Local Government Energy Audit Report

Municipal Building and Police Station

September 9, 2019

Prepared for:

Little Egg Harbor Township
665 Radio Road
Little Egg Harbor, NJ 08087

Prepared by:

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Disclaimer

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

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

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

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

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

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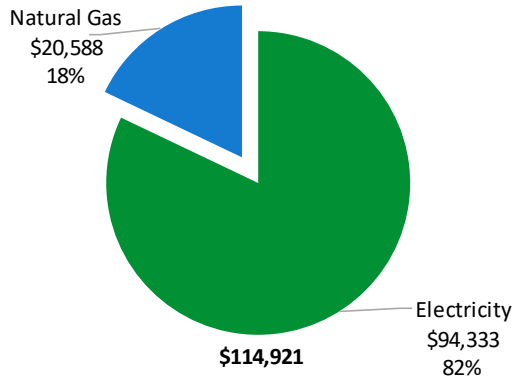
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Municipal Building and Police Station. 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 Energy Services (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: $114,921 Electricity: 661,038 kWh Natural Gas: 18,065 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.

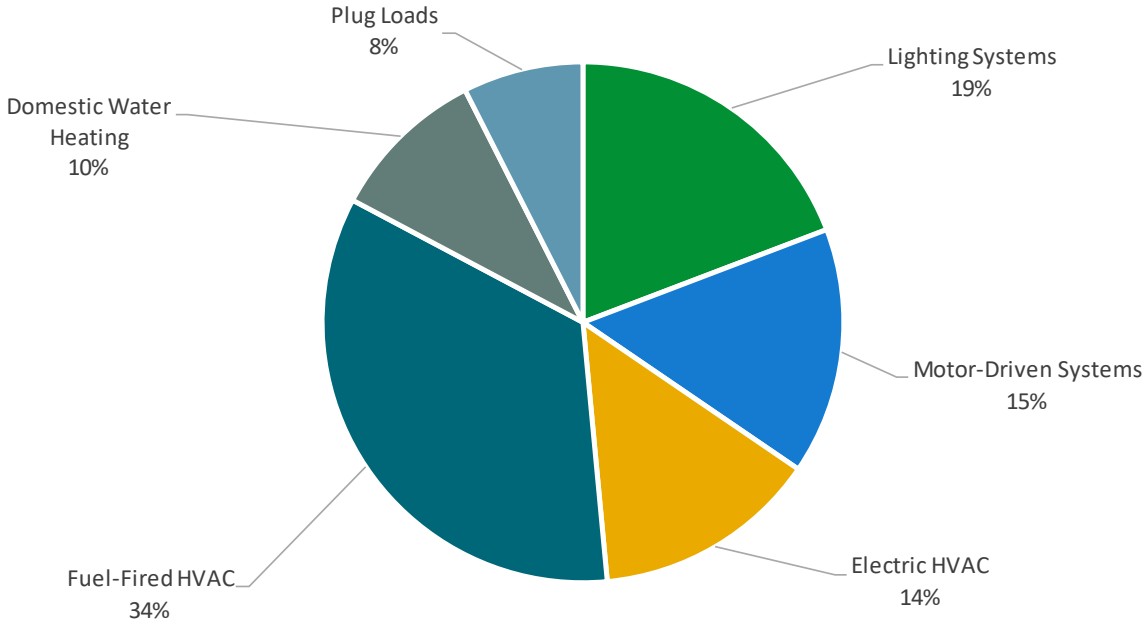


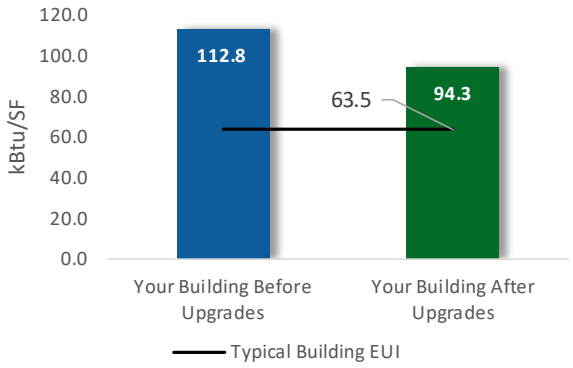
Figure 1 - Energy Use by System

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.

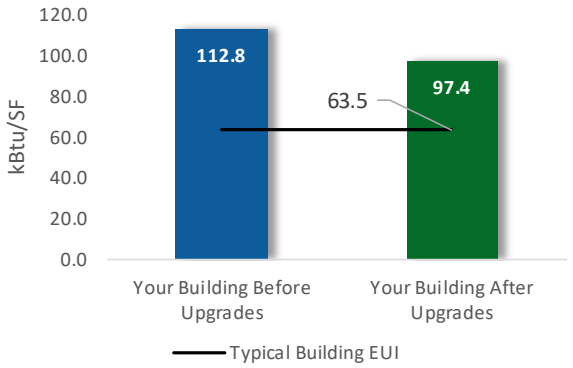
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$217,723
Potential Rebates & Incentives[1]	$14,934
Annual Cost Savings	$26,459
Annual Energy Savings	Electricity: 181,509 kWh Natural Gas: 488 Therms
Greenhouse Gas Emission Savings	94 Tons
Simple Payback	7.7 Years
Site Energy Savings (all utilities)	16%



Scenario 2: Cost Effective Package[2]

Installation Cost	$81,333
Potential Rebates & Incentives	$9,602
Annual Cost Savings	$24,211
Annual Energy Savings	Electricity: 172,110 kWh
Greenhouse Gas Emission Savings	85 Tons
Simple Payback	3.0 Years
Site Energy Savings (all utilities)	14%



On-site Generation Potential

Photovoltaic	High
Combined Heat and Power	None

[1] Incentives are based on current SmartStart Prescriptive incentives. Other program incentives 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	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**118,731**	**20.5**	**-24**	**$16,669**	**$250,036**	**$38,410**	**$7,233**	**$31,177**	**1.9**	**116,742**
ECM 1	Install LED Fixtures	3,673	0.7	0	$524	$7,862	$3,832	$290	$3,542	6.8	3,698
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	37	0.0	0	$5	$78	$51	$5	$46	8.7	37
ECM 3	Retrofit Fixtures with LED Lamps	115,021	19.8	-24	$16,140	$242,096	$34,527	$6,938	$27,589	1.7	113,007
Lighting Control Measures		**30,935**	**5.2**	**-7**	**$4,340**	**$34,716**	**$24,008**	**$2,319**	**$21,689**	**5.0**	**30,380**
ECM 4	Install Occupancy Sensor Lighting Controls	22,443	4.0	-5	$3,148	$25,185	$18,158	$2,319	$15,839	5.0	22,040
ECM 5	Install High/Low Lighting Controls	8,493	1.2	-2	$1,191	$9,531	$5,850	$0	$5,850	4.9	8,341
Variable Frequency Drive (VFD) Measures		**20,490**	**4.9**	**0**	**$2,924**	**$43,860**	**$18,455**	**$0**	**$18,455**	**6.3**	**20,633**
ECM 6	Install VFDs on Chilled Water Pumps	11,360	3.8	0	$1,621	$24,318	$10,303	$0	$10,303	6.4	11,440
ECM 7	Install VFDs on Heating Water Pumps	9,129	1.1	0	$1,303	$19,542	$8,152	$0	$8,152	6.3	9,193
Electric Chiller Replacement		**9,399**	**5.7**	**0**	**$1,341**	**$26,825**	**$97,263**	**$2,280**	**$94,983**	**70.8**	**9,465**
ECM 8	Install High Efficiency Chillers	9,399	5.7	0	$1,341	$26,825	$97,263	$2,280	$94,983	70.8	9,465
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**80**	**$906**	**$18,122**	**$39,127**	**$3,052**	**$36,075**	**39.8**	**9,309**
ECM 9	Install High Efficiency Hot Water Boilers	0	0.0	80	$906	$18,122	$39,127	$3,052	$36,075	39.8	9,309
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$279**	**$1,394**	**$460**	**$50**	**$410**	**1.5**	**1,968**
ECM 10	Vending Machine Control	1,954	0.2	0	$279	$1,394	$460	$50	$410	1.5	1,968
TOTALS (COST EFFECTIVE MEASURES)		**172,110**	**30.8**	**-31**	**$24,211**	**$330,006**	**$81,333**	**$9,602**	**$71,731**	**3.0**	**169,723**
TOTALS (ALL MEASURES)		**181,509**	**36.6**	**49**	**$26,459**	**$374,954**	**$217,723**	**$14,934**	**$202,789**	**7.7**	**188,497**

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

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

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

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.

