Local Government Energy Audit Report

Ancora Psych Hospital - Elm Hall

March 31, 2025

Prepared for:
State of NJ Department of Human Services
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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.

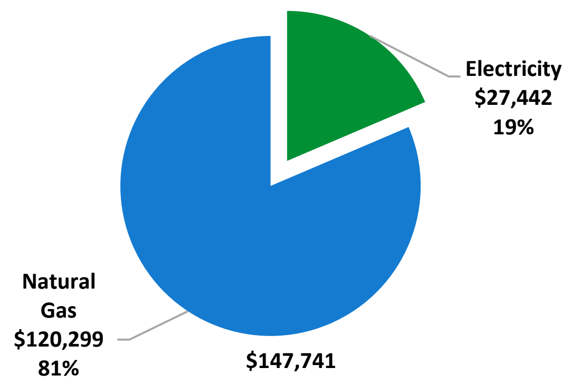
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

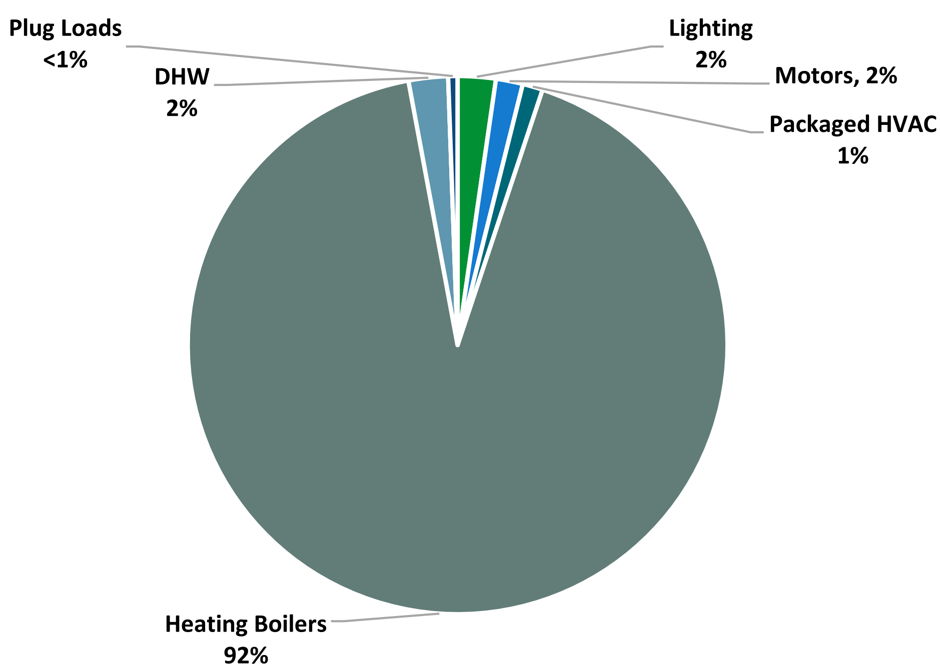
Table of Contents

1 Executive Summary

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

BUILDING PERFORMANCE REPORT

Annual Energy Utilities	Costs: $147,741 Electricity: 183,205 kWh Natural Gas: 107,483 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.



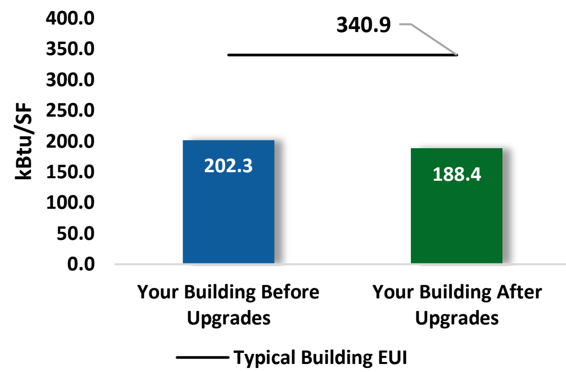
Energy Use by System

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.

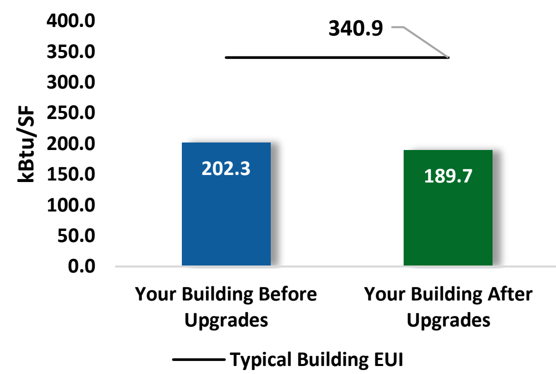
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$203,920
Potential Rebates & Incentives[1]	$17,350
Annual Cost Savings	$17,218
Annual Energy Savings	Electricity: 76,011 kWh Natural Gas: 5,211 Therms
Greenhouse Gas Emission Savings	69 Tons
Simple Payback	10.8 Years
Site Energy Savings (All Utilities)	7%



Scenario 2: Cost Effective Package[2]

Installation Cost	$59,060
Potential Rebates & Incentives	$7,070
Annual Cost Savings	$14,031
Annual Energy Savings	Electricity: 54,663 kWh Natural Gas: 5,221 Therms
Greenhouse Gas Emission Savings	58 Tons
Simple Payback	3.7 Years
Site Energy Savings (all utilities)	6%



On-site Generation Potential

Photovoltaic	None
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			**43,279**	**11.8**	**-8**	**$6,388**	**$20,880**	**$4,210**	**$16,670**	**2.6**	**42,587**
ECM 1	Install LED Fixtures	Yes	2,540	0.0	0	$381	$1,620	$400	$1,220	3.2	2,558
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	9,096	0.9	-2	$1,341	$1,400	$160	$1,240	0.9	8,937
ECM 3	Retrofit Fixtures with LED Lamps	Yes	31,643	10.9	-7	$4,666	$17,860	$3,650	$14,210	3.0	31,092
Lighting Control Measures			**9,469**	**2.9**	**-2**	**$1,396**	**$14,720**	**$4,010**	**$10,710**	**7.7**	**9,303**
ECM 4	Install Occupancy Sensor Lighting Controls	No	4,770	2.1	-1	$703	$9,960	$1,280	$8,680	12.3	4,687
ECM 5	Install High/Low Lighting Controls	Yes	4,699	0.8	-1	$693	$4,760	$2,730	$2,030	2.9	4,616
Variable Frequency Drive (VFD) Measures			**5,811**	**1.6**	**0**	**$870**	**$19,200**	**$2,000**	**$17,200**	**19.8**	**5,851**
ECM 6	Install VFDs on Heating Water Pumps	No	5,811	1.6	0	$870	$19,200	$2,000	$17,200	19.8	5,851
Unitary HVAC Measures			**10,768**	**15.4**	**0**	**$1,613**	**$115,700**	**$7,000**	**$108,700**	**67.4**	**10,843**
ECM 7	Install High Efficiency Air Conditioning Units	No	10,768	15.4	0	$1,613	$115,700	$7,000	$108,700	67.4	10,843
Domestic Water Heating Upgrade			**0**	**0.0**	**6**	**$67**	**$180**	**$80**	**$100**	**1.5**	**700**
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	6	$67	$180	$80	$100	1.5	700
Food Service & Refrigeration Measures			**1,954**	**0.2**	**0**	**$293**	**$540**	**$50**	**$490**	**1.7**	**1,968**
ECM 9	Vending Machine Control	Yes	1,954	0.2	0	$293	$540	$50	$490	1.7	1,968
Custom Measures			**4,730**	**0.0**	**526**	**$6,591**	**$32,700**	**$0**	**$32,700**	**5.0**	**66,304**
ECM 10	Retro-Commissioning Study	Yes	4,730	0.0	526	$6,591	$32,700	$0	$32,700	5.0	66,304
TOTALS (COST EFFECTIVE MEASURES)			**54,663**	**12.8**	**522**	**$14,031**	**$59,060**	**$7,070**	**$51,990**	**3.7**	**116,175**
TOTALS (ALL MEASURES)			**76,011**	**31.8**	**521**	**$17,218**	**$203,920**	**$17,350**	**$186,570**	**10.8**	**137,556**

* - 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 Ancora Psych Hospital - Elm Hall. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs.

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

2.1 Site Overview

On December 13, 2024, TRC performed an energy audit at Ancora Psych Hospital - Elm Hall located in Hammonton, New Jersey. TRC met with Kyle Irizarry to review the facility operations and help focus our investigation on specific energy-using systems. Ancora Psychiatric Hospital is a 600-bed adult inpatient facility that offers a multidisciplinary team approach to development and implementation of care. Opened in 1955, the Ancora campus consists of multiple buildings across 650 acres.

The Ancora Psych Hospital-Elm Hall is a three-story, 56,225-square-foot building built in 1953. Spaces include classrooms, offices, corridors, stairwells, lounges, residential wards, restrooms, storage rooms, electrical rooms, and mechanical spaces. Some areas of the second floor are currently not in use.

