Local Government Energy Audit Report

Chestnut Street Water Office and Pumping Station

November 9, 2021

Prepared for:

City of Orange Township

632 Chestnut Street

Orange, New Jersey 07050

Prepared by:

TRC

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Disclaimer

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

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

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

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

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

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ENERGY EFFICIENCY INCENTIVE & REBATE TRANSITION

For the purposes of your LGEA, estimated incentives and rebates are included as placeholders for planning purposes. New Jersey utilities are rolling out their own energy efficiency programs, which your project may be eligible for depending on individual measures, quantities, and size of the building.

In 2018, Governor Murphy signed into law the landmark legislation known as the Clean Energy Act. The law called for a significant overhaul of New Jersey's clean energy systems by building sustainable infrastructure in order to fight climate change and reduce carbon emissions, which will in turn create well-paying local jobs, grow the state's economy, and improve public health while ensuring a cleaner environment for current and future residents.

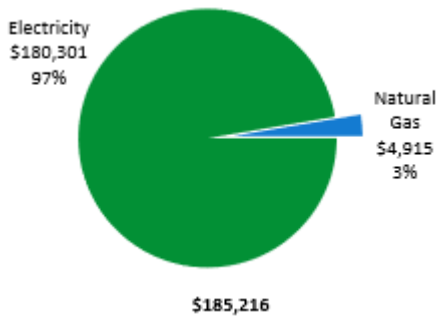
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and incentives directly to customers like you. NJCEP will still offer programs for new construction, renewable energy, the Energy Savings Improvement Program (ESIP), and large energy users.

New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website.

1 Executive Summary

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for Chestnut Street Water Office and Pumping 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 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: $185,216 Electricity: 1,721,485 kWh Natural Gas: 5,587 Therms	
ENERGY STAR® Benchmarking Score	N/A	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

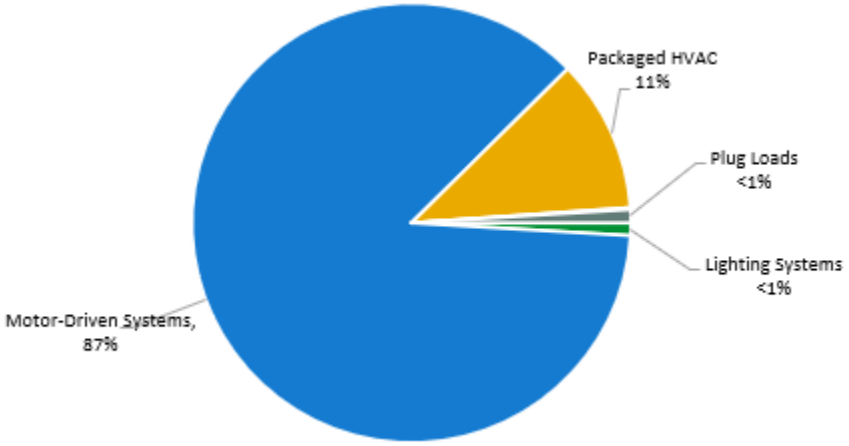


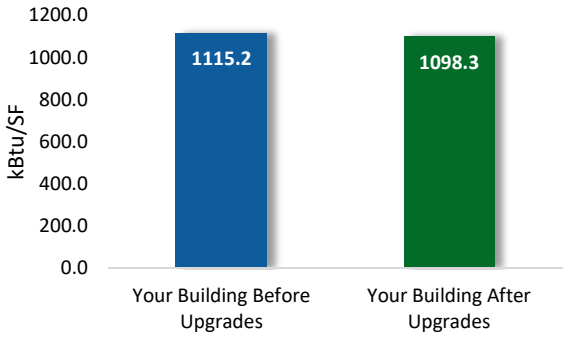
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

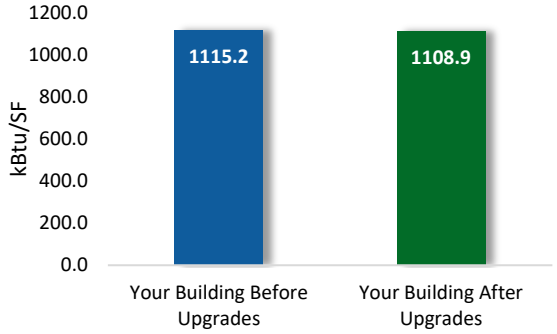
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$30,792
Potential Rebates & Incentives[1]	$5,407
Annual Cost Savings	$1,691
Annual Energy Savings	Electricity: 11,129 kWh Natural Gas: 597 Therms
Greenhouse Gas Emission Savings	9 Tons
Simple Payback	15.0 Years
Site Energy Savings (all utilities)	2%



Scenario 2: Cost Effective Package[2]

Installation Cost	$6,336
Potential Rebates & Incentives	$1,407
Annual Cost Savings	$1,151
Annual Energy Savings	Electricity: 11,129 kWh Natural Gas: -17 Therms
Greenhouse Gas Emission Savings	6 Tons
Simple Payback	4.3 Years
Site Energy Savings (all utilities)	1%