The potential ECMs identified for this building likely qualify for multiple incentive and funding programs. Based on current program rules and requirements, your measures are likely to qualify for the following programs:

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	x	x	
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x	x	
ECM 3	Retrofit Fixtures with LED Lamps	x	x	
ECM 4	Install Occupancy Sensor Lighting Controls	x	x	
ECM 5	Install High/Low Lighting Controls		x	
ECM 6	Install VFDs on Chilled Water Pumps		x	
ECM 7	Install VFDs on Hot Water Pumps		x	
ECM 8	Install High Efficiency Chillers			
ECM 9	Install High Efficiency Hot Water Boilers	x	x	
ECM 10	Vending Machine Control	x	x	

Figure 3 – Funding Options

New Jersey's Clean Energy Programs At-A-Glance

	SmartStart Flexibility to install at your own pace	**Direct Install** Turnkey installation	**Pay for Performance** Whole building upgrades
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.

Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.

Individual Measures with SmartStart

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 SmartStart 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 is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

The Direct Install program provides turnkey installation of multiple measures through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures. Direct Install contractors will assess and verify individual measure eligibility and, in most cases, they perform the installation work. The Direct Install program is available to sites with an average peak demand of less than 200 kW.

Whole Building Approach with Pay for Performance

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance 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. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings.

More Options from Around the State

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

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

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

The CHP program provides incentives for combined heat and power (aka 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.

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.

2 EXISTING CONDITIONS

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Municipal Building and Police Station. 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. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing 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 May 9, 2019, TRC performed an energy audit at the Municipal Building and Police Station located in Little Egg Harbor, New Jersey. TRC met with Jason A. Worth, P.E. to review the facility operations and help focus our investigation on specific energy-using systems.

The Municipal Building and Police Station is a two-story, 36,000 square foot building built in 2004. Spaces include: court room, offices, police station, corridors, stairwells, restrooms, small kitchen, mechanical room, storage, parking garage, locker rooms and lobby area.

2.2 Building Occupancy

The facility consists of two operating functions, the main municipal office and the police station. Both offices are occupied year-round. Typical weekday occupancy is 60 staff. The police station operates continuously but the nighttime occupancy could not be verified.

There are no weekend activities at the municipal building.

Building Name	Weekday/Weekend	Operating Schedule
Municipal Building Offices	Weekday	8:30 AM to 4:30 PM
	Weekend	None
Municipal Operation	Weekday	5:00 AM to 11:00 PM
	Weekend	None
Police	Weekday	24/7
	Weekend	24/7

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Building walls are concrete block over structural steel with a stone façade, as well as wood frame and lower decorative CMUs. The interior dividing walls are gypsum drywall.

Steel trusses support a pitched roof with a wood deck covered with asphalt shingles. The roof encloses a semi-conditioned space (e.g., a space that is not intentionally heated but escaping heat from HVAC equipment caused the space to be conditioned). The thermal barrier is between this space and the conditioned space below at the roof.

Most of the windows are double glazed and have aluminum frames with a thermal break. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing little evidence of excessive wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals.

Windows

Exterior Walls

Interior Walls

2.4 Lighting Systems

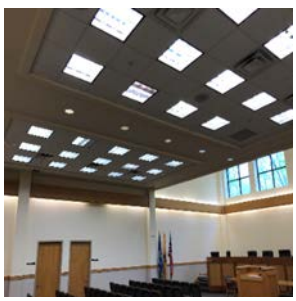
The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 40-Watt T12 fixtures and fixtures with 32-Watt U-bend lamps. Additionally, there are some compact fluorescent lamps (CFL), LED, and high intensity discharge (HID) general purpose lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts. Fixture types include 1-lamp, 2-lamp or 3- lamp, 3-foot or 4-foot long surface mounted fixtures. Most fixtures are in good condition. Interior lighting levels were generally sufficiently lit.

All exit signs are LED units.

Lighting fixtures in all the interior spaces are controlled manually by wall switches.

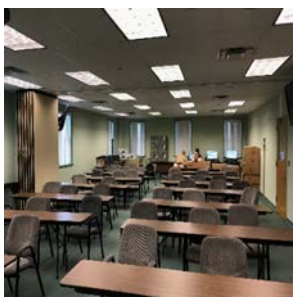
Exterior fixtures use HID, CFL and LED lamps.

Exterior light fixtures are controlled by a time clock, manual switch, or photocell depending on the fixture.



T8 Fixtures

Parking Fixture



T8 Fixtures

2.5 Air Handling Systems

Unit Ventilators

Conditioned air is primarily provided to the building via six air handling units. The units provide cooling via the chilled water supplied by the building's chiller and heating provided via hot water supplied by the boilers. The conditioned air is provided by supply fans ranging in size from 2 hp to 5 hp and return fans from 2 hp to 5 hp, respectively. All the supply and return fans are equipped with variable frequency drives (VFDs) and controlled by the building's EMS.

The building also has two window AC units and other small fan coil units providing conditioning to individual rooms.

York Air Handling Unit

Fan VFD

2.6 Heating Hot Water Systems

Two Weil Mclain 827 MBh hot water boilers serve the building space heating load. The burners are fully modulating with a nominal efficiency of 80%. The boilers are configured in an automated lead-lag control scheme. Both boilers are required under high load conditions. Installed in 2004, they are in good condition. There is a service contract in place.

The boilers serve a primary-only distribution system with two constant speed 5 hp heating hot water pumps operating in lead/lag fashion.

Boilers

Piping System

2.7 Chilled Water Systems

The chiller plant consists of a 114-ton, York, 407C, air-cooled scroll chiller. The chiller is configured in a primary-distribution loop with two 10 hp constant flow pumps.

The chilled water supply temperature is reset based on outside air temperature. The chilled water operating temperature could not be verified at the time of inspection.

The chiller supplies chilled water to the six air handlers. The chiller is controlled via the BMS system.

Air-cooled Chiller

2.8 Building Energy Management Systems (EMS)

A Trane EMS controls the air handling units, the boilers, and the chiller. The EMS provides equipment scheduling control and space temperatures, supply air temperatures, heating water loop temperatures, and chilled water loop temperatures.

The site staff expressed the intention of replacing the existing EMS with a new system.

EMS screenshot

2.9 Domestic Hot Water

Hot water is produced with a 200 gallon, 200 MBh gas-fired storage water heater with an 80% efficiency. A 1 hp circulation pump distributes water to end uses. The circulation pump operates continuously.

The domestic hot water pipes are insulated, and the insulation is in good condition.

AO Smith Domestic Hot Water Heater

2.10 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 8% of total building energy use. This is lower than a typical building.

You seem to already be doing a great job managing your electrical plug loads. This report makes additional suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are 100 computer work stations throughout the facility. Plug loads throughout the building include refrigerators and office equipment.

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

Vending Machines

Printer

2.11 Water-Using Systems

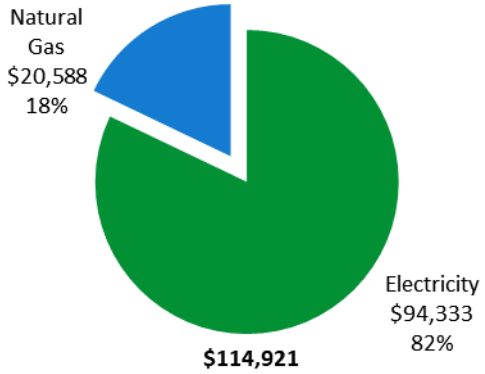
There are eleven restrooms with toilets, urinals, and sinks. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. Toilets are rated at 1.8 gallons per flush (gpf).

There are restrooms with showers, including seven showerheads rated at 4.5 gpm.

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	661,038 kWh	$94,333
Natural Gas	18,065 Therms	$20,588



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.

