Local Government Energy Audit Report

Atlantic County Government Center and Mechanical Building

April 30, 2024

Prepared for:
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Disclaimer

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

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

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

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

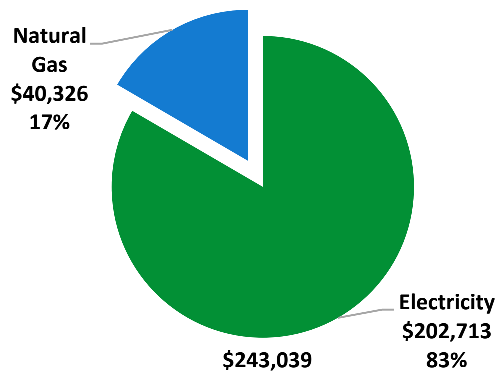
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state, and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

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

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $243,039 Electricity: 1,356,737 kWh Natural Gas: 29,661 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

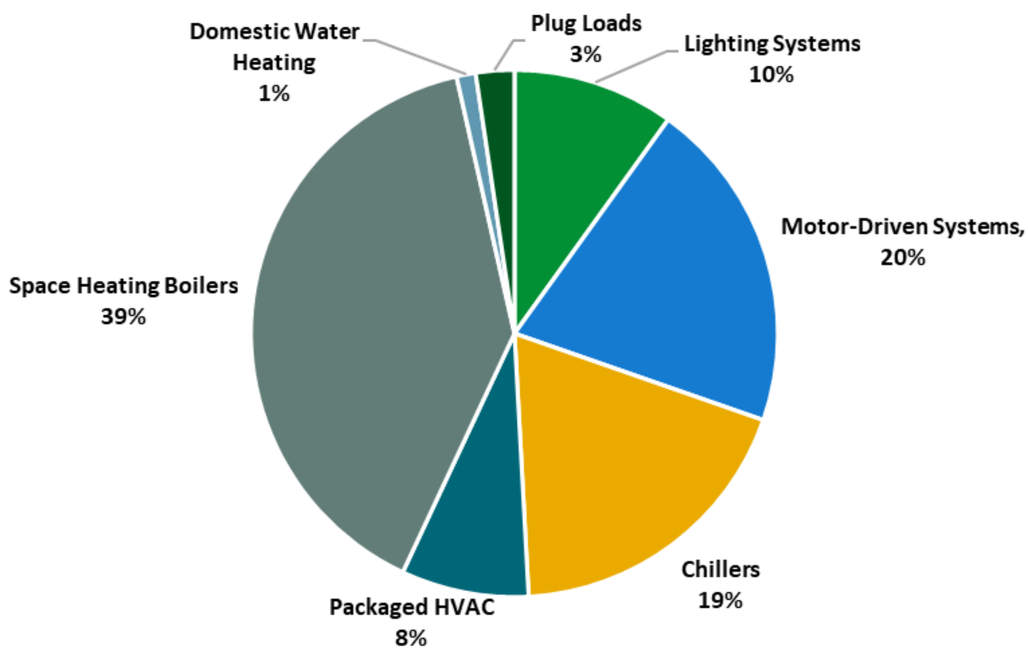


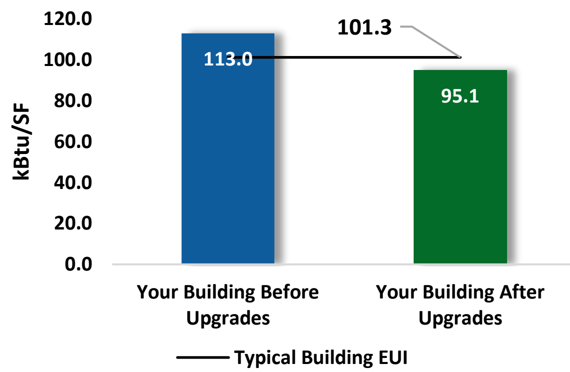
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

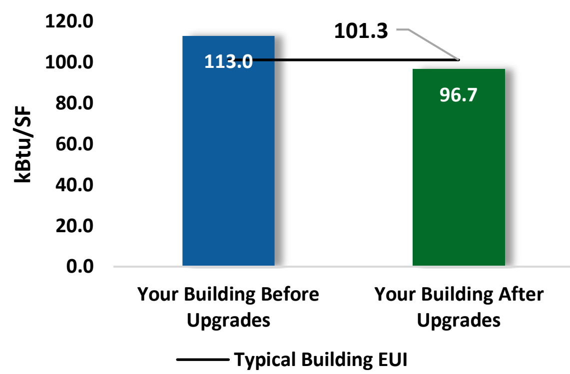
Scenario 1: Full Package (All Evaluated Measures)

Installation Cost	$392,665
Potential Rebates & Incentives[1]	$22,554
Annual Cost Savings	$46,637
Annual Energy Savings	Electricity: 293,601 kWh Natural Gas: 2,037 Therms
Greenhouse Gas Emission Savings	160 Tons
Simple Payback	7.9 Years
Site Energy Savings (All Utilities)	16%



Scenario 2: Cost Effective Package[2]

Installation Cost	$145,384
Potential Rebates & Incentives	$22,254
Annual Cost Savings	$44,284
Annual Energy Savings	Electricity: 285,453 kWh Natural Gas: 1,202 Therms
Greenhouse Gas Emission Savings	151 Tons
Simple Payback	2.8 Years
Site Energy Savings (all utilities)	14%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**120,645**	**23.4**	**-26**	**$17,677**	**$33,651**	**$8,182**	**$25,469**	**1.4**	**118,480**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	120,645	23.4	-26	$17,677	$33,651	$8,182	$25,469	1.4	118,480
Lighting Control Measures			**31,698**	**5.3**	**-7**	**$4,644**	**$30,083**	**$8,135**	**$21,948**	**4.7**	**31,130**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	25,707	4.4	-5	$3,766	$23,108	$2,955	$20,153	5.4	25,245
ECM 3	Install High/Low Lighting Controls	Yes	5,992	1.0	-1	$878	$6,975	$5,180	$1,795	2.0	5,884
Variable Frequency Drive (VFD) Measures			**68,821**	**15.2**	**0**	**$10,283**	**$62,170**	**$5,950**	**$56,220**	**5.5**	**69,302**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	29,515	5.4	0	$4,410	$23,087	$2,250	$20,837	4.7	29,721
ECM 5	Install VFDs on Chilled Water Pumps	Yes	26,351	5.6	0	$3,937	$18,354	$2,400	$15,954	4.1	26,535
ECM 6	Install Boiler Draft Fan VFDs	Yes	7,645	2.4	0	$1,142	$5,940	$1,000	$4,940	4.3	7,699
ECM 7	Install VFDs on Boiler Feedwater Pumps	No	2,885	1.5	0	$431	$7,774	$150	$7,624	17.7	2,905
ECM 8	Install VFDs on Condensate Pumps	No	2,425	0.3	0	$362	$7,015	$150	$6,865	18.9	2,442
Unitary HVAC Measures			**2,838**	**0.9**	**0**	**$424**	**$6,559**	**$0**	**$6,559**	**15.5**	**2,858**
ECM 9	Install High Efficiency Air Conditioning Units	No	1,707	0.5	0	$255	$3,922	$0	$3,922	15.4	1,719
ECM 10	Install High Efficiency Heat Pumps	No	1,132	0.4	0	$169	$2,638	$0	$2,638	15.6	1,140
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**84**	**$1,135**	**$225,933**	**$0**	**$225,933**	**199.0**	**9,778**
ECM 11	Install High Efficiency Steam Boilers	No	0	0.0	84	$1,135	$225,933	$0	$225,933	199.0	9,778
HVAC System Improvements			**4,285**	**0.0**	**0**	**$640**	**$835**	**$140**	**$695**	**1.1**	**4,314**
ECM 12	Install Pipe Insulation	Yes	4,285	0.0	0	$640	$835	$140	$695	1.1	4,314
Domestic Water Heating Upgrade			**3,753**	**0.0**	**0**	**$561**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 13	Install Low-Flow DHW Devices	Yes	3,753	0.0	0	$561	$194	$97	$97	0.2	3,780
Food Service & Refrigeration Measures			**1,954**	**0.2**	**0**	**$292**	**$460**	**$50**	**$410**	**1.4**	**1,968**
ECM 14	Vending Machine Control	Yes	1,954	0.2	0	$292	$460	$50	$410	1.4	1,968
Custom Measures			**59,606**	**0.0**	**153**	**$10,981**	**$32,780**	**$0**	**$32,780**	**3.0**	**77,895**
ECM 15	Retro-Commissioning Study	Yes	52,326	0.0	153	$9,893	$26,884	$0	$26,884	2.7	70,564
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	Yes	7,280	0.0	0	$1,088	$5,896	$0	$5,896	5.4	7,331
TOTALS (COST EFFECTIVE MEASURES)			**285,453**	**42.4**	**120**	**$44,284**	**$145,384**	**$22,254**	**$123,130**	**2.8**	**301,522**
TOTALS (ALL MEASURES)			**293,601**	**45.2**	**204**	**$46,637**	**$392,665**	**$22,554**	**$370,111**	**7.9**	**319,506**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

Utility-run energy efficiency programs 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. It incentivizes owners/users of buildings to upgrade or install energy conserving measures in existing buildings to help offset the capital costs associated with the project. The efficiency upgrades are customized to meet the requirements of the customers' existing facilities, while advancing the State's energy efficiency, conservation, and greenhouse gas reduction goals.

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 Atlantic County Government Center. 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 April 4, 2023, TRC performed an energy audit at Atlantic County Government Center located in Mays Landing, New Jersey. TRC met with Joe Miliar to review the facility operations and help focus our investigation on specific energy-using systems.

Atlantic County Government Center is comprised of two separate buildings built in 1979, with building areas provided in the table below. The buildings share utility meters for gas and electricity. Spaces include offices, conference rooms, lounges, courtrooms, kitchen, dining area, corridors, stairwells, restrooms, storage rooms, electrical and mechanical space.

Lighting for the facility is provided mainly by linear fluorescent T8 fixtures. Two chillers and five boilers provide cooling and heating to most spaces. There are three passenger elevators located in the main building. The facility has one gas-fired generator to provide emergency backup electricity.

Building Name	Size of Building (Square Feet)
Atlantic County Government Center	64,710
Mechanical Building	2,500

2.2 Building Occupancy

The facility is occupied year-round from 7:30 AM until 4:00 PM on weekdays, with a typical occupancy of 49 staff. The facility has limited use on weekends.

Building Name	Weekday/Weekend	Operating Schedule
Atlantic County Government Center	Weekday	7:30 AM - 4:00 PM
	Weekend	Limited Use

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a brick facade. The government center roof is primarily flat with some pitched areas and the mechanical building roof is flat. The flat roof sections are partially covered with stone ballast over a gray and black membrane, while the pitched sections are covered with asphalt shingles. The roof areas are in fair condition. The windows are double glazed and have a mix of wooden and aluminum frames with thermal breaks. The glass-to-frame seals are in fair condition. The operable window weather seals are in fair condition, showing little evidence of excessive wear. Exterior doors are metal and glass with metal frames and are in fair condition with worn door seals. Overall, the building envelope appears in fair condition.

Building Walls – Government Center

Building Walls – Mechanical Building

Building Windows

Entrance Door

Exit Door

Roof

2.4 Lighting Systems

The primary interior lighting system uses 32-Watt fluorescent T8 lamps. Fixture types include 1-lamp, 2-lamp, and 4-lamp, 2-foot and 4-foot long recessed, surface mounted, and pendant fixtures with linear tube lamps. Typically, T8 fluorescent lamps use electronic ballasts.

Additionally, lighting in some areas throughout the facility have been replaced over time with LED lamps. Compact fluorescent lamps (CFL) and incandescent lamps are also used in some spaces. Typically, CFLs at this site use 13-Watts and 26-Watts, while incandescent lamps draw 50-Watts. Exit signs use LED sources.

Interior light fixtures are primarily controlled by manual wall switches, with some occupancy sensors used for areas of the basement and mechanical building. All light fixtures are in good condition. Interior lighting levels were generally sufficient. Exterior fixtures use LED lamps with a mix of timer and photocell controls.

Fluorescent T8 Fixtures


CFLs


Exterior LED Fixtures

2.5 Air Handling Systems

Unit Ventilators & Fan Coil Units

Areas of the government center are conditioned using unit ventilators and fan coil units equipped with constant speed supply fans, chilled-water cooling coils, and a mix of either hot water heating coils or steam heating coils. Equipment is in fair condition. The fan coils units are monitored and controlled by the facility BAS.

Unit Ventilator

Unitary Electric HVAC Equipment

Areas of the facility are conditioned using split system air conditioning (AC) units, mini split AC units, mini split heat pump (HP) units, one through-the-wall HP unit, and a window AC unit. Cooling capacities range between 1 ton and 5 tons, with efficiencies between 8.9 EER and 20.5 EER. The HP units have heating capacities between 11.4 MBh and 34 MBh with efficiencies between 7.7 HSPF and 12.5 HSPF. The units are in fair to good condition and are thermostatically controlled.