On-site Generation Potential

Photovoltaic	Low
Combined Heat and Power	None

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**10,351**	**2.5**	**-2**	**$1,070**	**$5,382**	**$1,256**	**$4,126**	**3.9**	**10,240**
ECM 1	Install LED Fixtures	Yes	3,005	0.0	0	$315	$1,838	$350	$1,488	4.7	3,026
ECM 2	Retrofit Fixtures with LED Lamps	Yes	7,195	2.5	-2	$740	$3,398	$906	$2,492	3.4	7,066
ECM 3	Install LED Exit Signs	Yes	151	0.0	0	$16	$145	$0	$145	9.3	149
Lighting Control Measures			**468**	**0.2**	**0**	**$48**	**$926**	**$125**	**$801**	**16.6**	**459**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	468	0.2	0	$48	$926	$125	$801	16.6	459
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**61**	**$540**	**$24,456**	**$4,000**	**$20,456**	**37.9**	**7,184**
ECM 5	Install High Efficiency Furnaces	No	0	0.0	61	$540	$24,456	$4,000	$20,456	37.9	7,184
Domestic Water Heating Upgrade			**311**	**0.0**	**0**	**$33**	**$29**	**$26**	**$3**	**0.1**	**313**
ECM 6	Install Low-Flow DHW Devices	Yes	311	0.0	0	$33	$29	$26	$3	0.1	313
TOTALS (COST EFFECTIVE MEASURES)			**11,129**	**2.7**	**-2**	**$1,151**	**$6,336**	**$1,407**	**$4,930**	**4.3**	**11,012**
TOTALS (ALL MEASURES)			**11,129**	**2.7**	**60**	**$1,691**	**$30,792**	**$5,407**	**$25,386**	**15.0**	**18,196**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

Utility run energy efficiency programs and New Jersey's Clean Energy Programs give you the flexibility to do a little or a lot. Rebates, incentives, and financing are available to help reduce both your installation costs and your energy bills. If you are planning to take advantage of these programs, make sure to review incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives before purchasing materials or starting installation.

For details on these programs please visit New Jersey's Clean Energy Program website or contact your utility provider.

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 Chestnut Street Water Office and Pumping 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

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 21, 2021, TRC performed an energy audit at Chestnut Street Water Office and Pumping Station located in Orange, New Jersey. TRC met with John Dombrauskas to review the facility operations and help focus our investigation on specific energy-using systems.

Chestnut Street Water Office and Pumping Station is a campus with two single-story buildings on the site. The pumping station is an approximately 4,000 sq. ft building that houses both the water treatment and pumping for the water system, and it was constructed in 2008. The pumping station has a chemical storage room, a pumping room, a bathroom, an office, and a kitchen. The water office is a modular trailer that was installed within the last few years and measures approximately 1,768 sq. ft. This building has offices, a lobby, restrooms, and storage space.

The water department office is a new facility, so all equipment is new. Recent improvements to the pumping station include an updated supervisory control and data acquisition (SCADA) system and several new chemical transfer pumps.

2.2 Building Occupancy

The facility is occupied year-round and available for emergency purposes around the clock. The Office is generally open Monday through Friday 7:00 AM to 4:00 PM, and the pumping station is occupied as needed. Typical weekday occupancy is 5 to 10 staff on the campus.

Building Name	Weekday/Weekend	Operating Schedule
Chestnut St Water Office	Weekday	7:00 AM - 4:00 PM
	Weekend	Generally Not in Use
Chestnut St Pumping Station	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Pumping Station

The building walls are concrete block over structural steel with a corrugated steel façade. The roof is flat and is supported with steel trusses. The roof was not accessible during the audit to confirm the material or condition. The thermal barrier is at the roof.

There are no windows in the pumping station. The exterior door has an aluminum frame and is in good condition with undamaged door seals. The garage door is not insulated but is in fair condition. There is a visible air gap underneath the garage door. Degraded window and door seals increase drafts and outside air infiltration.

Site staff did not report any issues with the building envelope.

Building Exterior

Garage Door

Front Door

Interior Walls

Water Office

The water office is a new modular built facility installed within the last two years. The building walls are wooden stud construction with insulation and with a vinyl siding exterior. The roof is slightly pitched in the center but was not accessible at the time of the audit. Based on the age of the facility, the roof is assumed to be in good condition.

The windows are double glazed and have aluminum frames. The glass-to-frame seals are in good condition. The operable window weather seals are in good condition, showing no evidence of excessive wear. Exterior doors have aluminum frames and are in good condition with undamaged door seals. Degraded window and door seals increase drafts and outside air infiltration.

Site staff did not report any issues with the building envelope.

Office Building Exterior

Office Building Exterior

Office Building Exterior

Office Building Window

2.4 Lighting Systems

Pumping Station

The primary interior lighting system uses 32-Watt linear fluorescent T8 lamps. Fixture types include 2- or 3-lamp, 4-foot-long shop light and recessed fixtures with linear tube lamps. Most fixtures are in fair condition. All exit signs are compact fluorescents.

