Local Government Energy Audit Report

Water Plants and Pump Station

September 16, 2019

Prepared for:

Long Beach Township

Peahala Park, Holgate, Beach Haven Terrace and North Beach, NJ 08008

Prepared by:

TRC

900 Route 9 North

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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 Companies Inc. (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.

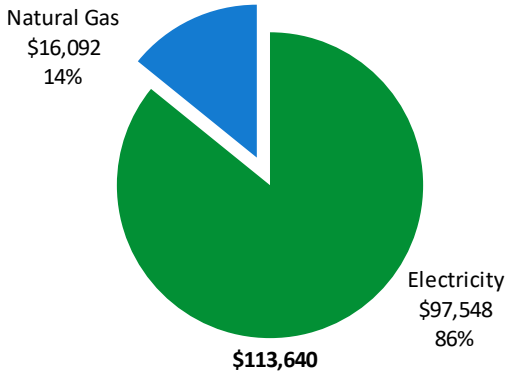
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Water Plants and Pump 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 Companies Inc. (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: $113,640 Electricity: 545,074 kWh Natural Gas: 14,577 Therms	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for these facility types. This report contains suggestions about how to improve building performance and reduce energy costs.

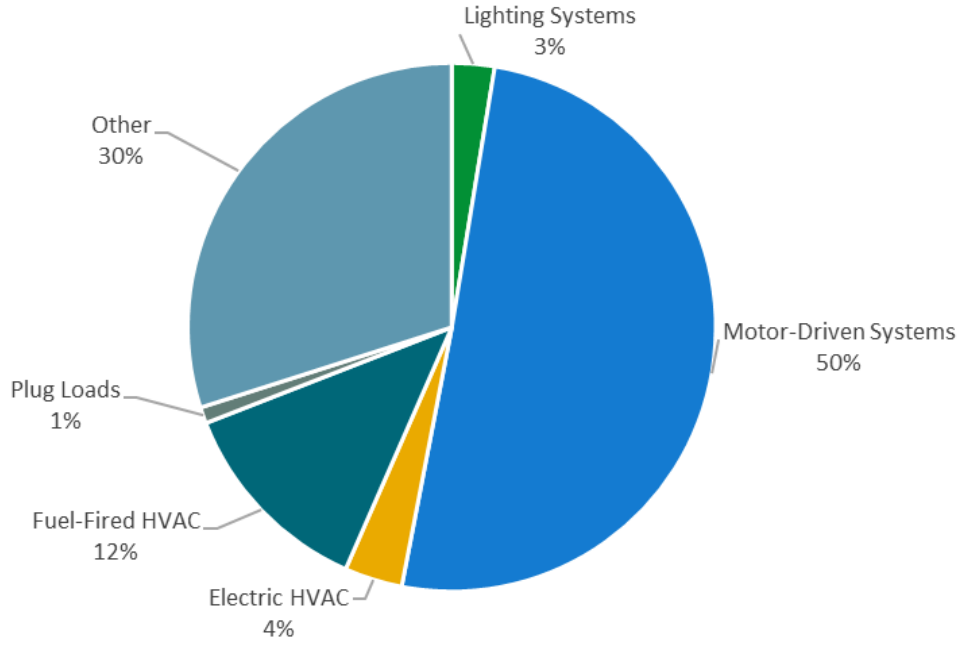


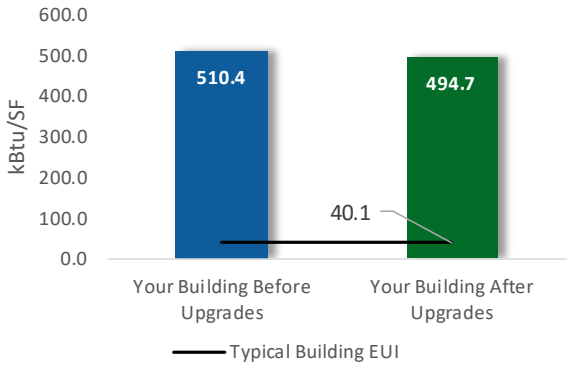
Figure 1 - Energy Use by System

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.

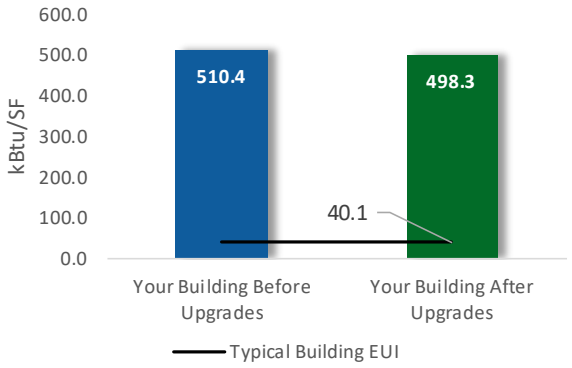
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$42,443
Potential Rebates & Incentives[1]	$3,998
Annual Cost Savings	$3,862
Annual Energy Savings	Electricity: 19,385 kWh Natural Gas: 356 Therms
Greenhouse Gas Emission Savings	12 Tons
Simple Payback	10.0 Years
Site Energy Savings (all utilities)	3%



Scenario 2: Cost Effective Package[2]

Installation Cost	$23,232
Potential Rebates & Incentives	$3,698
Annual Cost Savings	$2,637
Annual Energy Savings	Electricity: 12,525 kWh Natural Gas: 358 Therms
Greenhouse Gas Emission Savings	8 Tons
Simple Payback	7.4 Years
Site Energy Savings (all utilities)	2%



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		**12,386**	**5.3**	**-2**	**$2,198**	**$32,977**	**$20,161**	**$3,698**	**$16,463**	**7.5**	**12,280**
ECM 1	Install LED Fixtures	5,764	1.7	0	$1,030	$15,452	$13,650	$2,200	$11,450	11.1	5,789
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,571	0.7	0	$277	$4,157	$1,837	$280	$1,557	5.6	1,540
ECM 3	Retrofit Fixtures with LED Lamps	5,051	3.0	-1	$891	$13,367	$4,674	$1,218	$3,456	3.9	4,951
Lighting Control Measures		**874**	**0.4**	**0**	**$154**	**$1,234**	**$2,508**	**$300**	**$2,208**	**14.3**	**857**
ECM 4	Install Occupancy Sensor Lighting Controls	874	0.4	0	$154	$1,234	$2,508	$300	$2,208	14.3	857
Motor Upgrades		**5,986**	**3.3**	**0**	**$1,071**	**$16,069**	**$16,703**	**$0**	**$16,703**	**15.6**	**6,028**
ECM 5	Premium Efficiency Motors	5,986	3.3	0	$1,071	$16,069	$16,703	$0	$16,703	15.6	6,028
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**36**	**$403**	**$6,041**	**$3,049**	**$0**	**$3,049**	**7.6**	**4,272**
ECM 6	Install High Efficiency Unit Heaters	0	0.0	36	$403	$6,041	$3,049	$0	$3,049	7.6	4,272
Domestic Water Heating Upgrade		**139**	**0.0**	**1**	**$35**	**$354**	**$22**	**$0**	**$22**	**0.6**	**251**
ECM 7	Install Low-Flow DHW Devices	139	0.0	1	$35	$354	$22	$0	$22	0.6	251
TOTALS (COST EFFECTIVE MEASURES)		**12,525**	**5.3**	**36**	**$2,637**	**$39,371**	**$23,232**	**$3,698**	**$19,534**	**7.4**	**16,802**
TOTALS (ALL MEASURES)		**19,385**	**9.0**	**36**	**$3,862**	**$56,674**	**$42,443**	**$3,998**	**$38,445**	**10.0**	**23,687**

* - 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	Premium Efficiency Motors			
ECM 6	Install High Efficiency Unit Heaters		X	
ECM 7	Install Low-Flow Domestic Hot Water Devices		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 Water Plants and Pump 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 22, 2019, TRC performed an energy audit at Water Plants and a Pump Station located in Peahala Park, Holgate, Beach Haven Terrace and North Beach, New Jersey. TRC met with Angela Andersen to review the facility operations and help focus our investigation on specific energy-using systems.