Mini-split Units

Unitary Heating Equipment

The mechanical building is supplementally heated by four, 5 kW electric resistance heaters. The units are in good condition. Equipment is controlled by manual dial thermostats.

Areas of the Board of Elections office and clerk's side of the government center are heated by two Rheem gas-fired forced air furnaces equipped with fractional hp supply fans. The units have an input heating capacity of 71.25 MBh with an efficiency of 95%. Installed in 2011, the units are in good condition and are thermostatically controlled.

Electric Resistance Heater

Gas-fired Furnace

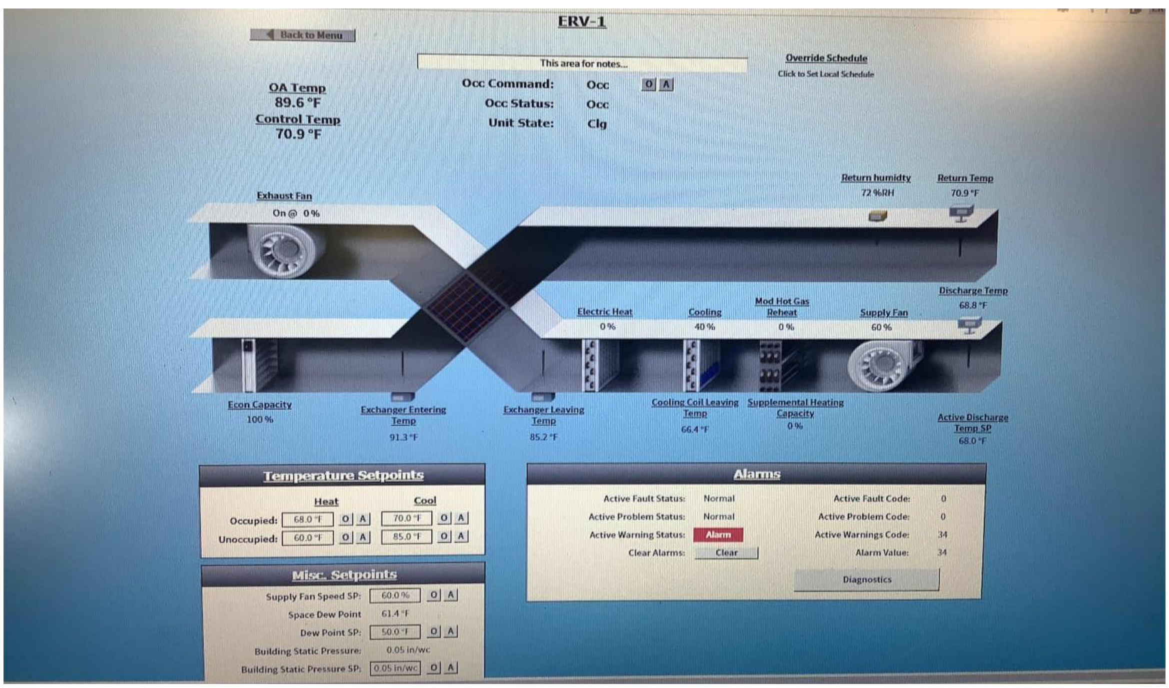
Packaged Units

Areas of the government center are conditioned by two Daikin packaged air-source HP units located on the roof. The unit serving the clerk's side of the government center has a 10-ton cooling capacity with a cooling efficiency of 19.3 EER, heating capacity of 105 MBh with a heating capacity of 3.42 COP, 4 hp VFD controlled supply fan motor, and 2.3 hp VFD controlled return fan motor.

The unit serving the Surrogate Court side of the government center has a 20-ton cooling capacity with a cooling efficiency of 20.4 EER, heating capacity of 218 MBh with a heating capacity of 3.40 COP, 10 hp VFD controlled supply fan motor, and 4 hp VFD controlled return fan motor.

Equipment is in good condition and is monitored and controlled by the facility BAS.

Packaged Air-Source HP Unit

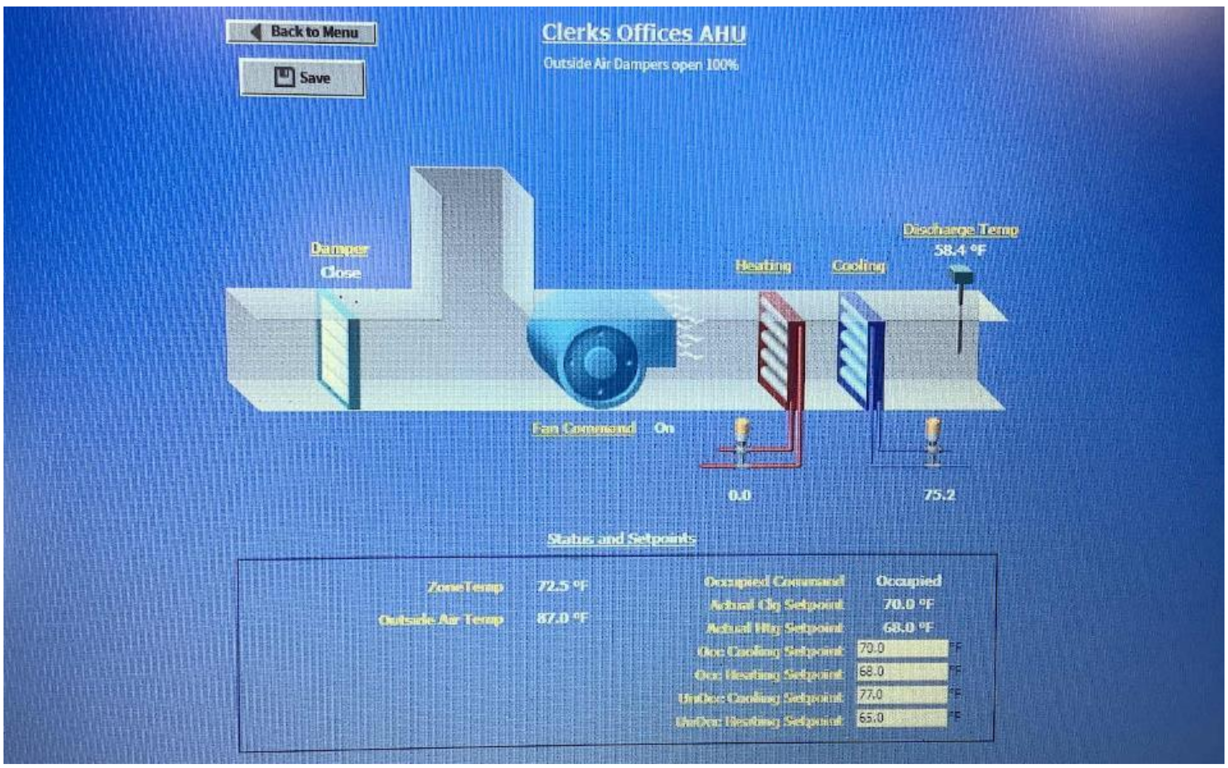


Packaged Air-Source HP EMS Diagram View

Air Handling Units (AHUs)

The facility is conditioned by air handling units (AHUs) equipped with constant speed supply fans, chilled-water cooling coils, and hot-water heating coils. AHU-3 and AHU-4 located in the basement mechanical rooms are also each equipped with two fractional hp constant speed heating hot water pumps. Equipment is in fair to good condition and is monitored and controlled by the facility BAS.

Air Handling Unit



Air Handling Unit EMS Diagram View

2.6 Heating Hot Water & Steam Systems

The hot water heating system consists of four Advanced Thermal Hydronics gas-fired condensing hot water boilers (B-1, B-2, B-3, and B-4), each with an output capacity of 1,480 MBh. The burners are fully modulating with a nominal efficiency of 92.5%. The boilers are configured in an automated control scheme and controlled by the facility's BAS. Boilers B-1 and B-2 provide hot water to the Surrogate Court side of the facility, while B-3 and B-4 provide hot water to the County Clerk's side of the facility. Installed in 2014, the boilers are in good condition. There is a service contract in place.

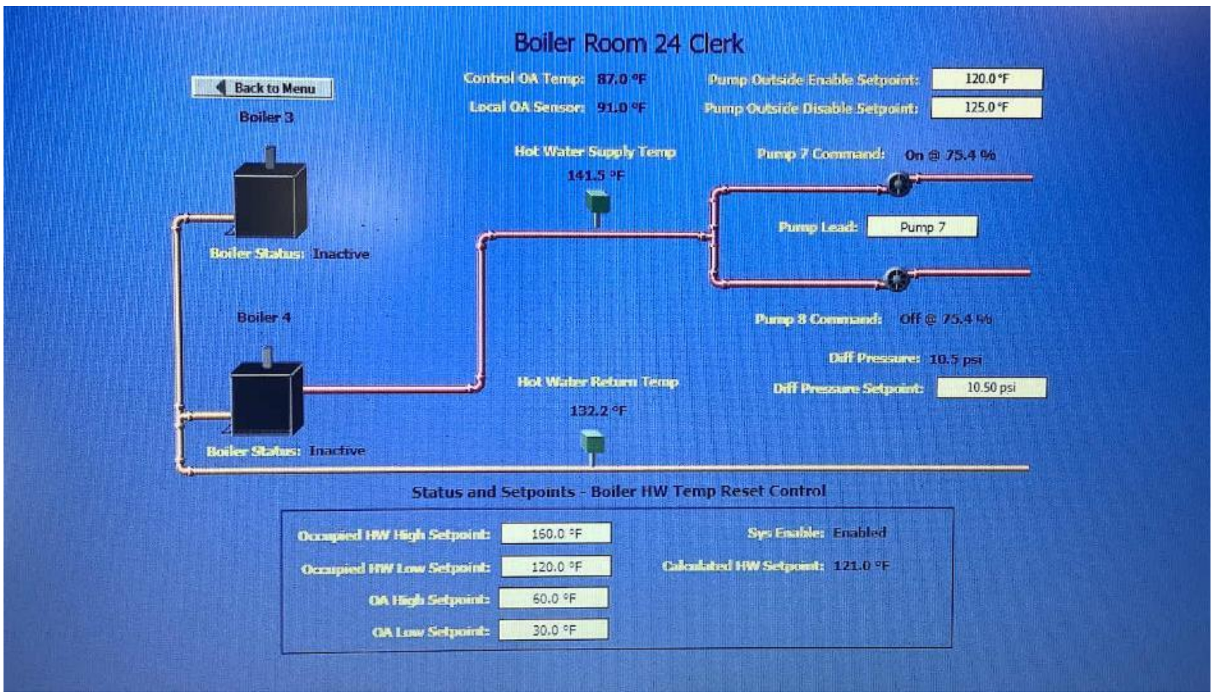
The steam heating system consists of one Iron Fireman gas-fired steam boiler with an output capacity of 8,375 MBh. The burner is fully modulating with an estimated nominal efficiency of 78%. The boiler is configured in an automated control scheme and controlled by the facility's BAS. The boiler provides steam to the central areas of the Government Center. Installed in 1962, the boiler is in fair condition. There is a service contract in place.

The hot water boilers are configured in a constant flow primary distribution with one, 1 hp constant speed hot water pump connected to each boiler (BP-1, BP-2, BP-3, and BP-4), two, 20 hp VFD controlled hot water pumps (HWP-5 and HWP-6) operating with a lead-lag control scheme for boilers B-1 and B-2, and two, 20 hp VFD controlled hot water pumps (HWP-7 and HWP-8) operating with a lead-lag control scheme for boilers B-3 and B-4. There are two, 1.5 hp boiler feed water pumps and two, 1 hp condensate pumps. The boilers provide hot water and steam to air handling units, radiators, and unit ventilators throughout the facility.