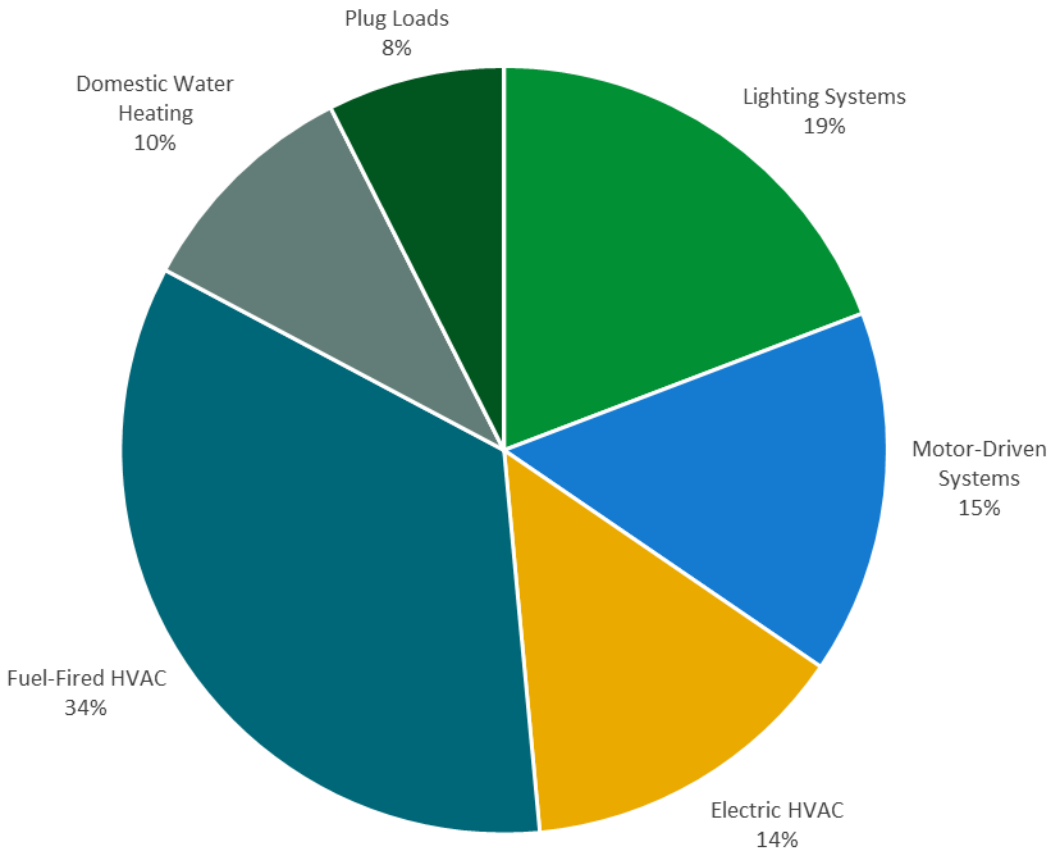
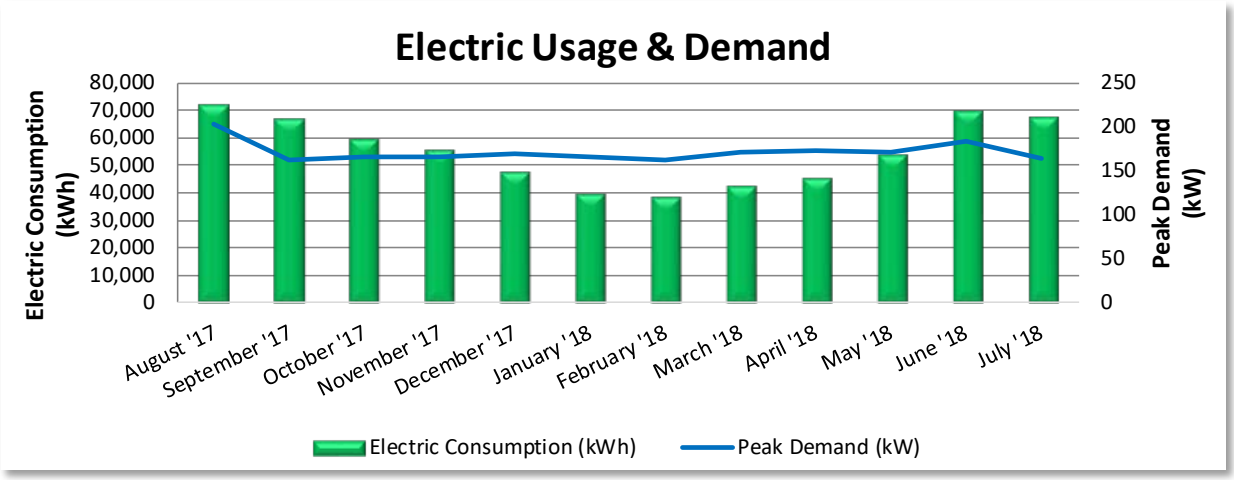


Figure 5 - Energy Balance

3.1 Electricity

Atlantic City Electric delivers electricity, but rate class could not be identified. There are no third-party suppliers.



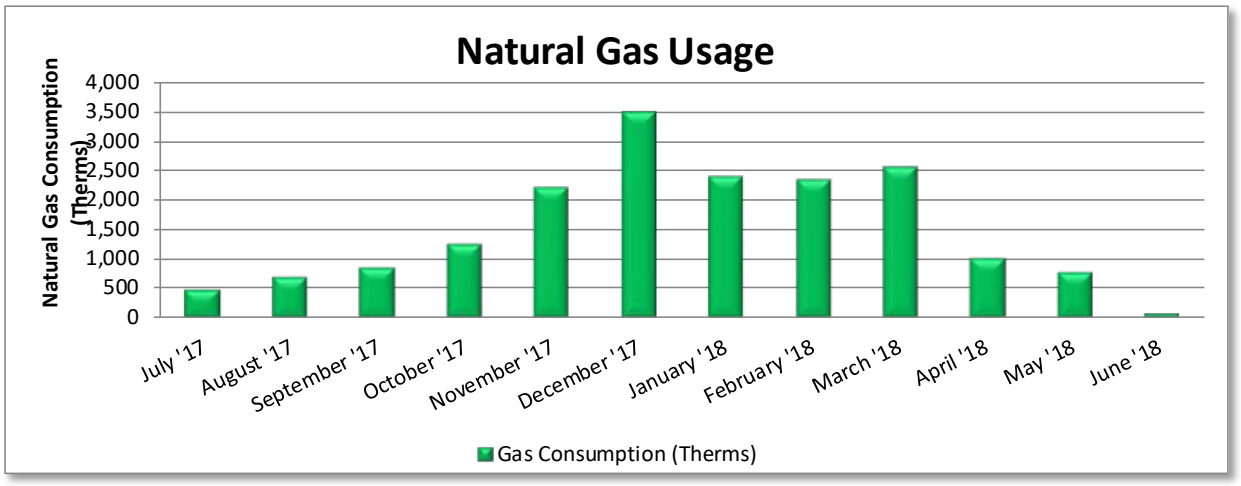
Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
8/28/17	30	72,342	202	1,835	$ 9,798.57
9/27/17	29	66,743	162	1,420	$ 9,196.05
10/25/17	30	59,538	167	1,462	$ 8,064.26
11/28/17	33	55,687	167	1,792	$ 8,080.77
12/27/17	29	47,579	169	1,594	$ 7,434.91
1/26/18	29	39,489	167	1,580	$ 6,301.89
2/23/18	30	38,557	161	1,464	$ 6,051.23
3/27/18	31	42,476	171	1,676	$ 6,757.21
4/26/18	29	45,245	172	1,600	$ 6,941.83
5/24/18	30	53,907	170	1,463	$ 7,633.42
6/27/18	33	69,887	184	1,909	$ 9,396.20
7/26/18	31	67,777	164	1,474	$ 8,418.49
Totals	**364**	**659,227**	**202**	**$19,268**	**$94,075**
Annual	**365**	**661,038**	**202**	**$19,321**	**$94,333**

Notes:

- Peak demand of 202 kW occurred in August 2017.
- The annual use profile is consistent with a building with electric cooling.
- The average electric cost over the past 12 months was $0.143/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

NJ Natural Gas delivers natural gas but the rate class could not be identified. Natural gas supply is provided by South Jersey Energy, a third-party supplier.



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
8/9/17	33	479	$ 780.16
9/7/17	28	674	$ 950.52
10/5/17	30	842	$ 1,095.59
11/3/17	28	1,239	$ 1,456.64
12/7/17	33	2,213	$ 2,402.97
1/10/18	33	3,468	$ 3,630.04
2/6/18	28	2,382	$ 2,563.32
3/8/18	29	2,324	$ 2,506.48
4/12/18	34	2,552	$ 2,701.25
5/10/18	30	1,013	$ 1,194.33
6/8/18	28	764	$ 957.28
7/9/18	30	66	$ 292.78
Totals	**364**	**18,015**	**$20,531**
Annual	**365**	**18,065**	**$20,588**

Notes:

- The annual use profile is typical for a building with space heating as the primary natural gas use.
- The average gas cost for the past 12 months is $1.140/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 county, 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.