The Long Beach Township Water Plants and Pump Station report combines analysis of three water plants and a pump station totaling 6,500 square feet, located in four different areas. Spaces include: offices, a break room, well rooms, water filtration areas, pump rooms, generator rooms, lime and chlorine rooms, restrooms and storage rooms. Recent improvements include the complete renovation of Terrace Water Plant.

2.2 Building Occupancy

The facilities operate 24 hours a day, seven days a week, year-round. Equipment operation varies based on the demand for water.

The Terrace Water Plant houses an office building that operates from Monday to Friday. The other facilities are mostly unoccupied, with short visits from the municipal utilities staff to record pump hours and perform maintenance.

Based on observations and conversations with facility staff, lighting systems are assumed to operate 10% – 15% of the time in the non-office areas. The typical schedule is presented in the table below.

Building Name	Weekday/Weekend	Operating Schedule
Terrace Water Plant	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
Holgate Water Plant	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
Peahala Water Plant	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
North Pump Station	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM

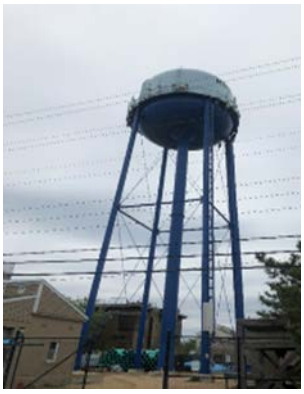
Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Holgate Water Plant

Holgate Water Plant is comprised of two buildings and an elevated water tower. Building walls are concrete block over structural wood. The roofs are pitched and covered with asphalt shingles. The windows are single glass with aluminum frames. Exterior doors are made of metal and appear in fair condition.

Generator-Chlorine & Well Buildings



Column Supported Elevated Water Tower

Terrace Water Plant

Terrace Water Plant is comprised of a two-story office building; a two-story water filtration building; two, single-story well buildings; and a 300,000-gallon water tower.

Building walls are concrete block over structural steel with a vinyl siding. The roofs are pitched and covered with asphalt shingles. The windows are a combination of single and double glass with aluminum frames. The glass-to-frame seals are in good condition. Exterior doors consist of metal frames entrance doors and garage roll up doors.

The water tower is an elevated structure supporting the 300,000-gallon water tank constructed at a height sufficient to pressurize a water supply system for the distribution of potable water.

Office and Filtration Buildings

Well Building

Well Building

Peahala Water Plant

The Peahala Water Plant is comprised of a water plant, a small transportation office building, and an elevated water tower with a 300,000-gallon storage tank.

Building walls are concrete block over structural steel with a vinyl siding. The roofs are pitched and covered with asphalt shingles. The windows are a combination of single and double glass with aluminum frames. The glass-to-frame seals are in good condition. Exterior doors are made of metal frames.

The water tower is an elevated structure supporting the 300,000-gallon water tank constructed at a height sufficient to pressurize a water supply system for the distribution of potable water.

Water Plant

Transportation Building

Elevated Water Tower

North Pump Station

The North Pump Station is comprised of two small buildings with walls made of concrete masonry units (CMUs). The roofs are pitched covered with asphalt shingles that are in good condition. Exterior doors are made of metal frames.

North Pump Station Building

2.4 Lighting Systems

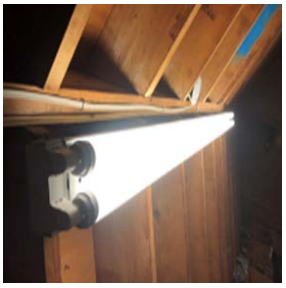
The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. There are also several 4-foot and 8-foot long T12 fixtures. Additionally, there are some LED and compact fluorescent lamps (CFLs). The filtration building at Terrace Water plant has two, 400-Watt metal halide fixtures. The 8-foot long T12 lamps are found in the attic and garage of the Terrace Water Plant office building, while the 40-Watt 4-foot long T12 lamps are used in the generator room of the North Pump Station building. The transportation building at Peahala uses LED panel fixtures. Exit signs are all LED. Interior lights are controlled with wall mounted switches. Most fixtures are in good condition and interior lighting levels were generally sufficient.

Exterior fixtures include wall mounted LED (Terrace Water Plant), 100-Watt high pressure sodium (HPS) (Holgate Water Plant), 150-Watt metal halide and LED (Peahala Water Plant and Transportation Building), CFLs, and 70-Watt HPS (North Pump Station). Exterior light control system in water plants and the pump station has been changed from photocells to manual wall switches. Exterior lights at Transportation building are controlled with photocells.

Typical 4-Foot Long T8

Typical 4-Foot Long T12

Exit Sign



8-Foot Long T12

LED Panel

Interior High Bay LED Fixtures

1Typical Wall Mounted Metal Halide

2Typical Wall Mounted Metal Halide

HPS Fixture

LED Fixture

2.5 Heating and Cooling Systems

The primary heating system for all facilities consists of gas fired Reznor and Dayton warm air unit heaters ranging in capacity from 24.8 MBh to 40 MBh with combustion efficiencies of 81% or 82%. They appear in good condition except two units serving the Peahala Water Plant which appear in fair condition. Additionally, there are several electrical resistance heaters in smaller spaces. The heating system is controlled with local thermostats. The unit heaters appear to operate throughout the winter for freeze protection.

The office and the break room at Terrace Water Plant are cooled with a 1-ton window air conditioner (AC) and a 5-ton Carrier split system AC, respectively. The transportation building at Peahala Water Plant uses a ductless mini-split heat pump. This 13 EER unit has a heating capacity of 36.4 MBh and 3-ton cooling capacity. The split system ACs are controlled with programmable thermostats and are in good condition.

Typical Gas Fired Warm Air Unit Heaters

Typical Electric Heaters

Thermostat

Window AC

Split AC

Split Heat Pump

2.6 Motors, Pumps and Wells

Terrace Water Plant

Terrace Water Plant is a brand-new water plant with a design flow rate of 2.1 million gallon a day (Mgd) and an average influent flow rate of 1 Mgd. Equipment operation varies based on flow and water demand. The plant operation varies to match the influent flow. The plant uses drip trays and blower system. The plant is controlled with a digital Allen Bradley control system.

The second floor of the plant houses a water filtration system with three filter tanks, each connected to a 50 hp variable speed (VSD) water supply pump. Each pump has a 750 gallon per minute (gpm) design flow rate, a 250 gpm minimum flow rate, and a 600 gpm average flow rate. The pumps are new and in good condition.