Hot Water Boilers

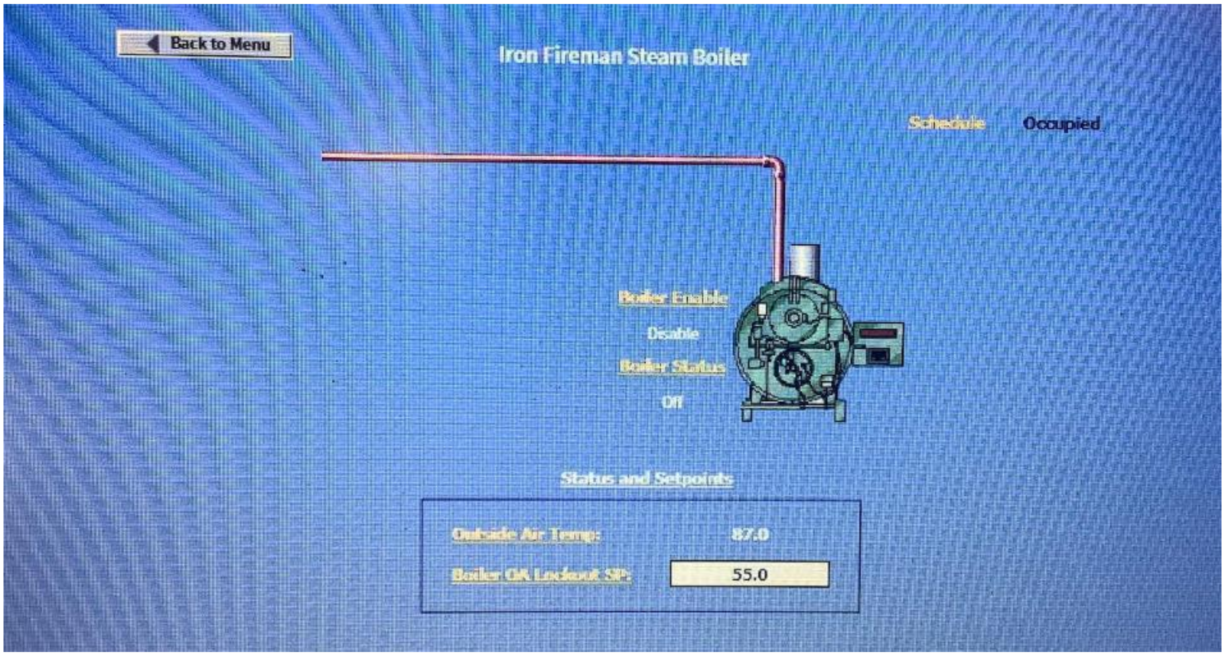
Heating Hot Water Pumps

VFDs



Heating Hot Water System EMS Diagram View

Steam Boiler



Steam System EMS Diagram View

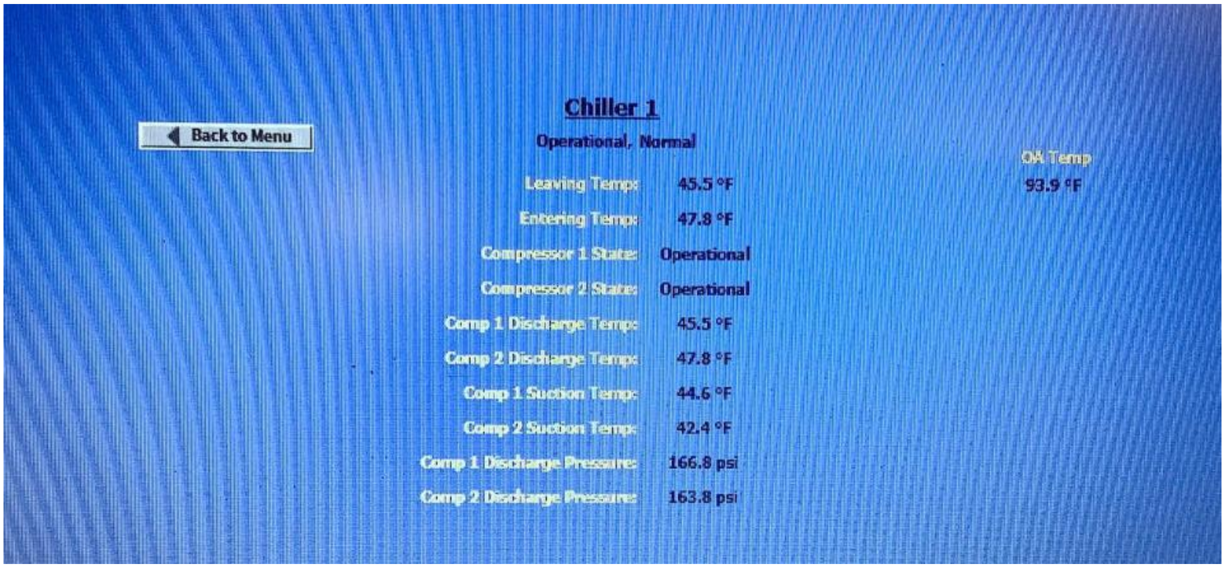
2.7 Chilled Water Systems

The chiller plant consists of two, 150-ton Arctic Cool variable speed, air-cooled centrifugal chillers. The chillers are configured in a primary distribution loop with two, 15 hp constant flow chilled water pumps (CWP1 and CWP2) operating with a lead-lag control scheme and two, 20 hp VFD controlled chilled water pumps (CWP3 and CWP4) operating with a lead-lag control scheme.

The chillers supply chilled water to the unit ventilators and air handling units throughout the building. The chilled water temperatures and chiller operating schedules are monitored by the facility BAS with individual unit controllers on each chiller. However, it was explained during the site visit that the chillers have long run hours, typically running year-round even in the colder winter months. Installed in 2015, the chillers are in good condition.

Air-cooled Chillers

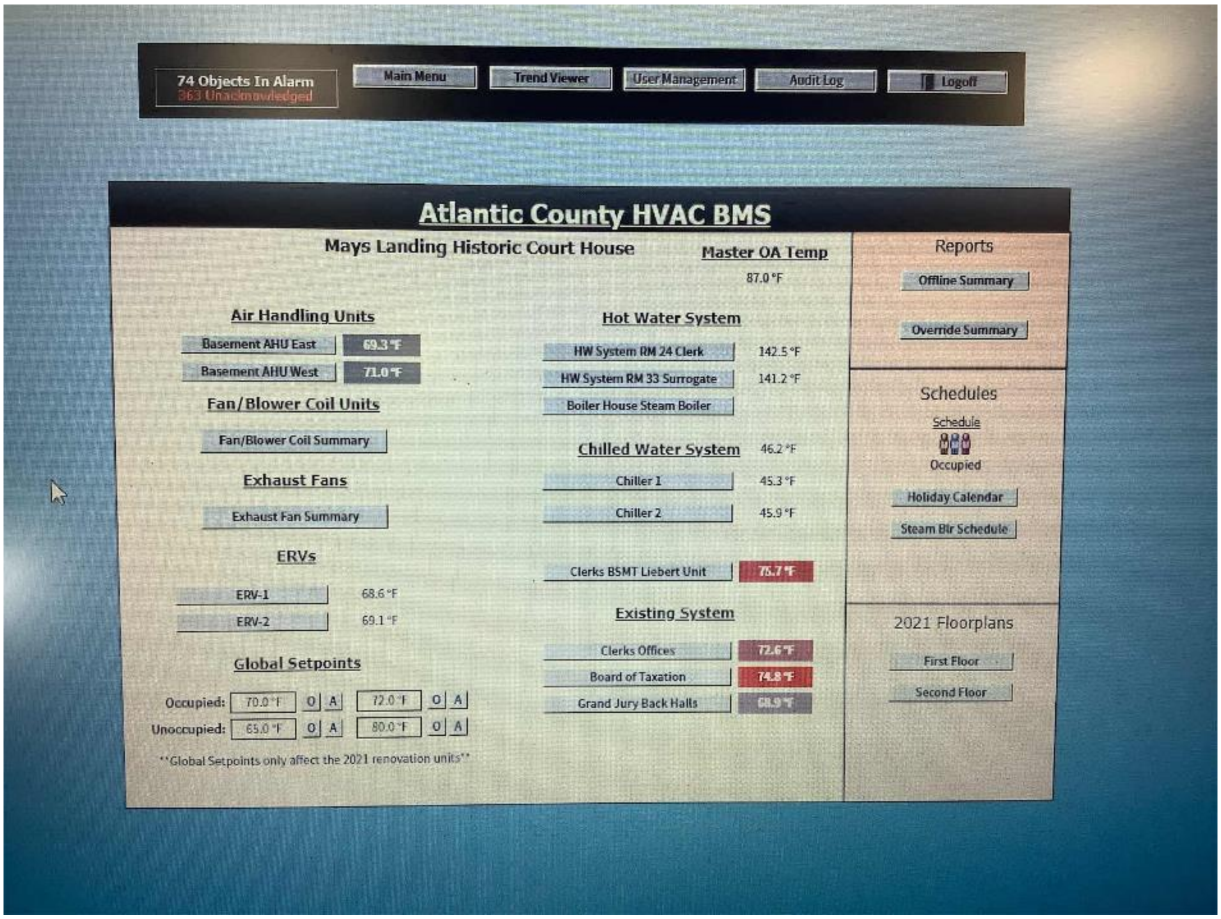
Chilled Water Pumps



Chilled Water System EMS Diagram View

2.8 Building Automation System (BAS)

A Johnson Controls BAS controls the HVAC equipment, boilers, chillers, and air handlers. The BAS provides equipment scheduling control and monitors and controls space temperatures, supply air temperatures, and humidity, heating water loop temperatures, and chilled water loop temperatures.



Building Energy Management System for Atlantic County Government Center

2.9 Domestic Hot Water

Hot water for the facility is produced by one electric instantaneous water heater and seven electric storage water heaters. The instantaneous water heater has a 3-kW capacity. The electric storage water heaters range in capacity from 2.0 kW to 4.5 kW, with storage capacities between 15 gallons and 52 gallons.

The units are in fair to good condition. The domestic hot water pipes are partially insulated, and the insulation is in good condition. Section 4 includes a discussion about replacing some of the electric storage water heaters with heat pump water heaters. Refer to Appendix A for detailed information about each unit.

Water Heaters

2.10 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 120 computer workstations throughout the facility. Plug loads throughout the building include general cafe and office equipment. There are typical office loads such as copiers, printers, microwaves, televisions, and mini refrigerators. There are five residential-style refrigerators throughout the building that are used to store food and drinks. These vary in condition and efficiency.

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

Vending Machine

Residential-style Refrigerator

2.11 Water-Using Systems

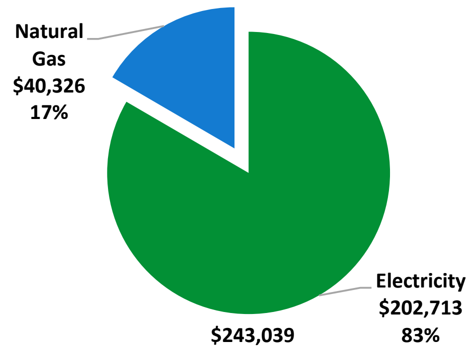
There are 17 restrooms with toilets, urinals, and sinks. Some restrooms contained low-flowing fixtures, while others had faucet flow rates of 2.2 gallons per minute (gpm) or higher.

Typical Restroom Sinks

3 Energy Use and Costs

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

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	1,356,737 kWh	$202,713
Natural Gas	29,661 Therms	$40,326
Total		**$243,039**