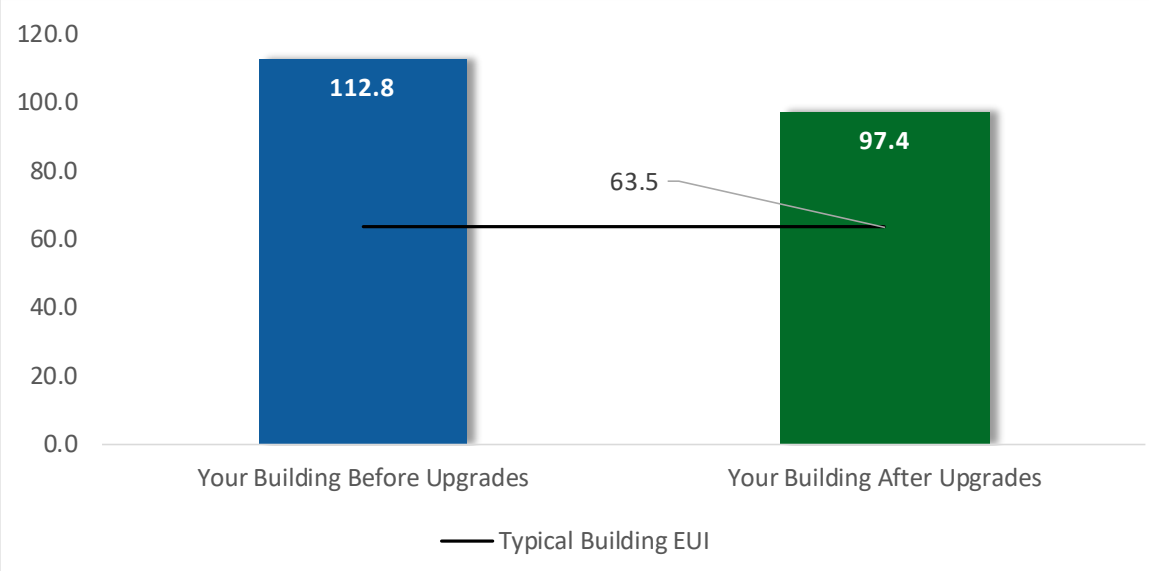


Figure 6 - Energy Use Intensity Comparison

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. A number of factors can cause a building to vary from the "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.

Tracking Your Energy Performance

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

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

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

For more information on ENERGY STAR® and Portfolio Manager®, visit their website[3].

[3] https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1

4 ENERGY CONSERVATION MEASURES

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

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

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

Financial incentives are based on the current NJCEP prescriptive SmartStart program. A higher level of investigation may be necessary to support any SmartStart Custom, Pay for Performance, or Direct Install incentive applications. Some measures and proposed upgrades may be eligible for higher incentives than those shown below through other NJCEP programs described in a following section of this report.

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	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**118,731**	**20.5**	**-24**	**$16,669**	**$38,410**	**$7,233**	**$31,177**	**1.9**	**116,742**
ECM 1	Install LED Fixtures	3,673	0.7	0	$524	$3,832	$290	$3,542	6.8	3,698
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	37	0.0	0	$5	$51	$5	$46	8.7	37
ECM 3	Retrofit Fixtures with LED Lamps	115,021	19.8	-24	$16,140	$34,527	$6,938	$27,589	1.7	113,007
Lighting Control Measures		**30,935**	**5.2**	**-7**	**$4,340**	**$24,008**	**$2,319**	**$21,689**	**5.0**	**30,380**
ECM 4	Install Occupancy Sensor Lighting Controls	22,443	4.0	-5	$3,148	$18,158	$2,319	$15,839	5.0	22,040
ECM 5	Install High/Low Lighting Controls	8,493	1.2	-2	$1,191	$5,850	$0	$5,850	4.9	8,341
Variable Frequency Drive (VFD) Measures		**20,490**	**4.9**	**0**	**$2,924**	**$18,455**	**$0**	**$18,455**	**6.3**	**20,633**
ECM 6	Install VFDs on Chilled Water Pumps	11,360	3.8	0	$1,621	$10,303	$0	$10,303	6.4	11,440
ECM 7	Install VFDs on Heating Water Pumps	9,129	1.1	0	$1,303	$8,152	$0	$8,152	6.3	9,193
Electric Chiller Replacement		**9,399**	**5.7**	**0**	**$1,341**	**$97,263**	**$2,280**	**$94,983**	**70.8**	**9,465**
ECM 8	Install High Efficiency Chillers	9,399	5.7	0	$1,341	$97,263	$2,280	$94,983	70.8	9,465
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**80**	**$906**	**$39,127**	**$3,052**	**$36,075**	**39.8**	**9,309**
ECM 9	Install High Efficiency Hot Water Boilers	0	0.0	80	$906	$39,127	$3,052	$36,075	39.8	9,309
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$279**	**$460**	**$50**	**$410**	**1.5**	**1,968**
ECM 10	Vending Machine Control	1,954	0.2	0	$279	$460	$50	$410	1.5	1,968
TOTALS		**181,509**	**36.6**	**49**	**$26,459**	**$217,723**	**$14,934**	**$202,789**	**7.7**	**188,497**

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**118,731**	**20.5**	**-24**	**$16,669**	**$38,410**	**$7,233**	**$31,177**	**1.9**	**116,742**
ECM 1	Install LED Fixtures	3,673	0.7	0	$524	$3,832	$290	$3,542	6.8	3,698
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	37	0.0	0	$5	$51	$5	$46	8.7	37
ECM 3	Retrofit Fixtures with LED Lamps	115,021	19.8	-24	$16,140	$34,527	$6,938	$27,589	1.7	113,007
Lighting Control Measures		**30,935**	**5.2**	**-7**	**$4,340**	**$24,008**	**$2,319**	**$21,689**	**5.0**	**30,380**
ECM 4	Install Occupancy Sensor Lighting Controls	22,443	4.0	-5	$3,148	$18,158	$2,319	$15,839	5.0	22,040
ECM 5	Install High/Low Lighting Controls	8,493	1.2	-2	$1,191	$5,850	$0	$5,850	4.9	8,341
Variable Frequency Drive (VFD) Measures		**20,490**	**4.9**	**0**	**$2,924**	**$18,455**	**$0**	**$18,455**	**6.3**	**20,633**
ECM 6	Install VFDs on Chilled Water Pumps	11,360	3.8	0	$1,621	$10,303	$0	$10,303	6.4	11,440
ECM 7	Install VFDs on Heating Water Pumps	9,129	1.1	0	$1,303	$8,152	$0	$8,152	6.3	9,193
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$279**	**$460**	**$50**	**$410**	**1.5**	**1,968**
ECM 10	Vending Machine Control	1,954	0.2	0	$279	$460	$50	$410	1.5	1,968
TOTALS		**172,110**	**30.8**	**-31**	**$24,211**	**$81,333**	**$9,602**	**$71,731**	**3.0**	**169,723**

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

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

Figure 8 – 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 ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**118,731**	**20.5**	**-24**	**$16,669**	**$38,410**	**$7,233**	**$31,177**	**1.9**	**116,742**
ECM 1	Install LED Fixtures	3,673	0.7	0	$524	$3,832	$290	$3,542	6.8	3,698
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	37	0.0	0	$5	$51	$5	$46	8.7	37
ECM 3	Retrofit Fixtures with LED Lamps	115,021	19.8	-24	$16,140	$34,527	$6,938	$27,589	1.7	113,007

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 are proposed, we suggest converting all of a specific lighting type (e.g. linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

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

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

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

Affected building areas: exterior fixtures.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

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

Affected building areas: elevator.

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent 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.

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: throughout the building.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**30,935**	**5.2**	**-7**	**$4,340**	**$24,008**	**$2,319**	**$21,689**	**5.0**	**30,380**
ECM 4	Install Occupancy Sensor Lighting Controls	22,443	4.0	-5	$3,148	$18,158	$2,319	$15,839	5.0	22,040
ECM 5	Install High/Low Lighting Controls	8,493	1.2	-2	$1,191	$5,850	$0	$5,850	4.9	8,341

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

ECM 4: Install Occupancy Sensor Lighting Controls

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

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

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

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

Affected building areas: offices, conference rooms, restrooms, court room, and storage rooms.

ECM 5: Install High/Low Lighting Controls

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

Lighting fixtures with these controls operate at default low levels when the area is unoccupied to provide minimal lighting to meet security or safety requirements. 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 taken into account when selecting retrofit lamps and bulbs for the areas proposed for high/low control.

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

Affected building areas: hallways and locker rooms.

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 an occupant approaches.

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 ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**20,490**	**4.9**	**0**	**$2,924**	**$18,455**	**$0**	**$18,455**	**6.3**	**20,633**
ECM 6	Install VFDs on Chilled Water Pumps	11,360	3.8	0	$1,621	$10,303	$0	$10,303	6.4	11,440
ECM 7	Install VFDs on Heating Water Pumps	9,129	1.1	0	$1,303	$8,152	$0	$8,152	6.3	9,193

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 motor —unless the existing motor meets or exceeds IHP 2014 standards—to conservatively account for the cost of an inverter duty rated motor. The savings and cost associated with the new motor are presented with the Premium Efficiency Motor measures. If the proposed VFD measure is not selected for implementation the motor replacement should be reevaluated.

ECM 6: 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: two 10 hp chilled water pumps.

ECM 7: Install VFDs on Heating Water Pumps

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

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

Affected pumps: two 5 hp heating water pumps.