There are four 0.5 hp VSD chlorine pumps located in the chlorine room. The lime room has a 3 hp mixing pump and two 0.5 hp lime pumps, all VSD controlled. The pumps are new and appear in good condition.

Well #13 contains a 40 hp VSD well pump while the Well #14 building houses a 60 hp VSD well pump. Both were recently installed as part of the plant system upgrade. Air is exhausted from the well rooms by roof mounted air exhausters that are controlled with line voltage thermostats.

Filter Tanks

Digital Control Panel

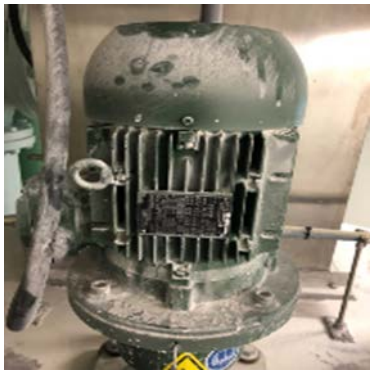
50 hp Water Pump

Variable Speed Drives (VFDs)

Chlorine Pumps

VFDs

Lime



Mixing Pumps

VFD

Well Pump #14

Well Pump #13

VFD

Water Plant Monitoring Panel

Holgate Water Plant

Holgate Water Plant has a design flow rate of 1.1 Mgd and an average influent flow rate of 0.4 Mgd. The system is comprised of two well pumps (Well #22 and #23) and two chlorine pumps. The Well #22 pump is a 60 hp constant speed pump which appears in fair condition and has been evaluated for replacement. The Well #23 pump is a 75 hp constant speed pump which was judged to be within useful life.

There two 0.5 hp constant speed chlorine pumps that are in good condition.

Well Pumps #22 & #23

Peahala Water Plant

Peahala Water Plant has a design flow rate of 1 Mgd and an average influent flow rate of 0.6 Mgd. It houses a 60 hp well pump (#1), two 0.5 hp chlorine pumps, two 0.75 lime pumps and a 0.75 hp mixing pump. All the pumps run at constant speed. The well pump appears in fair condition and has been evaluated for replacement.

Air is exhausted in the generator room by three exhaust fans. They are controlled with thermostats.

Well Pump #1 & Chlorine Pumps

Well Pump #1 & Chlorine Pumps

Lime

Mixing Pump

Mixing Pumps

North Pump Station

There are two 7.5 hp underground water supply pumps that run at a constant speed. They are not accessible, and the site contact mentioned that they are in good working condition.

Air is exhausted in the generator room and the pump room by exhaust fans that are controlled with thermostats.

Domestic Hot Water

Hot water at the Terrace Water Plant is produced with a 75 gallon, 76 MBh gas-fired storage water heater with an 82% efficiency. The Terrace Water Plant office building and the Peahala Transportation building each use a 28-gallon 4.5 kW storage water heater. The water heaters are in good condition. The remaining facilities are not served by domestic hot water.

Gas-Fired & Electric Water Heaters

2.7 Plug Load & Vending Machines

The utility bill analysis indicates that plug loads consume approximately 2% of total building energy use. This is lower than a typical building. Plug load equipment include desktop computers, copy machine, microwaves, water cooler, and dehumidifiers.

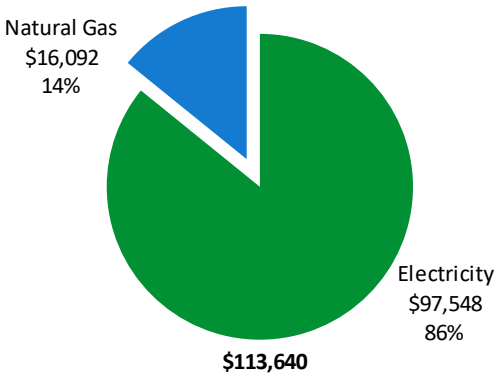
2.8 Water-Using Systems

There are two restrooms with toilets and sinks at Terrace Water Plant. Faucet flow rates are at 2.2 gallons per minute (gpm) or higher. Toilets are rated at 2.5 gallons per flush (gpf).

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	545,074 kWh	$97,548
Natural Gas	14,577 Therms	$16,092
Total		**$113,640**



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.

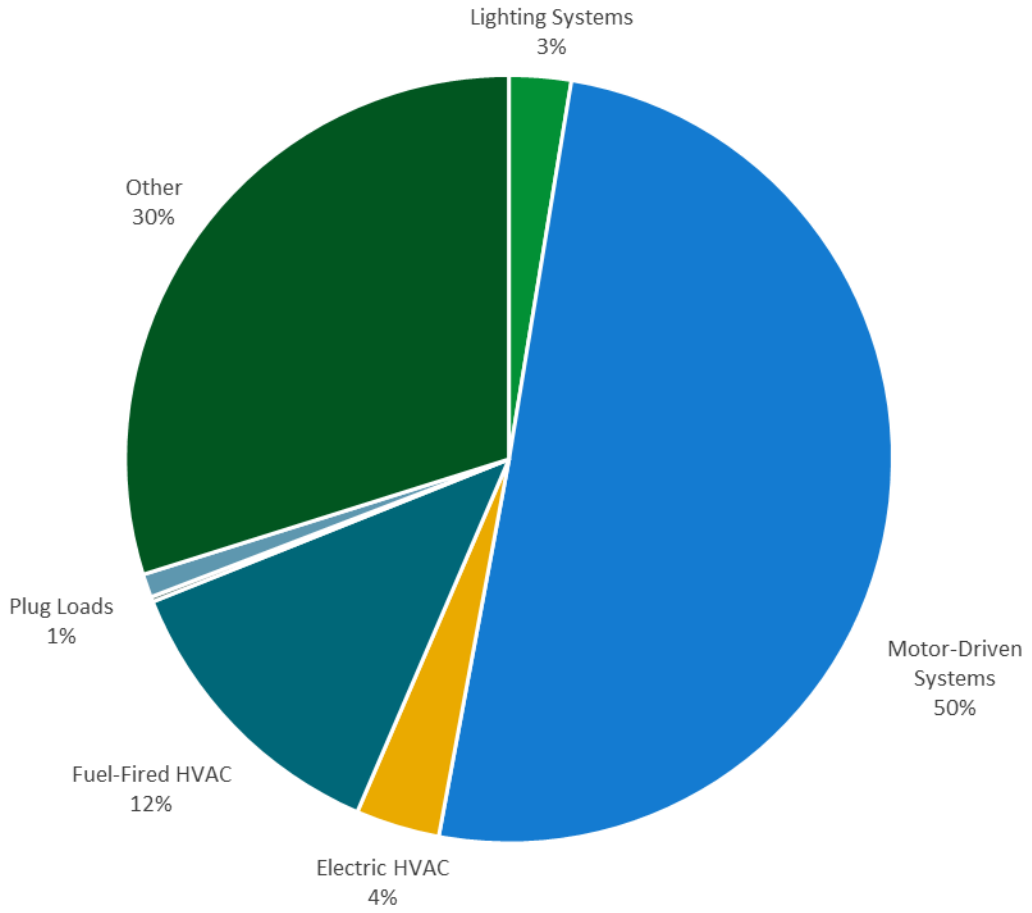
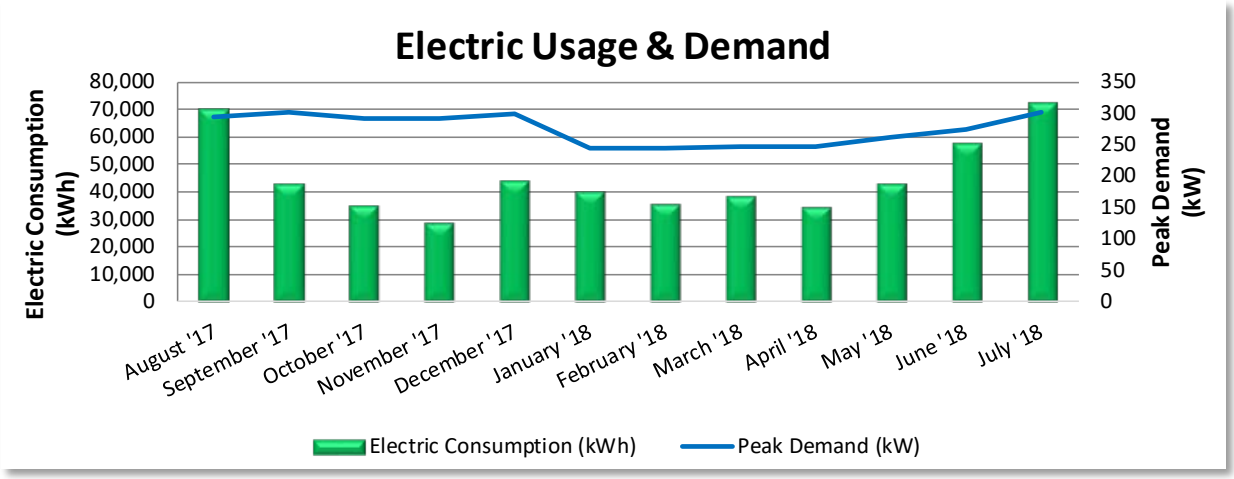