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

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

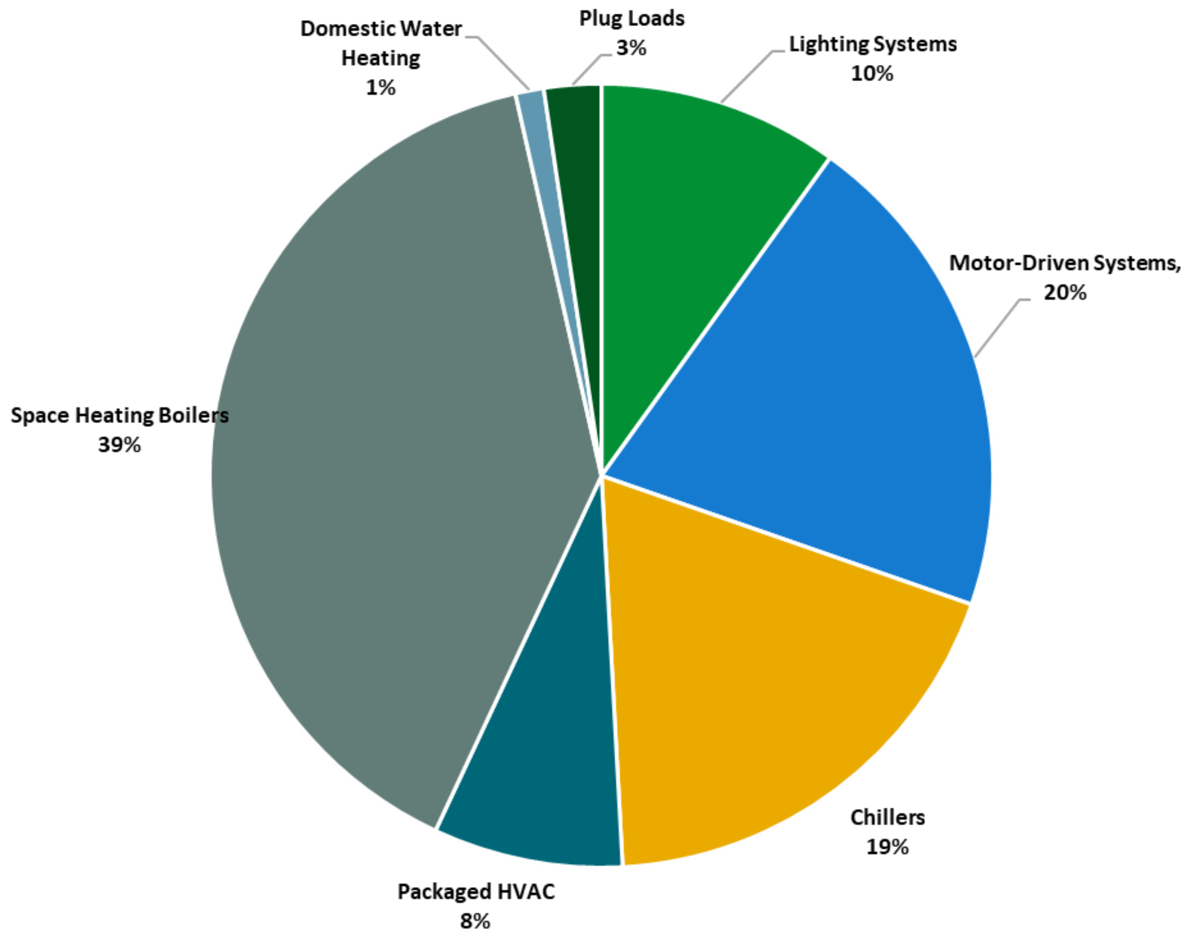
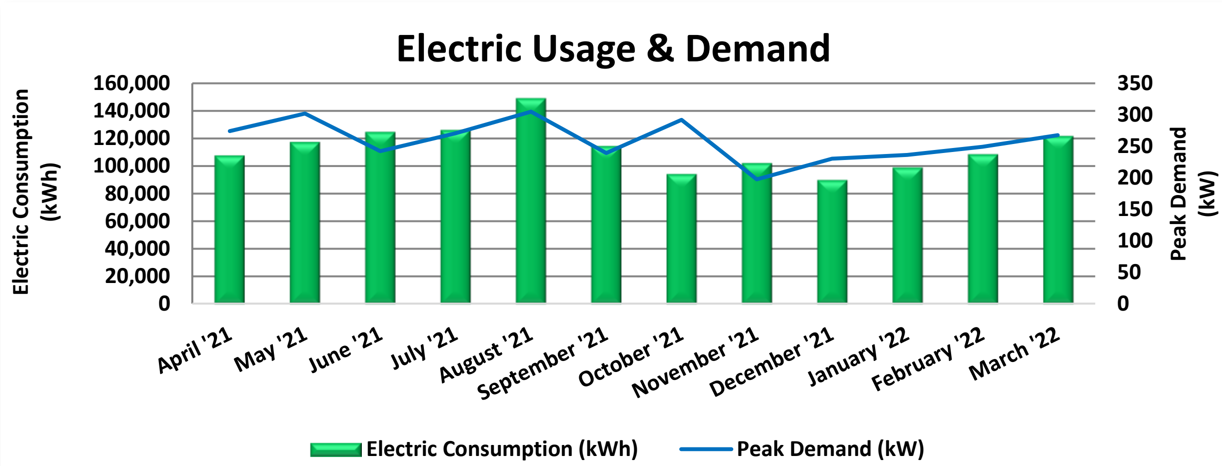


Figure 4 - Energy Balance

3.1 Electricity

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



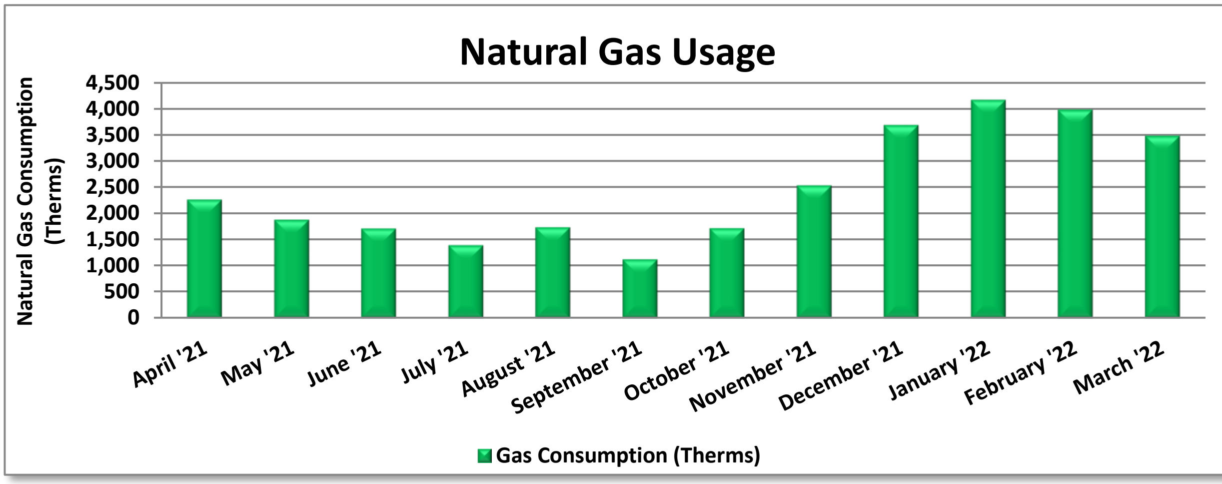
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
4/29/21	30	107,735	274	$343	$15,597
5/27/21	28	117,599	302	$352	$16,975
6/29/21	33	124,878	242	$376	$18,321
7/29/21	30	126,090	271	$433	$19,094
8/30/21	32	149,206	305	$521	$22,539
9/29/21	30	114,677	239	$383	$17,407
10/28/21	29	94,414	292	$356	$14,090
11/29/21	32	102,247	198	$263	$15,138
12/29/21	30	90,078	231	$288	$13,426
1/30/22	32	99,151	237	$372	$15,172
2/27/22	28	108,689	249	$347	$16,447
3/30/22	31	121,973	268	$412	$18,509
Totals	**365**	**1,356,737**	**305**	**$4,446**	**$202,713**
Annual	**365**	**1,356,737**	**305**	**$4,446**	**$202,713**

Notes:

- Peak demand of 305 kW occurred in August '21.
- Average demand over the past 12 months was 259 kW.
- The average electric cost over the past 12 months was $0.149/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 General Service Gas FT (GSGFT), with natural gas supply provided by UGI Energy, a third-party supplier.



Gas Billing Data			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
5/10/21	34	2,264	$3,031
6/8/21	29	1,878	$2,522
7/9/21	31	1,711	$2,322
8/5/21	27	1,391	$1,899
9/10/21	36	1,732	$2,369
10/11/21	31	1,122	$1,548
11/9/21	29	1,715	$2,359
12/6/21	27	2,531	$3,451
1/10/22	35	3,688	$4,990
2/5/22	26	4,167	$5,666
3/4/22	27	3,981	$5,416
4/6/22	33	3,481	$4,751
Totals	**365**	**29,661**	**$40,326**
Annual	**365**	**29,661**	**$40,326**

Notes:

- The average gas cost for the past 12 months is $1.360/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**N/A**

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

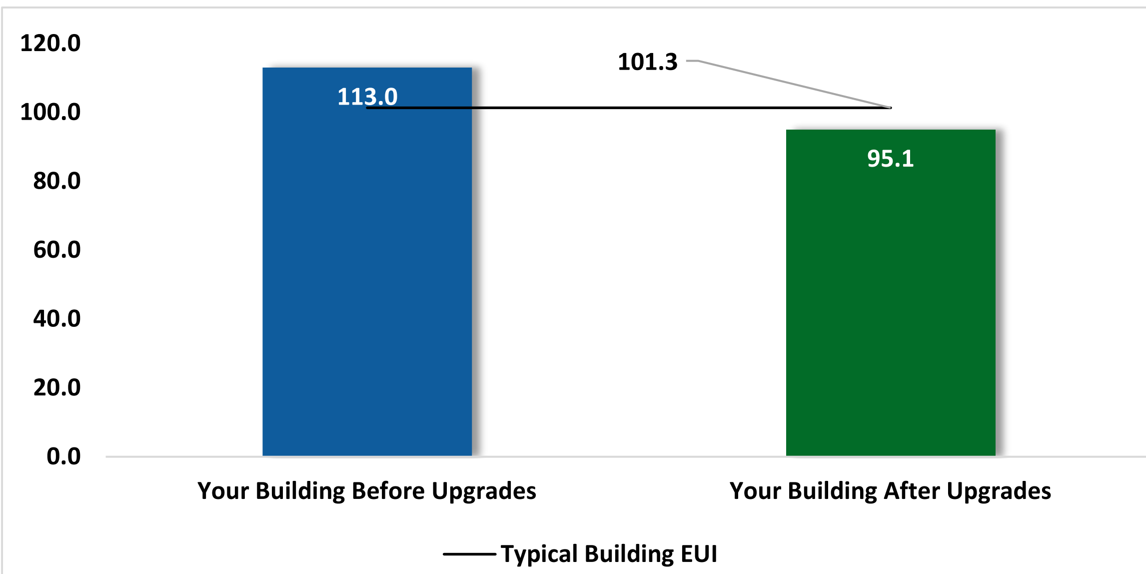


Figure 5 - Energy Use Intensity Comparison[3]

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

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

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

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

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

4 Energy Conservation Measures

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

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

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

Financial incentives 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			**120,645**	**23.4**	**-26**	**$17,677**	**$33,651**	**$8,182**	**$25,469**	**1.4**	**118,480**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	120,645	23.4	-26	$17,677	$33,651	$8,182	$25,469	1.4	118,480
Lighting Control Measures			**31,698**	**5.3**	**-7**	**$4,644**	**$30,083**	**$8,135**	**$21,948**	**4.7**	**31,130**
ECM 2	Install Occupancy Sensor Lighting Controls	Yes	25,707	4.4	-5	$3,766	$23,108	$2,955	$20,153	5.4	25,245
ECM 3	Install High/Low Lighting Controls	Yes	5,992	1.0	-1	$878	$6,975	$5,180	$1,795	2.0	5,884
Variable Frequency Drive (VFD) Measures			**68,821**	**15.2**	**0**	**$10,283**	**$62,170**	**$5,950**	**$56,220**	**5.5**	**69,302**
ECM 4	Install VFDs on Constant Volume (CV) Fans	Yes	29,515	5.4	0	$4,410	$23,087	$2,250	$20,837	4.7	29,721
ECM 5	Install VFDs on Chilled Water Pumps	Yes	26,351	5.6	0	$3,937	$18,354	$2,400	$15,954	4.1	26,535
ECM 6	Install Boiler Draft Fan VFDs	Yes	7,645	2.4	0	$1,142	$5,940	$1,000	$4,940	4.3	7,699
ECM 7	Install VFDs on Boiler Feedwater Pumps	No	2,885	1.5	0	$431	$7,774	$150	$7,624	17.7	2,905
ECM 8	Install VFDs on Condensate Pumps	No	2,425	0.3	0	$362	$7,015	$150	$6,865	18.9	2,442
Unitary HVAC Measures			**2,838**	**0.9**	**0**	**$424**	**$6,559**	**$0**	**$6,559**	**15.5**	**2,858**
ECM 9	Install High Efficiency Air Conditioning Units	No	1,707	0.5	0	$255	$3,922	$0	$3,922	15.4	1,719
ECM 10	Install High Efficiency Heat Pumps	No	1,132	0.4	0	$169	$2,638	$0	$2,638	15.6	1,140
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**84**	**$1,135**	**$225,933**	**$0**	**$225,933**	**199.0**	**9,778**
ECM 11	Install High Efficiency Steam Boilers	No	0	0.0	84	$1,135	$225,933	$0	$225,933	199.0	9,778
HVAC System Improvements			**4,285**	**0.0**	**0**	**$640**	**$835**	**$140**	**$695**	**1.1**	**4,314**
ECM 12	Install Pipe Insulation	Yes	4,285	0.0	0	$640	$835	$140	$695	1.1	4,314
Domestic Water Heating Upgrade			**3,753**	**0.0**	**0**	**$561**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 13	Install Low-Flow DHW Devices	Yes	3,753	0.0	0	$561	$194	$97	$97	0.2	3,780
Food Service & Refrigeration Measures			**1,954**	**0.2**	**0**	**$292**	**$460**	**$50**	**$410**	**1.4**	**1,968**
ECM 14	Vending Machine Control	Yes	1,954	0.2	0	$292	$460	$50	$410	1.4	1,968
Custom Measures			**59,606**	**0.0**	**153**	**$10,981**	**$32,780**	**$0**	**$32,780**	**3.0**	**77,895**
ECM 15	Retro-Commissioning Study	Yes	52,326	0.0	153	$9,893	$26,884	$0	$26,884	2.7	70,564
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	Yes	7,280	0.0	0	$1,088	$5,896	$0	$5,896	5.4	7,331
TOTALS			**293,601**	**45.2**	**204**	**$46,637**	**$392,665**	**$22,554**	**$370,111**	**7.9**	**319,506**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**120,645**	**23.4**	**-26**	**$17,677**	**$33,651**	**$8,182**	**$25,469**	**1.4**	**118,480**
ECM 1	Retrofit Fixtures with LED Lamps	120,645	23.4	-26	$17,677	$33,651	$8,182	$25,469	1.4	118,480
Lighting Control Measures		**31,698**	**5.3**	**-7**	**$4,644**	**$30,083**	**$8,135**	**$21,948**	**4.7**	**31,130**
ECM 2	Install Occupancy Sensor Lighting Controls	25,707	4.4	-5	$3,766	$23,108	$2,955	$20,153	5.4	25,245
ECM 3	Install High/Low Lighting Controls	5,992	1.0	-1	$878	$6,975	$5,180	$1,795	2.0	5,884
Variable Frequency Drive (VFD) Measures		**63,511**	**13.4**	**0**	**$9,489**	**$47,382**	**$5,650**	**$41,732**	**4.4**	**63,955**
ECM 4	Install VFDs on Constant Volume (CV) Fans	29,515	5.4	0	$4,410	$23,087	$2,250	$20,837	4.7	29,721
ECM 5	Install VFDs on Chilled Water Pumps	26,351	5.6	0	$3,937	$18,354	$2,400	$15,954	4.1	26,535
ECM 6	Install Boiler Draft Fan VFDs	7,645	2.4	0	$1,142	$5,940	$1,000	$4,940	4.3	7,699
HVAC System Improvements		**4,285**	**0.0**	**0**	**$640**	**$835**	**$140**	**$695**	**1.1**	**4,314**
ECM 12	Install Pipe Insulation	4,285	0.0	0	$640	$835	$140	$695	1.1	4,314
Domestic Water Heating Upgrade		**3,753**	**0.0**	**0**	**$561**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 13	Install Low-Flow DHW Devices	3,753	0.0	0	$561	$194	$97	$97	0.2	3,780
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$292**	**$460**	**$50**	**$410**	**1.4**	**1,968**
ECM 14	Vending Machine Control	1,954	0.2	0	$292	$460	$50	$410	1.4	1,968
Custom Measures		**59,606**	**0.0**	**153**	**$10,981**	**$32,780**	**$0**	**$32,780**	**3.0**	**77,895**
ECM 15	Retro-Commissioning Study	52,326	0.0	153	$9,893	$26,884	$0	$26,884	2.7	70,564
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	7,280	0.0	0	$1,088	$5,896	$0	$5,896	5.4	7,331
TOTALS		**285,453**	**42.4**	**120**	**$44,284**	**$145,384**	**$22,254**	**$123,130**	**2.8**	**301,522**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**120,645**	**23.4**	**-26**	**$17,677**	**$33,651**	**$8,182**	**$25,469**	**1.4**	**118,480**
ECM 1	Retrofit Fixtures with LED Lamps	120,645	23.4	-26	$17,677	$33,651	$8,182	$25,469	1.4	118,480