Interior lighting levels were generally sufficient, although there were quite a few fixtures that were inoperable during the site visit.

Lighting fixtures in the pumping station are controlled by wall switches.

Chemical Storage Room Fixtures

Office Recessed Fixtures

Exterior fixtures include wall packs with high intensity discharge (HID) lamps. Exterior fixtures are photocell controlled.

Wall Pack- HID

Wall Packs- HID

Water Office

The primary interior lighting system uses 32-Watt and 17-Watt linear fluorescent T8 lamps. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts.

Fixture types include 1-, 2-, 3-, or 4-lamp, 2- foot-long strip light or 4-foot-long recessed fixtures with linear tube lamps. Most fixtures are in good condition. All exit signs are LED. Interior lighting levels were generally sufficient. All light fixtures are controlled by occupancy sensors.

2x4 Recessed Fixture- Fluorescent

2x4 Recessed Fixture- Fluorescent

2' Strip Fixture- Fluorescent

Office Occupancy Sensor

Exterior fixtures include wall mounted area lights with LED lamps, which are controlled by a time clock.

Exterior LED Fixture

2.5 Air Handling Systems

Pumping Station

Packaged Units

The chemical storage room is served by a single packaged roof top unit (RTU). The roof was not accessible during the audit; however, assumptions were made regarding the size and efficiency of this unit. This unit provides heating and ventilation and is only operated during the heating season to provide heated outdoor air to the space. It is not operated during the summer months. The gas fired RTU has an estimated capacity of 250 MBh and a heating efficiency of 80%.

Ducting from RTU in Chemical Storage Room

Overhead view of RTU

Unitary Heating Equipment

The pump room is heated by three functional suspended Reznor gas fired furnaces. There is a fourth unit, but it is not currently operable. The units share a common ducted intake, heating the space by conditioning 100% outdoor air. The nameplates were not accessible during the audit, but assumptions were made on the size and efficiency of this unit. The units are only operated during the heating season. Each gas fired unit has an estimated capacity of 75 MBh at a heating efficiency estimated at 80%. The units are in fair condition.

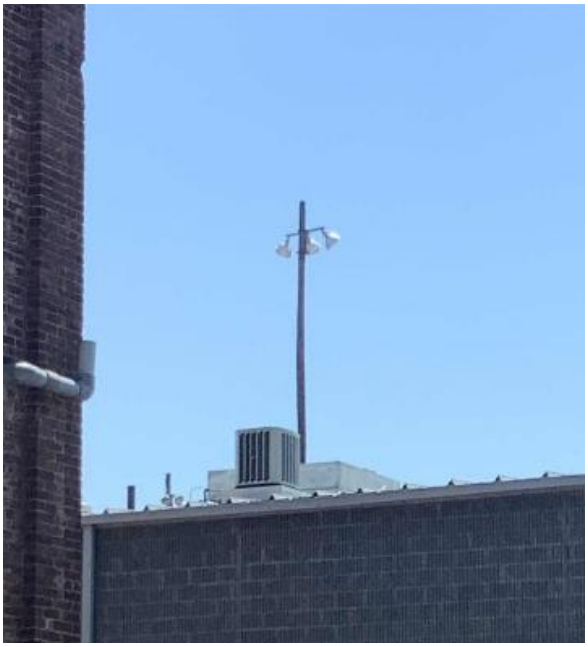
Reznor Heating Units

Reznor Heating Units

Air Handling Units (AHUs)

The restroom, sample room, and office are conditioned with a single air handling unit. This unit is equipped with a supply fan motor, a refrigerant coil for cooling, and with an electric resistance heater. The air handling unit is physically located above the ceiling and was inaccessible during the energy audit. The condenser is located on the roof, which also was not accessible during the energy audit. The supply fan motor is assumed to be ½ hp, constant speed, and of standard efficiency.

The cooling coil is served by an outdoor condensing unit that has an estimated cooling capacity of 3 tons and efficiency of 11 EER. The condition of the equipment could not be confirmed.



Rooftop condenser for AHU

Ductwork for AHU

Water Office

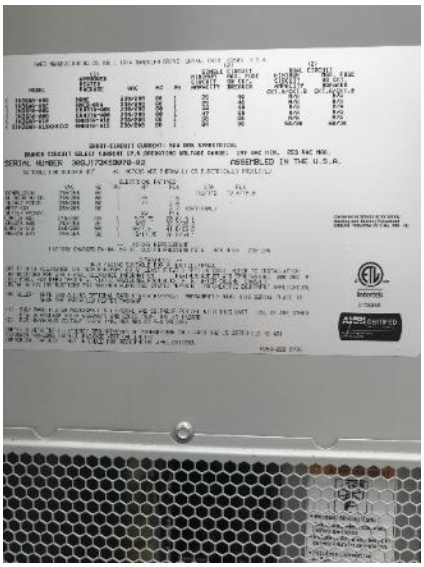
Packaged Units

The entire water department office is served by three single packaged vertical units (SPVU) mounted on the exterior of the building. These are fully electric units that are controlled by digital room thermostats.