Figure 5 - Energy Balance

3.1 Electricity

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



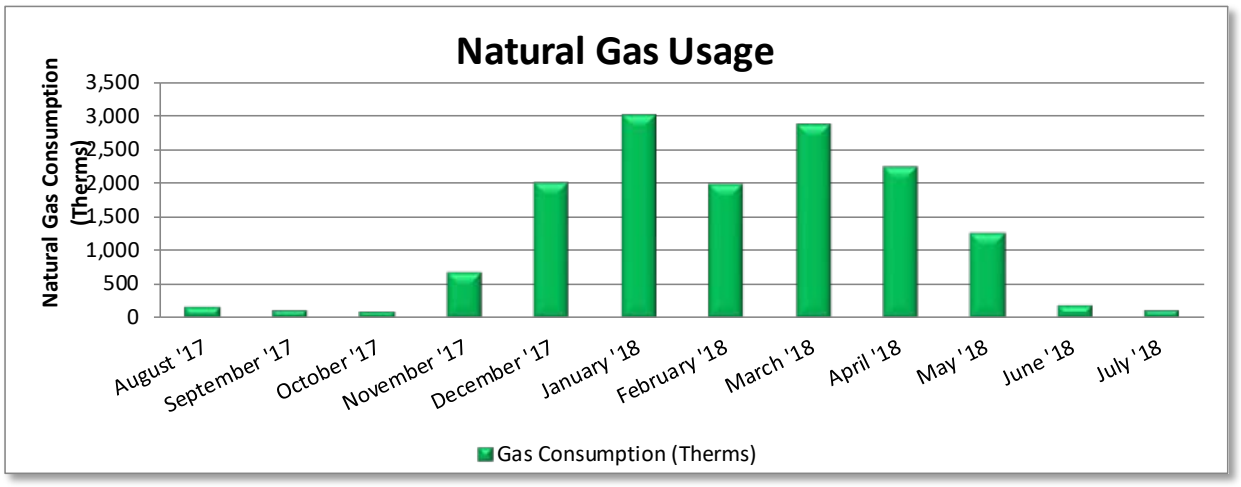
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
9/7/17	30	70,533	295	$582	$12,421
10/5/17	31	43,342	301	$443	$8,105
11/3/17	30	34,935	292	$497	$6,417
12/5/17	31	29,109	293	$534	$5,546
1/8/18	31	44,096	300	$603	$7,948
2/5/18	28	40,367	245	$403	$6,648
3/6/18	31	35,886	245	$423	$6,312
4/5/18	30	38,375	246	$439	$6,758
5/3/18	31	34,881	247	$392	$6,115
6/6/18	30	43,097	262	$290	$8,323
7/5/18	31	57,664	274	$578	$10,188
8/3/18	31	72,789	302	$630	$12,766
Totals	**365**	**545,074**	**302**	**$5,815**	**$97,548**
Annual	**365**	**545,074**	**302**	**$5,815**	**$97,548**

Notes:

- Peak demand of 302 kW occurred in July 2018.
- The average electric cost over the past 12 months was $0.179/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 under rate class FT Service, with natural gas supply provided by New Energy, a third-party supplier.



Notes:

- The average gas cost for the past 12 months is $1.104/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**N/A**

Due to their unique characteristics, these building types are not able to receive a benchmarking score. This report contains suggestions about how to improve building performance and reduce energy costs.

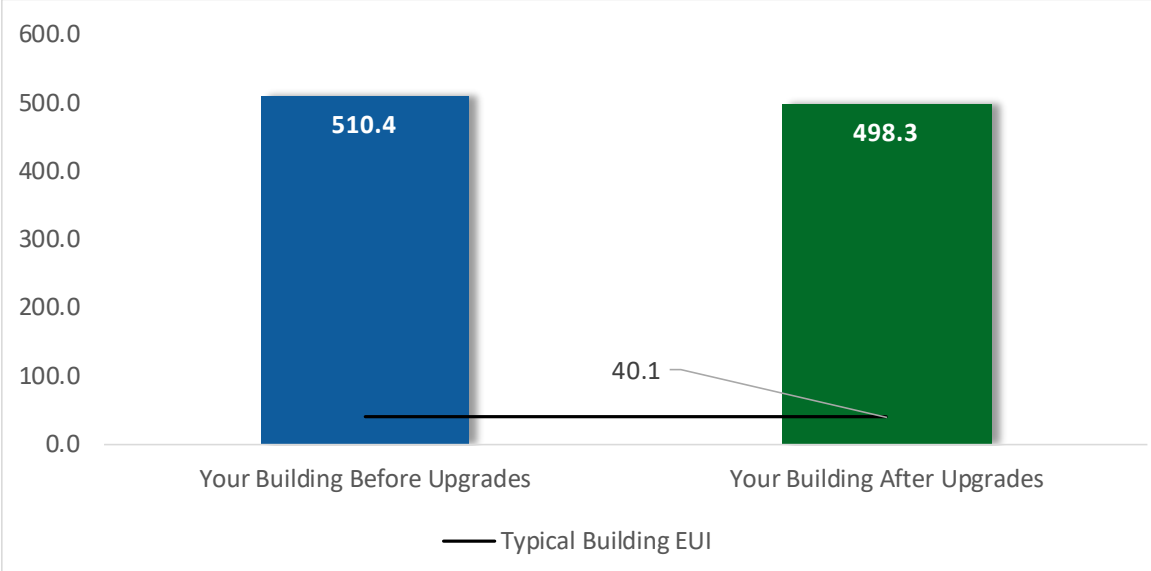


Figure 6 - Energy Use Intensity Comparison

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.