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: Retrofit Fixtures with LED Lamps

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

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

Affected Building Areas: all areas with fluorescent fixtures with T8 tubes, CFLs, and incandescent lamps

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**31,698**	**5.3**	**-7**	**$4,644**	**$30,083**	**$8,135**	**$21,948**	**4.7**	**31,130**
ECM 2	Install Occupancy Sensor Lighting Controls	25,707	4.4	-5	$3,766	$23,108	$2,955	$20,153	5.4	25,245
ECM 3	Install High/Low Lighting Controls	5,992	1.0	-1	$878	$6,975	$5,180	$1,795	2.0	5,884

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 2: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected Building Areas: offices, conference rooms, lounges, court rooms, kitchen, dining areas, restrooms, and storage rooms

ECM 3: 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, lobbies, 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		**68,821**	**15.2**	**0**	**$10,283**	**$62,170**	**$5,950**	**$56,220**	**5.5**	**69,302**
ECM 4	Install VFDs on Constant Volume (CV) Fans	29,515	5.4	0	$4,410	$23,087	$2,250	$20,837	4.7	29,721
ECM 5	Install VFDs on Chilled Water Pumps	26,351	5.6	0	$3,937	$18,354	$2,400	$15,954	4.1	26,535
ECM 6	Install Boiler Draft Fan VFDs	7,645	2.4	0	$1,142	$5,940	$1,000	$4,940	4.3	7,699
ECM 7	Install VFDs on Boiler Feedwater Pumps	2,885	1.5	0	$431	$7,774	$150	$7,624	17.7	2,905
ECM 8	Install VFDs on Condensate Pumps	2,425	0.3	0	$362	$7,015	$150	$6,865	18.9	2,442

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 4: Install VFDs on Constant Volume (CV) Fans

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

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

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

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

Affected Air Handlers: supply fans for AHU-3, AHU-4, HC-1, HC-5, and the AHU serving the clerk's offices

ECM 5: Install VFDs on Chilled Water Pumps

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

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

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

Affected Pumps: CWP-1 and CWP-2

ECM 6: Install Boiler Draft Fan VFDs

Replace existing volume control devices on boiler draft fans, such as inlet vanes or dampers, with VFDs. Inlet vanes or dampers are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device will be removed or permanently disabled, and the control signal will be redirected to the VFD to determine proper fan motor speed.

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

Additional maintenance savings may result from this measure. VFDs are solid state electronic devices, which generally require less maintenance than mechanical air volume control devices.

ECM 7: Install VFDs on Boiler Feedwater Pumps

We evaluated installing VFDs to control boiler feedwater pumps. The existing level control valve will need to be maintained fully open and its control signal used by the VFD to modulate the feedwater speed.

Energy savings result from reducing the pump motor speed (and power) at reduced feedwater flow. The magnitude of energy savings is based on the estimated amount of time that the pumping system will operate at reduced load.

ECM 8: Install VFDs on Condensate Pumps

We evaluated installing VFDs to control the condensate return pump(s). The condensate pump flow will have to be controlled to work in conjunction with the boiler feed water pump. The VFD control feedback should be based on a pressure transducer located in the main steam header. Before implementing this measure co-ordinate with the pump and boiler manufacturer.

Energy savings result from reducing the pump motor speed (and power) at reduced condensate flow from the condensate receiver. The magnitude of energy savings is based on the estimated amount of time that the pumping system will operate at reduced load.

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		**2,838**	**0.9**	**0**	**$424**	**$6,559**	**$0**	**$6,559**	**15.5**	**2,858**
ECM 9	Install High Efficiency Air Conditioning Units	1,707	0.5	0	$255	$3,922	$0	$3,922	15.4	1,719
ECM 10	Install High Efficiency Heat Pumps	1,132	0.4	0	$169	$2,638	$0	$2,638	15.6	1,140

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 mini split units are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes.

ECM 9: 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: 2-ton Sanyo mini split AC unit

ECM 10: Install High Efficiency Heat Pumps

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

Affected Units: 1-ton EMI mini split HP unit

4.5 Gas-Fired 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)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**84**	**$1,135**	**$225,933**	**$0**	**$225,933**	**199.0**	**9,778**
ECM 11	Install High Efficiency Steam Boilers	0	0.0	84	$1,135	$225,933	$0	$225,933	199.0	9,778

ECM 11: Install High Efficiency Steam Boilers

We evaluated replacing the older inefficient steam boiler with high-efficiency steam boilers. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

For the purpose of this analysis, we evaluated the replacement of boilers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your mechanical design team to select boilers that are sized appropriately for the heating load. In many cases installing multiple modular boilers, rather than one or two large boilers, will result in higher overall plant efficiency while providing additional system redundancy.

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

4.6 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**4,285**	**0.0**	**0**	**$640**	**$835**	**$140**	**$695**	**1.1**	**4,314**
ECM 12	Install Pipe Insulation	4,285	0.0	0	$640	$835	$140	$695	1.1	4,314

ECM 12: Install Pipe Insulation

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

Affected Systems: domestic hot water piping

4.7 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		**3,753**	**0.0**	**0**	**$561**	**$194**	**$97**	**$97**	**0.2**	**3,780**
ECM 13	Install Low-Flow DHW Devices	3,753	0.0	0	$561	$194	$97	$97	0.2	3,780

ECM 13: Install Low-Flow DHW Devices

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

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

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

4.8 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$292**	**$460**	**$50**	**$410**	**1.4**	**1,968**
ECM 14	Vending Machine Control	1,954	0.2	0	$292	$460	$50	$410	1.4	1,968

ECM 14: Vending Machine Control

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

4.9 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		**59,606**	**0.0**	**153**	**$10,981**	**$32,780**	**$0**	**$32,780**	**3.0**	**77,895**
ECM 15	Retro-Commissioning Study	52,326	0.0	153	$9,893	$26,884	$0	$26,884	2.7	70,564
ECM 16	Replace Electric Water Heater with Heat Pump Water Heater	7,280	0.0	0	$1,088	$5,896	$0	$5,896	5.4	7,331

ECM 15: 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 $0.40 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.

CM 16: Replace Electric Water Heater with Heat Pump Water Heater

A typical electric water heater uses electric resistance coils to heat water at a coefficient of performance (COP) of 1. Air source heat pump water heaters (HPWH) use a refrigeration cycle to transfer heat from the surrounding air to the domestic water. The typical average COP for a HPWH is about 2.5, so they require significantly less electricity to produce the same amount of hot water as a traditional electric water heater. There are two types of HPWH, those integrated with the heat pump and storage tank in the same unit, and those that are split into two sections (with the storage tank separate from the heat pump). The following addresses integrated HPWH.

HPWH reject cold air. As such, they need to be installed in an unconditioned space of about 750 cubic feet with good ventilation. Ideal locations are garages, large enclosed, unconditioned storage areas, or areas with excess heat such as a furnace or boiler room.[4] The HPWH will also produce condensate so accommodations for draining the condensate need to be provided.

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

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

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

4.10 Measures for Future Consideration

There are additional opportunities for improvement that Atlantic County 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.

Atlantic County 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.

Heating System Conversion from Steam to Hot Water

This type of system upgrade/conversion has significant up-front capital costs and is presented as an alternative to replacing the existing steam boiler to match the existing hot water boiler system. However, there are benefits with modular hot water boiler system designs with advanced control strategies. Advantages associated with configuring a boiler plant around several modular boilers include the better system performance at low load conditions, and the modular boilers will often take less space than multiple old large boilers.

As the existing boilers are approaching the end of their useful life, it is recommended that reconfiguring the boiler plant be further evaluated. We recommend that you work with your mechanical design team to select boilers that are sized appropriately for the heating load.

Replacing the steam boiler has a long payback, and it may not be justifiable based simply on energy considerations. However, the boiler has reached the end of its normal useful life. We also recommend working with your mechanical design team to determine whether a hot water heating system can operate with return water temperatures below 130°F, which would allow for operating condensing boilers at efficiencies above 90%. Energy savings results from improved combustion efficiency and reduced standby losses at low loads. Further analysis should be conducted for the feasibility of this measure. This measure is a capital improvement measure for future consideration.

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.

[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.

Lighting Controls

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

Motor Maintenance

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

Fans to Reduce Cooling Load

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

Thermostat Schedules and Temperature Resets

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

Economizer Maintenance

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

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

Chiller Maintenance

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

HVAC Filter Cleaning and Replacement

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

Ductwork Maintenance

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

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

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

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

Steam Trap Repair and Replacement

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

Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to keeping the heating system running efficiently and preventing expensive repairs. Annual tune-ups should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely and efficiently. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the boiler tubes to improve heat transfer.

Furnace Maintenance

Preventative maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should check for gas / carbon monoxide leaks; change the air and fuel filters; check components for cracks, corrosion, dirt, or debris build-up; ensure the ignition system is working properly; test and adjust operation and safety controls; inspect electrical connections; and lubricate motors and bearings.

Label HVAC Equipment

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

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

Optimize HVAC Equipment Schedules

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

Know your BAS scheduling capabilities. Regularly monitor HVAC equipment operating schedules and match them to building operating hours in order to eliminate unnecessary equipment operation and save energy. Monitoring should be performed often at sites with frequently changing usage patterns – daily in some cases. We recommend using the *optimal start* feature of the 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.

Water Conservation

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

For more information regarding water conservation go to the EPA's WaterSense website[6] or download a copy of EPA's "WaterSense at Work: Best Management Practices for Commercial and Institutional Facilities"[7] to get ideas for creating a water management plan and best practices for a wide range of water using systems.

Water conservation devices that do not reduce hot water consumption will not provide energy savings at the site level, but they may significantly affect your water and sewer usage costs. Any reduction in water use does however ultimately reduce grid-level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users.

