Local Government Energy Audit Report

Public Works Garage

April 30, 2019

Prepared for:

Salem County
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Pilesgrove, NJ 08079

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 is encouraged 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.

The 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.

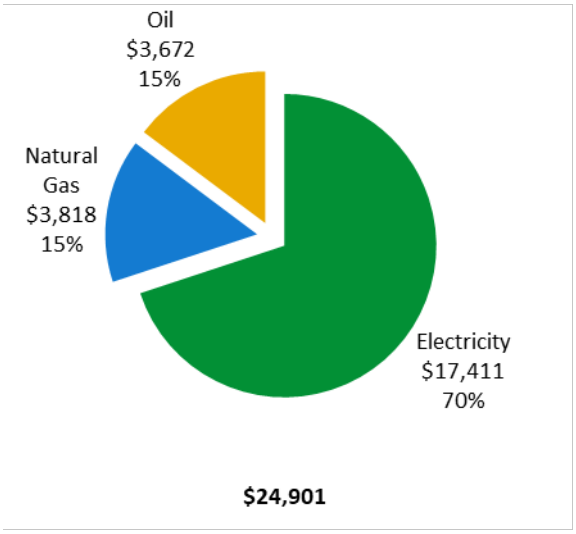
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for the Public Works Garage. 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 help protect our environment by reducing statewide energy consumption.

BUILDING PERFORMANCE REPORT

Annual Utilities	Costs: $24,901 Electricity: 91,827 kWh Natural Gas: 2,765 Therms No. 2 Fuel Oil: 1,946 Gallons	
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.

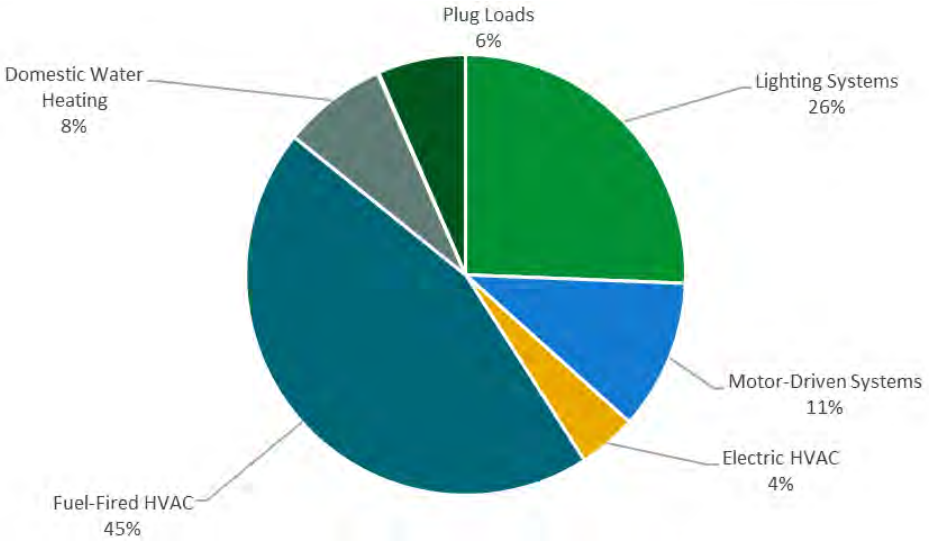


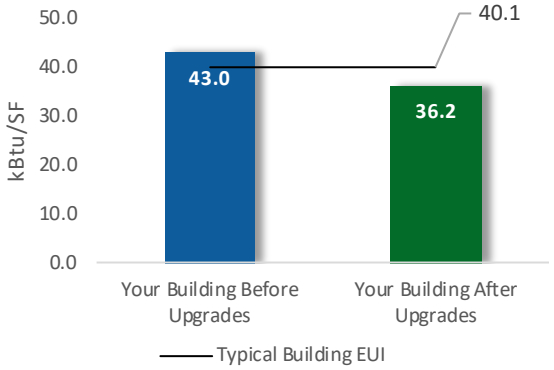
Figure 1 - Energy Use by System

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.

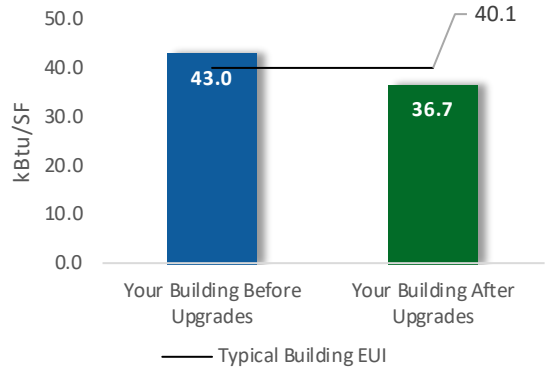
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$41,953
Potential Rebates & Incentives[1]	$4,388
Annual Cost Savings	$6,789
Annual Energy Savings	Electricity: 34,526 kWh No. 2 Fuel Oil: 129 Gallons
Greenhouse Gas Emission Savings	19 Tons
Simple Payback	5.5 Years
Site Energy Savings (all utilities)	16%



Scenario 2: Cost Effective Package[2]

Installation Cost	$29,738
Potential Rebates & Incentives	$3,898
Annual Cost Savings	$6,212
Annual Energy Savings	Electricity: 31,445 kWh No. 2 Fuel Oil: 133 Gallons
Greenhouse Gas Emission Savings	17 Tons
Simple Payback	4.2 Years
Site Energy Savings (all utilities)	15%