Two of the thermostats were in locations that were not easily accessible. These are 9.0 EER units with a heating capacity of 51.18 MBh (15 kW) and a 3 ton cooling capacity. These units are new and in good condition as they were installed when the building was recently constructed.

SPVU Mounted on Exterior

SPVUs on Exterior



SPVU Nameplate

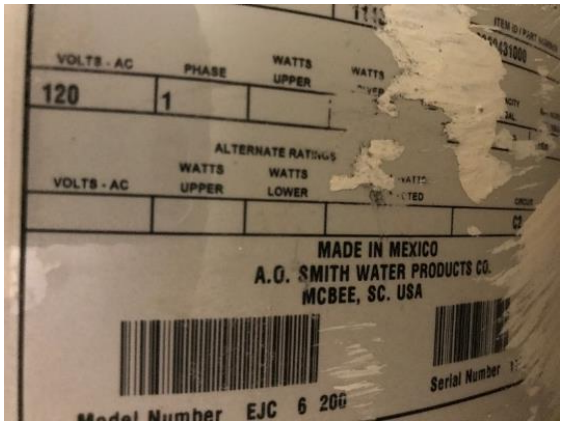
Digital Thermostat

2.6 Domestic Hot Water

Pumping Station

Hot water is produced by a six gallon, 1.65 kW electric storage water heater, which serves the restroom and sample room. The visible piping is fully insulated.

Electric Water Heater

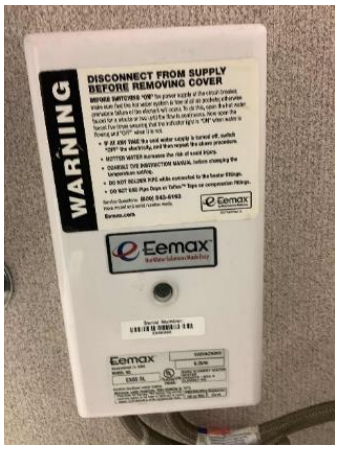


Water Heater Nameplate

Water Office

A 6.5 kW instantaneous water heater serves the two restrooms and the kitchen.

Instantaneous Water Heater



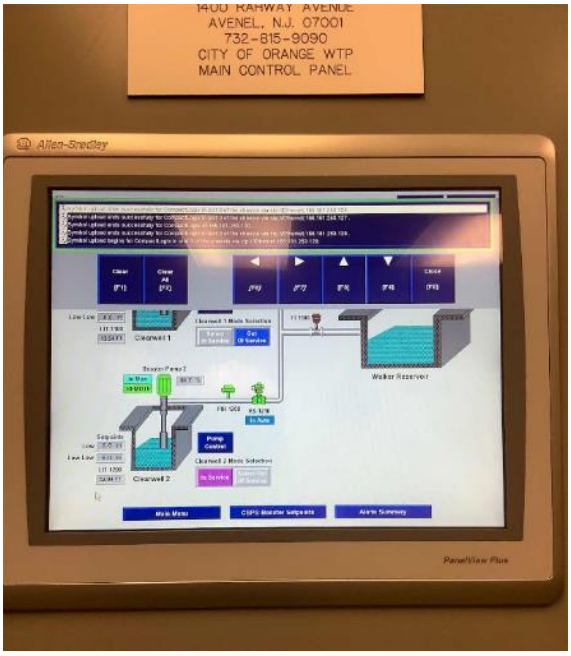
Instantaneous Water Heater

2.7 Plug Load & Vending Machines

Pumping Station

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

There are two computer workstations at the facility, and the office has a SCADA display and control panel. There are two portable fans in the pump room used for reducing the humidity in the space during the summer months. See Section 2.9 for additional information on process pumping and related systems.



SCADA Control Panel

Office Workstation

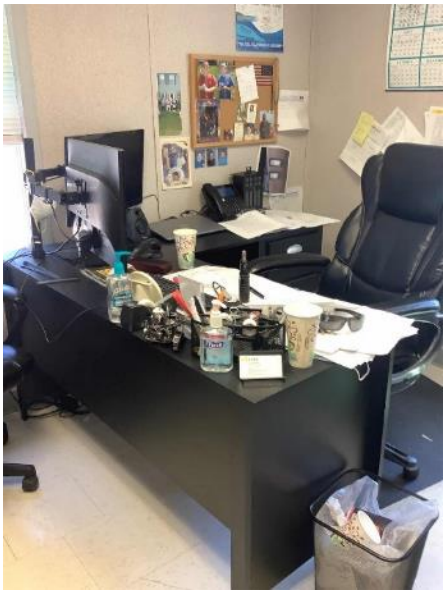
Pump Room Fan

Water Office

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

There are approximately 13 computer workstations throughout the facility. Plug loads throughout the building include general café and office equipment. There is also an electric space heater and a small server for the computers.

There is one residential style refrigerator in the building used to store food and beverages.



Office Workspace

Server Equipment

2.8 Water-Using Systems

Pumping Station

There is one restroom with a toilet and sink. Faucet flow rate is 2.2 gallons per minute (gpm). The toilet is rated at 1.6 gallons per flush (gpf). There is a utility sink in the sample room with a flow rate of 2.2 gpm.