For wastewater treatment plants the EUI is the total source energy use of the property divided by the average influent flow (in gallons per day).

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		**12,386**	**5.3**	**-2**	**$2,198**	**$20,161**	**$3,698**	**$16,463**	**7.5**	**12,280**
ECM 1	Install LED Fixtures	5,764	1.7	0	$1,030	$13,650	$2,200	$11,450	11.1	5,789
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,571	0.7	0	$277	$1,837	$280	$1,557	5.6	1,540
ECM 3	Retrofit Fixtures with LED Lamps	5,051	3.0	-1	$891	$4,674	$1,218	$3,456	3.9	4,951
Lighting Control Measures		**874**	**0.4**	**0**	**$154**	**$2,508**	**$300**	**$2,208**	**14.3**	**857**
ECM 4	Install Occupancy Sensor Lighting Controls	874	0.4	0	$154	$2,508	$300	$2,208	14.3	857
Motor Upgrades		**5,986**	**3.3**	**0**	**$1,071**	**$16,703**	**$0**	**$16,703**	**15.6**	**6,028**
ECM 5	Premium Efficiency Motors	5,986	3.3	0	$1,071	$16,703	$0	$16,703	15.6	6,028
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**36**	**$403**	**$3,049**	**$0**	**$3,049**	**7.6**	**4,272**
ECM 6	Install High Efficiency Unit Heaters	0	0.0	36	$403	$3,049	$0	$3,049	7.6	4,272
Domestic Water Heating Upgrade		**139**	**0.0**	**1**	**$35**	**$22**	**$0**	**$22**	**0.6**	**251**
ECM 7	Install Low-Flow DHW Devices	139	0.0	1	$35	$22	$0	$22	0.6	251
TOTALS		**19,385**	**9.0**	**36**	**$3,862**	**$42,443**	**$3,998**	**$38,445**	**10.0**	**23,687**

* - 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		**12,386**	**5.3**	**-2**	**$2,198**	**$20,161**	**$3,698**	**$16,463**	**7.5**	**12,280**
ECM 1	Install LED Fixtures	5,764	1.7	0	$1,030	$13,650	$2,200	$11,450	11.1	5,789
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,571	0.7	0	$277	$1,837	$280	$1,557	5.6	1,540
ECM 3	Retrofit Fixtures with LED Lamps	5,051	3.0	-1	$891	$4,674	$1,218	$3,456	3.9	4,951
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**36**	**$403**	**$3,049**	**$0**	**$3,049**	**7.6**	**4,272**
ECM 6	Install High Efficiency Unit Heaters	0	0.0	36	$403	$3,049	$0	$3,049	7.6	4,272
Domestic Water Heating Upgrade		**139**	**0.0**	**1**	**$35**	**$22**	**$0**	**$22**	**0.6**	**251**
ECM 7	Install Low-Flow DHW Devices	139	0.0	1	$35	$22	$0	$22	0.6	251
TOTALS		**12,525**	**5.3**	**36**	**$2,637**	**$23,232**	**$3,698**	**$19,534**	**7.4**	**16,802**

* - 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		**12,386**	**5.3**	**-2**	**$2,198**	**$20,161**	**$3,698**	**$16,463**	**7.5**	**12,280**
ECM 1	Install LED Fixtures	5,764	1.7	0	$1,030	$13,650	$2,200	$11,450	11.1	5,789
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,571	0.7	0	$277	$1,837	$280	$1,557	5.6	1,540
ECM 3	Retrofit Fixtures with LED Lamps	5,051	3.0	-1	$891	$4,674	$1,218	$3,456	3.9	4,951

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 (high pressure sodium, metal halide) lamps with new LED light fixtures. This measure saves energy by installing LEDs, which use less power than other technologies with a comparable light output.

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

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

Affected building areas: interior –Terrace Water Plant (filtration room), exterior fixtures (various).

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Retrofit fluorescent T12 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: North Pump Station (generator room), Terrace Water Plant (attic floor and garage at the office building).

ECM 3: Retrofit Fixtures with LED Lamps

Replace fluorescent T8, incandescent and compact 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: interior and exterior fixtures.

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		**874**	**0.4**	**0**	**$154**	**$2,508**	**$300**	**$2,208**	**14.3**	**857**
ECM 4	Install Occupancy Sensor Lighting Controls	874	0.4	0	$154	$2,508	$300	$2,208	14.3	857

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 that lighting controls use dual technology sensors, which reduce the possibility of lights turning off unexpectedly.

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

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

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

Affected building areas: Peahala Water Plant(offices), Terrace Water Plant (attic floor, filtration room, break room, garage, offices).

4.3 Motors

#	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)
Motor Upgrades		**5,986**	**3.3**	**0**	**$1,071**	**$16,703**	**$0**	**$16,703**	**15.6**	**6,028**
ECM 5	Premium Efficiency Motors	5,986	3.3	0	$1,071	$16,703	$0	$16,703	15.6	6,028

ECM 5: Premium Efficiency Motors

Replace standard efficiency motors with IHP 2014 efficiency motors. This evaluation assumes that existing motors will be replaced with motors of equivalent size and type. In some cases, additional savings may be possible by downsizing motors to better meet the motor's current load requirements.

Affected motors: Well #22, Well #1, two underground pumps at North Pump Station.

Savings are based on the difference between baseline and proposed efficiencies and the assumed annual operating hours. The base case motor energy consumption is estimated using the efficiencies found on nameplates or estimated based on the age of the motor and our best estimates of motor run hours. Efficiencies of proposed motor upgrades are obtained from the current *New Jersey's Clean Energy Program Protocols to Measure Resource Savings*.

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**	**36**	**$403**	**$3,049**	**$0**	**$3,049**	**7.6**	**4,272**
ECM 6	Install High Efficiency Unit Heaters	0	0.0	36	$403	$3,049	$0	$3,049	7.6	4,272

ECM 6: Install High Efficiency Unit Heaters

Replace existing standard gas-fired unit heaters at Peahala water plant with high efficiency gas-fired unit heaters. Improved combustion technology and heat exchanger design optimize the heat recovery from the combustion gases which can significantly improve unit heater efficiency. Savings result from improved system efficiency.

Note: these units produce acidic condensate that requires proper drainage.

Affected units: Peahala Water Plant unit heaters.

4.5 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**139**	**0.0**	**1**	**$35**	**$22**	**$0**	**$22**	**0.6**	**251**
ECM 7	Install Low-Flow DHW Devices	139	0.0	1	$35	$22	$0	$22	0.6	251

ECM 7: Install Low-Flow DHW Devices

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

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm

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

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.

Lighting Maintenance

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

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

Lighting Controls

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

Motor Maintenance

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

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

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.

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[5] or download a copy of EPA's "WaterSense™ at Work: Best Management Practices for Commercial and Institutional Facilities"[6] 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] https://www.epa.gov/watersense

[6] 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.