4.4 Electric Chillers

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Chiller Replacement		**9,399**	**5.7**	**0**	**$1,341**	**$97,263**	**$2,280**	**$94,983**	**70.8**	**9,465**
ECM 8	Install High Efficiency Chillers	9,399	5.7	0	$1,341	$97,263	$2,280	$94,983	70.8	9,465

ECM 8: Install High Efficiency Chillers

Replace older inefficient electric chillers with new high efficiency chillers. The type of chiller to be installed depends on the magnitude of the cooling load and variability of the cooling load profile, for example:

- Positive displacement chillers are usually under 600 tons of cooling capacity and centrifugal chillers generally start at 150 tons of cooling capacity.
- Constant speed chillers should be used to meet cooling loads with little or no variation while variable speed chillers are more efficient for variable cooling load profiles.
- Water cooled chillers are more efficient than air cooled chillers but require cooling towers and additional pumps to circulate the cooling water.
- In any given size range, variable speed chillers tend to have better partial load efficiency, but worse full load efficiency, than constant speed chillers.

Energy savings result from the improvement in chiller efficiency and matching the right type of chiller to the cooling load. The energy savings are calculated based on the cooling capacity of the new chiller, the improvement in efficiency compared with the base case equipment, the cooling load profile, and the estimated annual operating hours of the chiller before and after the upgrade.

For the purposes of this analysis, we evaluated the replacement of chillers on a one-for-one basis with equipment of the same capacity. We recommend that you work with your design team to select chillers that are sized appropriately for the cooling load at this facility. In some cases, the plant energy use can be reduced by selecting multiple chillers that match the facility load profile rather than one or two large chillers. This can also improve the chiller plant reliability through increased redundancy. Energy savings are maximized by proper selection of new equipment based on the cooling load profile.

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

4.5 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**80**	**$906**	**$39,127**	**$3,052**	**$36,075**	**39.8**	**9,309**
ECM 9	Install High Efficiency Hot Water Boilers	0	0.0	80	$906	$39,127	$3,052	$36,075	39.8	9,309

ECM 9: Install High Efficiency Hot Water Boilers

Replace older inefficient hot water boilers with high efficiency hot water boilers. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

For the purposes 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 at this facility. 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 boilers has a long payback and may not be justifiable based simply on energy considerations. However, the boilers are nearing the end of their 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. We also recommend working with your mechanical design team to determine whether the heating system can operate with return water temperatures below 130°F, which would allow the use of condensing boilers.

4.6 Food Service & Refrigeration Measures

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$279**	**$460**	**$50**	**$410**	**1.5**	**1,968**
ECM 10	Vending Machine Control	1,954	0.2	0	$279	$460	$50	$410	1.5	1,968

ECM 10: Vending Machine Control

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

5 ENERGY EFFICIENT BEST PRACTICES

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs. 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 can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[4]. Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Thermostat Schedules and Temperature Resets

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

Chiller Maintenance

Service chillers regularly to keep them operating properly. Chillers are responsible for a substantial portion of a commercial building's overall energy usage and when they do not work well, there is usually a noticeable increase in energy bills and increased occupant complaints. Regular diagnostics and service can save 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.

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

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

Duct Sealing

Duct leakage in commercial buildings can account for five to twenty-five percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building wasting conditioned air. Eliminating duct leaks can improve ventilation system performance and reduce heating and cooling system operation.

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. Boilers should be cleaned according to the manufacturer's instructions to remove soot and scale from the water side or fire side of the boiler.

Water Heater Maintenance

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

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

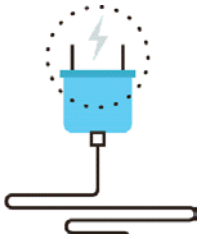
Compressed Air System Maintenance

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

- Inspection, cleaning, and replacement of inlet filter cartridges
- Cleaning of drain traps
- Daily inspection of lubricant levels to reduce unwanted friction
- Inspection of belt condition and tension
- Check for leaks and adjust loose connections
- Overall system cleaning

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

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[5]. Your local utility may offer incentives or rebates for this equipment.

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.

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.

[5] For additional information refer to "Assessing and Reducing Plug and Process Loads in Office Buildings" http://www.nrel.gov/docs/fy13osti/54175.pdf, or "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices

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

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

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.

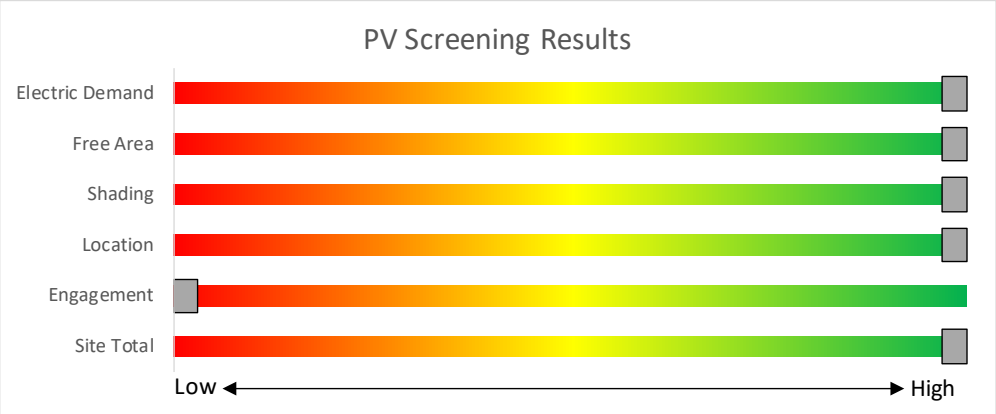
6.1 Solar Photovoltaic

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	129	kW DC STC
Electric Generation	153,687	kWh/yr
Displaced Cost	$21,930	/yr
Installed Cost	$335,400	

Figure 9 - Photovoltaic Screening

Solar Renewable Energy Certificate (SREC) Registration Program (SRP)

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program before starting construction. Once your PV system is up and running, you periodically earn credits, which can then be sold on the open market for up to 15 years.

If you are considering installing solar photovoltaics on your building, visit www.njcleanenergy.com/srec for more information about the SREC Registration Program.

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:

- **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.

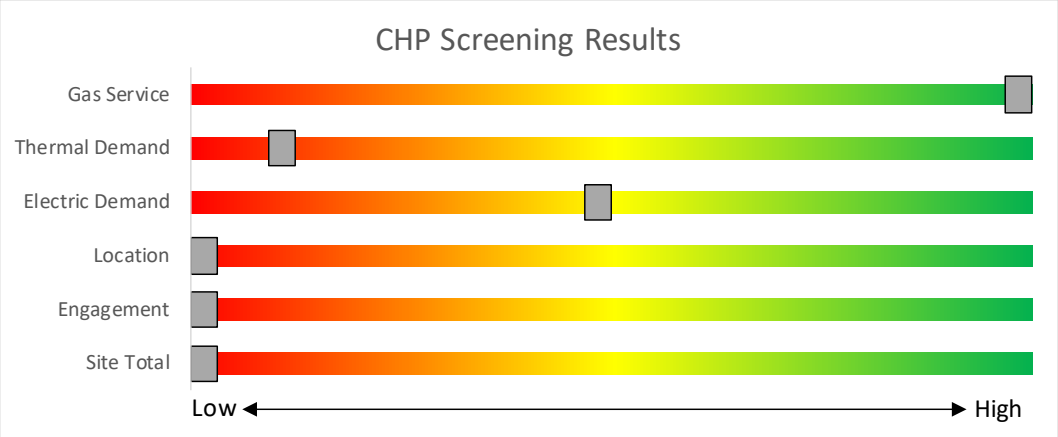
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be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



Potential	None	
System Type	None	
System Potential	10	kW
Electric Generation	35,410	kWh/yr
Thermal Generation	793,184	MBtu/yr
Displaced Cost	$672	/yr
Installed Cost	$19,000	

Figure 10 - Combined Heat and Power Screening

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

7 PROJECT FUNDING AND INCENTIVES

Ready to improve your building's performance? New Jersey's Clean Energy Programs can help. Pick the program that works best for you. Incentive programs that may apply to this facility are identified in the Executive Summary. This section provides an overview of currently available from New Jersey's Clean Energy Programs.