The facility primarily uses linear fluorescent T8 fixtures for lighting. The building is cooled by rooftop package units. Heating is provided by steam from the boiler house which is converted to hot water using heat exchangers. The HVAC system is controlled using a BAS system.

2.2 Building Occupancy

The facility is occupied Monday through Friday during regular hours and intermittently, as needed, for maintenance and operations.

Building Name	Weekday/Weekend	Operating Schedule
Ancora Psych Hospital - Elm Hall	Weekday	7:00 AM - 4:30 PM
	Weekend	None

Building Occupancy Schedule

2.3 Building Envelope

The walls consist of concrete masonry units (CMUs) over structural steel with a brick veneer and a painted CMU interior finish. The flat roof is supported by steel trusses and formed of reinforced concrete deck with an ethylene propylene diene terpolymer (EPDM) covering. Overall, the roof is in good condition and encloses conditioned space.

Most of the windows are single paned with aluminum frames. The glass-to-frame seals are in fair condition, as are the weather seals on the operable windows, which show little evidence of excessive wear.

Exterior doors are made from fiberglass reinforced polymer (FRP) composite material with aluminum frames. They are in fair condition, with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

Typical Building Envelope

Typical Building Roof

Building Door

Building Windows

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also a few T12 fixtures in stair A/C #1, stair A/C #2, stair B/D #1, and stair B/D #2. Fixture types include 2-lamp, 3-lamp, and 4-lamp fixtures, 4-foot-long recessed, pendant and surface-mounted fixtures with U-bend and linear tube lamps. Typically, T8 fluorescent lamps use electronic ballasts, while T12 fluorescent lamps use magnetic ballasts.

Additionally, there are some compact fluorescent lamps (CFL), incandescent, and LED general-purpose lamps, mainly in storage areas and mechanical rooms. LED ceiling-mounted fixtures illuminate the A ward multipurpose room.

All exit signs are LED. Most fixtures are in fair condition. Interior lighting levels were generally sufficient. Most lighting fixtures are controlled manually by wall switches.

Linear Fluorescent U-Bend T8 Lamps

Linear Fluorescent T8 Lamps

Typical LED Screw-in Lamp

CFL Lamp

Linear Fluorescent T8 Lamps

Typical LED Screw-in Lamp

Exterior fixtures include a mix of wall packs, pole mounted, and floodlights with CFL, HID, and LED lamps. Exterior light fixtures are mainly controlled by photocell.

Exterior LED Fixture

Exterior LED Fixture

Exterior HID Pole Fixture

Exterior LED Fixture

2.5 Air Handling Systems

Packaged Units

Several areas of Elm Hall are served by two Aaon packaged units with DX cooling coils, controlled by the facility's BAS. One unit has a cooling capacity of 70 tons and the other has a cooling capacity of 17.8 tons. These units are operating beyond their useful life and have been evaluated for replacement. The equipment is in fair condition.

RTAC-1 has a 20 hp supply fan and a 5 hp return fan, while RTAC-2 has a 5 hp supply fan and a 2 hp return fan. Supply and return fan motors are rated standard efficiency and are equipped with variable frequency drives (VFDs). The packaged units are equipped with economizers that are in fair condition.

Refer to Appendix A for detailed information about each unit.

Rooftop Package Unit- 1 *Rooftop Package Unit- 2*

<u>**Exhaust Fans**</u>

Several fractional horsepower exhaust fans on the walls and roof of the building serve various areas including mechanical areas and restrooms. The fan motors are standard efficiency and are in fair condition. Most of them operate during the building's occupied hours and are controlled locally.

Exhaust Fan *Roof: Exhaust Fans*

2.6 Steam to Hot Water

This building is supplied with steam produced by the boilers located at the boiler house. The steam is converted to hot water in this building using a heat exchanger, and the hot water is distributed to heating end uses.

The building has a primary distribution system with two constant-speed hot water pumps that operate in a lead/lag sequence. Two, 5 hp pumps are located in the mechanical rooms, and there are also two, 1 hp pumps dedicated to package units. Additionally, there are four, 0.75 hp condensate return pumps in the mechanical rooms. The heat exchangers and hot water system are controlled by the BAS system.

On the day of the audit, the BAS system provided hot water at about 151°F, with a return temperature of around 148°F. The system shuts off when the outside temperature reaches 65°F. Most of the supply/return pipes are well insulated and the insulation is in fair condition.

Heat Exchanger

Heat Exchanger

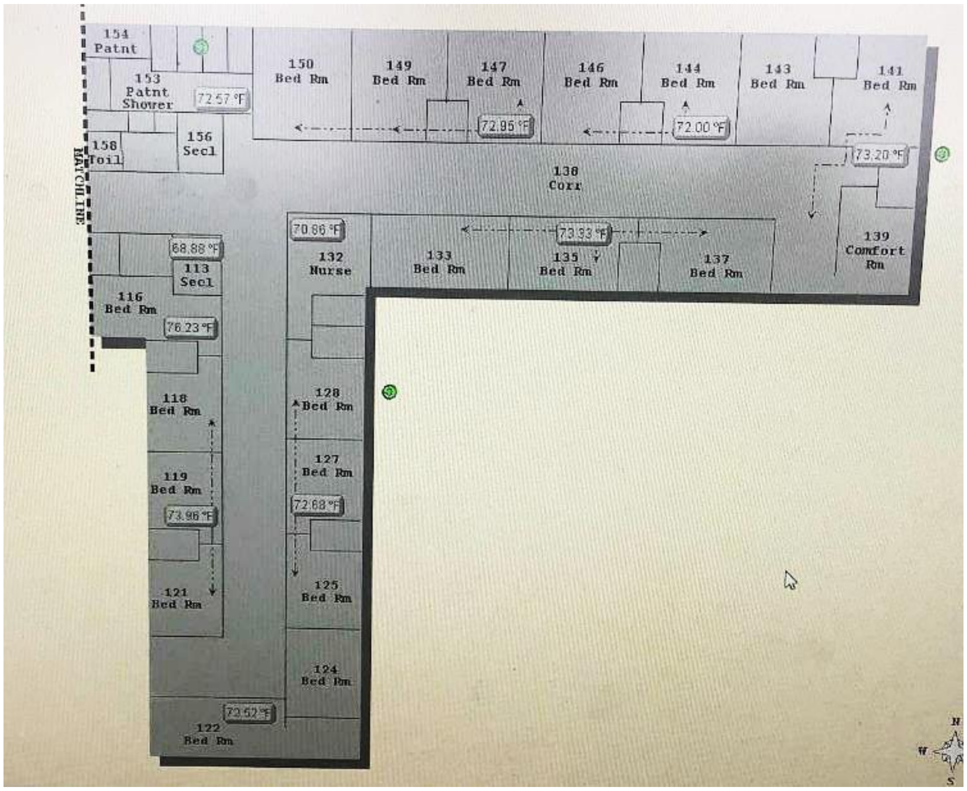
Hot Water Pumps- Roof Top Units

Hot Water Pumps

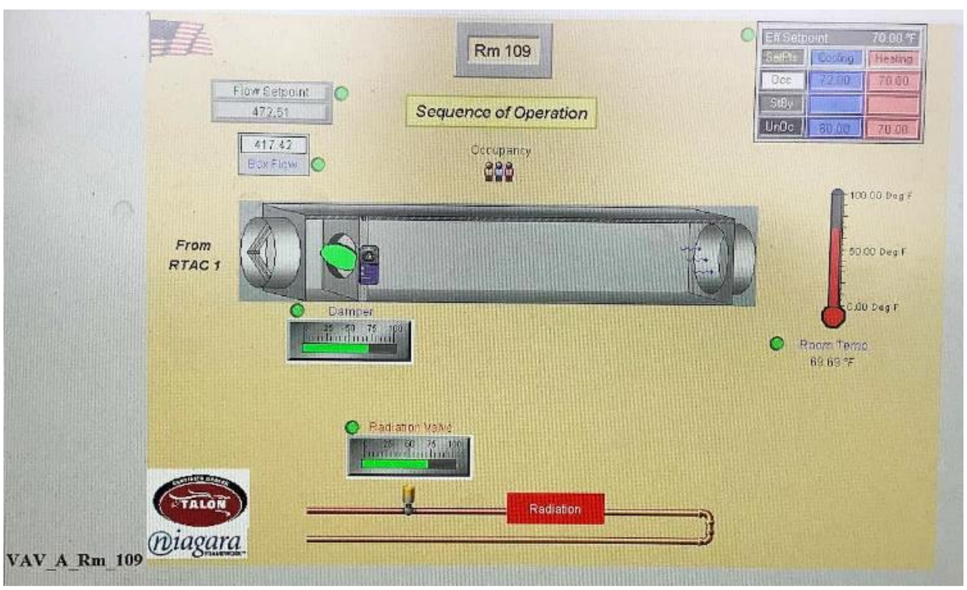
2.7 Building Automation System (BAS)

The Talon BAS is used to monitor and control the HVAC equipment, heat exchanger, hot water loop, and package units. It provides an overview of temperature settings in various rooms and sections of the building, including the heat exchanger set points for hot water supply and pump operations. It provides equipment scheduling control, allowing users to manage temperature settings based on predefined schedules. As an example, during the audit the room 109 cooling temperature was set to 72°F and heating to 70°F for occupied periods, and 80°F for cooling and 70°F for heating when unoccupied.