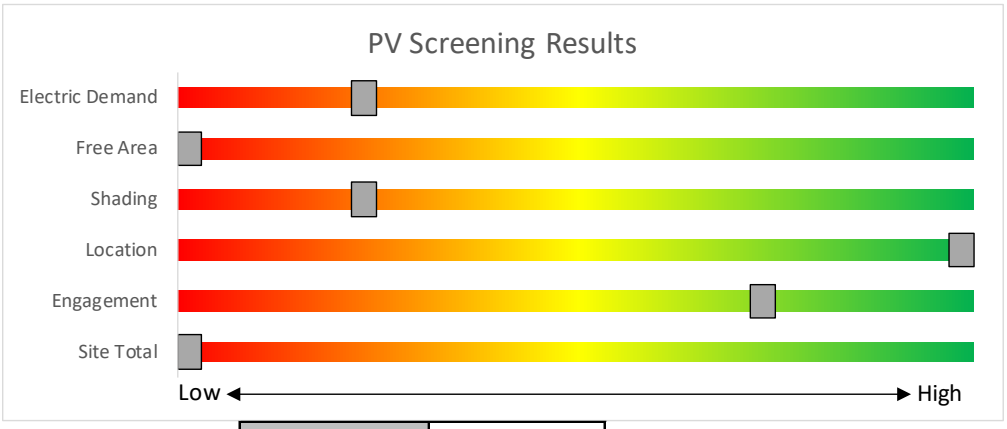
6.1 Solar Photovoltaic

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 each facility has no potential for installing a PV array.

These facilities do not appear to 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 sustained electric demand and sufficient 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.



Potential	None	
System Potential	21	kW DC STC
Electric Generation	15,802	kWh/yr
Displaced Cost	$2,830	/yr
Installed Cost	$54,600	

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.

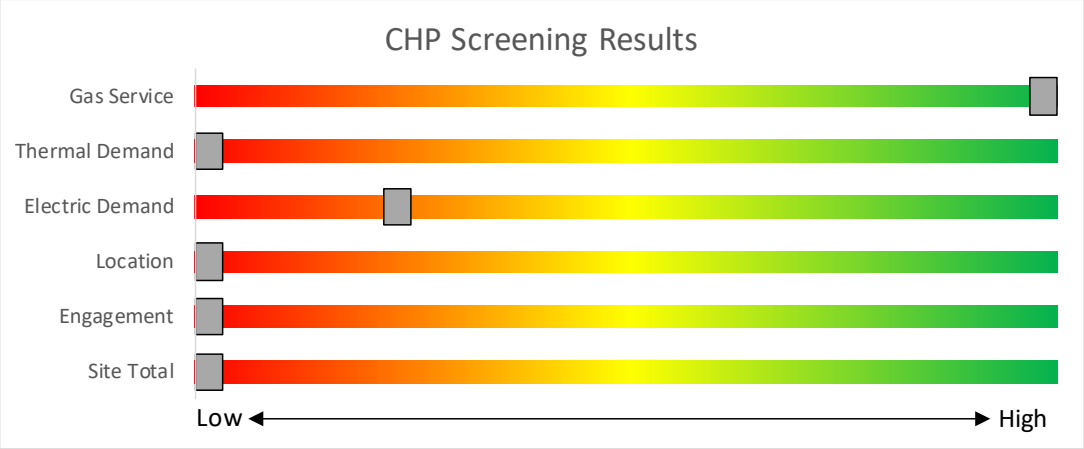
CHP systems typically produce a portion of the electric power used on-site, with the balance of electric power needs supplied by the local utility company. The heat is used to supplement (or replace) existing boilers and provide space heating and/or domestic hot water heating. Waste heat can also be 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 facilities have no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facilities do 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	0	kW
Electric Generation	0	kWh/yr
Thermal Generation	0	MBtu/yr
Displaced Cost	$0	/yr
Installed Cost	$0	

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 Pay for Performance - Existing Buildings

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 that results in at least 15% source energy savings, and lighting cannot make up the majority of the savings. P4P is a generally a good option for medium-to-large sized facilities looking to implement as many measures as possible under a single project to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

Incentives

Incentives are based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

How to Participate

Contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, they will help further evaluate the measures identified in this report through development of the energy reduction plan, assist you in implementing selected measures, and verify actual savings one year after the installation. Your Partner will also help you apply for incentives.

Approval of the final scope of work is required by the program prior to installation. Installation can be done by the contractor of your choice (some P4P Partners are also contractors) or by internal staff, but the Partner remains involved throughout construction to ensure compliance with the program requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: www.njcleanenergy.com/P4P.

7.4 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.

7.5 Energy Savings Improvement Program

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

7.6 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[7].

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[8].

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

[8] 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
Terrace WP - Office Building	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,000	3, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,380	0.1	336	0	$59	$416	$75	5.8
Terrace Water Plant - Office Building	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
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,000	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,000	0.0	66	0	$12	$37	$10	2.3
Stairwell	4	Incandescent: Screw in	Wall Switch	S	65	2,000	3	Relamp	No	4	LED Lamps: LED Lamps	Wall Switch	10	2,000	0.1	442	0	$78	$69	$4	0.8
Attic Floor	4	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	126	2,000	2, 4	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,380	0.2	611	0	$108	$785	$115	6.2
Garage	6	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	126	2,000	2, 4	Relamp & Reballast	Yes	6	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	1,380	0.3	916	0	$162	$1,042	$155	5.5
Water Plant - Filtration Building 1st Floor	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.3	549	0	$97	$584	$160	4.4
Plumbing Room	2	LED - Fixtures: High-Bay	Wall Switch	S	75	1,040		None	No	2	LED - Fixtures: High-Bay	Wall Switch	75	1,040	0.0	0	0	$0	$0	$0	0.0
Pump Room	6	LED - Fixtures: High-Bay	Wall Switch	S	75	1,040		None	No	6	LED - Fixtures: High-Bay	Wall Switch	75	1,040	0.0	0	0	$0	$0	$0	0.0
Pump Room	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
Water Plant - Filtration Building 2nd Floor	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3, 4	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	718	0.4	611	0	$108	$1,051	$210	7.8
Water Plant - Filtration Building 2nd Floor	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
Water Plant - Filtration Building 2nd Floor	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	1,040	3, 4	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	718	0.1	154	0	$27	$416	$75	12.6
Chlorine Room	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
Chlorine Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.0	69	0	$12	$73	$20	4.4
Break Room	5	Incandescent: Screw in	Wall Switch	S	65	1,040	3, 4	Relamp	Yes	5	LED Lamps: LED Lamps	Occupancy Sensor	10	718	0.2	303	0	$53	$356	$40	5.9
Break Room	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
Exterior Wall Pack - Filtration Building	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch		65	3,120		None	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	65	3,120	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack - Well #13	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch		65	3,120		None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	65	3,120	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack - Well #14	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch		65	3,120		None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	65	3,120	0.0	0	0	$0	$0	$0	0.0
Well #14 Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	137	0	$24	$146	$40	4.4
Well #13 Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	103	0	$18	$110	$30	4.4
Gnerator Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	137	0	$24	$146	$40	4.4
Attic Floor	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3, 4	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	718	0.2	349	0	$62	$562	$115	7.3
Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	137	0	$24	$146	$40	4.4