Restroom Faucet

Restroom Toilet

Sample Room- Sink

Water Office

There are two restrooms each with a toilet and sink. Faucet flow rates are at 1.2 gpm or higher. Toilets are rated at 1.6 gpf.

2.9 Process Equipment

Pumping Station

Water Supply Pumps

The Pumping Station has a variety of process equipment including water supply pumps with variable frequency drive (VFD) controllers and SCADA displays, chemical transfer and injection pumps, and a backup generator.

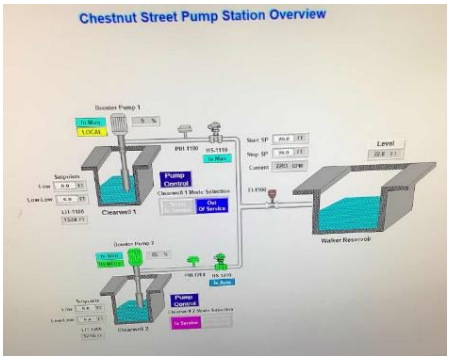
Two supply pumps located in the pump room transport treated water from the treatment facility to the Walker Holding Tank, where the water is stored until it is distributed throughout the downstream system. The pumps alternate, so only one operates at a time. These pumps have an average flow rate calculated at 3.3 MGD combined. Equipment operation varies based on flow and water demand. The system is comprised of two 400 hp water supply pumps that alternate: pump 1 is driven by an Emerson motor while pump 2 uses a Nidec motor. Both systems appear to be in good condition. Both pumps have VFD controllers which can be remotely adjusted with the SCADA system. Pump 2 was operating during the onsite survey with the VFD display registering 50.9 Hz.

A third supply pump in the pump room serves as the connection to the East Orange Water system. This pump is 75 hp with an Emerson motor and appears to be in good condition. This pump has a VFD controller that can be remotely adjusted with the SCADA system. The VFD for this pump registered at 35.2 Hz during the onsite survey.

Water Supply Pump 1- VFD

Water Supply Pump 2

East Orange Pump- VFD Display



SCADA Display (2300 GPM)

Water Treatment Process Pumps

A variety of transfer and process pumps located in the chemical storage room treat the water with additive chemicals before it is distributed to customers. These include orthophosphate pumps (for corrosion control), chlorine, and chlorite pumps. Each additive has two pumps that are alternated. There are eight pumps rated less than 1/5 hp, four transfer pumps at ½ hp each, and two chlorine pumps that are 1 hp each. Many of these pumps are newer and include capability for speed control. The operation of these pumps is generally manual; many only operate a few minutes each day. The rotation of the pumps is also generally manual.

Transfer Pump Controls

Caustic Pumps

Injection Pump

Injection Pumps

Generator

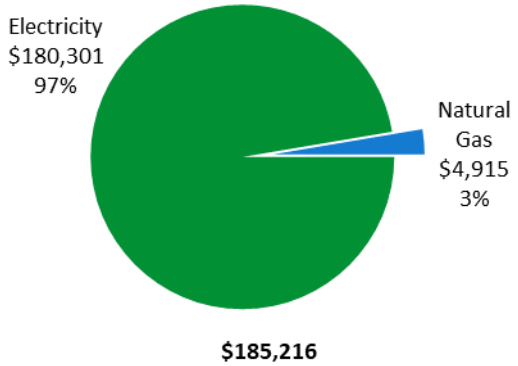
There is a single diesel generator that provides provide backup power to the water treatment facility as needed. This unit is rarely operated and was not included in the energy analysis for this report.

Diesel Generator

3 Energy Use and Costs

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

Utility Summary		
Fuel	**Usage**	**Cost**
Electricity	1,721,485 kWh	$180,301
Natural Gas	5,587 Therms	$4,915
Total		**$185,216**