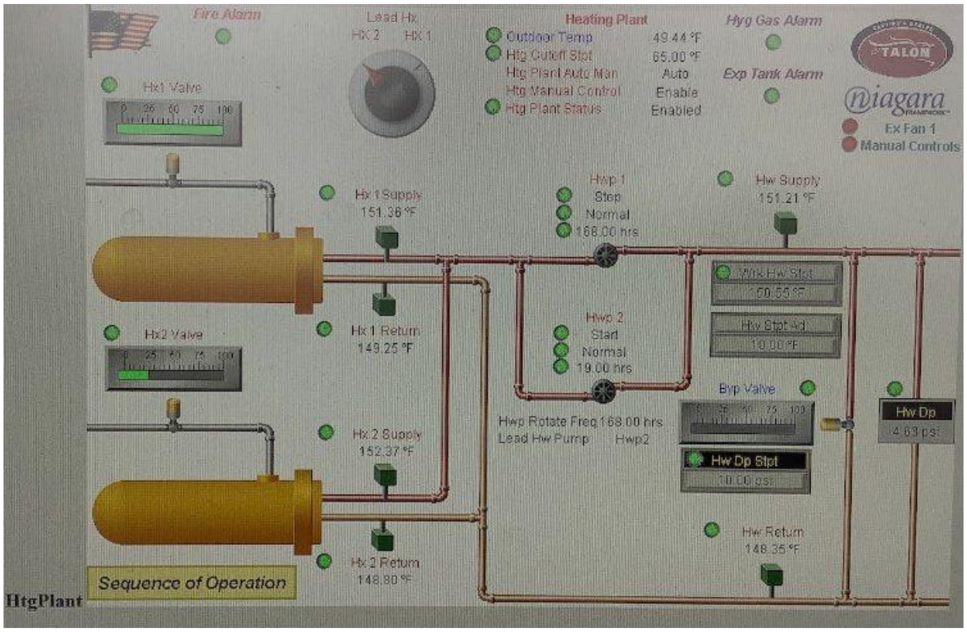
In addition to temperature control, the BAS provides a graphical interface that offers users an insightful view of the various HVAC components and their operational status. This graphical section gives a visual representation of the equipment, allowing users to monitor its functioning in real-time. Site staff expressed interest in expanding the level of control provided by the BAS and receiving additional training on its operation. The BAS system has been evaluated for retro-commissioning.



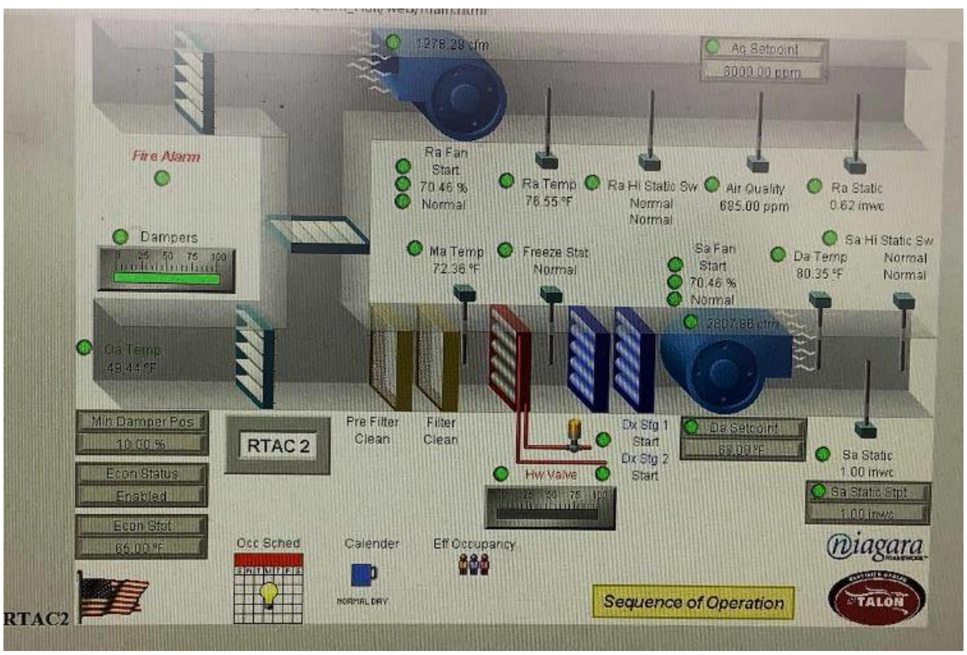
BAS System-East Section



BAS -VAV_A-Room 109



BAS Heating System

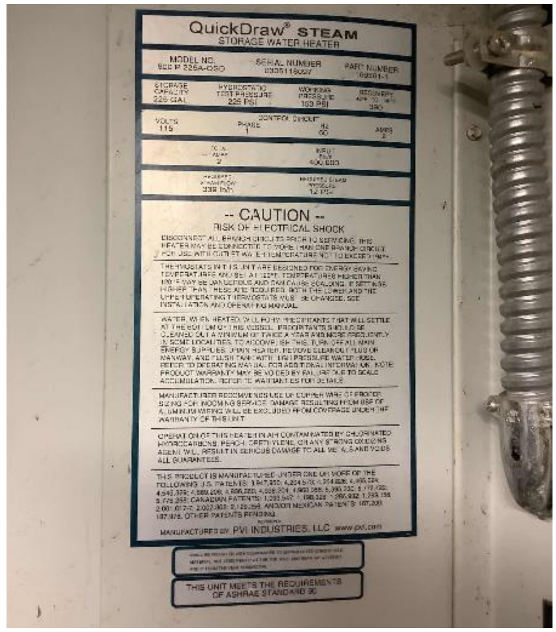


BAS–RTAC 2

2.8 Domestic Hot Water

This building receives steam from the boilers at the boiler house. The steam is converted into potable hot water using a dedicated 225-gallon, 400 MBh storage tank with a built-in heat exchanger. Hot water is stored and then distributed to end uses. The domestic hot water pipes are insulated, and the insulation is in fair condition.

Hot Water Tank



Hot Water Tank Nameplate

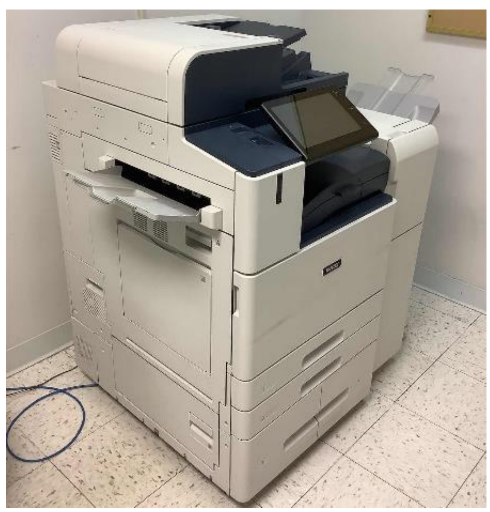
2.9 Plug Load and Vending Machines

The location is doing a great job managing the electrical plug loads. This report makes additional suggestions for ECMs in this area as well as energy efficient best practices.

There are 43 computer workstations throughout the facility. Plug loads include general cafe and office equipment. Typical office and kitchen loads include a coffee machine, microwave, printer/copier, and television.

There are also a few residential-style refrigerators throughout the building that store food and drinks. These vary in condition and efficiency. There is a refrigerated beverage vending machine and a non-refrigerated vending machine. The vending machines are not equipped with occupancy-based controls.

Vending Machines



Printer/Copier

Residential Style Refrigerators

2.10 Water-Using Systems

Water is provided by New Jersey American Water. There is one active onsite well that serves as a secondary water source for emergencies, firefighting, and other uses. Well water is directed to the water tower located on campus. The primary use of water is for drinking, cleaning, cooking, and sanitary fixtures. No water leaks were observed.