On-site Generation Potential

Photovoltaic	None
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		**29,490**	**8.9**	**-8**	**$5,487**	**$82,311**	**$23,092**	**$3,098**	**$19,994**	**3.6**	**28,446**
ECM 1	Install LED Fixtures	14,812	3.2	-2	$2,786	$41,796	$16,484	$1,800	$14,684	5.3	14,651
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	4,867	1.9	-2	$895	$13,418	$3,266	$503	$2,763	3.1	4,562
ECM 3	Retrofit Fixtures with LED Lamps	9,811	3.8	-4	$1,806	$27,097	$3,343	$795	$2,548	1.4	9,233
Lighting Control Measures		**1,241**	**0.5**	**-1**	**$228**	**$1,825**	**$4,050**	**$490**	**$3,560**	**15.6**	**1,163**
	Install Occupancy Sensor Lighting Controls	1,241	0.5	-1	$228	$1,825	$4,050	$490	$3,560	15.6	1,163
Electric Unitary HVAC Measures		**1,840**	**1.3**	**0**	**$349**	**$5,233**	**$8,166**	**$0**	**$8,166**	**23.4**	**1,853**
	Install High Efficiency Air Conditioning Units	1,840	1.3	0	$349	$5,233	$8,166	$0	$8,166	23.4	1,853
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**26**	**$354**	**$7,084**	**$6,185**	**$800**	**$5,385**	**15.2**	**4,256**
ECM 4	Install High Efficiency Furnaces	0	0.0	26	$354	$7,084	$6,185	$800	$5,385	15.2	4,256
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$371**	**$1,853**	**$460**	**$0**	**$460**	**1.2**	**1,968**
ECM 5	Vending Machine Control	1,954	0.2	0	$371	$1,853	$460	$0	$460	1.2	1,968
TOTALS		**34,526**	**10.9**	**18**	**$6,789**	**$98,306**	**$41,953**	**$4,388**	**$37,565**	**5.5**	**37,686**

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

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

Figure 2 – Evaluated Energy Improvements

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 High Efficiency Furnaces	X	X	
ECM 5	Vending Machine Control		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 their 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 Public Works Garage. 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 October 2, 2018, TRC performed an energy audit at the Public Works Garage located in Pilesgrove, New Jersey. TRC met with Sam Willis to review the facility operations and help focus our investigation on specific energy-using systems.

The Public Works Garage is a multi-story, multi-building, 20,008 square foot facility built in 1959. Spaces include: garage bays, offices, and various storage and mechanical spaces.

Recent improvements include: Over the last five years the facility has been replacing its existing T12 fluorescent fixtures with T8 fluorescent fixtures as needed, but not all have been replaced.

2.2 Building Occupancy

The facility is occupied five days per week, year-round with no activity on weekends. Typical occupancy is six staff.

Building Name	Weekday/Weekend	Operating Schedule
Public Works Garage	Weekday	8:30AM - 4:30PM
	Weekend	Closed

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

There are four different building types at this facility: the main building, wood-frame pole barns, streel-frame pole barns with concrete block, and mobile trailers.

The main building is constructed partially of concrete block over structural steel, and partially of wood-frame construction with vinyl siding exterior. The interior of the garage bays is painted concrete block, while the office area interior has wood panel finish. The roof is pitched with asphalt shingles and is in good condition. The other building types include wood-frame pole barns with metal sheeting (Building #2 & #3), a steel and concrete-frame salt barn with vinyl stretched over, and wood-frame construction mobile trailers.

Main Building

Building #2

Building #3

Sign Shop Lunch Trailer

Lunch Trailer

2.4 Lighting Systems

The primary interior lighting throughout the facility is 32-Watt linear fluorescent T8 lamps. There are also several 40-Watt T12 fixtures. Additionally, there are some compact fluorescent lamps (CFL) and incandescent lamps in restrooms and offices. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 2-lamp or 4-lamp, 2- or 4-foot long surface-mounted fixtures. There were also some 2-lamp, 8-foot fixtures with T12 linear tube lamps. The salt barn contains metal halide fixtures with 400-Watt lamps. Most fixtures are in fair condition. Interior lighting levels were generally sufficient.

All exit signs are LED units.

Truck Bay Lighting

Office Lighting

Truck Bay Lighting

Salt Barn Exit Sign

Interior lighting fixtures throughout the facility are controlled by wall switches.

Exterior fixtures include wall packs, flood lights, and pole-mounted light fixtures with high intensity discharge (HID) lamps or incandescent flood lamps. There are seven pole-mounted site lights, six pump station canopy lights, and five wall pack fixtures with HID lamps. There are also four incandescent light fixtures on the main building, each with 75-Watt flood lamps.

The pole-mounted fixtures, wall packs, and canopy fixtures have metal halide lamps with 250-Watt, 100-Watt, and 175-Watt, respectfully.

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

Site Lighting

Site Lighting

Fuel Station Canopy

2.5 Air Handling Systems

Warm Air Unit Heaters

There are two natural gas-fired unit heaters located at this facility. There is one unit located in Building #2 in the truck bay area, and one located in Building #3 in the truck washing bay area. Both heaters are manufactured by Reznor and have a capacity of 26 MBh and 24.6 MBh, with an efficiency of 84% and 82.5%, respectfully. The units are in good condition and well within the equipment's useful life.

Building #3 Warm Air Heater

Building #2 Warm Air Heater

Oil Furnaces

The main building at this facility is heated by two oil-fired furnaces located in parts rooms 1 and 2. The unit in parts room 1 is a 250 MBh capacity unit serving the office area, while the unit in parts room 2 is a 23 MBh capacity unit serving the truck bay area.

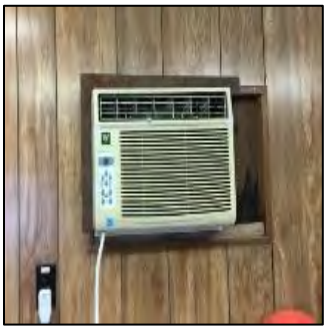
Main Building Office Oil Furnace

Main Building Truck Bays Oil Furnace

Air Conditioners

The main building office area and sign shop use window air conditioning (AC) units. These vary in capacity between 12,000 Btu/hr and 24,000 Btu/hr. The units are in fair condition. They range in efficiency between 8.5 EER to 10 EER. They are ENERGY STAR® labeled.

Office Window AC



Sign Shop Window AC

2.6 Domestic Hot Water

Domestic hot water for the restrooms is produced by a 40-gallon, 4.5 kW Bradford White electric storage water heater located in the main building.

There is an additional water heater cleaning system located in a storage room in building 3 which serves the truck wash bay. Hot water for the wash bay is produced by a 400 MBh gas-fired Aladdin water heater and cleaning system with a storage capacity of 50 gallons.

At the time of the site visit, the domestic water heater used for restrooms was set at 115°F.

The domestic hot water pipes are partially insulated and the insulation is in fair condition.

Domestic Hot Water

Wash Bay Water Heater

2.7 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 6.5% of total building energy use. This is higher than a typical building which is likely attributed to the use of shop tools.

