Fan Coil Unit	0.33	65.0%	No			B	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 7	FCU 11-1	1	Fan Coil Unit	0.50	70.0%	No			B	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 7	FCU 11-2	1	Fan Coil Unit	0.50	70.0%	No			B	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 7	FCU 12-1	1	Fan Coil Unit	0.75	70.0%	No			B	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 7	FCU 12-2	1	Fan Coil Unit	0.75	70.0%	No			B	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 7	FCU	1	Fan Coil Unit	0.10	70.0%	No			W	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 7	FCU 18	1	Fan Coil Unit	0.75	70.0%	No			B	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1	Hydronic Unit Heater	1	Fan Coil Unit	0.10	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Dressing Room 2	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dressing Room 3	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Dressing Room 4	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Dressing Room 5	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Dressing Room 6	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Dressing Room 7	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Dressing Room 8	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Janitors Closet 3rd Floor	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Lower Lobby	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Maintenance Office	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 2	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 3	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 3 B	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 6	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Meeting Room 1 Closet	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Northwest Elevator Lobby 2nd Floor	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage 1	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage 4	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage 4	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Ticket Room	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Trash room BSMT	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Veterans Memorial Room Lobby	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Women's Restroom Basement Lobby 2	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Women's Room Basement Lobby	Hydronic Unit Heater	1	Fan Coil Unit	0.05	65.0%	No			W	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1 Back	Exhaust Fan	2	Exhaust Fan	0.50	70.0%	No	Greenheck	SBCE-3H36-30	W	2,000		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1	Pipe Organ Blower Motor	1	Process Blower	15.00	92.4%	No	U.S. Electrical Motors	254-T	W	500		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 5	Air Compressor	1	Air Compressor	0.17	65.0%	No	GE Motors	5KH33GN293JX	W	500		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Pump Room	HHW Pump 1	1	Heating Hot Water Pump	25.00	91.7%	No	Bell & Gossett	9.125BF	B	1,900	9	No	93.6%	Yes	1	2.6	15,020	0	$4,474	$16,500	$1,400	3.4
Mechanical Pump Room	HHW Pump 2	1	Heating Hot Water Pump	25.00	91.7%	No	Bell & Gossett	9.125BF	B	1,900	9	No	93.6%	Yes	1	2.6	15,020	0	$4,474	$16,500	$1,400	3.4
Mechanical Pump Room	HHW Pump 3 - AHUs	1	Heating Hot Water Pump	3.00	86.5%	No	MagneTek		B	1,900	9	No	89.5%	Yes	1	0.3	1,955	0	$582	$5,100	$200	8.4
Mechanical Pump Room	HHW Pump 4 - AHUs	1	Heating Hot Water Pump	3.00	86.5%	No	MagneTek	6-355652	B	1,900	9	No	89.5%	Yes	1	0.3	1,955	0	$582	$5,100	$200	8.4
Mechanical Pump Room	HHW Pump 5 - Fan Coil Units	1	Heating Hot Water Pump	3.00	86.5%	No	MagneTek	6-355652	B	1,900	9	No	89.5%	Yes	1	0.3	1,955	0	$582	$5,100	$200	8.4
Mechanical Pump Room	HHW Pump 6 - Fan Coil Units	1	Heating Hot Water Pump	3.00	86.5%	No	MagneTek	6-355652	B	1,900	9	No	89.5%	Yes	1	0.3	1,955	0	$582	$5,100	$200	8.4
Mechanical Pump Room	HHW Pump 7 - Reheat System	1	Heating Hot Water Pump	5.00	87.5%	No	MagneTek	7-055654	B	1,900	9	No	89.5%	Yes	1	0.5	3,159	0	$941	$5,600	$900	5.0
Mechanical Pump Room	HHW Pump 8 - Reheat System	1	Heating Hot Water Pump	5.00	89.5%	No	Century		W	1,900	9	No	89.5%	Yes	1	0.5	2,969	0	$885	$5,600	$900	5.3
Mechanical Room 2	HHW Pump 9	1	Heating Hot Water Pump	1.00	82.5%	No	MagneTek	E117	B	1,900		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Pump Room	Municipal HW Supply Pump	1	Heating Hot Water Pump	5.00	89.5%	No			W	1,900	9	No	89.5%	Yes	1	0.5	2,969	0	$885	$5,600	$900	5.3