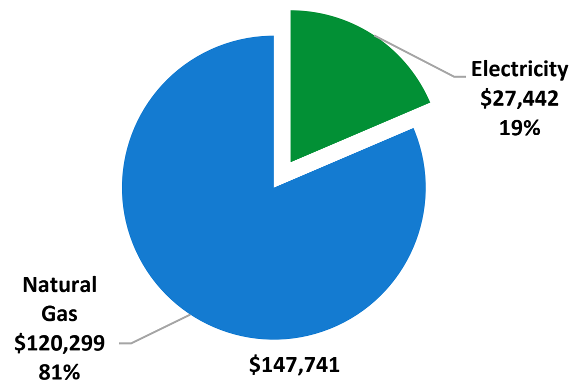
The EPA WaterSense® program has set maximum flow rates for sanitary fixtures: 1.28 gallons per flush (gpf) for toilets, 0.5 gpf for urinals, 1.5 gallons per minute (gpm) for lavatory faucets, and 2.0 gpm for showerheads. There are a few restrooms with toilets, urinals, and sinks. Faucet flow rates are 2.2 gpm or higher.

Restroom Faucet

3 ENERGY USE AND COSTS

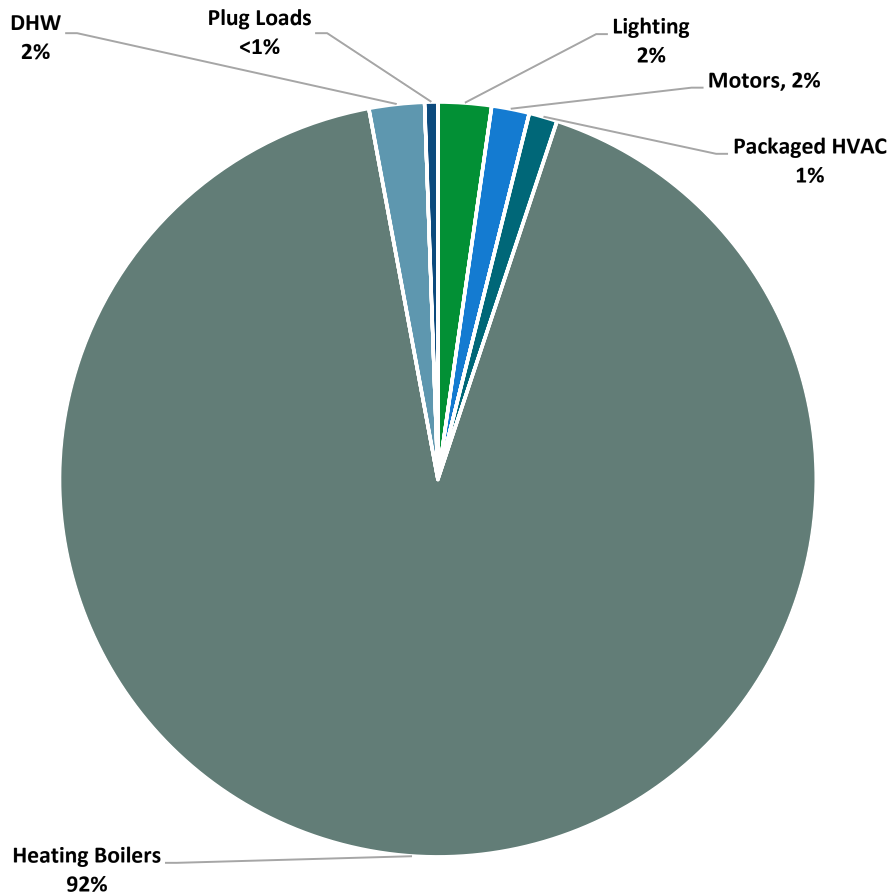
Twelve months of utility billing data are used to develop annual energy consumption and cost data. This information creates a profile of the annual energy consumption and energy costs.

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	183,205 kWh	$27,442
Natural Gas	107,483 Therms	$120,299
Total		**$147,741**



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.

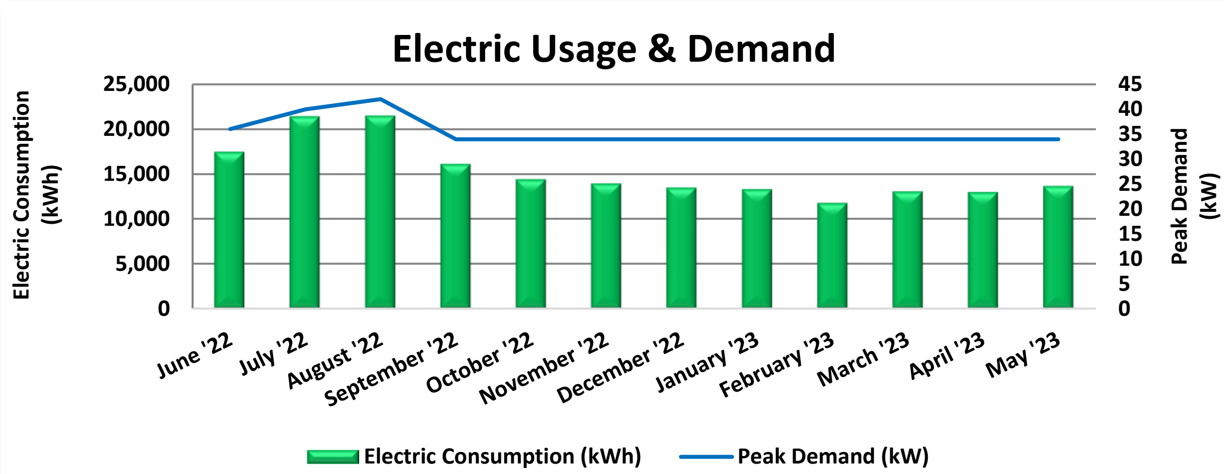
The energy auditor collects information regarding equipment operating hours, capacity, efficiency, and other operational parameters from facility staff, drawings, and on-site observations. This information is used as the inputs to calculate the existing conditions energy use for the site. The calculated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

Atlantic City Electric delivers electricity under rate class Annual General Service Primary (GSP), with electric production provided by Constellation, a third-party supplier.



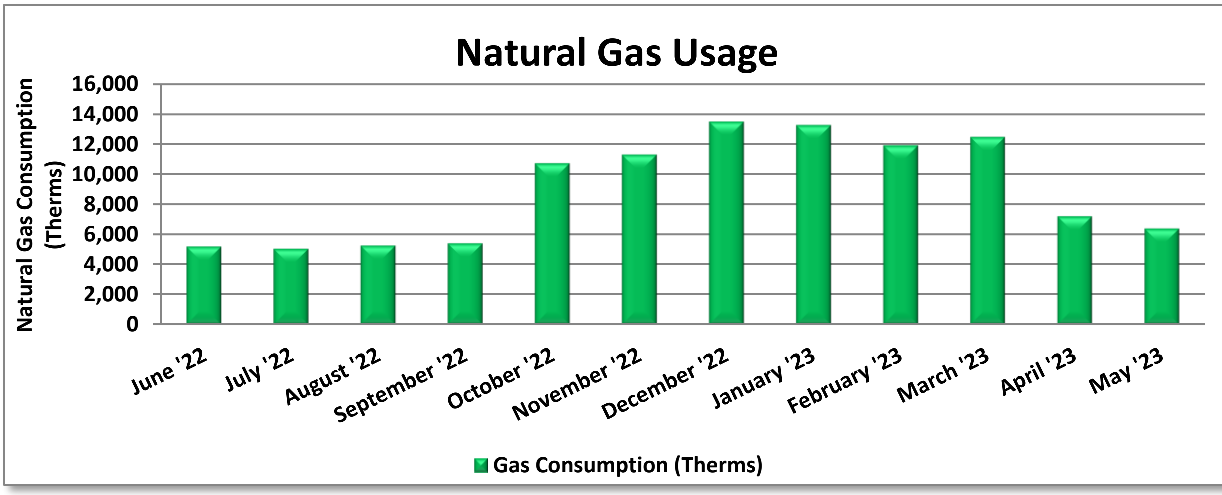
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
6/30/22	30	17,470	36	$360	$2,514
7/31/22	31	21,407	40	$413	$3,054
8/31/22	31	21,469	42	$435	$3,082
9/30/22	30	16,129	34	$341	$2,345
10/31/22	31	14,426	34	$349	$2,134
11/30/22	30	13,952	34	$338	$2,063
12/31/22	31	13,491	34	$349	$2,105
1/31/23	31	13,319	34	$349	$2,079
2/28/23	28	11,803	34	$315	$1,859
3/31/23	31	13,065	34	$349	$2,048
4/30/23	30	12,997	34	$338	$2,026
5/31/23	31	13,677	34	$349	$2,133
Totals	**365**	**183,205**	**42**	**$4,285**	**$27,442**
Annual	**365**	**183,205**	**42**	**$4,285**	**$27,442**

Notes:

- An estimated peak demand of 42 kW occurred in August '22.
- The estimated average demand over the past 12 months was 35 kW.
- This building is served from the main campus electric meter along with several others. Energy usage (kWh) and demand (kW) was apportioned among those buildings using a formula that accounts for building area (sf), usage, and the energy intensity of the equipment.
- The average electric cost over the past 12 months was $0.150/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

South Jersey Gas delivers natural gas under rate class Comprehensive Transportation Services (SJ-CTS), 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
6/30/22	30	5,174	$6,368
7/31/22	31	5,041	$6,339
8/31/22	31	5,257	$6,386
9/30/22	30	5,390	$6,484
10/31/22	31	10,713	$10,502
11/30/22	30	11,279	$11,058
12/31/22	31	13,471	$9,312
1/31/23	31	13,249	$15,589
2/28/23	28	11,906	$14,795
3/31/23	31	12,445	$14,875
4/30/23	30	7,179	$9,707
5/31/23	31	6,379	$8,884
Totals	**365**	**107,483**	**$120,299**
Annual	**365**	**107,483**	**$120,299**

Notes:

- The average gas cost for the past 12 months is $1.119/therm, which is the blended rate used throughout the analysis.
- Heating hot water and domestic hot water for this building are converted from steam provided by the central plant. Central plant natural gas use has been apportioned among the buildings served with steam using a formula that accounts for building area (sf), usage, and the energy intensity of the equipment.