You may wish to consider paying particular attention to minimizing your plug load usage. This report makes suggestions for ECMs in this area as well as Energy Efficient Best Practices.

There are four computer work stations throughout the facility. Plug loads throughout the building include general mechanical and office equipment. The offices have desk printers, water coolers, a standing refrigerator, compact refrigerator, microwave oven, and fans. The garage bays and storage rooms contain various equipment including air compressor, drill press, hydraulic lift, arc welder, tire changer, ice machine, and a sign maker.

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

Compact Refrigerator

Office Equipment

Refrigerated Vending Machine

Non-Refrigerated Vending Machine

2.8 Water-Using Systems

There are two restrooms with toilets and sinks. Faucet flow rates are at 2.0 gallons per minute (gpm). Toilets are rated at 2.5 gallons per flush (gpf).

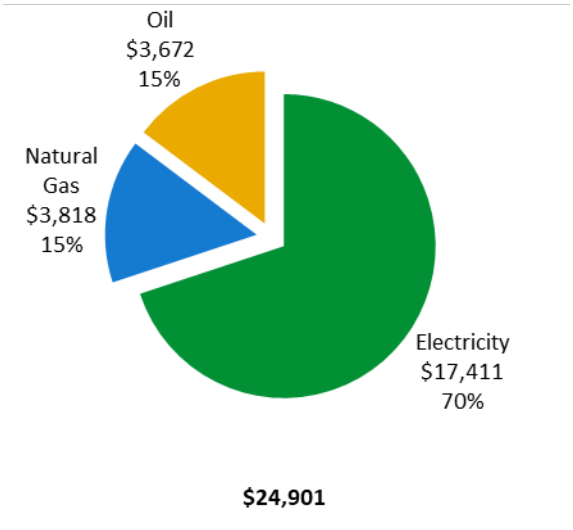
There is also a wash room containing a sink with a faucet rated at 2.5 gpm.

Wash Room

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	91,827 kWh	$17,411
Natural Gas	2,765 Therms	$3,818
No. 2 Fuel Oil	1,946 Gallons	$3,672
Total		**$24,901**



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.

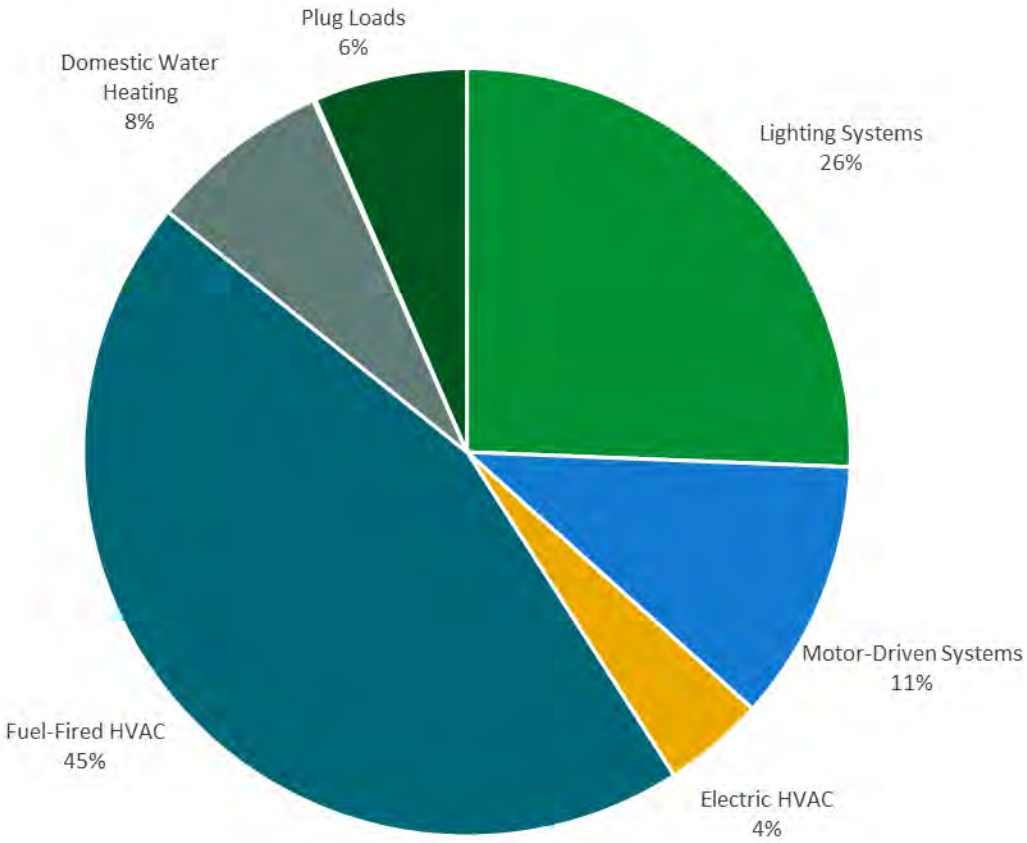
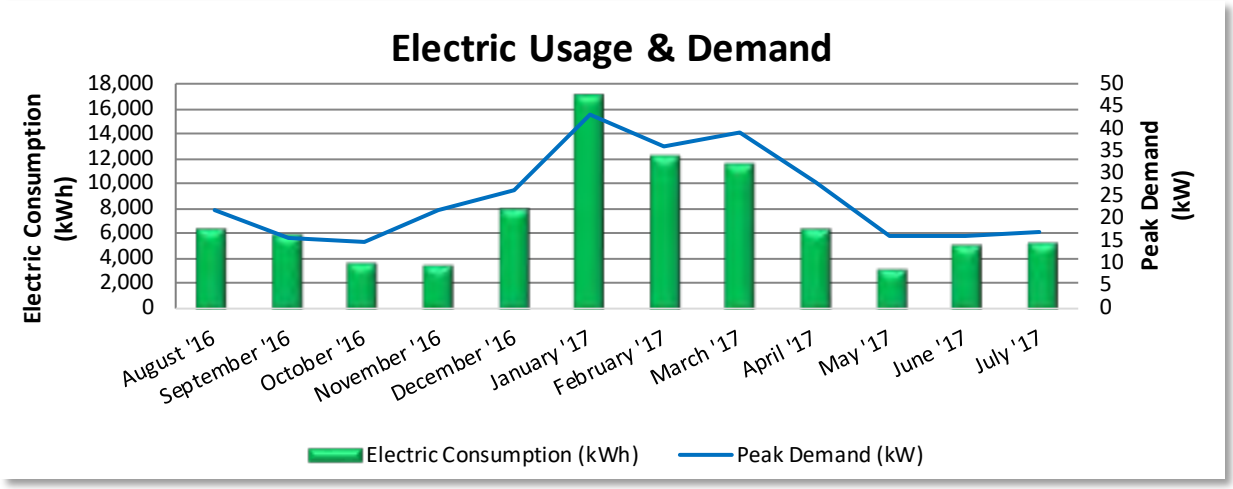