Mechanical Room 1	HHW Pump AHU 4	1	Heating Hot Water Pump	0.50	70.0%	No	Bell & Gossett	LVL48T17D175B	W	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1	HHW Pump AHU 9	1	Heating Hot Water Pump	0.50	70.0%	No	Bell & Gossett	LVL48T17D175B	W	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 3	HHW Pump AHU 2	1	Heating Hot Water Pump	0.50	70.0%	No	Bell & Gossett	903580	W	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 3B	HHW Pump AHU 1	1	Heating Hot Water Pump	1.00	82.5%	No	MagneTek	E117	W	1,900		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical Room 3B	HHW Pump	1	Heating Hot Water Pump	0.50	70.0%	No	Bell & Gossett	903580	B	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 4	HHW Pump AHU 8	1	Heating Hot Water Pump	0.50	70.0%	No			W	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 6	HHW Pump AHU 3	1	Heating Hot Water Pump	0.33	65.0%	No	Bell & Gossett	M80036	B	1,900		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 6	HHW Pump AHU 6	1	Heating Hot Water Pump	0.50	70.0%	No	Bell & Gossett	M80067	B	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 6	HHW Pump AHU 5	1	Heating Hot Water Pump	0.50	70.0%	No	Bell & Gossett	903580	W	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Pump Room	Chilled Water Return Pump 1	1	Chilled Water Pump	3.00	80.0%	Yes	Baldor	JMM3158T	W	2,000		No	80.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Pump Room	Chilled Water Supply Pump 2	1	Chilled Water Pump	3.00	85.5%	Yes	Baldor	EJMM3158T	W	2,000		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Pump Room	DHW Booster Pump	2	DHW Circulation Pump	0.20	65.0%	No	Alyan Pumps	CCPS-6030-2	B	0		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1 Back	Condensate Pump AHU 1	1	Condensate Pump	0.20	65.0%	No	Little Giant	554902	W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Water Filter Room	Chilled Drinking Water Water Pump	1	Chilled Water Pump	0.33	65.0%	No	Emerson	SA-55JXCTS-3994	W	2,000		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Ballroom	Wheelchair Lift	1	Other	1.50	84.0%	No	Wheel-O-Vator		W	5		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Accessibility Entrance	Automatic Door Motor	1	Other	0.50	70.0%	No	Door-O-Matic	99000	W	20		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Elevator Machine Room 1	Elevator Motor	1	Other	75.00	94.1%	No	MagneTek	6-373496-01-F2	W	250		No	94.1%	No		0.0	0	0	$0	$0	$0	0.0
Elevator Machine Room 3	Elevator Motor	1	Other	25.00	89.3%	No	Dover	EP-080-25	B	250		No	89.3%	No		0.0	0	0	$0	$0	$0	0.0
Machine Room 2	Elevator Motor	1	Other	15.00	91.0%	No	Dover	EP-060-15	W	250		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Pump Room	Sewage Ejector Pump #1	1	Other	6.00	87.5%	No	Alyan Pumps	19719A	B	1,700		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1	Sewage Ejector Pump #3	1	Other	6.00	87.5%	No	Alyan Pumps	19719A	B	1,700		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 1 Back	Gas Booster Pump	1	Other	0.75	70.0%	No	Eclipse	HB3316	B	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Storage 1	Scenery Lift	1	Other	15.00	93.0%	No	Paco Corp	97-2023-S-6-1	W	3,391		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Sump Pit	Sump Pump	1	Other	1.50	84.0%	No			W	2,745		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Trap Room	Stage Lift	2	Other	20.00	91.0%	No	SEW - EURODRIVE	DFV160L4BN30HR	B	3,391		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof West	Exhaust Fan	2	Exhaust Fan	0.25	65.0%	No			W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof West	Exhaust Fan	2	Exhaust Fan	0.50	70.0%	No			W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Room 6	AHU-3 Stage Area, MER311-17	1	Return Fan	2.00	80.0%	No			B	3,200	8	No	86.5%	Yes	1	0.7	2,541	0	$757	$4,700	$100	6.1
Mechanical Room 6	AHU-5 Ballroom, MER311-17	1	Return Fan	2.00	80.0%	No			B	3,200	8	No	86.5%	Yes	1	0.7	2,541	0	$757	$4,700	$100	6.1
Mechanical Room 6	AHU-6 Ballroom, MER311-17	1	Return Fan	2.00	80.0%	No			B	3,200	8	No	86.5%	Yes	1	0.7	2,541	0	$757	$4,700	$100	6.1
Storage 6	AHU - Dimmer Room	1	Supply Fan	0.75	70.0%	No	Trane	TWE060D	W	1,900		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Generator Pit	Sewage Ejector Pump #2	1	Other	1.00	82.5%	No	Alyan Pumps	19719C	B	1,700		No	82.5%	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
Roof East	Organ Room 1	1	Split-System Air-Source HP	2.50	19.00	10.60	7.1 HSPF	Mitsubishi Electric	PUH30EK	B	11	Yes	1	Split-System Air-Source HP	2.50	19.00	15.50	8.5 HSPF	0.4	1,514	0	$451	$5,900	$300	12.4
Roof East	Condensing Unit - Dimmer Room	1	Split-System	5.00		9.80		Trane	TTA060	B	10	Yes	1	Split-System	5.00		16.00		1.2	2,847	0	$848	$10,800	$500	12.1
Storage 6	Dimmer Room	1	Package Unit		19.65		1 COP	Trane	TWE060D150A1	B		No							0.0	0	0	$0	$0	$0	0.0
Roof East	Second Floor	1	Split-System Air-Source HP	2.50	19.00	10.60	7.1 HSPF	Mitsubishi Electric	PUH30EK	B	11	Yes	1	Split-System Air-Source HP	2.50	19.00	15.50	8.5 HSPF	0.4	1,514	0	$451	$5,900	$300	12.4
Roof West	Second Floor	1	Split-System	5.00		9.80				B		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Vicinity Power Plant	District Chilled Water System	1	Water-Cooled Reciprocating Chiller	450.00	Proxy Chiller		W		No							0.0	0	0	$0	$0	$0	0.0
Water Filter Room	Drinking Fountain Chiller	1	Air-Cooled Reciprocating Chiller	0.30	Halsey Taylor	SJ19BQ	B		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
Vicinity Power Plant	District Hot Water System - War Memorial	1	Non-Condensing Hot Water Boiler	5,000	Proxy Boiler		W		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
Mechanical Room 5	DHW Tank	1	Storage Tank Water Heater (> 50 Gal)	Rheem	G100UN	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
Restroom Faucets	12	52	Faucet Aerator (Lavatory)	0.80	0.50	0.0	0	2	$52	$440	$210	4.5
Kitchen Faucets	12	3	Faucet Aerator (Kitchen)	1.80	1.50	0.0	0	0	$3	$30	$10	6.7