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

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

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

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

Procurement Strategies

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

6 On-site Generation

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

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

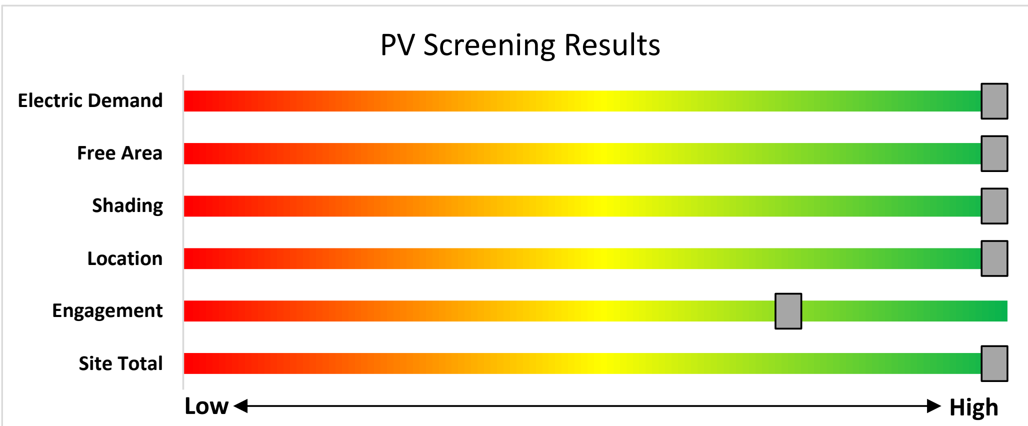
6.1 Solar Photovoltaic

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

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

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

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



Potential	High	
System Potential	161	kW DC STC
Electric Generation	191,811	kWh/yr
Displaced Cost	$28,660	/yr
Installed Cost	$418,600	

Figure 8 - Photovoltaic Screening

Successor Solar Incentive Program (SuSI)

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

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

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

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

6.2 Combined Heat and Power

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

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

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

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

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

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

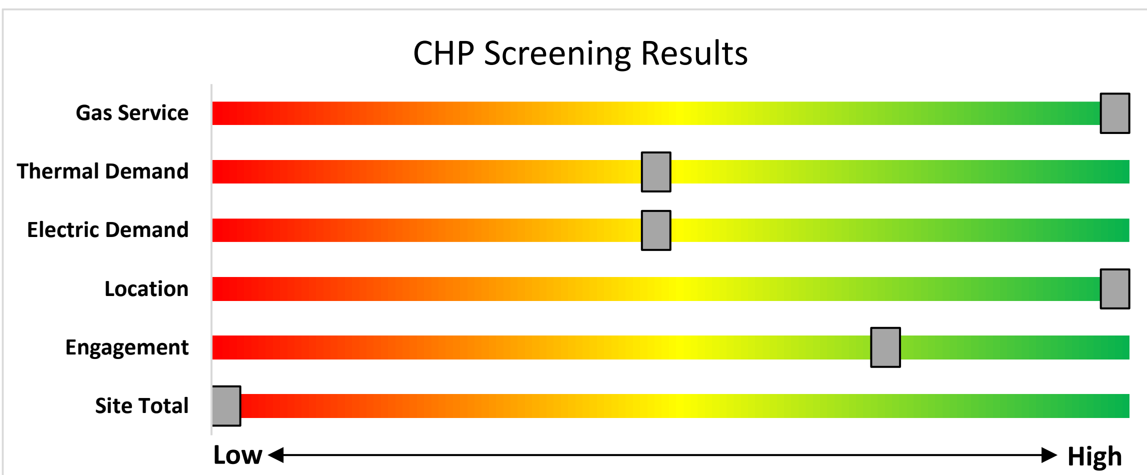


Figure 9 - Combined Heat and Power Screening

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

7 ELECTRIC VEHICLES (EV)

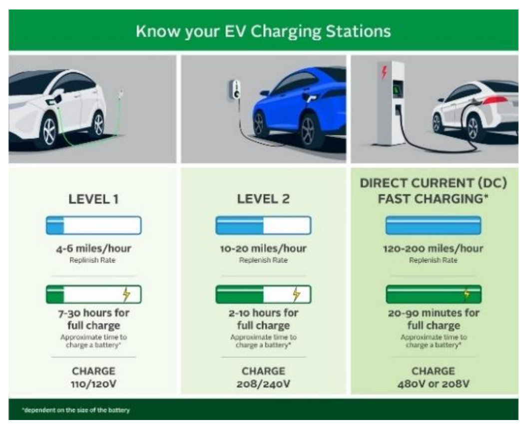
All electric vehicles (EVs) have an electric motor instead of an internal combustion engine. EVs function by plugging into a charge point, taking electricity from the grid, and then storing it in rechargeable batteries. Although electricity production may contribute to air pollution, the U.S. EPA categorizes 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.

7.1 Electric Vehicle 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 high 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.

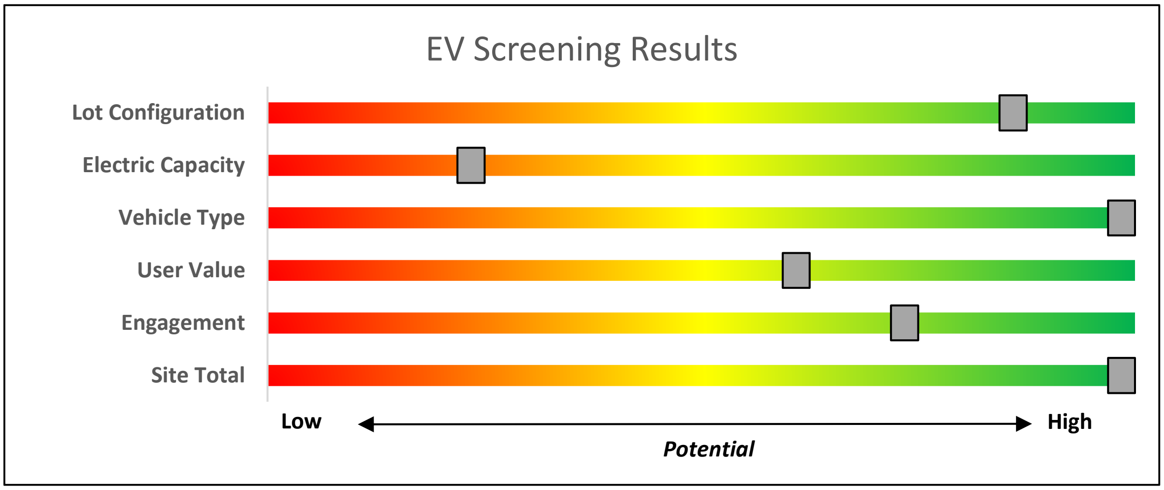


Figure 10 – EV Charger Screening

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) or Public Service Electric & Gas Company (PSE&G), 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 or PSE&G, up to 90% of the combined charger purchase and installation costs. Please check ACE or PSE&G program eligibility requirements before purchasing EV charging equipment, as additional conditions on types of eligible chargers may apply for utility incentives.

Both Jersey Central Power & Light (JCP&L) and Rockland Electric (RECO) have filed proposals for EV charging programs. BPU staff is currently reviewing those proposals.

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.

8 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.

8.1 Utility Energy Efficiency Programs

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

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.

8.2 New Jersey's Clean Energy Programs

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 that annually contribute at least $200,000 to the NJCEP aggregate of all buildings/sites. This equates to roughly $5 million in energy costs in the prior fiscal year.

Incentives

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

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

How to Participate

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

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

Combined Heat and Power

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

Incentives

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

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

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

How to Participate

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

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.

dministratively 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 Program

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

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

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

Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

9 Project Development

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

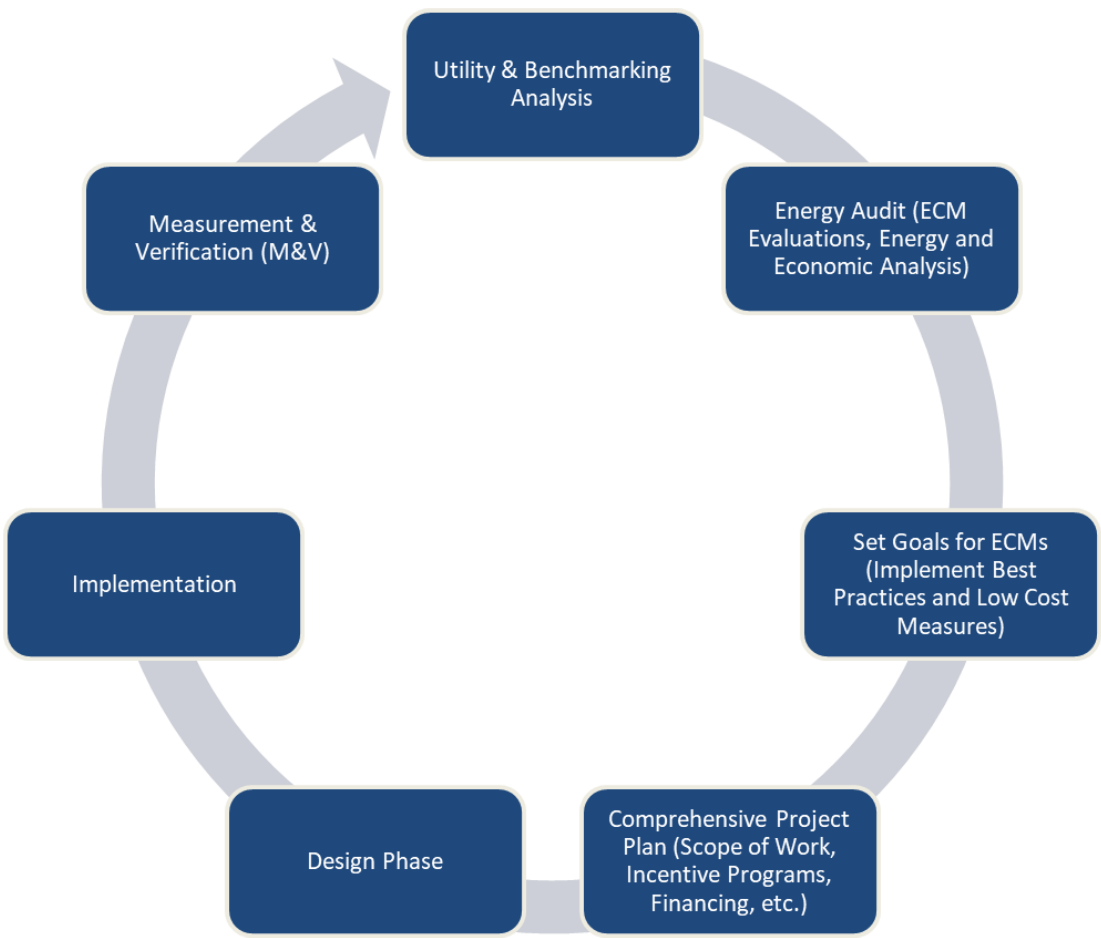


Figure 11 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

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

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

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

10.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[9].