Figure 5 - Energy Balance

3.1 Electricity

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



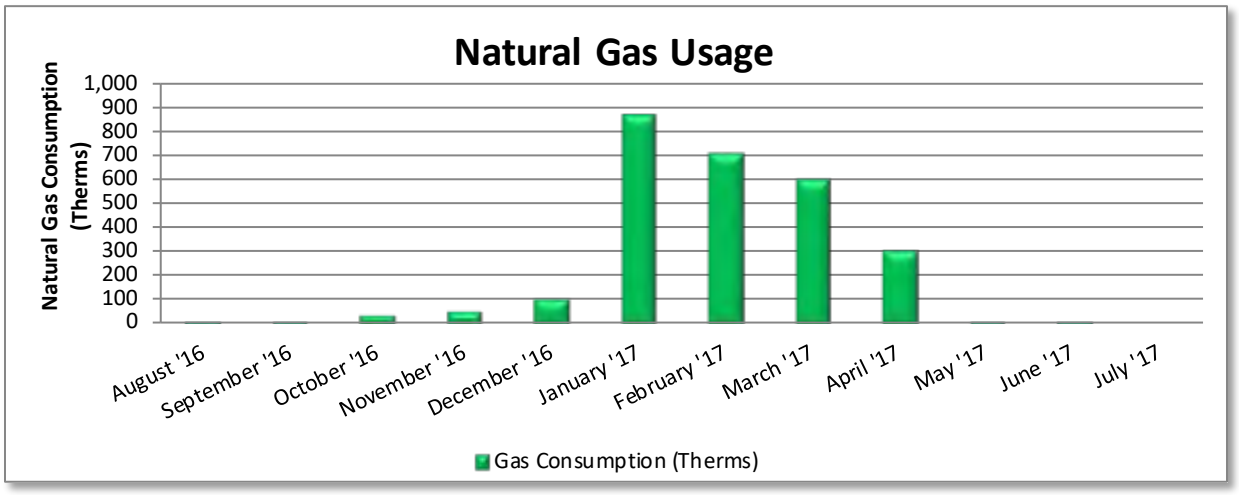
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
8/18/16	29	6,492	22	$37	$1,265
9/19/16	31	5,859	16	$31	$1,135
10/19/16	29	3,738	15	$25	$749
11/17/16	26	3,474	22	$56	$783
12/17/16	28	8,083	26	$40	$1,521
1/18/17	34	17,053	43	$78	$3,083
2/17/17	27	12,195	36	$53	$2,225
3/17/17	29	11,511	39	$61	$2,131
4/19/17	32	6,417	28	$48	$1,257
5/17/17	27	3,268	16	$23	$668
6/20/17	33	5,151	16	$32	$984
7/18/17	27	5,315	17	$30	$990
Totals	**352**	**88,556**	**43**	**$513**	**$16,791**
Annual	**365**	**91,827**	**43**	**$532**	**$17,411**

Notes:

- Peak demand of 43 kW occurred in January 2017.
- The average electric cost over the past 12 months was $0.190/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges. This report uses this blended rate to estimate energy cost savings.

3.2 Natural Gas

South Jersey Gas delivers natural gas under rate class General Service FT, with natural gas supply provided by Woodruff Energy, a third-party supplier.



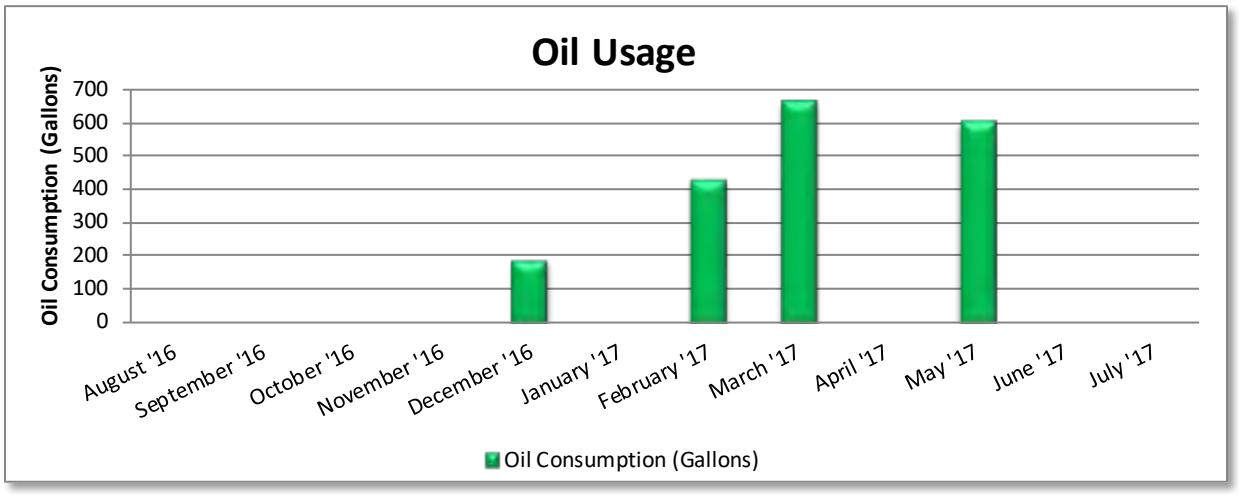
Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
8/18/16	29	1	$59
9/19/16	31	3	$66
10/19/16	29	37	$102
11/17/16	26	53	$116
12/17/16	28	101	$179
1/18/17	34	866	$1,035
2/17/17	27	703	$832
3/17/17	29	595	$716
4/19/17	32	302	$398
5/17/17	27	4	$57
6/20/17	33	1	$67
7/18/17	27	0	$54
Totals	**352**	**2,666**	**$3,682**
Annual	**365**	**2,765**	**$3,818**

Notes:

- The average gas cost for the past 12 months is $1.381/therm, which is the blended rate used throughout the analysis.