	SmartStart *Flexibility to install at your own pace*	**Direct Install** *Turnkey installation*	**Pay for Performance** *Whole building upgrades*
Who should use it?	Buildings installing individual measures or small group of measures.	Small to mid-size facilities that can bundle multiple measures together. Average peak demand should be below 200 kW. Not suitable for significant building shell issues.	Mid to large size facilities looking to implement as many measures as possible at one time. Peak demand should be over 200 kW.
How does it work?	Use in-house staff or your preferred contractor.	Pre-approved contractors pass savings along to you via reduced material and labor costs.	Whole-building approach to energy upgrades designed to reduce energy use by at least 15%. The more you save, the higher the incentives.
What are the Incentives?	Fixed incentives for specific energy efficiency measures.	Incentives pay up to 70% of eligible costs, up to $125,000 per project. You pay the remaining 30% directly to the contractor.	Up to 25% of installation cost, calculated based on level of energy savings per square foot.
How do I participate?	Submit an application for the specific equipment to be installed.	Contact a participating contractor in your region.	Contact a pre-qualified Partner to develop your Energy Reduction Plan and set your energy savings targets.
Take the next step by visiting **www.njcleanenergy.com** for program details, applications, and to contact a qualified contractor.			

7.1 SmartStart

SmartStart 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.

SmartStart routinely adds, removes, or modifies incentives from year-to-year for various energy-efficient equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

Incentives

The SmartStart Prescriptive program provides fixed incentives for specific energy efficiency measures. Prescriptive incentives vary by equipment type.

SmartStart Custom provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentives. Custom incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings. Incentives are capped at 50% of the total installed incremental project cost, or a project cost buy down to a one-year payback (whichever is less). Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

Submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. You can work with your preferred contractor or use internal staff to install measures.

Visit www.njcleanenergy.com/SSB for a detailed program description, instructions for applying, and applications.

7.2 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 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, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. 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 program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Detailed program descriptions and applications can be found at: www.njcleanenergy.com/DI.

7.3 Combined Heat and Power

The Combined Heat & Power (CHP) program provides incentives for eligible CHP or

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

Incentives

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

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

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

How to Participate

You 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.

7.4 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. Annual payments are lower than the savings projected from the 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 (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Carefully consider all alternatives to develop an approach that best meets your needs. A detailed program description 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.

7.5 SREC Registration Program

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

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

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

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar Renewable Portfolio Standard. Purchasing SRECs can help them meet those requirements. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period fluctuates depending on supply and demand.

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

8 Energy Purchasing and Procurement Strategies

8.1 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. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility 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].

8.2 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 that fluctuate monthly. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier 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].

[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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Office Mayor	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.4	2,547	-1	$357	$708	$155	1.5
Office Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.0	39	0	$5	$37	$10	4.8
Admin Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	1,273	0	$179	$489	$95	2.2
208 Admin	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.3	1,910	0	$268	$599	$125	1.8
Finance Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	9	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.5	2,865	-1	$402	$763	$170	1.5
Finance Main	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
Const. Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.3	1,910	0	$268	$599	$125	1.8
Men RR 2nd Fl	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.3	1,586	0	$223	$850	$115	3.3
Men RR 2nd Fl	3	Compact Fluorescent: 13 Watt - 2L - Pin base	Wall Switch	s	26	4,680	3	Relamp	No	3	LED Lamps: 9 Watt LED - 2L	Wall Switch	18	4,680	0.0	121	0	$17	$103	$6	5.7
Women RR	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.3	1,586	0	$223	$850	$115	3.3
Women RR	3	Compact Fluorescent: 13 Watt - 2L - Pin base	Wall Switch	s	26	4,680	3	Relamp	No	3	LED Lamps: 9 Watt LED - 2L	Wall Switch	18	4,680	0.0	121	0	$17	$103	$6	5.7
Const. Office 2	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	1,273	0	$179	$489	$95	2.2
206 Corridor	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	8,760	3, 5	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	6,044	0.2	1,788	0	$251	$389	$45	1.4
Stair C Hall	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	8,760	3, 5	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	6,044	0.2	1,788	0	$251	$389	$45	1.4
Stair C Hall	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
214 Employee	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.4	2,547	-1	$357	$708	$155	1.5
215 Mech Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.1	156	0	$22	$146	$40	4.8
Stair D Hall	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	s	32	8,760		None	No	4	LED - Fixtures: Ambient 2x4 Fixture	Wall Switch	32	8,760	0.0	0	0	$0	$0	$0	0.0
Display Area	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.3	1,586	0	$223	$850	$115	3.3
249 Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.0	39	0	$5	$37	$10	4.8
249 Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	756	0.2	298	0	$42	$489	$60	10.3
Cleaning Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	1,095	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,095	0.1	117	0	$16	$110	$30	4.8
2nd Fl Lobby	10	Compact Fluorescent: 13 Watt - 2L - Pin base	Wall Switch	s	26	4,680	3, 5	Relamp	Yes	10	LED Lamps: 9 Watt LED - 2L	High/Low Control	18	3,229	0.1	686	0	$96	$795	$20	8.0
Elevator	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	s	32	1,095	3	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	None	15	1,095	0.0	21	0	$3	$18	$5	4.6
Elevator	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	s	46	1,095	2	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	None	15	1,095	0.0	37	0	$5	$51	$5	8.7

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
2nd Fl Lobby	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	None	s	93	4,680	3, 5	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	3,229	0.7	3,820	-1	$536	$1,107	$180	1.7
2nd Fl Lobby	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
216 Tech Equipment	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	1,273	0	$179	$489	$95	2.2
219 Records Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	955	0	$134	$434	$80	2.6
Stair B	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	8,760	3	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,760	0.1	1,405	0	$197	$164	$45	0.6
Stair B	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	8,760	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.1	624	0	$88	$73	$20	0.6
220 Police Comm	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.3	1,910	0	$268	$599	$125	1.8
220 Storage	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,095	0.0	34	0	$5	$72	$10	13.0
220 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,680	0.0	147	0	$21	$72	$10	3.0
Police Hall	24	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 5	Relamp	Yes	24	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	3,229	1.3	7,640	-2	$1,072	$2,215	$360	1.7
Police Hall	6	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	6	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
224 School Resource	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
225 Office Security	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
226 Lieutenant	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
241 Storage B	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,095	0.1	69	0	$10	$145	$20	13.0
227 Comm Service	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
Stair A	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	8,760	3	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,760	0.1	1,405	0	$197	$164	$45	0.6
Stair A	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	8,760	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.1	624	0	$88	$73	$20	0.6
Stair C	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	8,760	3	Relamp	No	3	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,760	0.1	1,405	0	$197	$164	$45	0.6
Stair C	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	8,760	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.1	624	0	$88	$73	$20	0.6
229 Police Training	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.3	1,592	0	$223	$544	$110	1.9
Men RR 2nd Fl	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.1	793	0	$111	$560	$75	4.4
Women RR 2nd FL	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.1	793	0	$111	$560	$75	4.4
235 Investigation	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.4	2,228	0	$313	$653	$140	1.6
232 Interview	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
231	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
230 Storage	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,095	0.0	34	0	$5	$72	$10	13.0
238 Lieutenant	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	955	0	$134	$434	$80	2.6
237 Breakroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	955	0	$134	$434	$80	2.6
240 Storage	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,095	0.1	69	0	$10	$145	$20	13.0
239 Lieutenant	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	955	0	$134	$434	$80	2.6
247 Police	14	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	14	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.5	2,776	-1	$389	$1,284	$175	2.8
247 Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,680	0.0	147	0	$21	$72	$10	3.0
246 Captain	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	955	0	$134	$434	$80	2.6
248 Chief	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.4	2,228	0	$313	$653	$140	1.6
248 Chief	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
AHC Municipal	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,229	0.2	1,273	0	$179	$489	$95	2.2
AHC Police	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,229	0.3	1,486	0	$208	$526	$105	2.0
1st Fl Hall	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	8,760	3, 5	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	6,044	0.2	1,788	0	$251	$389	$45	1.4
1st Fl Hall	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
112 Tax Office	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.6	3,502	-1	$491	$872	$200	1.4
110 Mech Room	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,095	0.0	34	0	$5	$72	$10	13.0
112 Tax	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
115 Clerk	21	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	21	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	1.2	6,685	-1	$938	$1,690	$385	1.4
115 Main clerk	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
1st FL Hall	3	Compact Fluorescent: 13 Watt - 2L - Pin base	Wall Switch	s	26	8,760	3	Relamp	No	3	LED Lamps: 9 Watt LED - 2L	Wall Switch	18	8,760	0.0	227	0	$32	$103	$6	3.1
Men 1st FL	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.1	793	0	$111	$560	$75	4.4
Women 1st FL	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.1	793	0	$111	$560	$75	4.4
107 tax	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.6	3,184	-1	$447	$818	$185	1.4
106 tax storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,680	0.1	500	0	$70	$110	$30	1.1