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

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

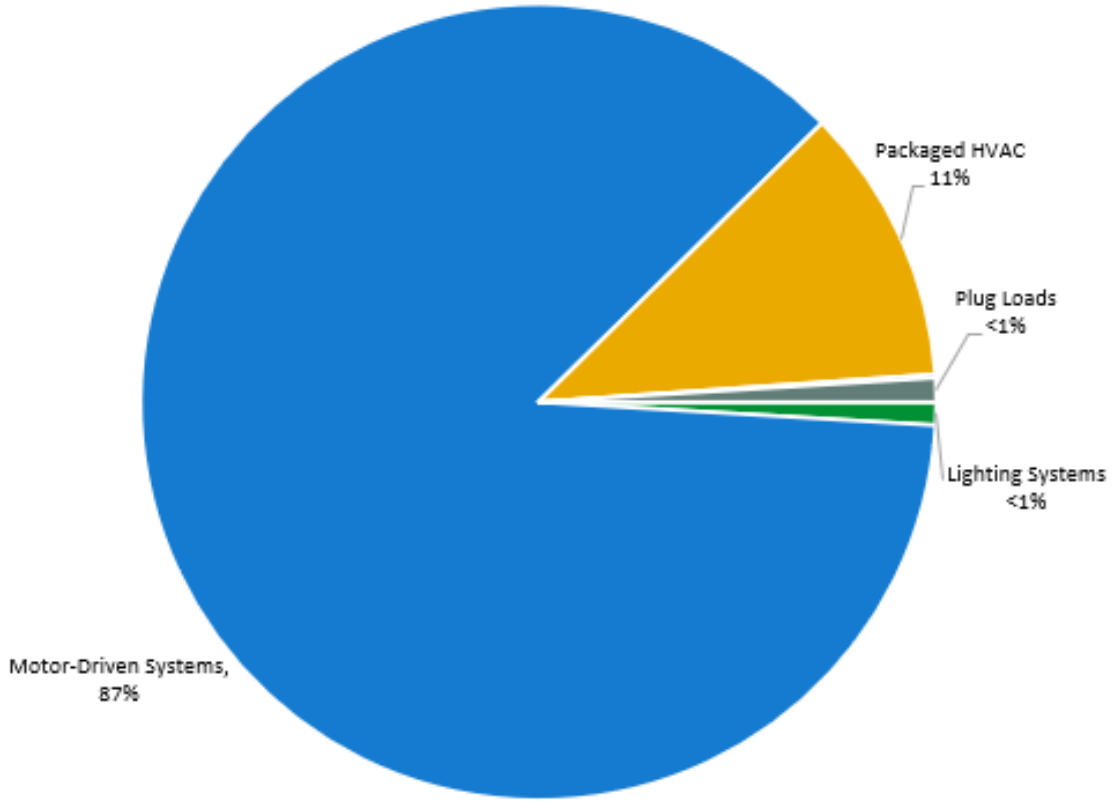
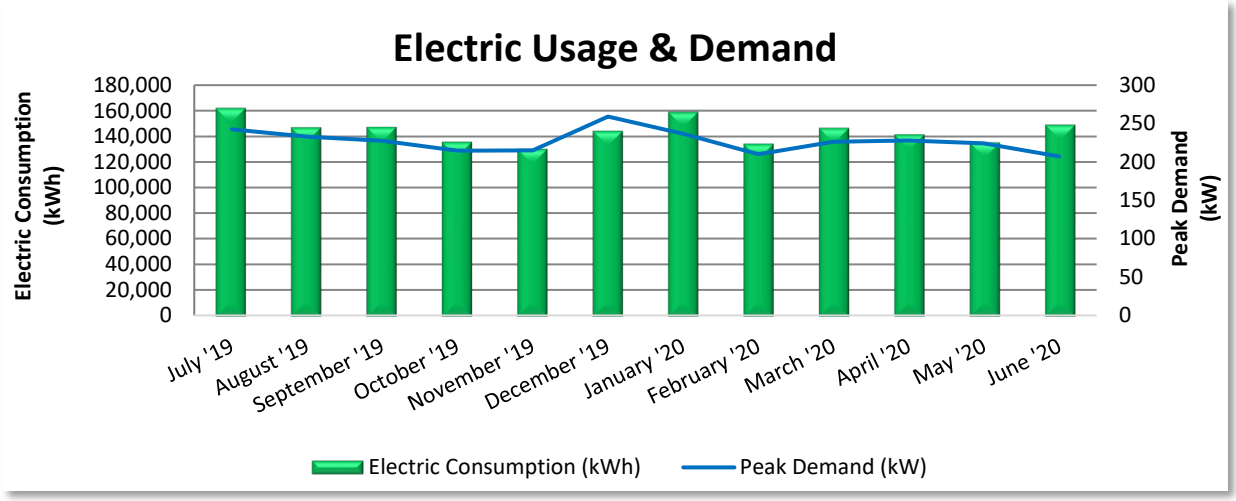


Figure 4 - Energy Balance

3.1 Electricity

PSE&G delivers electricity under rate class LPLS.