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	Manufacturer	Model	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Catering 2	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Continental Refrigerator	2R	No		No	0.0	0	0	$0	$0	$0	0.0

Cooking Equipment Inventory & Recommendations

	Existing Conditions					Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	Manufacturer	Model	High Efficiency Equipement?	ECM #	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Catering 2	1	Electric Convection Oven (Half Size)	Lang		Yes		No	0.0	0	0	$0	$0	$0	0.0
Catering 2	1	Insulated Food Holding Cabinet (Full Size)	Servolift Eastern	2600-H73-U	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
War Memorial	1	Clothes Washer	900	No	Maytag	
War Memorial	1	Clothes Dryer	5,000	No		
War Memorial	1	Desktop	150	No		
War Memorial	1	Fan (Large)	246	No		
War Memorial	2	Fan (Portable)	80	No		
War Memorial	2	Laptop	45	No		
War Memorial	3	Microwave	1,000	No		
Ballroom	1	AV Receiver	50	No	TSCAM	CD-200SB
Ballroom	1	Antenna Distribution System	120	No	Shure	UA844
Ballroom AV Room	1	AV Receiver	50	No	TSCAM	CD-RW900
Ballroom AV Room	1	Audio Mixer	500	No	Yamaha	
Ballroom AV Room	1	Theater Controller	30	No	Acclaim	100 Series
Ballroom AV Room	1	AV Equipment	200	No		
Elevator Machine Room 1	1	Floor Blower Fan	600	No		
Main Stage	2	6 Bay Radio Charger	220	No		
Main Stage	1	AV Equipment	500	No		
War Memorial	1	Television	60	No		
Rack Room Mechanical Room1	1	Server Equipment	500	Yes		
Rack Room Mechanical Room1	1	AV Equipment (Mechanical Room 1)	150	No		
Southwest Stair Closet 3rd Floor	1	Server Equipment	120	No		
Storage 5	1	Condensate Pump	80	No		
War Memorial	1	Paper Shredder	150	No		
War Memorial	1	Printer (Medium/Small)	20	No		
War Memorial	1	Printer/Copier (Large)	600	No		
War Memorial	1	Projector	300	No		
War Memorial	1	Refrigerator (Mini)	150	No		
War Memorial	1	Refrigerator (Residential)	172	No		
War Memorial	8	Speakers (Large)	400	No	EAW	SB1000zR
War Memorial	4	Speakers (Large)	400	No	EAW	SB1000zR
War Memorial	6	Speakers (Medium/Small)	200	No	EAW	JF80