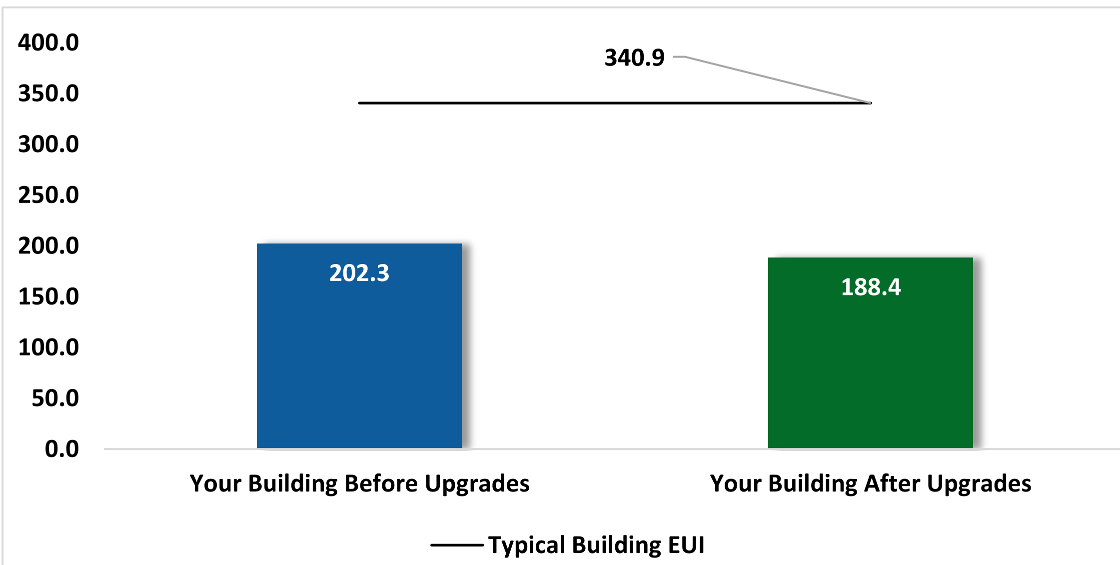
3.3 Benchmarking

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

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

Benchmarking Score	N/A

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

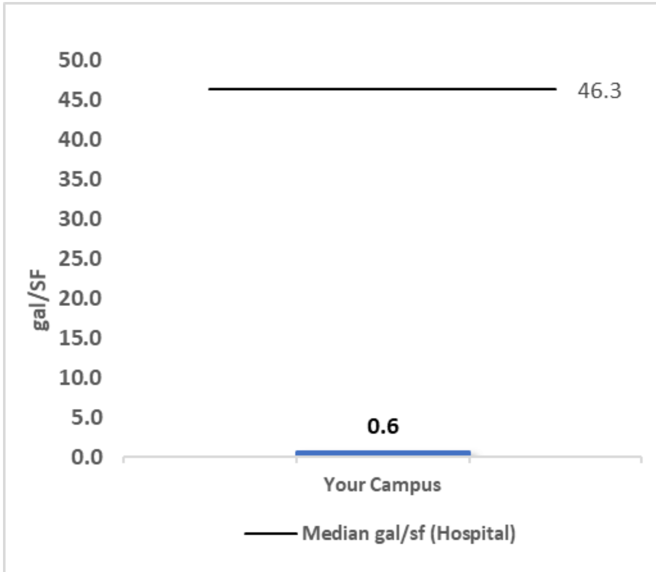


Energy Use Intensity Comparison[4]

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.

Note that the typical building EUI used in this report refers to the national median energy use intensity for a "specialty hospital" and does not correlate with the energy use intensity of a particular building. Specifically, buildings with lower occupancy periods or less equipment typically use less energy.

[4] Based on all evaluated ECMs



A benchmark is provided for your campus'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.

New Jersey American Water supplies water to the campus. This building, along with several others, shares the main campus water meter. The water bill is not divided among these buildings, so it covers the metered water usage for multiple buildings on campus. This information has been included in the report for the Main Hospital. Additional use of unmetered well water may contribute slightly to overall water consumption. Water use varies considerably depending mainly on the extent of indoor water use and whether process water is used. 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.

3.4 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			**43,279**	**11.8**	**-8**	**$6,388**	**$20,880**	**$4,210**	**$16,670**	**2.6**	**42,587**
ECM 1	Install LED Fixtures	Yes	2,540	0.0	0	$381	$1,620	$400	$1,220	3.2	2,558
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	9,096	0.9	-2	$1,341	$1,400	$160	$1,240	0.9	8,937
ECM 3	Retrofit Fixtures with LED Lamps	Yes	31,643	10.9	-7	$4,666	$17,860	$3,650	$14,210	3.0	31,092
Lighting Control Measures			**9,469**	**2.9**	**-2**	**$1,396**	**$14,720**	**$4,010**	**$10,710**	**7.7**	**9,303**
ECM 4	Install Occupancy Sensor Lighting Controls	No	4,770	2.1	-1	$703	$9,960	$1,280	$8,680	12.3	4,687
ECM 5	Install High/Low Lighting Controls	Yes	4,699	0.8	-1	$693	$4,760	$2,730	$2,030	2.9	4,616
Variable Frequency Drive (VFD) Measures			**5,811**	**1.6**	**0**	**$870**	**$19,200**	**$2,000**	**$17,200**	**19.8**	**5,851**
ECM 6	Install VFDs on Heating Water Pumps	No	5,811	1.6	0	$870	$19,200	$2,000	$17,200	19.8	5,851
Unitary HVAC Measures			**10,768**	**15.4**	**0**	**$1,613**	**$115,700**	**$7,000**	**$108,700**	**67.4**	**10,843**
ECM 7	Install High Efficiency Air Conditioning Units	No	10,768	15.4	0	$1,613	$115,700	$7,000	$108,700	67.4	10,843
Domestic Water Heating Upgrade			**0**	**0.0**	**6**	**$67**	**$180**	**$80**	**$100**	**1.5**	**700**
ECM 8	Install Low-Flow DHW Devices	Yes	0	0.0	6	$67	$180	$80	$100	1.5	700
Food Service & Refrigeration Measures			**1,954**	**0.2**	**0**	**$293**	**$540**	**$50**	**$490**	**1.7**	**1,968**
ECM 9	Vending Machine Control	Yes	1,954	0.2	0	$293	$540	$50	$490	1.7	1,968
Custom Measures			**4,730**	**0.0**	**526**	**$6,591**	**$32,700**	**$0**	**$32,700**	**5.0**	**66,304**
ECM 10	Retro-Commissioning Study	Yes	4,730	0.0	526	$6,591	$32,700	$0	$32,700	5.0	66,304
TOTALS			**76,011**	**31.8**	**521**	**$17,218**	**$203,920**	**$17,350**	**$186,570**	**10.8**	**137,556**

* - 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		**43,279**	**11.8**	**-8**	**$6,388**	**$20,880**	**$4,210**	**$16,670**	**2.6**	**42,587**
ECM 1	Install LED Fixtures	2,540	0.0	0	$381	$1,620	$400	$1,220	3.2	2,558
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	9,096	0.9	-2	$1,341	$1,400	$160	$1,240	0.9	8,937
ECM 3	Retrofit Fixtures with LED Lamps	31,643	10.9	-7	$4,666	$17,860	$3,650	$14,210	3.0	31,092
Lighting Control Measures		**4,699**	**0.8**	**-1**	**$693**	**$4,760**	**$2,730**	**$2,030**	**2.9**	**4,616**
ECM 5	Install High/Low Lighting Controls	4,699	0.8	-1	$693	$4,760	$2,730	$2,030	2.9	4,616
Domestic Water Heating Upgrade		**0**	**0.0**	**6**	**$67**	**$180**	**$80**	**$100**	**1.5**	**700**
ECM 8	Install Low-Flow DHW Devices	0	0.0	6	$67	$180	$80	$100	1.5	700
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$293**	**$540**	**$50**	**$490**	**1.7**	**1,968**
ECM 9	Vending Machine Control	1,954	0.2	0	$293	$540	$50	$490	1.7	1,968
Custom Measures		**4,730**	**0.0**	**526**	**$6,591**	**$32,700**	**$0**	**$32,700**	**5.0**	**66,304**
ECM 10	Retro-Commissioning Study	4,730	0.0	526	$6,591	$32,700	$0	$32,700	5.0	66,304
TOTALS		**54,663**	**12.8**	**522**	**$14,031**	**$59,060**	**$7,070**	**$51,990**	**3.7**	**116,175**