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

[9] 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
Conference - Clerks	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Conference - Virtual #1	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.0	178	0	$26	$37	$10	1.0
Corridor - Courts 1st	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Courts 1st	1	LED - Fixtures: Ceiling Mount	Wall Switch		40	4,992	3	None	Yes	1	LED - Fixtures: Ceiling Mount	High/Low Control	40	3,444	0.0	67	0	$10	$0	$0	0.0
Corridor - Courts 1st	13	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 3	Relamp	Yes	13	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	3,444	0.2	1,491	0	$218	$1,098	$533	2.6
Corridor - Public 1st	4	Compact Fluorescent: (2) 13W Double Biaxial Plug-In Lamps	Wall Switch		26	4,992	1, 3	Relamp	Yes	4	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	19	3,444	0.0	278	0	$41	$325	$148	4.3
Corridor - Public 1st	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Public 1st	1	LED - Fixtures: Ceiling Mount	Wall Switch		40	4,992	3	None	Yes	1	LED - Fixtures: Ceiling Mount	High/Low Control	40	3,444	0.0	67	0	$10	$0	$0	0.0
Corridor - Public 1st	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	3,444	0.0	115	0	$17	$33	$6	1.6
Corridor - Public 1st	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch		114	4,992	1, 3	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	3,444	1.0	6,382	-1	$935	$1,843	$880	1.0
Courtroom #1	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	4,992	1, 2	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,444	0.5	2,965	-1	$434	$996	$195	1.8
Courtroom #1	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.4	2,264	0	$332	$635	$135	1.5
Courtroom #2	16	Compact Fluorescent: (2) 13W Double Biaxial Plug-In Lamps	Wall Switch		26	4,992	1, 2	Relamp	Yes	16	LED Lamps: GX23 (Plug-In) Lamps	Occupancy Sensor	19	3,444	0.2	1,112	0	$163	$940	$102	5.1
Courtroom #2	4	LED Lamps: (10) 9W Screw-In Lamps	Wall Switch		90	4,992	2	None	Yes	4	LED Lamps: (10) 9W Screw-In Lamps	Occupancy Sensor	90	3,444	0.1	602	0	$88	$270	$35	2.7
Courtroom #3	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	4,992	1, 2	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,444	0.5	2,965	-1	$434	$996	$195	1.8
Courtroom #3	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.4	2,264	0	$332	$635	$135	1.5
Lobby - Board of Elections #1	11	Compact Fluorescent: (1) 26W Double Biaxial Plug-In Lamp	Wall Switch		26	4,992	1, 3	Relamp	Yes	11	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	19	3,444	0.1	764	0	$112	$588	$396	1.7
Lobby - Board of Elections Waiting Area	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,444	0.1	679	0	$100	$335	$135	2.0
Lobby - Clerks	1	LED Lamps: (2) 9W A19 Screw-In Lamps	Wall Switch		18	4,992	3	None	Yes	1	LED Lamps: (2) 9W A19 Screw-In Lamps	High/Low Control	18	3,444	0.0	30	0	$4	$0	$0	0.0
Lobby - Clerks	7	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 3	Relamp	Yes	7	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	3,444	0.1	803	0	$118	$678	$287	3.3
Lobby - Surrogate 1st	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	3,444	0.1	344	0	$50	$323	$123	4.0
Lounge - Clerks	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Lounge - Surrogate 1st Break Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Mechanical - Central Boiler House	36	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	2,912	1	Relamp	No	36	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,912	1.1	3,736	-1	$547	$1,315	$360	1.7
Office - 106	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,992	2	None	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.0	194	0	$28	$270	$35	8.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - 113	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - 114	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Board of Elections #1	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch		29	4,992	2	None	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.0	291	0	$43	$270	$35	5.5
Office - Board of Elections #2	10	Incandescent: (1) 50W A19 Screw-In Lamp	Wall Switch		50	4,992	1, 2	Relamp	Yes	10	LED Lamps: A19 Lamps	Occupancy Sensor	8	3,444	0.4	2,398	-1	$351	$442	$45	1.1
Office - Clerks #1	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.0	229	0	$34	$181	$32	4.4
Office - Clerks #1	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.5	2,943	-1	$431	$1,015	$200	1.9
Office - Clerks #2	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.3	1,811	0	$265	$562	$115	1.7
Office - Clerks Open 1st	3	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.1	344	0	$50	$368	$53	6.2
Office - Clerks Open 1st	34	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	34	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	1.3	7,697	-2	$1,128	$2,052	$445	1.4
Office - Clerks Open 2nd	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.1	573	0	$84	$433	$65	4.4
Office - Clerks Open 2nd	71	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	71	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	2.6	16,073	-3	$2,355	$4,753	$990	1.6
Office - Clerks Supervisor #1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	679	0	$100	$380	$65	3.2
Office - Clerks Supervisor #2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	679	0	$100	$380	$65	3.2
Office - Judges Chambers #1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	679	0	$100	$380	$65	3.2
Office - Judges Chambers #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Judges Chambers #3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Office - Prosecutor Room A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.0	178	0	$26	$37	$10	1.0
Office - Prosecutors	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.4	2,264	0	$332	$635	$135	1.5
Office - Prosecutors #1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Prosecutors #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Prosecutors #3	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Public Defender	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.0	178	0	$26	$37	$10	1.0
Office - Resource Organizations and Probation	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.2	1,358	0	$199	$489	$95	2.0
Office - Sheriff #1	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch		114	4,992	1, 2	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,444	0.4	2,393	-1	$351	$708	$155	1.6
Office - Sheriff #2	7	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch		114	4,992	1, 2	Relamp	Yes	7	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,444	0.5	2,792	-1	$409	$781	$175	1.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Office - Surrogate Judges #1	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Surrogate Judges #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Restroom - Clerks #1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Restroom - Clerks #2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Restroom - Female Public 1st	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Restroom - Female Sheriff	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Restroom - Judges Chambers #1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Restroom - Judges Chambers #2	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Restroom - Male Public 1st	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Restroom - Male Sheriff	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Restroom - Prosecutors #1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Restroom - Prosecutors #2	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Restroom - Surrogates 1st	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.0	115	0	$17	$33	$6	1.6
Restroom - Surrogates 1st	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.0	226	0	$33	$153	$30	3.7
Stairs - Board of Elections	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,444	0.1	906	0	$133	$371	$180	1.4
Storage - Clerks Lobby	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	2,210	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.1	401	0	$59	$416	$40	6.4
Storage - Surrogates 1st	27	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	2,210	1, 2	Relamp	Yes	27	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	1.0	2,706	-1	$396	$1,526	$270	3.2
Conference - Tax	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Corridor - Courts 2nd	11	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	11	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor - Courts 2nd	55	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 3	Relamp	Yes	55	LED - Linear Tubes: (2) 2' Lamps	High/Low Control	17	3,444	1.0	6,307	-1	$924	$4,038	$2,255	1.9
Corridor - Courts 2nd	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 3	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,444	0.3	2,037	0	$299	$779	$405	1.3
Court Office #2	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.1	459	0	$67	$400	$59	5.1
Court Office #2	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	1.0	6,339	-1	$929	$1,562	$350	1.3
Courtroom #4	25	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch		32	4,992	1, 2	Relamp	Yes	25	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,444	0.5	2,965	-1	$434	$996	$195	1.8
Courtroom #4	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.4	2,264	0	$332	$635	$135	1.5

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Dining Area 208	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Electrical Room CL2A	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	2,210	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,210	0.0	79	0	$12	$37	$10	2.3
File Room #1 233	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
File Room #2 233	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
File Room #3	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,992	0.0	178	0	$26	$37	$10	1.0
Kitchen 2nd Floor	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch		114	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,444	0.3	1,595	0	$234	$562	$115	1.9
Lobby - Elevator #3 2nd Floor	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 3	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,444	0.1	679	0	$100	$335	$135	2.0
Mechanical 209	4	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch		22	2,210	1	Relamp	No	4	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,210	0.0	129	0	$19	$65	$12	2.8
Mechanical 209	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	2,210	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,210	0.0	38	0	$6	$33	$6	4.7
Office - 1st Surrogates #1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Office - 1st Surrogates #1	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.4	2,717	-1	$398	$978	$190	2.0
Office - 1st Surrogates #2	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.4	2,264	0	$332	$635	$135	1.5
Office - 1st Surrogates #3	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.2	1,358	0	$199	$489	$95	2.0
Office - 201	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Office - 202	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.2	1,358	0	$199	$489	$95	2.0
Office - 203	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.2	1,358	0	$199	$489	$95	2.0
Office - 207	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - 215	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.2	1,358	0	$199	$489	$95	2.0
Office - 216	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$189	$40	2.2
Office - 217	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Board of Elections 2nd Floor	10	Incandescent: (1) 50W A19 Screw-In Lamp	Wall Switch		50	4,992	1, 2	Relamp	Yes	10	LED Lamps: A19 Lamps	Occupancy Sensor	8	3,444	0.4	2,398	-1	$351	$442	$45	1.1
Office - Board of Elections 2nd Floor	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch		15	4,992	2	None	Yes	3	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,444	0.0	73	0	$11	$270	$35	22.1
Office - Scheduling Unit	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch		114	4,992	1, 2	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,444	0.8	4,786	-1	$701	$1,416	$310	1.6
Office - Tax	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.2	1,032	0	$151	$563	$89	3.1
Office - Tax	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6

	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
Office - Tax #1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	679	0	$100	$380	$65	3.2
Office - Tax #2	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Tax #3	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Tax #4	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Office - Tax #5	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	906	0	$133	$416	$75	2.6
Restroom - 208	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Restroom - Female 2nd Floor	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.0	115	0	$17	$33	$6	1.6
Restroom - Female 2nd Floor	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	453	0	$66	$343	$55	4.3
Restroom - Male 2nd Floor	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1, 2	Relamp	Yes	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	3,444	0.0	115	0	$17	$33	$6	1.6
Restroom - Male 2nd Floor	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch		62	4,992	1, 2	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,444	0.1	679	0	$100	$380	$65	3.2
Restroom - Tax #1	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Restroom - Tax #2	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch		33	4,992	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	4,992	0.0	86	0	$13	$33	$6	2.1
Stairs - Clerks	20	Compact Fluorescent: (1) 26W Double Biaxial Plug-In Lamp	Wall Switch		26	4,992	1, 3	Relamp	Yes	20	LED Lamps: GX23 (Plug-In) Lamps	High/Low Control	19	3,444	0.2	1,390	0	$204	$1,150	$720	2.1
Storage - Court Office #2	1	LED - Fixtures: Ceiling Mount	Wall Switch		40	2,210		None	No	1	LED - Fixtures: Ceiling Mount	Wall Switch	40	2,210	0.0	0	0	$0	$0	$0	0.0
Corridor Basement	12	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	12	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Corridor Basement	28	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	2,912	1	Relamp	No	28	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,912	0.4	1,409	0	$206	$910	$168	3.6
Electrical Room 002	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
Electrical Room 002	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.2	435	0	$64	$292	$80	3.3
Electrical Room 23	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.0	54	0	$8	$37	$10	3.3
Mechanical 033	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.1	109	0	$16	$73	$20	3.3
Mechanical East 024	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.4	652	0	$96	$438	$120	3.3
Mechanical Elevator 035	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.1	109	0	$16	$73	$20	3.3
Mechanical Elevators 021	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.1	109	0	$16	$73	$20	3.3
Mechanical Fire Pump 034	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.1	217	0	$32	$146	$40	3.3
Mechanical West 001	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.2	435	0	$64	$292	$80	3.3

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Restroom - 016	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	2,912	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,912	0.0	50	0	$7	$33	$6	3.6
Storage - Clerks	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.6	1,141	0	$167	$767	$210	3.3
Storage 005	39	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	39	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.6	1,028	0	$151	$1,268	$234	6.9
Storage 008	14	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	14	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.2	369	0	$54	$455	$84	6.9
Storage 008	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor		62	1,525	1	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,525	0.1	109	0	$16	$73	$20	3.3
Storage 011	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.1	264	0	$39	$325	$60	6.9
Storage 012	10	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	10	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.1	264	0	$39	$325	$60	6.9
Storage 018	8	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	8	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.1	211	0	$31	$260	$48	6.9
Storage 019	12	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.2	316	0	$46	$390	$72	6.9
Storage 020	12	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	12	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.2	316	0	$46	$390	$72	6.9
Storage 022	16	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	16	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.2	422	0	$62	$520	$96	6.9
Storage 025	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.1	105	0	$15	$130	$24	6.9
Storage 027	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor		33	1,525	1	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,525	0.0	26	0	$4	$33	$6	6.9
Exterior	6	LED Lamps: (1) 9W A19 Screw-In Lamp	Photocell		9	4,380		None	No	6	LED Lamps: (1) 9W A19 Screw-In Lamp	Photocell	9	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior	10	LED Lamps: (1) 40W Corn Bulb Screw-In Lamp	Timeclock		40	4,380		None	No	10	LED Lamps: (1) 40W Corn Bulb Screw-In Lamp	Timeclock	40	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior	5	LED - Fixtures: Wall Pack	Photocell		20	4,380		None	No	5	LED - Fixtures: Wall Pack	Photocell	20	4,380	0.0	0	0	$0	$0	$0	0.0

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Government Center	Unit Ventilators	98	Supply Fan	0.1	60.0%	No			W	4,992		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Government Center	Fan Coil Units	13	Fan Coil Unit	0.3	62.5%	No			W	4,992		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Government Center	Fan Coil Units	4	Fan Coil Unit	2.0	84.0%	No			W	4,992		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Board of Elections	Furnace - Board of Elections	1	Supply Fan	0.5	75.0%	No	Rheem		W	4,992		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	Furnace - Clerks Side	1	Supply Fan	0.5	75.0%	No	Rheem		W	4,992		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU - Clerks Side	1	Supply Fan	4.0	89.5%	Yes	Daikin		W	4,992		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU - Clerks Side	1	Return Fan	2.3	86.5%	Yes	Daikin		W	4,992		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU - Surrogate Side	1	Supply Fan	10.0	91.7%	Yes	Daikin		W	4,992		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
Roof	RTU - Surrogate Side	1	Return Fan	8.0	91.0%	Yes	Daikin		W	4,992		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Mechanical Fire Pump 034	1	Supply Fan	0.5	75.0%	No	Liebert		W	4,992		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical West 001	AHU3,4 - Surrogate Side	1	Supply Fan	7.5	91.0%	No	Daikin		W	4,992	4	No	91.0%	Yes	1	2.1	11,510	0	$1,720	$5,945	$1,000	2.9
Mechanical West 001	AHU3,4 - Surrogate Side	1	Heating Hot Water Pump	0.3	65.0%	No	Bell & Gossett		W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical West 001	AHU3,4 - Surrogate Side	1	Heating Hot Water Pump	0.3	62.5%	No	Bell & Gossett		W	2,745		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	AHU3,4 - Clerks Side	1	Supply Fan	7.5	91.0%	No	Daikin		W	4,992	4	No	91.0%	Yes	1	2.1	11,510	0	$1,720	$5,945	$1,000	2.9
Mechanical East 024	AHU3,4 - Clerks Side	1	Heating Hot Water Pump	0.3	65.0%	No	Bell & Gossett		W	2,745		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	AHU3,4 - Clerks Side	1	Heating Hot Water Pump	0.3	62.5%	No	Bell & Gossett		W	2,745		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical - Clerks	Clerks Offices	1	Supply Fan	1.0	85.5%	No	Vanguard		W	4,992	4	No	85.5%	Yes	1	0.3	1,633	0	$244	$3,508	$75	14.1
Mechanical - Tax Office	HC-1 Tax Office	1	Supply Fan	1.0	85.5%	No	Weg		W	4,992	4	No	85.5%	Yes	1	0.3	1,633	0	$244	$3,508	$75	14.1
Mechanical 209	HC5 Surrogate Side	1	Supply Fan	2.0	86.5%	No	US Motors		W	4,992	4	No	86.5%	Yes	1	0.6	3,229	0	$482	$4,182	$100	8.5
Mechanical - Central Boiler House	Boiler Feed Water	2	Boiler Feed Water Pump	1.5	84.0%	No	Baldor		B	2,745	7	No	86.5%	Yes	2	1.5	2,885	0	$431	$7,774	$150	17.7