Miscellaneous Fuel Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Input Capacity per Unit (MBh)	ENERGY STAR Qualified?	Manufacturer	Model
Mechanical Room 1 Back	1	UPS	68.2	No	0.0	0.0

Custom (High Level) Measure Analysis

Retro-Commissioning Study										Building Square Footage	95,892				Fuel Utility Rate	$29.662	MMBtu						
										Percent of Conditioned Area Impacted	100%				Blended Electric Utility Rate	$0.298	kWh						

Existing Conditions						Proposed Conditions					Energy Impact & Financial Analysis										
Description	Area(s)/System(s) Served	Remaining Useful Life	Total HVAC Motor Usage kWh	Total HVAC Electric Usage kWh	Total HVAC Fuel Usage MMBtu	Description	% Savings HVAC Motor Usage kWh	% Savings HVAC Electric Usage kWh	% Savings HVAC Fuel Usage MMBtu	Estimated Cost per Sqft	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Base Incentives	Enhanced Incentives	Total Incentives	Total Net Cost	Payback w/o Incentives in Years	Simple Payback w/ Incentives in Years
HVAC Controls Not Currently Optimized	HVAC Equipment & Systems	3	647,485	321,102	5,275	Retro-Commissioning Study	15%	2%	5%	$4.00	0.00	103,545	264	$38,667	$446,500	$0	$0	$0	$446,500	11.55	11.55

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.

NJCEP uses the EPA's ENERGY STAR Portfolio Manager system to generate baseline energy usage results and comparable building EUIs. Portfolio Manager is specifically designed for benchmarking energy consumption within a building. Due to the building type, NJCEP is unable to provide an ENERGY STAR Statement of Energy Performance (SEP) for this facility. Utility bills have been entered into Portfolio Manager for this facility. We encourage you to keep the utility bills updated monthly within Portfolio Manager for energy and cost savings purposes.

For our analysis, CHW ton-hours is converted to kWh with a conversion factor of 80%. This is done to account for generation and transportation loss from the Vicinity plant to the site. This results in a discrepancy between the ENERGY STAR Portfolio Manager SEP which directly converts CHW ton-hours to kBtu without accounting for losses.

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

DOS_TREAS_War Memorial

Primary Property Type: Other - Entertainment/Public Assembly
Gross Floor Area (ft²): 95,892
Built: 1930

For Year Ending: June 30, 2024
Date Generated: December 29, 2024

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
DOS_TREAS_War Memorial War Memorial Drive Trenton, New Jersey 08625	State of New Jersey 428 East State Street Trenton, NJ 08625 (609) 940-4129	New Jersey Board of Public Utilities State Energy Services 44 South Clinton Ave Trenton, NJ 08625 6096339666 BPU.EnergyServices@bpu.nj.gov

Property ID: 1185583
LBAM: 378
UA: 0378-WAR MEMORIAL
Unique Building Identifier (UBID): 87G7669J+8PC-11-16-11-17

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
126.4 kBtu/ft²

Annual Energy by Fuel	
District Hot Water (kBtu)	4,359,903 (36%)
District Chilled Water - Electric (kBtu)	4,335,720 (36%)
Electric - Grid (kBtu)	3,405,066 (28%)
Natural Gas (kBtu)	18,930 (0%)

Annual Emissions	
Total (Location-Based) GHG Emissions (Metric Tons CO2e/ year)	818

Source EUI
195.5 kBtu/ft²

National Median Comparison	
National Median Site EUI (kBtu/ft²)	72.4
National Median Source EUI (kBtu/ft²)	112
% Diff from National Median Source EUI	74%

Green Power	
Green Power – Onsite (kWh)	N/A
Green Power – Offsite (kWh)	0
Percent of RECs Retained	N/A

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 (II)	*Solar renewable energy credit*: a credit you can earn from the state for energy produced from a photovoltaic array.
T5, T8, T12	A reference to a linear lamp diameter. The number represents increments of 1/8th 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.