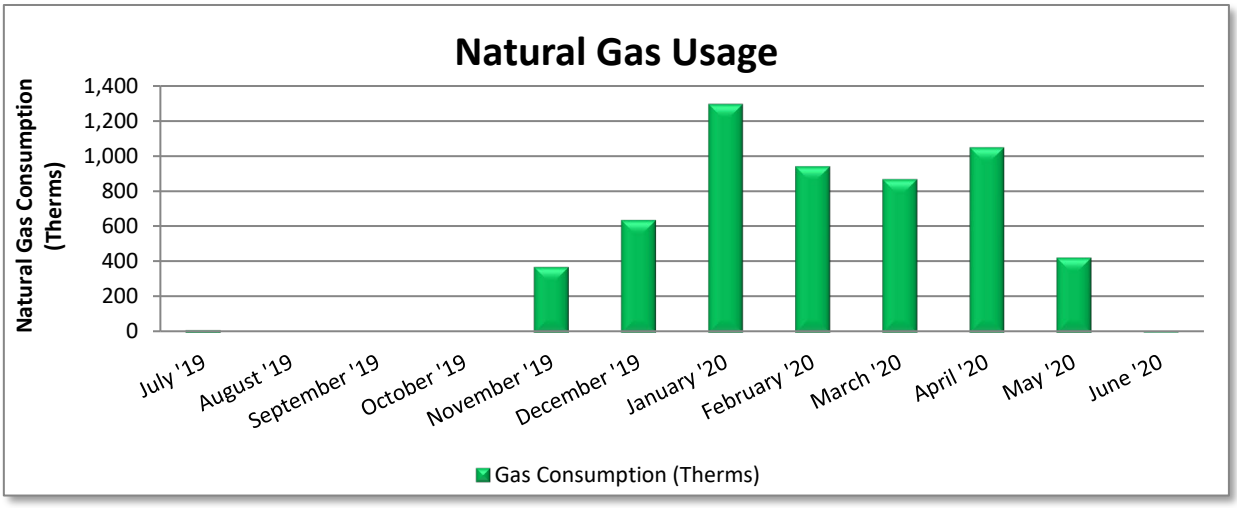
Electric Billing Data					
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**
7/23/19	32	161,898	243	$243	$17,580
8/21/19	29	146,897	233	$233	$15,727
9/20/19	30	147,044	228	$228	$14,978
10/21/19	31	135,705	215	$215	$13,539
11/19/19	29	130,188	215	$215	$13,039
12/20/19	31	144,086	259	$259	$14,470
1/23/20	34	158,919	237	$237	$15,747
2/21/20	29	134,077	210	$210	$14,334
3/23/20	31	146,439	226	$226	$16,341
4/22/20	30	141,478	228	$228	$15,403
5/21/20	29	135,195	224	$224	$14,000
6/22/20	32	148,992	207	$207	$16,130
Totals	**367**	**1,730,918**	**259**	**$2,724**	**$181,289**
Annual	**365**	**1,721,485**	**259**	**$2,709**	**$180,301**

Notes:

- Peak demand of 259 kW occurred in December '19.
- Average demand over the past 12 months was 227 kW.
- The average electric cost over the past 12 months was $0.105/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

PSE&G delivers natural gas under rate class GSG (HTG).



Gas Billing Data			
Period Ending	**Days in Period**	**Natural Gas Usage (Therms)**	**Natural Gas Cost**
7/22/19	31	15	$27
8/20/19	29	0	$15
9/19/19	30	0	$15
10/18/19	29	0	$16
11/19/19	32	372	$350
12/20/19	31	640	$590
1/23/20	34	1,297	$1,148
2/20/20	28	943	$803
3/20/20	29	870	$732
4/21/20	32	1,050	$865
5/20/20	29	427	$362
6/22/20	33	3	$18
Totals	**367**	**5,618**	**$4,942**
Annual	**365**	**5,587**	**$4,915**

Notes:

- The average gas cost for the past 12 months is $0.880/therm, which is the blended rate used throughout the analysis.

3.3 Benchmarking

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

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

Benchmarking Score	**N/A**

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

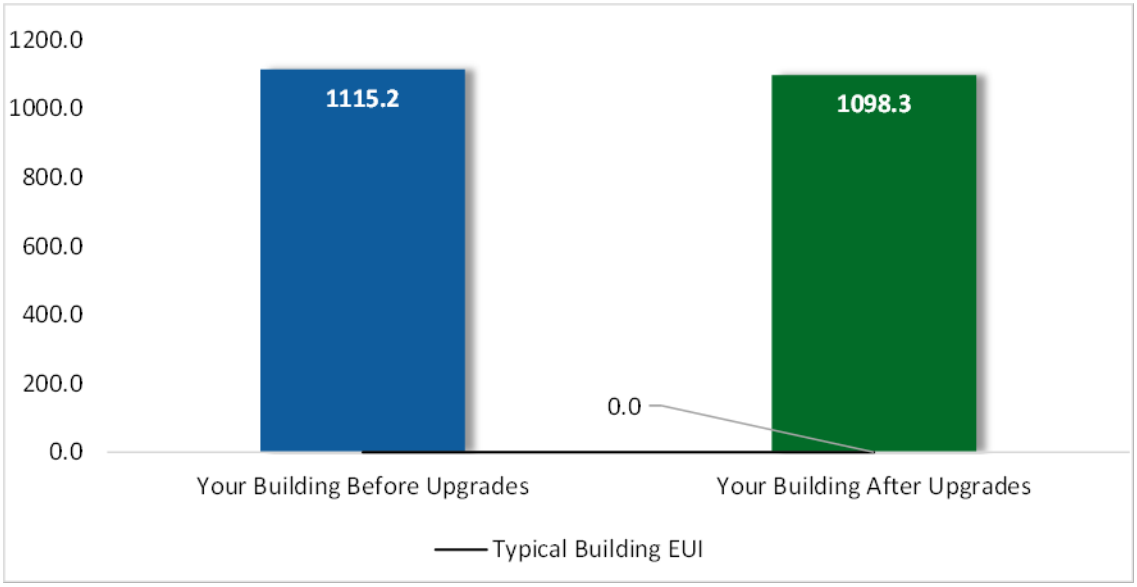


Figure 5 - Energy Use Intensity Comparison[3]

Energy use intensity (EUI) measures energy consumption per square foot and is the standard metric for comparing buildings' energy performance. A lower EUI means better performance and less energy consumed. 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.