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical West 001	CWP 3 4	2	Chilled Water Pump	20.0	93.0%	Yes	Baldor		W	2,920		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical West 001	CWP1 2	2	Chilled Water Pump	15.0	93.0%	No	Weg		W	2,920	5	No	93.0%	Yes	2	5.6	26,351	0	$3,937	$18,354	$2,400	4.1
Mechanical - Central Boiler House	Steam Heating System Boiler #2	1	Combustion Air Fan	7.5	83.3%	No	Century		B	2,745	6	No	88.5%	Yes	1	2.4	7,645	0	$1,142	$5,940	$1,000	4.3
Mechanical - Central Boiler House	Steam Heating System Boiler #2	2	Condensate Pump	1.0	76.0%	No			B	2,745	8	No	85.5%	Yes	2	0.3	2,425	0	$362	$7,015	$150	18.9
Roof	Exhaust System	9	Exhaust Fan	0.1	60.0%	No			W	4,992		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 033	Hydronic Heating System Surrogate Side - B-1 B-2	2	Heating Hot Water Pump	1.0	85.5%	No	Bell & Gossett		W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical 033	Hydronic Heating System Surrogate Side - B-1 B-2	2	Heating Hot Water Pump	20.0	93.0%	Yes	Baldor		W	2,745		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	Hydronic Heating System Clerks Side - B-3 B-4	2	Heating Hot Water Pump	1.0	85.5%	No	Bell & Gossett		W	2,745		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	Hydronic Heating System Clerks Side - B-3 B-4	2	Heating Hot Water Pump	20.0	93.0%	Yes	Baldor		W	2,745		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Elevator 035	Elevator 3	1	Other	20.0	91.0%	No	Schindler Elevator Co		W	400		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Elevators 021	Elevator 1 & 2	2	Other	20.0	91.0%	No	Millar Elevator Co		W	400		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	Sump Pump	2	Process Pump	0.3	62.5%	No			W	400		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical Fire Pump 034	Sump Pump	1	Process Pump	0.3	62.5%	No			W	400		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical West 001	Sump Pump	1	Process Pump	0.3	62.5%	No			W	400		No	62.5%	No		0.0	0	0	$0	$0	$0	0.0
Mechanical West 001	Glycol Pump	1	Process Pump	0.3	65.0%	No	Neptune		W	2,745		No	65.0%	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
Mechanical - Central Boiler House	Mechanical Building	4	Electric Resistance Heat		17.06		1 COP	TPI		W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical - Board of Elections	Board of Elections - Government Center	1	Forced Air Furnace		71.25		0.95 AFUE	Rheem	RGRC-07EMAES	W		No							0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	Clerks Side - Government Center	1	Forced Air Furnace		71.25		0.95 AFUE	Rheem	RGRC-07ERBGS	W		No							0.0	0	0	$0	$0	$0	0.0
Office - Clerks #2	Office - Clerks #2	1	Window AC	1.00		8.90		Frigidaire	FFPA1222R1	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Office - Board of Elections #1	1	Through-The-Wall HP	1.25	18.30	20.00	12.5 HSPF	Daikin	RXL15QMVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Electrical Room 002	3	Ductless Mini-Split HP	2.75	34.00	18.00	9 HSPF	Samsung	AQX36VFUAGM	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Electrical Room 002	1	Ductless Mini-Split HP	1.50	20.60	20.50	9 HSPF	Samsung	AR18HSFSJWKX	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Electrical Room 002	1	Ductless Mini-Split HP	1.00	13.60	19.50	9.5 HSPF	Samsung	AR12MSWXCWKX	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Electrical Room 23	1	Ductless Mini-Split HP	1.83	27.00	20.00	10 HSPF	Samsung	AR24HSFSJWKX	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Mechanical Elevators 021	1	Ductless Mini-Split HP	1.83	27.00	20.00	10 HSPF	Samsung	AR24HSFSJWKX	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Office - Clerks #1	1	Ductless Mini-Split HP	1.50	21.60	18.00	9 HSPF	Daikin	RX18NMVJU	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Government Center	1	Ductless Mini-Split HP	1.00	11.40	13.00	7.7 HSPF	EMI	S1HG2000D10	B	10	Yes	1	Ductless Mini-Split HP	1.00	11.40	18.00	3.8 COP	0.4	1,132	0	$169	$2,638	$0	15.6
Exterior HVAC	Government Center	1	Ductless Mini-Split AC	1.00		16.00		Sanyo	CL1271	B		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Government Center	1	Ductless Mini-Split AC	2.00		10.00		Sanyo	CM2412	B	9	Yes	1	Ductless Mini-Split AC	2.00		18.00		0.5	1,707	0	$255	$3,922	$0	15.4
Exterior HVAC - Mechanical Building	Mechanical Building	3	Ductless Mini-Split HP	2.75	34.00	18.00	9 HSPF	Samsung	AQX36VFUAGM	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Clerks Side	1	Packaged Air-Source HP	10.00	105.00	19.30	3.42 COP	Daikin	DPS010AHHE4DW-4	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Surrogate Side	1	Packaged Air-Source HP	20.00	218.00	20.40	3.4 COP	Daikin	DPS020AHHE4DW-4	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior HVAC	Mechanical Fire Pump 034	1	Split-System	5.00		12.00		Liebert	PFH067A-AH7	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Government Center	1	Split-System	4.00		14.50		Rheem	RAPM-048JAZ	W		No							0.0	0	0	$0	$0	$0	0.0
Roof	Government Center	1	Split-System	3.00		14.50		Rheem	RAPM-036JAZ	W		No							0.0	0	0	$0	$0	$0	0.0

Electric Chiller Inventory & Recommendations

		Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	**Area(s)/System(s) Served**	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Exterior - Mechanical Building	Cooling System	2	Air-Cooled Centrifugal Chiller	150.00	Arctic Cool	ACA150BT308F	W		No							0.0	0	0	$0	$0	$0	0.0

Space Heating Boiler Inventory & Recommendations

		Existing Conditions						Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical - Central Boiler House	Steam Heating System	1	Forced Draft Steam Boiler	8,375	Iron Fireman	301-L-250	B	11	Yes	1	Forced Draft Steam Boiler	8,375	81.00%	Et	0.0	0	84	$1,135	$225,933	$0	199.0
Mechanical 033	Hydronic Heating System Surrogate Side - B-1 B-2	2	Condensing Hot Water Boiler	1,480	ATH	KN16	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	Hydronic Heating System Clerks Side - B-3 B-4	2	Condensing Hot Water Boiler	1,480	ATH	KN16	W		No						0.0	0	0	$0	$0	$0	0.0

Pipe Insulation Recommendations

		Recommendation Inputs			Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Length of Uninsulated Pipe (ft)	Pipe Diameter (in)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Mechanical - Tax Office	Domestic Hot Water	12	5	0.75	0.0	414	0	$62	$60	$10	0.8
Restroom - Female 2nd Floor	Domestic Hot Water	12	5	0.75	0.0	414	0	$62	$60	$10	0.8
Mechanical East 024	Domestic Hot Water	12	10	0.75	0.0	828	0	$124	$119	$20	0.8
Mechanical Fire Pump 034	Domestic Hot Water	12	50	0.75	0.0	2,629	0	$393	$597	$100	1.3

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
Restroom - 016	Restroom - 016	1	Tankless Water Heater	Eemax	SP3012	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical - Tax Office	Surrogate Side	1	Storage Tank Water Heater (≤ 50 Gal)	Ruud	RP15P4-1	B		No						0.0	0	0	$0	$0	$0	0.0
Mechanical 209	Surrogate Side	1	Storage Tank Water Heater (> 50 Gal)	Ruud	RH52-2	B		No						0.0	0	0	$0	$0	$0	0.0
Office - 1st Surrogates #1	Surrogate Side	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	MI4056DS13	W		No						0.0	0	0	$0	$0	$0	0.0
Restroom - Female 2nd Floor	2nd Floor Restrooms	1	Storage Tank Water Heater (≤ 50 Gal)	Bradford White	MI4056DS13	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical East 024	Clerks Side	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	EJCS 20 200	B		No						0.0	0	0	$0	$0	$0	0.0
Mechanical Fire Pump 034	Clerks Side	1	Storage Tank Water Heater (≤ 50 Gal)	AO Smith	ECS 40 200	W		No						0.0	0	0	$0	$0	$0	0.0
Mechanical West 001	Judges Chambers	1	Storage Tank Water Heater (≤ 50 Gal)	Ruud	RP15P4-1	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
Atlantic County Government Center	13	27	Faucet Aerator (Lavatory)	2.20	0.50	0.0	3,753	0	$561	$194	$97	0.2

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Government Center	7	Coffee Machine	500	No		
Government Center	120	Desktop	120	No		
Government Center	1	Fan (Portable)	200	No		
Government Center	9	Microwave	1,000	No		
Government Center	2	Paper Shredder	146	No		
Government Center	35	Printer (Medium/Small)	450	No		
Government Center	13	Printer/Copier (Large)	600	No		
Government Center	4	Projector	240	No		
Government Center	4	Refrigerator (Mini)	174	No		
Government Center	5	Refrigerator (Residential)	340	No		
Government Center	10	Television	224	No		
Government Center	3	Toaster Oven	600	No		
Government Center	3	Water Cooler	192	No		
Government Center	1	Water Fountain	370	No		
Government Center	1	Server	4,000	No		
Mechanical Building	1	Microwave	1,000	No		
Mechanical Building	1	Refrigerator (Mini)	174	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
Government Center	1	Non-Refrigerated	14	Yes	0.0	343	0	$51	$230	$0	4.5
Government Center	1	Refrigerated	14	Yes	0.2	1,612	0	$241	$230	$50	0.7

Custom (High Level) Measure Analysis

Retro-Commissioning Study

Building Square Footage	67,210	**Fuel Utility Rate**	$13.596 MMBtu
Percent of Conditioned Area Impacted	100%	**Blended Electric Utility Rate**	$0.149 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	457,577	588,945	3,053	Retro-Commissioning Study	5%	5%	5%	$0.40	0.00	52,326	153	$9,893	$26,884	$0	$0	$0	$26,884	2.72	2.72

Electric Tank Water Heater to HPWH

NOTE: HPWH calculation should not be used for existing water heaters with a storage capacity greater than 120 gal.

Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis										
Description	Area(s)/System(s) Served	SF of Area Served	Fuel Type	Input Capacity per Unit (kW)	Tank Capacity per Unit (Gal)	Description	COP	Tank Capacity per Unit (Gal)	Estimated Unit Cost	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	Payback w/ Incentives in Years
Storage Tank Water Heater (>50 Gal)	Surrogate Side	7,000	Electric	5	52	Heat Pump Water Heater	2.5	50	$2,383.17	0.00	2,831	0	$423	$2,383	$0	$0	$0	$2,383	5.63	5.63
Storage Tank Water Heater (≤50 Gal)	Clerks Side	4,000	Electric	3	20	Heat Pump Water Heater	2.5	20	$1,443.36	0.00	1,618	0	$242	$1,443	$0	$0	$0	$1,443	5.96	5.96
Storage Tank Water Heater (≤50 Gal)	Clerks Side	7,000	Electric	4.5	40	Heat Pump Water Heater	2.5	40	$2,069.90	0.00	2,831	0	$423	$2,070	$0	$0	$0	$2,070	4.89	4.89

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]

Atlantic County Government Center (campus)

Primary Property Type: Courthouse
Gross Floor Area (ft²): 67,210
Built: 1979

For Year Ending: February 28, 2022
Date Generated: August 28, 2023

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
Atlantic County Government Center (campus) 5909 E Main Street Mays Landing, New Jersey 08330	Atlantic County 1227 Drexel Avenue Atlantic City, NJ 08401 (609) 343-2284	Jerry Griffin 1227 Drexel Avenue Atlantic City, NJ 08401 (609) 343-2284 griffin_jerry@aclink.org

Property ID: 28841573

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
115.6 kBtu/ft²

Source EUI
241.1 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	4,599,187 (59%)
Natural Gas (kBtu)	3,167,386 (41%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	101.3
National Median Source EUI (kBtu/ft²)	211.4
% Diff from National Median Source EUI	14%

Annual Emissions

Total (Location-Based) GHG Emissions (Metric Tons CO2e/year)	582

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, which 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.