3.3 No. 2 Fuel Oil

Riggins Oil Co. Inc. delivers No. 2 Fuel Oil to the project site. Monthly "usage" corresponds to deliveries as opposed to actual usage.



No. 2 Fuel Oil Billing Data			
Period Ending	**Days in Period**	**Oil Usage (Gallons)**	**Fuel Cost**
8/18/16	29	0	$0
9/19/16	31	0	$0
10/19/16	29	0	$0
11/17/16	26	0	$0
12/17/16	28	188	$308
1/18/17	34	0	$0
2/17/17	27	424	$762
3/17/17	29	665	$1,321
4/19/17	32	0	$0
5/17/17	27	600	$1,151
6/20/17	33	0	$0
7/18/17	27	0	$0
Totals	**352**	**1,877**	**$3,542**
Annual	**365**	**1,946**	**$3,672**

Notes:

- The average No. 2 Fuel Oil cost for the past 12 months is $1.887/Gallon, which is the blended rate used throughout the analysis.

3.4 Benchmarking

Your building was benchmarked using the United States Environmental Protection Agency's *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.

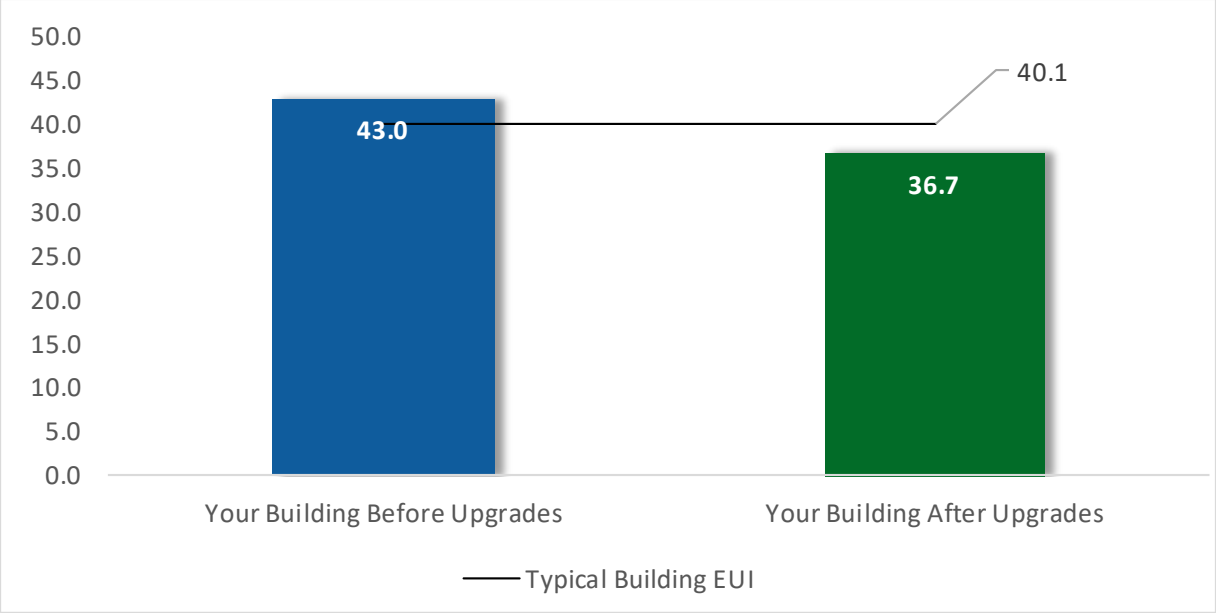


Figure 6 - Energy Use Intensity Comparison

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.

Appendix A: Equipment Inventory & Recommendations

This appendix provides a detailed list of the locations and recommended upgrades for each energy conservation measure.

#	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		**29,490**	**8.9**	**-8**	**$5,487**	**$82,311**	**$23,092**	**$3,098**	**$19,994**	**3.6**	**28,446**
ECM 1	Install LED Fixtures	14,812	3.2	-2	$2,786	$41,796	$16,484	$1,800	$14,684	5.3	14,651
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	4,867	1.9	-2	$895	$13,418	$3,266	$503	$2,763	3.1	4,562
ECM 3	Retrofit Fixtures with LED Lamps	9,811	3.8	-4	$1,806	$27,097	$3,343	$795	$2,548	1.4	9,233
Lighting Control Measures		**1,241**	**0.5**	**-1**	**$228**	**$1,825**	**$4,050**	**$490**	**$3,560**	**15.6**	**1,163**
	Install Occupancy Sensor Lighting Controls	1,241	0.5	-1	$228	$1,825	$4,050	$490	$3,560	15.6	1,163
Electric Unitary HVAC Measures		**1,840**	**1.3**	**0**	**$349**	**$5,233**	**$8,166**	**$0**	**$8,166**	**23.4**	**1,853**
	Install High Efficiency Air Conditioning Units	1,840	1.3	0	$349	$5,233	$8,166	$0	$8,166	23.4	1,853
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**26**	**$354**	**$7,084**	**$6,185**	**$800**	**$5,385**	**15.2**	**4,256**
ECM 4	Install High Efficiency Furnaces	0	0.0	26	$354	$7,084	$6,185	$800	$5,385	15.2	4,256
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$371**	**$1,853**	**$460**	**$0**	**$460**	**1.2**	**1,968**
ECM 5	Vending Machine Control	1,954	0.2	0	$371	$1,853	$460	$0	$460	1.2	1,968
TOTALS		**34,526**	**10.9**	**18**	**$6,789**	**$98,306**	**$41,953**	**$4,388**	**$37,565**	**5.5**	**37,686**