* - 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		**43,279**	**11.8**	**-8**	**$6,388**	**$20,880**	**$4,210**	**$16,670**	**2.6**	**42,587**
ECM 1	Install LED Fixtures	2,540	0.0	0	$381	$1,620	$400	$1,220	3.2	2,558
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	9,096	0.9	-2	$1,341	$1,400	$160	$1,240	0.9	8,937
ECM 3	Retrofit Fixtures with LED Lamps	31,643	10.9	-7	$4,666	$17,860	$3,650	$14,210	3.0	31,092

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

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

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

Affected Building Areas: exterior fixtures

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected Building Areas: all areas with fluorescent fixtures with T12 tubes: stairs A/C #1, stairs A/C #2, stairs B/D #1, and stairs B/D #2

ECM 3: Retrofit Fixtures with LED Lamps

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

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

Affected Building Areas: all areas with fluorescent fixtures with T8 tubes; CFLs: storage mason shop, exterior fixture; and incandescent lamps: mechanical room 12

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		**9,469**	**2.9**	**-2**	**$1,396**	**$14,720**	**$4,010**	**$10,710**	**7.7**	**9,303**
ECM 4	Install Occupancy Sensor Lighting Controls	4,770	2.1	-1	$703	$9,960	$1,280	$8,680	12.3	4,687
ECM 5	Install High/Low Lighting Controls	4,699	0.8	-1	$693	$4,760	$2,730	$2,030	2.9	4,616

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

ECM 4: Install Occupancy Sensor Lighting Controls

We evaluated installing 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, electrical rooms, lounge, multipurpose room, residential wards, classrooms, restrooms, and storage rooms

ECM 5: Install High/Low Lighting Controls

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

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

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

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

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

Affected Building Areas: hallways and stairwells

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		**5,811**	**1.6**	**0**	**$870**	**$19,200**	**$2,000**	**$17,200**	**19.8**	**5,851**
ECM 6	Install VFDs on Heating Water Pumps	5,811	1.6	0	$870	$19,200	$2,000	$17,200	19.8	5,851

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

ECM 6: Install VFDs on Heating Water Pumps

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

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

Affected Pumps: heating hot water pumps: multipurpose room, and mechanical 18 A 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		**10,768**	**15.4**	**0**	**$1,613**	**$115,700**	**$7,000**	**$108,700**	**67.4**	**10,843**
ECM 7	Install High Efficiency Air Conditioning Units	10,768	15.4	0	$1,613	$115,700	$7,000	$108,700	67.4	10,843

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

ECM 7: Install High Efficiency Air Conditioning Units

We evaluated replacing 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: rooftop package units 1 and 2

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**	**6**	**$67**	**$180**	**$80**	**$100**	**1.5**	**700**
ECM 8	Install Low-Flow DHW Devices	0	0.0	6	$67	$180	$80	$100	1.5	700

ECM 8: 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.

4.6 Food Service and Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$293**	**$540**	**$50**	**$490**	**1.7**	**1,968**
ECM 9	Vending Machine Control	1,954	0.2	0	$293	$540	$50	$490	1.7	1,968

ECM 9: Vending Machine Control

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

Affected Units: refrigerated and non-refrigerated vending machines

4.7 Custom Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Custom Measures		**4,730**	**0.0**	**526**	**$6,591**	**$32,700**	**$0**	**$32,700**	**5.0**	**66,304**
ECM 10	Retro-Commissioning Study	4,730	0.0	526	$6,591	$32,700	$0	$32,700	5.0	66,304

ECM 10: 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 $0.50 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 5.0% of the HVAC energy consumption baseline.

4.8 Measures for Future Consideration

There are additional opportunities for improvement that State of NJ Department of Human Services may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment, and/or include significant system reconfiguration. These measures are therefore beyond the scope of this energy audit. These measures are described here to support a whole building approach to energy efficiency and sustainability.

State of NJ Department of Human Services 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.

<u>Electric Sub Metering</u>

Electricity use varies in different facilities, and plant operators need to perform their own investigations and analyses to understand how their facilities consume energy. Utility bills indicate how much energy a facility uses across the entire facility, but submetering provides more detailed data on the energy consumption of specific systems and even on individual pieces of equipment, depending on how extensively meters are installed. Electric submeters alone do not save energy, but they are a useful tool under the right circumstances. Electric sub-meters can provide facility staff with real-time energy use data for specific buildings and equipment, information that enhances the potential for greater energy management activities. Revenue grade submeters are a tool that allow operators to better understand how and where electricity is used at the facility. Better resolution of system energy use can lead to operational changes or even equipment modifications or replacement, which often result in reduced energy use, which often result in reduced energy use.

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, 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[5]. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Weatherization

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

Doors and Windows

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

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.

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

Lighting Maintenance

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

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

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.

Thermostat Schedules and Temperature Resets

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

Economizer Maintenance

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

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

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

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.

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[6]. 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[7].

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[8] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[9] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water Metering and Submetering

Tracking a facility's total water use, as well as specific end uses, is a key component of a facility's water-efficiency efforts. Accurately measuring water use can help facility managers identify areas for targeted reductions and track progress from water-efficiency upgrades. If possible, install meters to measure all water conveyed to the facility, regardless of the source. Each source should be metered separately. Consider developing a metering plan and installing separate submeters to measure specific end uses. There are many types and sizes of meters intended for different uses. Installing the correct type and size of meter are critical to accurate water measurement. Sub-metering applications may include:

- Individual tenant spaces
- Cooling tower make-up and blowdown water supply
- Water lines serving other HVAC systems including water circulating loops
- Make up water supply for steam boiler plants with a capacity of 500,000 Btu/hr. or greater
- Systems or equipment that use single pass cooling water
- Irrigation systems

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

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

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

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

- Roof spray systems (for irrigating vegetated roofs or thermal conditioning)
- Ornamental water features
- Indoor and outdoor pools and spas
- Industrial water using processes

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 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 campus wide screening based on the facility's demand, combined available spaces, and shading elements has been included in the report for Boiler House.

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

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

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

A preliminary screening based on heating and electrical demand, siting, and interconnection has been included in the report for the Boiler House.

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

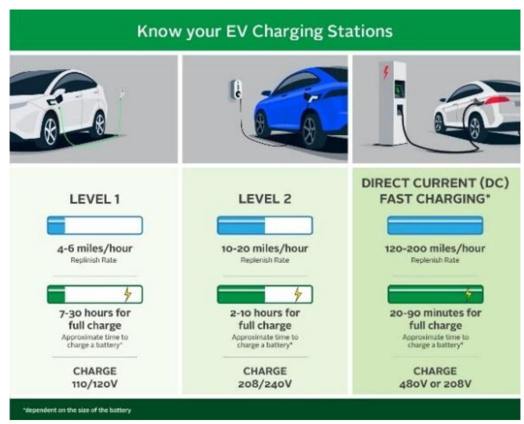
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes 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 medium potential for adding EV chargers to the facility's parking, based on potential costs of installation and other site factors.

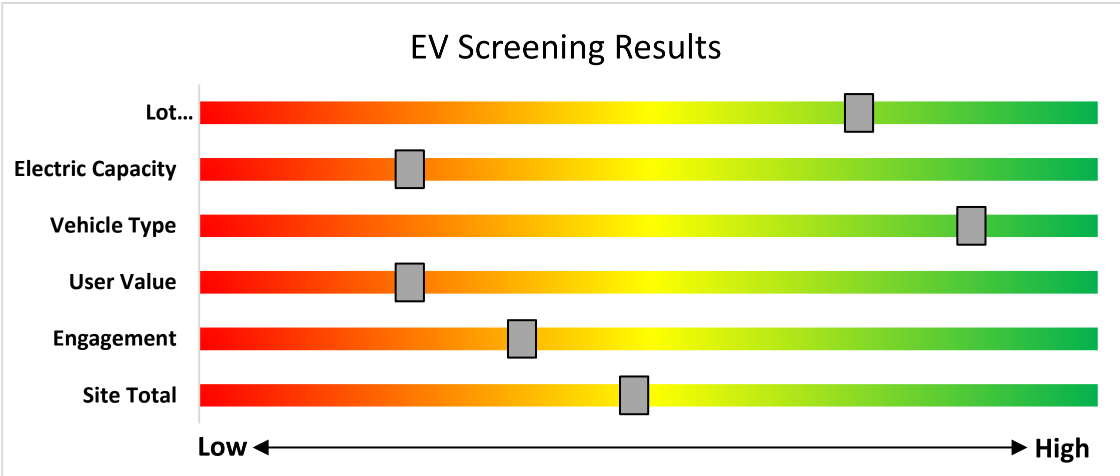
The primary costs associated with installing EV charging are the charger hardware and the cost to extend power from the facility to parking spaces. This may include upgrades to electric panels to serve increased loads.