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
storage file	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	8	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,095	0.2	274	0	$38	$580	$80	13.0
103 Elec room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.0	39	0	$5	$37	$10	4.8
1st Ffl Hall	34	Compact Fluorescent: 13 Watt - 2L - Pin base	None	s	26	8,760	3, 5	Relamp	Yes	34	LED Lamps: 9 Watt LED - 2L	High/Low Control	18	6,044	0.4	4,368	-1	$613	$2,521	$68	4.0
1st Ffl Hall	3	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Vestibule	8	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.3	1,586	0	$223	$850	$115	3.3
Vestibule	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
125 Clerk	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.8	4,457	-1	$625	$1,307	$280	1.6
125 Restroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,680	0.0	147	0	$21	$72	$10	3.0
122 Judge's room	5	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	5	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.2	991	0	$139	$632	$85	3.9
Police records	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	3	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	0.1	595	0	$83	$487	$65	5.1
126 corridor	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	s	62	4,680	3, 5	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,229	0.6	3,184	-1	$447	$998	$150	1.9
161 police record	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.6	3,184	-1	$447	$818	$185	1.4
161 closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	1,095	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,095	0.0	59	0	$8	$55	$15	4.8
160	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
140 Evidence	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,680	0.0	250	0	$35	$55	$15	1.1
141 evidence	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.2	1,273	0	$179	$489	$95	2.2
158 armory	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,680	0.1	334	0	$47	$73	$20	1.1
164 Tactical	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,680	0.1	334	0	$47	$73	$20	1.1
Women Staff RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,680	0.0	147	0	$21	$72	$10	3.0
Men Staff RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,680	0.0	147	0	$21	$72	$10	3.0
155 Janitor	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,095	0.0	34	0	$5	$72	$10	13.0
142 sergeants	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
126 corridor	4	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
146 Sergeants B	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
145 Sergent C	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5

	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
147 Squad	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.4	2,547	-1	$357	$708	$155	1.5
151 Locker	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,680	0.1	334	0	$47	$73	$20	1.1
152 Gym	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	3,229	0.4	2,228	0	$313	$608	$105	1.6
Women's Locker	10	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 5	Relamp	Yes	10	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,229	0.3	1,983	0	$278	$1,175	$100	3.9
Men's Locker	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 5	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	3,229	0.4	2,228	0	$313	$608	$105	1.6
Men's Locker	4	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) U-Lamp	High/Low Control	33	3,229	0.1	793	0	$111	$515	$40	4.3
135 Prisoner	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,680	0.1	334	0	$47	$73	$20	1.1
135 Prisoner	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,229	0.4	2,335	0	$327	$672	$145	1.6
135 Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.1	78	0	$11	$73	$20	4.8
127 Sallyport	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 5	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	3,229	0.1	849	0	$119	$371	$40	2.8
127 Sallyport	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
131 Janitor	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.0	39	0	$5	$37	$10	4.8
136 Cell	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,680	0.0	167	0	$23	$37	$10	1.1
137 Cell	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,680	0.0	167	0	$23	$37	$10	1.1
139 Cell	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	4,680	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,680	0.0	167	0	$23	$37	$10	1.1
Canopy	11	Compact Fluorescent: 13 Watt - 2L - Pin base	Photocell		26	4,380	3	Relamp	No	11	LED Lamps: 9 Watt LED - 2L	Photocell	18	4,380	0.1	385	0	$55	$379	$22	6.5
Parking Lot	6	LED - Fixtures: Parking Garage Fixture	Timeclock		60	3,640		None	No	6	LED - Fixtures: Parking Garage Fixture	Timeclock	60	3,640	0.0	0	0	$0	$0	$0	0.0
Parking Lot	1	High-Pressure Sodium: (1) 150W Lamp	Timeclock		188	3,640	1	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Timeclock	45	3,640	0.1	521	0	$74	$931	$50	11.9
Elec Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	s	62	1,095	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,095	0.1	78	0	$11	$73	$20	4.8
Door Canopy	11	Compact Fluorescent: 13 Watt - 2L - Pin base	Wall Switch		26	4,680	3	Relamp	No	11	LED Lamps: 9 Watt LED - 2L	Wall Switch	18	4,680	0.1	412	0	$59	$379	$22	6.1
Canopy	18	Compact Fluorescent: 13 Watt - 2L - Pin base	Wall Switch		26	4,680	3	Relamp	No	18	LED Lamps: 9 Watt LED - 2L	Wall Switch	18	4,680	0.1	674	0	$96	$620	$36	6.1
Flood Lights	4	Metal Halide: (1) 150W Lamp	Timeclock		190	3,640	1	Fixture Replacement	No	4	LED - Fixtures: Ceiling Mount	Timeclock	45	3,640	0.4	2,111	0	$301	$1,188	$40	3.8
Canopy	13	Compact Fluorescent: 13 Watt - 2L - Pin base	Timeclock		26	3,640	3	Relamp	No	13	LED Lamps: 9 Watt LED - 2L	Timeclock	18	3,640	0.1	379	0	$54	$448	$26	7.8
Door Canopy	5	Compact Fluorescent: 13 Watt - 2L - Pin base	Timeclock		26	3,640	3	Relamp	No	5	LED Lamps: 9 Watt LED - 2L	Timeclock	18	3,640	0.0	146	0	$21	$172	$10	7.8
Fuel Pump Canopy	2	High-Pressure Sodium: (1) 150W Lamp	Timeclock		188	3,640	1	Fixture Replacement	No	2	LED - Fixtures: Fuel Pump Canopy	Timeclock	45	3,640	0.2	1,041	0	$149	$1,713	$200	10.2

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Court Room	42	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	s	62	4,680	3, 4	Relamp	Yes	42	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	3,229	1.5	8,328	-2	$1,168	$3,988	$543	2.9
Court Room	33	Compact Fluorescent: 13 Watt - 2L - Pin base	Wall Switch	s	26	4,680	3, 4	Relamp	Yes	33	LED Lamps: 9 Watt LED - 2L	Occupancy Sensor	18	3,229	0.4	2,265	0	$318	$1,879	$162	5.4
Court Room	36	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	4,680	3, 4	Relamp	Yes	36	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,229	0.7	4,002	-1	$561	$1,467	$285	2.1
Court Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	s	32	4,680	3, 4	Relamp	Yes	10	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,229	0.2	1,112	0	$156	$453	$85	2.4
Court Room	14	Linear Fluorescent - T8: 3' T8 (25W) - 1L	Wall Switch	s	27	4,680	3, 4	Relamp	Yes	14	LED - Linear Tubes: (1) 3' Lamp	Occupancy Sensor	11	3,229	0.2	1,398	0	$196	$796	$140	3.3
Court Room	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
119 court rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,229	0.1	637	0	$89	$380	$65	3.5
126 corridor	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	s	93	4,680	3, 5	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	3,229	0.2	1,273	0	$179	$444	$60	2.2

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
215 Mech Room	Boiler 1	1	Combustion Air Fan	0.3	70.5%	No	w	2,745		No	70.5%	No		0.0	0	0	$0	$0	$0	0.0
215 Mech Room	Boiler 2	1	Combustion Air Fan	0.3	70.5%	No	w	2,745		No	70.5%	No		0.0	0	0	$0	$0	$0	0.0
Elevator Machine Room	Elevator	1	Process Pump	20.0	91.0%	No	w	2,920		No	91.0%	No		0.0	0	0	$0	$0	$0	0.0
Closet	Air Compressor	1	Air Compressor	1.0	85.5%	No	w	2,190		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
Closet	DHW Circulation	1	Water Supply Pump	1.0	85.5%	No	w	8,760		No	85.5%	No		0.0	0	0	$0	$0	$0	0.0
215 Mech Room	Chiller	1	Chilled Water Pump	10.0	89.5%	No	w	1,800	6	No	91.7%	Yes	1	1.9	5,869	0	$838	$5,152	$0	6.2
215 Mech Room	Chiller	1	Chilled Water Pump	10.0	91.7%	No	w	1,800	6	No	91.7%	Yes	1	1.9	5,491	0	$784	$5,152	$0	6.6
215 Mech Room	Boiler-1	1	Boiler Feed Water Pump	0.5	76.2%	No	w	2,745		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
215 Mech Room	Boiler-2	1	Boiler Feed Water Pump	0.5	76.2%	No	w	2,745		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
215 Mech Room	Heating Hot Water Pump	1	Heating Hot Water Pump	5.0	87.5%	No	w	2,745	7	No	89.5%	Yes	1	0.5	4,565	0	$651	$4,076	$0	6.3
215 Mech Room	Heating Hot Water Pump	1	Heating Hot Water Pump	5.0	87.5%	No	w	2,745	7	No	89.5%	Yes	1	0.5	4,565	0	$651	$4,076	$0	6.3
Rooftop	Exhaust Fan-1	1	Exhaust Fan	0.3	70.5%	No	w	8,760		No	70.5%	No		0.0	0	0	$0	$0	$0	0.0
Rooftop	Exhaust Fan-2	1	Exhaust Fan	0.5	76.2%	No	w	8,760		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
Rooftop	Exhaust Fan-4	1	Exhaust Fan	0.3	70.5%	No	w	2,745		No	70.5%	No		0.0	0	0	$0	$0	$0	0.0
Rooftop	Exhaust Fan-5	1	Exhaust Fan	0.5	76.2%	No	w	2,745		No	76.2%	No		0.0	0	0	$0	$0	$0	0.0
Rooftop	Exhaust Fan-3	1	Exhaust Fan	0.3	70.5%	No	w	2,745		No	70.5%	No		0.0	0	0	$0	$0	$0	0.0
Rooftop	Exhaust Fan-7	1	Exhaust Fan	0.3	70.5%	No	w	2,745		No	70.5%	No		0.0	0	0	$0	$0	$0	0.0
Rooftop	Exhaust Fan-8	1	Exhaust Fan	0.3	70.5%	No	w	2,745		No	70.5%	No		0.0	0	0	$0	$0	$0	0.0
249 Storage	AHU-4	1	Supply Fan	3.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
249 Storage	AHU-3	1	Supply Fan	3.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Attic	AHU-6	1	Supply Fan	5.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Attic	AHU-5	1	Supply Fan	3.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Attic Police Side	AHU-1	1	Supply Fan	3.0	89.5%	Yes	w	8,760		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Attic Police Side	AHU-2	1	Supply Fan	2.0	86.5%	Yes	w	8,760		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0
249 Storage	AHU-4	1	Return Fan	3.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
249 Storage	AHU-3	1	Return Fan	3.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Attic	AHU-6	1	Return Fan	5.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Attic	AHU-5	1	Return Fan	3.0	89.5%	Yes	w	2,745		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Attic Police Side	AHU-1	1	Return Fan	3.0	89.5%	Yes	w	8,760		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Attic Police Side	AHU-2	1	Return Fan	2.0	86.5%	Yes	w	8,760		No	86.5%	No		0.0	0	0	$0	$0	$0	0.0