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

** - 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 ($)	Lifetime Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**29,490**	**8.9**	**-8**	**$5,487**	**$82,311**	**$23,092**	**$3,098**	**$19,994**	**3.6**	**28,446**
ECM 1	Install LED Fixtures	14,812	3.2	-2	$2,786	$41,796	$16,484	$1,800	$14,684	5.3	14,651
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	4,867	1.9	-2	$895	$13,418	$3,266	$503	$2,763	3.1	4,562
ECM 3	Retrofit Fixtures with LED Lamps	9,811	3.8	-4	$1,806	$27,097	$3,343	$795	$2,548	1.4	9,233
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**26**	**$354**	**$7,084**	**$6,185**	**$800**	**$5,385**	**15.2**	**4,256**
ECM 4	Install High Efficiency Furnaces	0	0.0	26	$354	$7,084	$6,185	$800	$5,385	15.2	4,256
Food Service & Refrigeration Measures		**1,954**	**0.2**	**0**	**$371**	**$1,853**	**$460**	**$0**	**$460**	**1.2**	**1,968**
ECM 5	Vending Machine Control	1,954	0.2	0	$371	$1,853	$460	$0	$460	1.2	1,968
TOTALS		**34,526**	**10.9**	**18**	**$6,789**	**$98,306**	**$41,953**	**$4,388**	**$37,565**	**5.5**	**37,686**

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

** - 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		**29,490**	**8.9**	**-8**	**$5,487**	**$23,092**	**$3,098**	**$19,994**	**3.6**	**28,446**
ECM 1	Install LED Fixtures	14,812	3.2	-2	$2,786	$16,484	$1,800	$14,684	5.3	14,651
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	4,867	1.9	-2	$895	$3,266	$503	$2,763	3.1	4,562
ECM 3	Retrofit Fixtures with LED Lamps	9,811	3.8	-4	$1,806	$3,343	$795	$2,548	1.4	9,233

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: site pole lights, building exterior wall packs, and salt barn interior.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent fixtures by removing the 8-foot T12 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: garage bays, parts rooms, wash room, sign shop, and wood shop.

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent, or incandescent lamps with LED lamps. Many LED tubes are direct replacements for existing fluorescent tubes and can be installed while leaving the fluorescent fixture ballast in place. LED lamps can be used in existing fixtures as a direct replacement for most other lighting technologies.

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: general, including garage bays, parts rooms, restrooms, wash room, offices, storage rooms, sign shop, wood shop, and lunch trailer.

4.2 Lighting Controls

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.

#	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		**1,241**	**0.5**	**-1**	**$228**	**$4,050**	**$490**	**$3,560**	**15.6**	**1,163**
	Install Occupancy Sensor Lighting Controls	1,241	0.5	-1	$228	$4,050	$490	$3,560	15.6	1,163

Install Occupancy Sensor Lighting Controls

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

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

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

This measure provides energy savings by reducing the lighting operating hours. However, the projected payback period exceeds the expected life of the add-on equipment.

Affected building areas: parts rooms, restrooms, offices, storage rooms, sign shop, wood shop, and lunch trailer.

4.3 Electric Unitary HVAC

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

#	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 Unitary HVAC Measures		**1,840**	**1.3**	**0**	**$349**	**$8,166**	**$0**	**$8,166**	**23.4**	**1,853**
	Install High Efficiency Air Conditioning Units	1,840	1.3	0	$349	$8,166	$0	$8,166	23.4	1,853

Install High Efficiency Air Conditioning Units

We evaluated replacing the standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours. In this case, the projected payback period exceeds the expected life of the replacement equipment.

4.4 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**	**26**	**$354**	**$6,185**	**$800**	**$5,385**	**15.2**	**4,256**
ECM 4	Install High Efficiency Furnaces	0	0.0	26	$354	$6,185	$800	$5,385	15.2	4,256

ECM 4: Install High Efficiency Furnaces

Replace standard efficiency furnaces with condensing furnaces. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

Note: The recommended replacement units produce acidic condensate that require proper drainage.

4.5 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**	**$371**	**$460**	**$0**	**$460**	**1.2**	**1,968**
ECM 5	Vending Machine Control	1,954	0.2	0	$371	$460	$0	$460	1.2	1,968

ECM 5: 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 also 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.

Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment.

Doors and Windows

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

Window Treatments/Coverings

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

Lighting Maintenance

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

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

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

Lighting Controls

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

Fans to Reduce Cooling Load

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

Thermostat Schedules and Temperature Resets

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

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.

Furnace Maintenance

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

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 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.

[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

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.

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 reduction, 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 a **low** potential for installing a PV array.

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

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

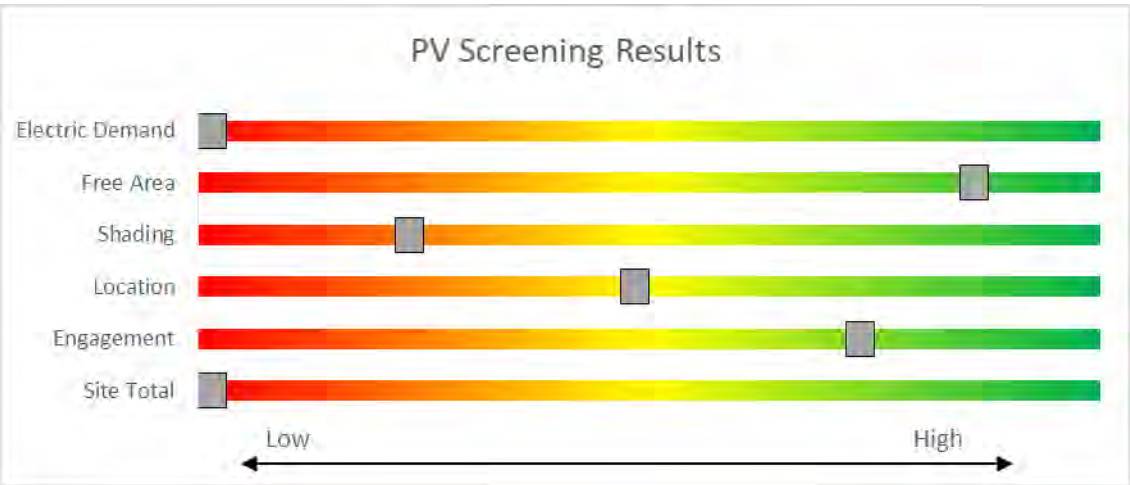


Figure 9 - Photovoltaic Screening

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.