	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
Stairwell	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
Holgate WP	6	High-Pressure Sodium: (1) 100W Lamp	Wall Switch		138	1,040	1	Fixture Replacement	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	41	1,040	0.4	603	0	$108	$3,900	$600	30.6
Generator Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.2	275	0	$48	$292	$80	4.4
Generator Room	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
Well Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	137	0	$24	$146	$40	4.4
Chlorine Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.0	69	0	$12	$73	$20	4.4
Exterior Wall Pack - Well #23 Building	5	High-Pressure Sodium: (1) 100W Lamp	Wall Switch		138	3,120	1	Fixture Replacement	No	5	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	41	3,120	0.3	1,507	0	$270	$3,250	$500	10.2
Well #23 Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.2	240	0	$42	$256	$70	4.4
Peahala WP Exterior Wall Pack	6	Metal Halide: (1) 150W Lamp	Wall Switch		190	3,120	1	Fixture Replacement	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	57	3,120	0.5	2,490	0	$446	$3,900	$600	7.4
Lime Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	137	0	$24	$146	$40	4.4
Lime Room	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
Filtration Room	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.4	686	0	$121	$730	$200	4.4
Filtration Room	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
Filtration Room	2	Metal Halide: (1) 400W Lamp	Wall Switch	S	400	1,040	1	Fixture Replacement	No	2	LED - Fixtures: High-Bay	Wall Switch	120	1,040	0.4	582	0	$103	$1,300	$300	9.7
Chlorine Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	103	0	$18	$110	$30	4.4
Chlorine Room	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
Generator Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.1	206	0	$36	$219	$60	4.4
Restroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	S	33	1,040	3	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	1,040	0.0	17	0	$3	$33	$6	9.0
Exterior Wall Pack Transportation Building	1	LED Lamps: LED Lamps	Photocell		15	4,380		None	No	1	LED Lamps: LED Lamps	Photocell	15	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Recessed Transportation Building	2	LED Lamps: LED Lamps	Photocell		9	4,380		None	No	2	LED Lamps: LED Lamps	Photocell	9	4,380	0.0	0	0	$0	$0	$0	0.0
Exterior Wall Pack Transportation Building	2	LED Lamps: LED Lamps	Photocell		19	4,380		None	No	2	LED Lamps: LED Lamps	Photocell	19	4,380	0.0	0	0	$0	$0	$0	0.0
Office	3	LED - Fixtures: LED Panel	Wall Switch	S	40	1,120	4	None	Yes	3	LED - Fixtures: LED Panel	Occupancy Sensor	40	773	0.0	42	0	$7	$116	$20	13.1
Men Restroom	2	LED - Fixtures: LED Panel	Wall Switch	S	40	1,120	4	None	Yes	2	LED - Fixtures: LED Panel	Occupancy Sensor	40	773	0.0	28	0	$5	$116	$0	23.7

	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
Men Restroom	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
Wmen Restroom	2	LED - Fixtures: LED Panel	Wall Switch	S	40	1,120	4	None	Yes	2	LED - Fixtures: LED Panel	Occupancy Sensor	40	773	0.0	28	0	$5	$116	$0	23.7
Wmen Restroom	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
Storage Room	2	Compact Fluorescent: Screw in	Wall Switch	S	14	1,120	3	Relamp	No	2	LED Lamps: LED Lamps	Wall Switch	10	1,120	0.0	9	0	$2	$70	$2	41.0
North PS Exterior Wall Pack	1	Compact Fluorescent: Screw in	Wall Switch		42	3,120	3	Relamp	No	1	LED Lamps: LED Lamps	Wall Switch	29	3,120	0.0	39	0	$7	$35	$1	4.8
Pump Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	1,040	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.0	69	0	$12	$73	$20	4.4
Pump Room	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
Generator Room	8	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	S	88	1,040	2	Relamp & Reballast	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.3	491	0	$87	$550	$80	5.4
Exterior Wall Pack - North Pump Station	2	High-Pressure Sodium: (1) 70W Lamp	Photocell		95	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	29	4,380	0.1	583	0	$104	$1,300	$200	10.6

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
Terrace WP Pump Room	Water Supply Pumps	3	Water Supply Pump	50.0	94.5%	Yes	W	1,820		No	94.5%	No		0.0	0	0	$0	$0	$0	0.0
Chlorine Room	Chlorine Room	4	Process Pump	0.5	82.5%	Yes	W	2,184		No	82.5%	No		0.0	0	0	$0	$0	$0	0.0
Lime Room	Mixing Pump	1	Process Pump	3.0	89.5%	Yes	W	2,184		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
Lime Room	Lime Pumps	2	Process Pump	0.5	82.0%	Yes	W	2,184		No	82.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #14	Well Pump	1	Water Supply Pump	60.0	94.5%	Yes	W	2,912		No	94.5%	No		0.0	0	0	$0	$0	$0	0.0
Well #13	Well Pump	1	Water Supply Pump	40.0	94.5%	Yes	W	2,912		No	94.5%	No		0.0	0	0	$0	$0	$0	0.0
Break Room/Pump Room	Break Room/Pump Room	1	Supply Fan	0.3	75.0%	No	W	1,820		No	75.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #14 Room	Well Pump Room	2	Exhaust Fan	0.3	65.0%	No	W	1,820		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #13 Room	Well Pump Room	2	Exhaust Fan	0.3	65.0%	No	W	1,820		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Holgate Water Plant	Well #22	1	Water Supply Pump	60.0	88.9%	No	B	1,001	5	Yes	95.0%	No		1.8	2,427	0	$434	$6,967	$0	16.0
Holgate Water Plant	Well #23	1	Water Supply Pump	75.0	94.5%	No	W	1,001		No	94.5%	No		0.0	0	0	$0	$0	$0	0.0
Holgate Water Plant	Well #23	1	Exhaust Fan	0.3	65.0%	No	W	1,820		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Holgate Water Plant	Chlorine Pump	2	Process Pump	0.5	65.0%	No	W	2,184		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Peahala Water Plant	Generator Room	3	Exhaust Fan	0.1	60.0%	No	W	1,820		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Peahala Water Plant	Chlorine Pump	2	Process Pump	0.5	60.0%	No	B	2,184		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
Peahala Water Plant	Lime Pump	2	Process Pump	0.8	77.0%	No	W	2,184		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0
Peahala Water Plant	Mixing Pump	1	Process Pump	0.8	77.0%	No	W	2,184		No	77.0%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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
Peahala Water Plant	Well #1	1	Water Supply Pump	60.0	90.3%	No	B	1,365	5	Yes	95.0%	No		1.4	2,511	0	$449	$6,967	$0	15.5
North PS	Pump Room	1	Exhaust Fan	0.1	60.0%	No	W	1,820		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
North PS	Generator Room	2	Exhaust Fan	0.1	60.0%	No	W	1,820		No	60.0%	No		0.0	0	0	$0	$0	$0	0.0
North PS	Underground Water Supply Pumps	2	Water Supply Pump	7.5	89.5%	No	W	4,368	5	Yes	91.7%	No		0.2	1,048	0	$188	$2,769	$0	14.8

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
Terrace WP Office Building	Office Building - Terrace Water Plant	1	Window AC	1.00		W		No							0.0	0	0	$0	$0	$0	0.0
Restroom	Restroom	1	Electric Resistance Heat		10.24	W		No							0.0	0	0	$0	$0	$0	0.0
Break Room/Pump Room	Break Room/Pump Room	1	Split-System AC	5.00		W		No							0.0	0	0	$0	$0	$0	0.0
Holgate Water Plant	Well #22 Room	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
Holgate Water Plant	Well #23 Room	2	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
Pehala WP Transportation Building	Transportation Building	1	Ductless Mini-Split HP	3.00	36.40	W		No							0.0	0	0	$0	$0	$0	0.0
Peahala Water Plant	Chlorine Room	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
North Pump Sation	Pump Room	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
North Pump Sation	Generator Room	2	Electric Resistance Heat		12.62	W		No							0.0	0	0	$0	$0	$0	0.0