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 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

- 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[10]

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

10

[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[11]. 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[12].

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.

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

[12] 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.

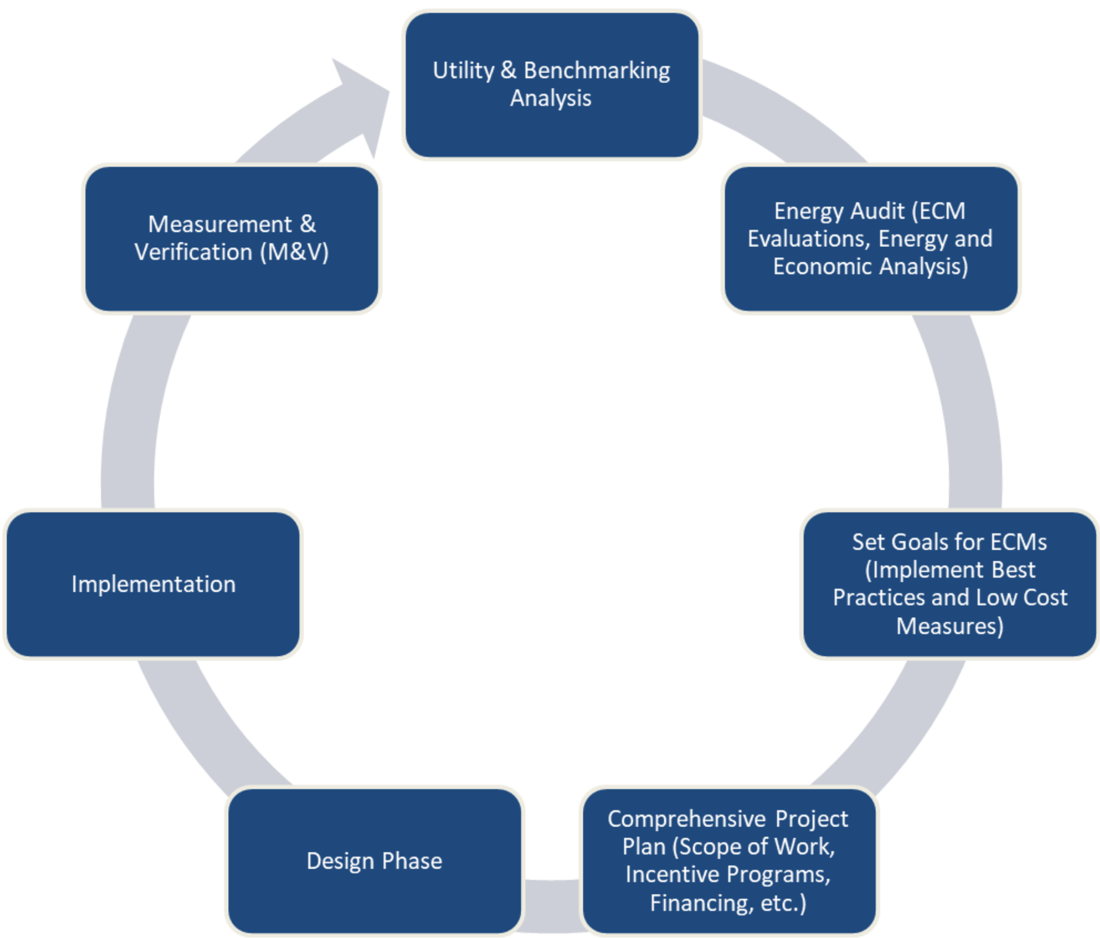
Engineered Solutions

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[13].

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[14].

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

[14] 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
Classroom - 109	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.2	513	0	$76	$520	$90	5.7
Computer Lab 150	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.2	513	0	$76	$520	$90	5.7
Corridor - Ward A	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Ward A	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,200	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,898	0.2	970	0	$143	$530	$230	2.1
Corridor - Ward B 115	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Ward B 115	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,200	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,898	0.4	2,037	0	$300	$720	$360	1.2
Corridor - Ward B 138	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Ward B 138	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,200	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,898	0.4	2,037	0	$300	$1,000	$360	2.1
Corridor - Ward B Day Rooms	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Ward B Day Rooms	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,200	3, 5	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,898	0.4	1,746	0	$257	$660	$300	1.4
Corridor - Ward B Nurse Station	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Ward B Nurse Station	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,200	3, 5	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,898	0.4	1,746	0	$257	$660	$300	1.4
Corridor - Ward B Offices	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Ward B Offices	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	4,200	3, 5	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,898	0.3	1,455	0	$215	$600	$260	1.6
Electrical Room 107	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,470	3	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,470	0.1	152	0	$22	$90	$20	3.1
File Room - Loading Dock	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.1	342	0	$50	$280	$50	4.6
Janitorial 106	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	18	0	$3	$40	$10	11.6
Janitorial 177	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,000	0.0	32	0	$5	$90	$10	17.0
Lounge - 115F	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.1	342	0	$50	$280	$50	4.6
Lounge - 115F	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,704	0.0	107	0	$16	$90	$10	5.1
Lounge - 138	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.1	342	0	$50	$280	$50	4.6
Lounge - 179	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.1	342	0	$50	$280	$50	4.6
Lounge 164	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.1	342	0	$50	$280	$50	4.6
Lounge 164	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,704	0.0	107	0	$16	$90	$10	5.1
Mail Room - 159	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.1	342	0	$50	$280	$50	4.6

	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
Multipurpose - Day Room B Ward 166	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Multipurpose - Day Room B Ward 166	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.5	1,540	0	$227	$900	$180	3.2
Multipurpose - Day Room B Ward 167	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Multipurpose - Day Room B Ward 167	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.5	1,540	0	$227	$900	$180	3.2
Multipurpose - Day Room Ward A	2	LED - Fixtures: Ceiling Mount	None	S	20	2,470		None	No	2	LED - Fixtures: Ceiling Mount	None	20	2,470	0.0	0	0	$0	$0	$0	0.0
Office - 103	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 104	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,297	0.1	306	0	$45	$330	$60	6.0
Office - 115A	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 115B	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 115B	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 115C	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 115C	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 115D	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 115D	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 115E	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 115G	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 115G	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 115H	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 115H	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 115I	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 115I	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 138A	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 138A	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 138B	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 138B	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - 138C	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 138C	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Office - 138D	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 138E	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 138F	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 138G	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 138H	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 138I	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 176	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 178	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.2	391	0	$58	$340	$70	4.7
Office - 180	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 181	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 182	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - 183	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - Nurse Station	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,880	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,297	0.1	261	0	$38	$280	$50	6.0
Office - Nurse Station	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,880	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,297	0.0	81	0	$12	$90	$10	6.7
Residential - Ward A #1	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
Residential - Ward A #1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.2	456	0	$67	$530	$80	6.7
Residential - Ward A #2	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
Residential - Ward A #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.2	456	0	$67	$200	$40	2.4
Restroom - 104	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 112	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 115A	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 115C	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 115E	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - 115G	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 115I	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 130	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 138 Lounge	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 138A	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 138B	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 138D	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 138F	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 138H	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 150	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 152	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3, 4	Relamp	Yes	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,023	0.4	767	0	$113	$1,390	$160	10.9
Restroom - 157	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 161	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,482	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,482	0.0	81	0	$12	$60	$20	3.4
Restroom - 165	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 168	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 175	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Restroom - 184	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,482	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,482	0.0	47	0	$7	$90	$10	11.5
Stairs - Central B/D	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	8,760	3, 5	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.1	1,214	0	$179	$430	$140	1.6
Stairs - Ward A/C #1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch		88	8,760	2, 5	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.3	2,621	-1	$386	$630	$180	1.2
Stairs - Ward A/C #2	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch		88	8,760	2, 5	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.3	2,621	-1	$386	$630	$180	1.2
Stairs - Ward B/D #1	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch		88	8,760	2, 5	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.3	2,621	-1	$386	$630	$180	1.2
Stairs - Ward B/D #2	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch		88	8,760	2, 5	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	6,044	0.3	2,621	-1	$386	$630	$180	1.2
Storage 112	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.2	208	0	$31	$340	$70	8.8
Storage 157	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.2	208	0	$31	$340	$70	8.8
Storage 160	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.1	139	0	$20	$280	$50	11.3