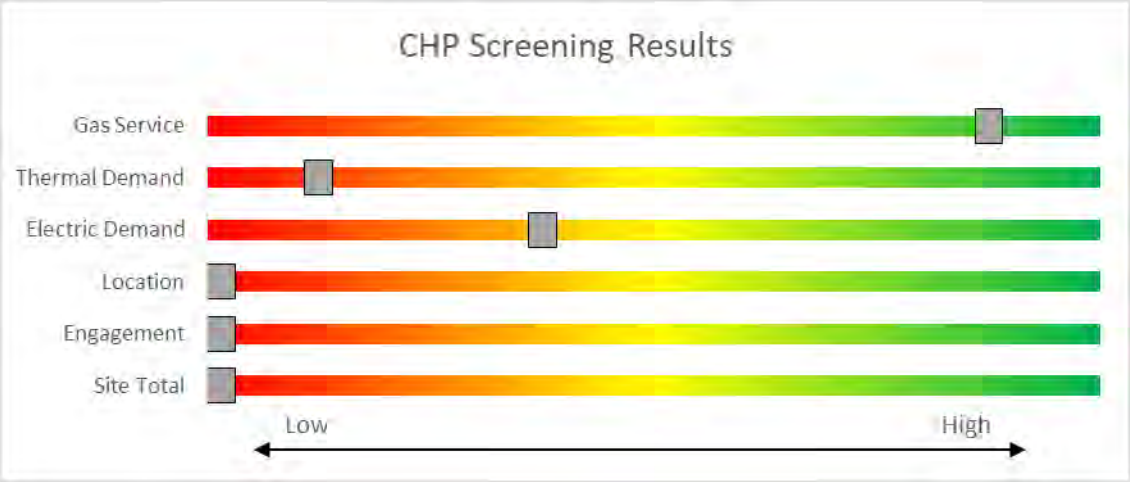


Figure 10 - Combined Heat and Power Screening

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 in 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.

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
Main Building Bay Area	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	30	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.9	2,224	-1	$409	$1,095	$300	1.9
Main Building Bay Area	2	Linear Fluorescent - T12: 8' T12 (75W) - 4L	Wall Switch	S	316	2,080	2	Relamp & Reballast	No	2	LED - Linear Tubes: (4) 8' Lamps	Wall Switch	144	2,080	0.3	773	0	$142	$515	$80	3.1
Parts Room 1	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, NR	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.2	487	0	$89	$527	$75	5.1
Parts Room 1	1	Linear Fluorescent - T12: 8' T12 (75W) - 4L	Wall Switch	S	316	2,080	2, NR	Relamp & Reballast	Yes	1	LED - Linear Tubes: (4) 8' Lamps	Occupancy Sensor	144	1,435	0.2	487	0	$89	$527	$75	5.1
Parts Room 1	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, NR	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	283	0	$52	$380	$65	6.0
Parts Room 1	1	Exit Signs: LED - 2 W Lamp	None	S	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
Parts Room 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	189	0	$35	$343	$55	8.3
Parts Room 2	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, NR	Relamp & Reballast	Yes	1	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.1	243	0	$45	$399	$55	7.7
Wash Room	1	Linear Fluorescent - T12: 2' T12 (20W) - 1L	Wall Switch	S	25	2,080	2	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,080	0.0	37	0	$7	$49	$3	6.7
Restroom	1	Incandescent: Screw-In: (60W) - 2L	Wall Switch	S	120	2,080	3, NR	Relamp	Yes	1	LED Screw-In Lamps: LED Screw-In: (9W) - 2L	Occupancy Sensor	9	1,435	0.1	256	0	$47	$304	$2	6.4
Shop Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, NR	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	377	0	$69	$416	$75	4.9
Shop Office	9	Incandescent: Screw-In: (75W) - 1L	Wall Switch	S	75	2,080	3, NR	Relamp	Yes	9	LED Screw-In Lamps: LED Screw-In: (75W) - 1L	Occupancy Sensor	11	1,435	0.5	1,359	-1	$250	$425	$44	1.5
2nd Floor Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, NR	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.1	189	0	$35	$343	$55	8.3
Admin Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	2,080	3, NR	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,435	0.3	665	0	$122	$562	$115	3.7
Admin Office	8	Incandescent: Screw-In: (75W) - 1L	Wall Switch	S	75	2,080	3, NR	Relamp	Yes	8	LED Screw-In Lamps: LED Screw-In: (75W) - 1L	Occupancy Sensor	11	1,435	0.5	1,208	-1	$222	$408	$43	1.6
Admin Office	2	Exit Signs: LED - 2 W Lamp	None	S	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
Admin Office	7	Incandescent: Screw-In: (75W) - 1L	Wall Switch	S	75	2,080	3, NR	Relamp	Yes	7	LED Screw-In Lamps: LED Screw-In: (75W) - 1L	Occupancy Sensor	11	1,435	0.4	1,057	0	$194	$391	$42	1.8
Water Heater Area	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	S	22	2,080	3	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Wall Switch	9	2,080	0.0	30	0	$6	$16	$3	2.4
Restroom 2	1	Compact Fluorescent: Screw-In: (13W) - 1L	Wall Switch	S	13	2,080	3	Relamp	No	1	LED Screw-In Lamps: LED Screw-In: (9W) - 1L	Wall Switch	9	2,080	0.0	9	0	$2	$17	$1	9.8
Restroom 2	1	Compact Fluorescent: Plug-In: (18W) - 2L	Wall Switch	S	18	2,080	3	Relamp	No	1	LED Screw-In Lamps: LED Screw-In: (13W) - 1L	Wall Switch	13	2,080	0.0	11	0	$2	$17	$1	7.9
Building 2 Bay Area 1	8	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2	Relamp & Reballast	No	8	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	2,080	0.6	1,546	-1	$284	$1,030	$160	3.1
Building 2 Bay Area 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	148	0	$27	$73	$20	1.9
Building 2 Bay Area 1	1	Exit Signs: LED - 2 W Lamp	None	S	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
Building 2 Bay Area 2	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	12	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.4	890	0	$164	$438	$120	1.9
Building 2 Bay Area 3	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.1	297	0	$55	$146	$40	1.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Lunch Trailer	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3, NR	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,435	0.3	755	0	$139	$562	$115	3.2
Lunch Trailer	2	Exit Signs: LED - 2 W Lamp	None	S	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
Sign Shop	3	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, NR	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.3	730	0	$134	$656	$95	4.2
Sign Shop	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,080	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,080	0.0	74	0	$14	$37	$10	1.9
Sign Shop	1	Exit Signs: LED - 2 W Lamp	None	S	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
Building 3	3	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	2,080	0.2	580	0	$107	$386	$60	3.1
Building 3 Woodshop	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	2,080	2, NR	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,435	0.2	487	0	$89	$527	$75	5.1
Salt Barn	5	Metal Halide: (1) 400W Lamp	Wall Switch	S	458	2,080	1	Fixture Replacement	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	120	2,080	1.5	3,796	-2	$698	$4,830	$500	6.2
Salt Barn	2	Exit Signs: LED - 2 W Lamp	None	S	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
Site Lighting	7	Metal Halide: (1) 250W Lamp	Photocell	S	295	4,380	1	Fixture Replacement	No	7	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Photocell	75	4,380	1.0	6,745	0	$1,279	$6,514	$700	4.5
Pump Station	6	Metal Halide: (1) 175W Lamp	Timeclock	S	215	4,380	1	Fixture Replacement	No	6	LED - Fixtures: Fuel Pump Canopy	Timeclock	53	4,380	0.6	4,271	0	$810	$5,140	$600	5.6
Main Garage	5	Metal Halide: (1) 100W Lamp	Timeclock	S	128	2,190		None	No	5	Metal Halide: (1) 100W Lamp	Timeclock	128	2,190	0.0	0	0	$0	$0	$0	0.0
Main Office Building	4	Halogen Incandescent: Screw-In: (75W) - 1L	Wall Switch	S	75	2,080	3	Relamp	No	4	LED Screw-In Lamps: LED Screw-In: (75W) - 1L	Wall Switch	11	2,080	0.2	530	0	$101	$69	$4	0.6