Electric 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)	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/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
147 Squad Room	147 Squad Room	1	Window AC	1.25		w		No							0.0	0	0	$0	$0	$0	0.0
216 Server Room	216 Tech equipment room	1	Window AC	5.00		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)	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Outdoor	Chiller	1	Air-Cooled Scroll Chiller	114.00	b	8	Yes	1	Air-Cooled Centrifugal Chiller	Constant	114.00	1.17	0.88	5.7	9,399	0	$1,341	$97,263	$2,280	70.8

Fuel Heating 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)	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
215 Mech Room	Boiler 1	1	Non-Condensing Hot Water Boiler	872.00	W	9	Yes	1	Non-Condensing Hot Water Boiler	872.00	85.00%	Et	0.0	0	40	$453	$19,564	$1,526	39.8
215 Mech Room	Boiler 2	1	Non-Condensing Hot Water Boiler	872.00	W	9	Yes	1	Non-Condensing Hot Water Boiler	872.00	85.00%	Et	0.0	0	40	$453	$19,564	$1,526	39.8

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Mayor Closet	Various	1	Storage Tank Water Heater (> 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

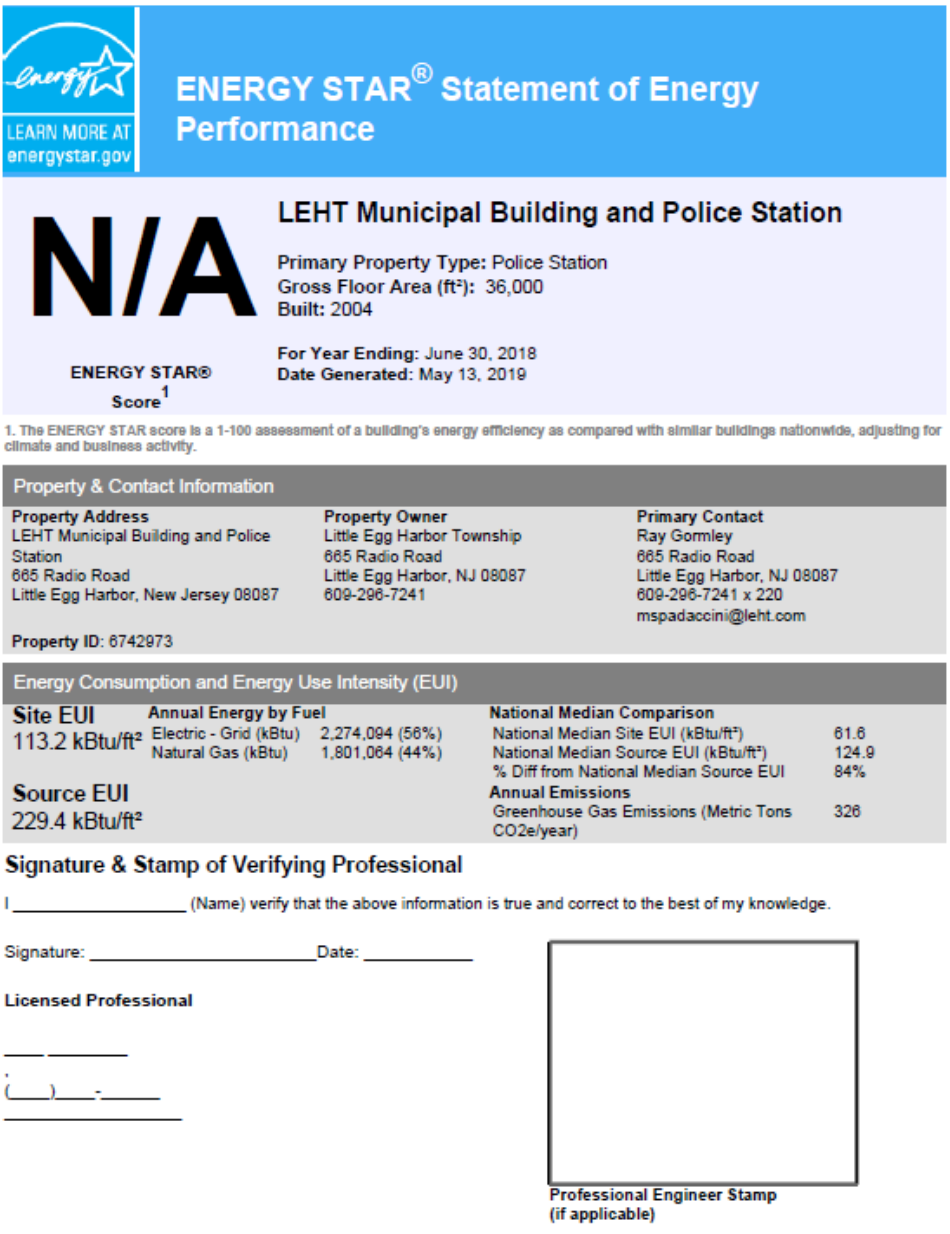
	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Various	100	Computer	120.0	No
Various	4	Server	120.0	No
Various	10	Medium Copier/Printer	200.0	No
Various	9	Large Copier/Printer	494.0	No
Various	34	Small Printer	192.0	No
Various	6	Microwave	800.0	No
Various	17	Coffee Machine	900.0	No
Various	11	TV	150.0	No
Various	9	Small Refrigerator	150.0	No
Various	1	Medium Refrigerator	300.0	No
Various	3	Large Regrigerator	220.0	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	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Building	1	Refrigerated	10	Yes	0.2	1,612	0	$230	$230	$50	0.8
Building	1	Non-Refrigerated	10	Yes	0.0	343	0	$49	$230	$0	4.7

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

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]

LEHT Municipal Building and Police Station

Primary Property Type: Police Station
Gross Floor Area (ft²): 36,000
Built: 2004

For Year Ending: June 30, 2018
Date Generated: May 13, 2019

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
LEHT Municipal Building and Police Station 665 Radio Road Little Egg Harbor, New Jersey 08087	Little Egg Harbor Township 665 Radio Road Little Egg Harbor, NJ 08087 609-296-7241	Ray Gormley 665 Radio Road Little Egg Harbor, NJ 08087 609-296-7241 x 220 mspadaccini@leht.com

Property ID: 6742973

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
113.2 kBtu/ft²

Source EUI
229.4 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	2,274,094 (56%)	
Natural Gas (kBtu)	1,801,064 (44%)	

National Median Comparison	
National Median Site EUI (kBtu/ft²)	61.6
National Median Source EUI (kBtu/ft²)	124.9
% Diff from National Median Source EUI	84%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	326

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

___ _____
.
(___)___-_____
_____

Professional Engineer Stamp (if applicable)

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 gases:* gases that are transparent to solar (short-wave) radiation but opaque to long-wave (infrared) radiation, thus preventing long-wave radiant energy from leaving Earth's atmosphere. The net effect is a trapping of absorbed radiation and a tendency to warm the planet's surface.
gpf	*Gallons per flush*

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

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