Location	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Storage 163	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.2	208	0	$31	$340	$70	8.8
Storage 169	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.1	139	0	$20	$280	$50	11.3
Storage 169	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	S	62	1,000	3, 4	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	690	0.0	43	0	$6	$90	$10	12.6
Storage 170	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.2	208	0	$31	$340	$70	8.8
Storage 172	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,000	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	690	0.2	277	0	$41	$400	$80	7.8
Vestibule - Loading Dock	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Vestibule - Loading Dock	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	2,470	0.0	134	0	$20	$60	$20	2.0
Vestibule 174	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	2,470	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,704	0.1	342	0	$50	$280	$50	4.6
Corridor - Ward C	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 - Ward C	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,200	3, 5	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,898	0.3	1,358	0	$200	$910	$320	2.9
Corridor - Ward D	1	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Ward D	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,200	3, 5	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,898	0.2	970	0	$143	$530	$230	2.1
Residential - Ward C #1	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
Residential - Ward C #1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.2	456	0	$67	$530	$80	6.7
Residential - Ward C #2	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
Residential - Ward C #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.2	456	0	$67	$530	$80	6.7
Residential - Ward D #1	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
Residential - Ward D #1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.2	456	0	$67	$530	$80	6.7
Residential - Ward D #2	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
Residential - Ward D #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.2	456	0	$67	$530	$80	6.7
Corridor - Basement	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Basement	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	4,200	3, 5	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,898	0.4	1,940	0	$286	$1,070	$450	2.2
Electrical Room - 18	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.3	799	0	$118	$680	$110	4.8
Electrical Room - Main	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,470	0.1	179	0	$26	$100	$20	3.0
Electrical Room 14 - Telecom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,704	0.2	456	0	$67	$530	$80	6.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical - Elevator	4	LED Lamps: (1) 12W A19 Screw-In Lamp	Wall Switch	S	12	2,470		None	No	4	LED Lamps: (1) 12W A19 Screw-In Lamp	Wall Switch	12	2,470	0.0	0	0	$0	$0	$0	0.0
Mechanical - Room 12	1	Incandescent: (1) 50W A19 Screw-In Lamp	Wall Switch	S	50	2,470	3	Relamp	No	1	LED Lamps: A19 Lamps	Wall Switch	8	2,470	0.0	114	0	$17	$30	$0	1.8
Mechanical 18A - Main	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,470	3	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,470	0.2	628	0	$93	$350	$70	3.0
Storage - Mason Shop	2	Compact Fluorescent: (1) 42W Triple Biaxial Plug-In Lamp	Wall Switch	S	42	1,000	3	Relamp	No	2	LED Lamps: PL-L (Biax) Lamps	Wall Switch	30	1,000	0.0	26	0	$4	$30	$0	7.7
Exterior	2	Compact Fluorescent: (1) 42W Triple Biaxial Plug-In Lamp	Photocell		42	4,380	3	Relamp	No	2	LED Lamps: PL-L (Biax) Lamps	Photocell	30	4,380	0.0	105	0	$16	$30	$0	1.9
Exterior	3	LED Lamps: (1) 100W Corn Bulb Screw-In Lamp	Photocell		100	4,380		None	No	3	LED Lamps: (1) 100W Corn Bulb Screw-In Lamp	Photocell	100	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell		100	4,380		None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	100	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell		20	4,380		None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	20	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior	4	Metal Halide: (1) 150W Lamp	Photocell		190	4,380	1	Fixture Replacement	No	4	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	45	4,380	0.0	2,540	0	$381	$1,620	$400	3.2

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	RTAC 1- Building Cooling	1	Supply Fan	20.00	91.0%	Yes			W	1,865		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTAC 2- Building Cooling	1	Supply Fan	5.00	85.0%	Yes			W	1,865		No	85.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Condensate Pump	2	Condensate Pump	0.75	74.0%	No			W	1,647		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 18A - Main	Condensate Pump	2	Condensate Pump	0.75	74.0%	No			W	1,647		No	74.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Exhaust Fan	1	Exhaust Fan	0.25	65.0%	No			W	1,784		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 18A - Main	Exhaust Fan	1	Exhaust Fan	0.25	65.0%	No			W	1,784		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust Fan	6	Exhaust Fan	0.33	70.0%	No			W	1,784		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust Fan	11	Exhaust Fan	0.25	65.0%	No			W	1,784		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Multipurpose - Day Room Ward D	Heating Hot Water Pump	2	Heating Hot Water Pump	1.00	80.0%	No			W	1,250	6	No	85.5%	Yes	2	0.3	975	0	$146	$7,900	$200	52.7
Mechanical 18A - Main	HWP-1, HWP-2	2	Heating Hot Water Pump	5.00	82.5%	No			W	1,250	6	No	89.5%	Yes	2	1.3	4,835	0	$724	$11,300	$1,800	13.1
Mechanical - Elevator	Elevator	1	Other	15.00	75.0%	No			W	100		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 1	Sump Pump	2	Other	1.00	80.0%	No			W	800		No	80.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTAC 1- Building Cooling	1	Return Fan	5.00	89.5%	Yes			W	1,865		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTAC 2- Building Cooling	1	Return Fan	2.00	82.0%	Yes			W	1,865		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Roof	RTAC 1- Building Cooling	1	Package Unit	70.00		8.72		Aaon	RN-070-8-0-AA02-ENN	B	7	Yes	1	Package Unit	70.00		12.00		13.2	9,219	0	$1,381	$96,000	$5,400	65.6
Roof	RTAC 2- Building Cooling	1	Package Unit	17.80		10.85		Aaon	RN-018-8-0-AA02-EJH	B	7	Yes	1	Package Unit	17.80		14.00		2.2	1,549	0	$232	$19,700	$1,600	78.0

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Central Power Plant	Building Heating System- Steam	1	Forced Draft Steam Boiler	10,318			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 18A	Domestic Hot Water System	1	Storage Tank Water Heater (> 50 Gal)	PIVI	600P 225A-QSD	B		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommendation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Various Restrooms	8	21	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	6	$67	$180	$80	1.5

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Various Location	43	Desktop	150	No		
Various Location	3	Coffee Machine	900	No		
Various Location	3	Microwave	1,000	No		
Various Location	26	Printer (Medium/Small)	200	No		
Mail Room - 159	1	Printer/Copier (Large)	600	No		
Office - 115A	1	Printer/Copier (Large)	600	No		
Lounge - 115F	1	Refrigerator (Mini)	153	No		
Office - 138C	1	Refrigerator (Mini)	153	No		
Office - 138E	1	Refrigerator (Mini)	153	No		
Lounge - 115F	1	Refrigerator (Residential)	218	No		
Lounge - 138	1	Refrigerator (Residential)	218	No		
Lounge - 179	1	Refrigerator (Residential)	218	No		
Lounge 164	1	Refrigerator (Residential)	218	No		
Various Location	5	Television	190	No		

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	ECM #	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Corridor - Ward B Day Rooms	1	Non-Refrigerated	9	Yes	0.0	343	0	$51	$270	$0	5.3
Corridor - Ward B Day Rooms	1	Refrigerated	9	Yes	0.2	1,612	0	$241	$270	$50	0.9

Custom (High Level) Measure Analysis

Retro-Commissioning Study

Building Square Footage	56,225	Fuel Utility Rate	$11.192 MMBtu
Percent of Conditioned Area Impacted	100%	Blended Electric Utility Rate	$0.150 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	53,998	40,608	10,512	Retro-Commissioning Study	5%	5%	5%	$0.50	0.00	4,730	526	$6,591	$32,700	$0	$0	$0	$32,700	4.96	4.96

APPENDIX B: ENERGY STAR STATEMENT OF ENERGY PERFORMANCE

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

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ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

DHS - Ancora Psychiatric Hospital (APH Campus)

Primary Property Type: Other - Specialty Hospital
Gross Floor Area (ft²): 833,680
Built: 1953

For Year Ending: April 30, 2023
Date Generated: August 05, 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
DHS - Ancora Psychiatric Hospital (APH Campus) 301 Spring Garden Road Hammonton, New Jersey 08037	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 (609) 633-9666 BPU.EnergyServices@bpu.nj.gov

Property ID: 29865004
Unique Building Identifier (UBID): 87F7M4MQ+39R-448-488-439-512

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
212.3 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	154,445,594 (87%)
Electric - Grid (kBtu)	22,538,831 (13%)

Source EUI
270.2 kBtu/ft²

National Median Comparison

National Median Site EUI (kBtu/ft²)	340.9
National Median Source EUI (kBtu/ft²)	433.9
% Diff from National Median Source EUI	-38%

Annual Emissions

Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	10,229

Signature & Stamp of Verifying Professional

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

LP Signature: ____________________Date: __________

Licensed Professional

____ _______
,
(____)____-______
____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

SEER	*Seasonal energy efficiency ratio:* a measure of efficiency in terms of annual cooling energy provided divided by total electric input.
SEP	*Statement of energy performance:* a summary document from the ENERGY STAR Portfolio Manager.
Simple Payback	The amount of time needed to recoup the funds expended in an investment or to reach the break-even point between investment and savings.
SREC (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.