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
Terrace WP Garage	Garage Office Building	1	Warm Air Unit Heater	24.60	W		No						0.0	0	0	$0	$0	$0	0.0
Terrace Water Plant	1st Floor	3	Warm Air Unit Heater	24.60	W		No						0.0	0	0	$0	$0	$0	0.0
Well#13	Well#13	1	Warm Air Unit Heater	24.60	W		No						0.0	0	0	$0	$0	$0	0.0
Well#14	Well#14	1	Warm Air Unit Heater	24.60	W		No						0.0	0	0	$0	$0	$0	0.0
Well#14	Terrace Water Plant	1	Other	4,615.00	W		No						0.0	0	0	$0	$0	$0	0.0
Holgate Water Plant	Generator Room	1	Warm Air Unit Heater	24.60	W		No						0.0	0	0	$0	$0	$0	0.0
Holgate Water Plant	Holgate Water Plant	1	Other	2,300.00	W		No						0.0	0	0	$0	$0	$0	0.0
Peahala Water Plant	Peahala Water Plant	1	Warm Air Unit Heater	24.35	B	6	Yes	1	Warm Air Unit Heater	24.35	93.00%	Et	0.0	0	8	$87	$712	$0	8.1
Peahala Water Plant	Peahala Water Plant	2	Warm Air Unit Heater	40.00	W	6	Yes	2	Warm Air Unit Heater	40.00	93.00%	Et	0.0	0	29	$315	$2,338	$0	7.4
Peahala Water Plant	Peahala Water Plant	1	Other	2,300.00	W		No						0.0	0	0	$0	$0	$0	0.0
North Pump Station	North Pump Station	1	Other	1,200.00	W		No						0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	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
Terrace Water Plant	Domestic Hot Water	1	Storage Tank Water Heater (> 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Closet	Office Building	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0
Peahala WP	Transportation Building	1	Storage Tank Water Heater (≤ 50 Gal)	W		No						0.0	0	0	$0	$0	$0	0.0

Low-Flow Device Recommendations

	Recommedation Inputs					Energy Impact & Financial Analysis						
Location	ECM #	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Terrace Water Plant	7	2	Faucet Aerator (Lavatory)	2.20	0.50	0.0	0	1	$10	$14	$0	1.4
Terrace Water Plant	7	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$25	$7	$0	0.3

Plug Load Inventory

	Existing Conditions			
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**
Terrace WP Office Building	4	Desktop Computer	120.0	Yes
Office Building	1	Copy Machine	600.0	Yes
Office Building	1	Water Cooler	120.0	Yes
Terrace Water Plant	2	Refrigerator	144.0	Yes
Water Filtration Room	3	Electric Water Filtration Pumps	120.0	No
Water Filtration Room	18	Electric Water Filtration Pumps	80.0	No
Water Filtration Room	2	Dehumidifier	1,320.0	No
Water Filtration Room	1	Dehumidifier	540.0	No
Terrace Water Plant	1	Combo- Washing/Drying Machine	1,200.0	No
Terrace Water Plant	1	Electric Stove	1,300.0	No
Terrace Water Plant	1	Microwave	1,000.0	No
Well #14	1	Dehumidifier	747.0	No
Holgate/Transportaion Blg	2	Desktop Computer	120.0	Yes
Holgate/Transportaion Blg	1	Desktop Printer	55.0	Yes
Holgate/Transportaion Blg	1	Microwave	800.0	No
Holgate/Transportaion Blg	1	Small Fridge	85.0	Yes
Holgate/Transportaion Blg	1	Water Cooler	72.0	Yes
Holgate/Transportaion Blg	1	Coffee Machine	250.0	No
Peahala Water Plant	2	Small Dehumidifier	250.0	No

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]

Terrace Water Plant (Long Beach Township)

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 2,500
Built: 2017

For Year Ending: June 30, 2018
Date Generated: July 10, 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
Terrace Water Plant (Long Beach Township) 13000 Long Beach Boulevard Beach Haven Terrace, New Jersey 08008	Long Beach Township 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641	Angela Andersen 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641 andersen@longbeachtownship.com

Property ID: 6831281

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
801.8 kBtu/ft²

Source EUI
1,582.1 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	947,074 (47%)
Electric - Grid (kBtu)	1,057,406 (53%)

National Median Comparison

National Median Site EUI ()	N/A
National Median Source EUI ()	N/A
% Diff from National Median Source EUI	N/A%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	157

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)

ENERGY STAR® Statement of Energy Performance

Peahala Water Plant & Transportation Building

N/A

ENERGY STAR® Score[1]

Primary Property Type: Other - Public Services
Gross Floor Area (ft²): 1,500
Built: 1985

For Year Ending: June 30, 2018
Date Generated: June 09, 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
Peahala Water Plant & Transportation Building 9303 Long Beach Boulevard Peahala Park, New Jersey 08008	Long Beach Township 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641	Angela Andersen 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641 andersen@longbeachtownship.com

Property ID: 6831279

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
388 kBtu/ft²

Source EUI
716.2 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	317,226 (54%)
Electric - Grid (kBtu)	264,718 (46%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	48.4
National Median Source EUI (kBtu/ft²)	89.3
% Diff from National Median Source EUI	702%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	44

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)

ENERGY STAR® Statement of Energy Performance

North Pump Station (Long Beach Township)

N/A

ENERGY STAR® Score[1]

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 1,000
Built: 1975

For Year Ending: June 30, 2018
Date Generated: July 10, 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
North Pump Station (Long Beach Township) 1065A Long Beach Boulevard North Beach, New Jersey 08008	Long Beach Township 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641	Angela Andersen 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641 andersen@longbeachtownship.com

Property ID: 6831282

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
205.1 kBtu/ft²

Source EUI
561.8 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	197,951 (96%)
Natural Gas (kBtu)	7,162 (4%)

National Median Comparison	
National Median Site EUI ()	N/A
National Median Source EUI ()	N/A
% Diff from National Median Source EUI	N/A%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	20

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)

ENERGY STAR® Statement of Energy Performance

Holgate Water Plant (Long Beach Township)

N/A

ENERGY STAR® Score[1]

Primary Property Type: Water Treatment & Distribution
Gross Floor Area (ft²): 1,500
Built: 1980

For Year Ending: June 30, 2018
Date Generated: July 19, 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
Holgate Water Plant (Long Beach Township) 21 Roosevelt Avenue Holgate, New Jersey 08008	Long Beach Township 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641	Angela Andersen 6805 Long Beach Boulevard Brant Beach, NJ 08008 (609) 361-6641 andersen@longbeachtownship.com

Property ID: 6831280

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
357 kBtu/ft²

Source EUI
783.8 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	184,936 (34%)
Electric - Grid (kBtu)	350,553 (66%)

National Median Comparison	
National Median Site EUI ()	N/A
National Median Source EUI ()	N/A
% Diff from National Median Source EUI	N/A%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	45

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.