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
Tool Room	Shop/Furnace	2	Supply Fan	1.0	82.5%	No	W	2,745		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Tool Room	Shop/Furnace	1	Air Compressor	0.5	78.2%	No	W	6,978		No	78.2%	No		0.0	0	0	$0	$0	$0	0.0
Garage	Lift	1	Process Pump	2.0	84.0%	No	W	2,745		No	84.0%	No		0.0	0	0	$0	$0	$0	0.0
Garage/PoleBarn	Fume exhaust	2	Exhaust Fan	0.8	81.1%	No	W	2,745		No	81.1%	No		0.0	0	0	$0	$0	$0	0.0
Garage	Drill Press	1	Other	0.8	81.1%	No	W	2,745		No	81.1%	No		0.0	0	0	$0	$0	$0	0.0
Garage/Offices	Warm Air Unit Heater	2	Supply Fan	0.3	69.5%	No	W	2,745		No	69.5%	No		0.0	0	0	$0	$0	$0	0.0
Roof	Exhaust	2	Exhaust Fan	1.0	82.5%	No	W	2,745		No	82.5%	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
Whole Site	Offices	5	Window AC	1.50		W	NR	Yes	5	Window AC	1.50		12.00		1.3	1,840	0	$349	$8,166	$0	23.4

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)	Heating Efficiency	Heating Efficiency Units	Manufacturer	Model	Remaining Useful Life	Existing Heating Lookup Table	Annual Heating EFLH	Total kW	Total Annual kWh	Total Annual MMBtu	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
Parts Room 1	Main Building Office	1	Furnace	250.00	84.00%	AFUE	York		B	FuelHeating_F	681	0.00	0	202.7	4	Yes	1	Furnace	250.00	95.00%	AFUE	0.0	0	23	$320	$5,664	$400	16.5
Parts Room 2	Main Building Bay Areas	1	Furnace	23.00	82.30%	AFUE	Armstrong		B	FuelHeating_F	681	0.00	0	19.0	4	Yes	1	Furnace	23.00	95.00%	AFUE	0.0	0	3	$35	$521	$400	3.5
Building 2 Bay Area 2	Bay Area 2	1	Warm Air Unit Heater	26.00	84.00%	Et	Reznor		W	FuelHeating_WAUH	681	0.00	0	21.1		No						0.0	0	0	$0	$0	$0	0.0
Building 3 Bay Area	Bay Area	1	Warm Air Unit Heater	24.60	82.50%	Et	Reznor	V3 Series	W	FuelHeating_WAUH	681	0.00	0	20.3		No						0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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
Office Area	Office Area	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Wash Bay Storage	Wash Bay	1	Storage Tank Water Heater (> 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Conditions		Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	ECM #	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Garage	1	Ice Making Head (<450 lbs/day), Batch	Yes		No	0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Whole Site	4	Desktop Computers	150.0	Yes
Whole Site	5	Desk Printers	45.0	Yes
Whole Site	1	Mini Fridge	152.0	Yes
Whole Site	2	Water Cooler	500.0	Yes
Whole Site	1	CRT TV	60.0	Yes
Whole Site	1	Refrigerator	173.0	Yes
Whole Site	1	Microwave Oven	1,000.0	Yes
Whole Site	1	Misc. Tools/Equipment	10,000.0	No
Sign Shop	1	Sign Maker	15,000.0	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
Lunch Trailer	1	Refrigerated	5	Yes	0.2	1,612	0	$306	$230	$0	0.8
Lunch Trailer	1	Non-Refrigerated	5	Yes	0.0	343	0	$65	$230	$0	3.5

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.

LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Salem County Public Works

Primary Property Type: Repair Services (Vehicle, Shoe, Locksmith, etc.)
Gross Floor Area (ft²): 20,008
Built: 1959

For Year Ending: June 30, 2017
Date Generated: December 17, 2018

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
Salem County Public Works 153 Cemetery Road Pilesgrove, New Jersey 08079	County of Salem 110 Fifth Street, Suite 400 Salem, NJ 08079 856-935-7510	Debby Turner 110 Fifth Street, Suite 400 Salem, NJ 08079 856-935-7510 Ext. 8601 Debby.Turner-Fox@salemcountynj.gov

Property ID: 6667562

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
45.3 kBtu/ft²

Source EUI
74.1 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	311,086 (34%)
Fuel Oil (No. 2) (kBtu)	327,957 (36%)
Natural Gas (kBtu)	266,863 (30%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	59.2
National Median Source EUI (kBtu/ft²)	96.9
% Diff from National Median Source EUI	-24%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	70

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.