[3] Based on all evaluated ECMs

Tracking Your Energy Performance

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

We have created a Portfolio Manager® account for your facility and 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[4].

[4] 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 and provide information about the cost effectiveness of those improvements. Most energy conservation measures have received preliminary analysis of feasibility, which identifies expected ranges of savings. This level of analysis is typically sufficient to demonstrate project cost-effectiveness and help prioritize energy measures.

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

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

Financial incentives are based on previously run state rebate programs. New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website. Some measures and proposed upgrades may be eligible for higher incentives than those shown below.

For a detailed list of the locations and recommended energy conservation measures for all inventoried equipment, see **Appendix A: Equipment Inventory & Recommendations.**

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**10,351**	**2.5**	**-2**	**$1,070**	**$5,382**	**$1,256**	**$4,126**	**3.9**	**10,240**
ECM 1	Install LED Fixtures	Yes	3,005	0.0	0	$315	$1,838	$350	$1,488	4.7	3,026
ECM 2	Retrofit Fixtures with LED Lamps	Yes	7,195	2.5	-2	$740	$3,398	$906	$2,492	3.4	7,066
ECM 3	Install LED Exit Signs	Yes	151	0.0	0	$16	$145	$0	$145	9.3	149
Lighting Control Measures			**468**	**0.2**	**0**	**$48**	**$926**	**$125**	**$801**	**16.6**	**459**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	468	0.2	0	$48	$926	$125	$801	16.6	459
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**61**	**$540**	**$24,456**	**$4,000**	**$20,456**	**37.9**	**7,184**
ECM 5	Install High Efficiency Furnaces	No	0	0.0	61	$540	$24,456	$4,000	$20,456	37.9	7,184
Domestic Water Heating Upgrade			**311**	**0.0**	**0**	**$33**	**$29**	**$26**	**$3**	**0.1**	**313**
ECM 6	Install Low-Flow DHW Devices	Yes	311	0.0	0	$33	$29	$26	$3	0.1	313
TOTALS			**11,129**	**2.7**	**60**	**$1,691**	**$30,792**	**$5,407**	**$25,386**	**15.0**	**18,196**

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

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

Figure 6 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**10,351**	**2.5**	**-2**	**$1,070**	**$5,382**	**$1,256**	**$4,126**	**3.9**	**10,240**
ECM 1	Install LED Fixtures	3,005	0.0	0	$315	$1,838	$350	$1,488	4.7	3,026
ECM 2	Retrofit Fixtures with LED Lamps	7,195	2.5	-2	$740	$3,398	$906	$2,492	3.4	7,066
ECM 3	Install LED Exit Signs	151	0.0	0	$16	$145	$0	$145	9.3	149
Lighting Control Measures		**468**	**0.2**	**0**	**$48**	**$926**	**$125**	**$801**	**16.6**	**459**
ECM 4	Install Occupancy Sensor Lighting Controls	468	0.2	0	$48	$926	$125	$801	16.6	459
Domestic Water Heating Upgrade		**311**	**0.0**	**0**	**$33**	**$29**	**$26**	**$3**	**0.1**	**313**
ECM 6	Install Low-Flow DHW Devices	311	0.0	0	$33	$29	$26	$3	0.1	313
TOTALS		**11,129**	**2.7**	**-2**	**$1,151**	**$6,336**	**$1,407**	**$4,930**	**4.3**	**11,012**

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

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

Figure 7 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**10,351**	**2.5**	**-2**	**$1,070**	**$5,382**	**$1,256**	**$4,126**	**3.9**	**10,240**
ECM 1	Install LED Fixtures	3,005	0.0	0	$315	$1,838	$350	$1,488	4.7	3,026
ECM 2	Retrofit Fixtures with LED Lamps	7,195	2.5	-2	$740	$3,398	$906	$2,492	3.4	7,066
ECM 3	Install LED Exit Signs	151	0.0	0	$16	$145	$0	$145	9.3	149

When considering lighting upgrades, we suggest using a comprehensive design approach that simultaneously upgrades lighting fixtures and controls to maximize energy savings and improve occupant lighting. Comprehensive design will also consider appropriate lighting levels for different space types to make sure that the right amount of light is delivered where needed. If conversion to LED light sources are proposed, we suggest converting all of a specific lighting type (e.g., linear fluorescent) to LED lamps to minimize the number of lamp types in use at the facility, which should help reduce future maintenance costs.

ECM 1: Install LED Fixtures

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

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

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

Affected building areas: exterior wall packs at the pumping station.

ECM 2: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: all areas with fluorescent fixtures with T8 tubes.

ECM 3: Install LED Exit Signs

Replace compact fluorescent exit signs with LED exit signs. LED exit signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output. Maintenance savings and improved reliability may also be achieved, as the longer-lasting LED lamps will not need to be replaced as often as the existing lamps.

4.2 Lighting Controls

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**468**	**0.2**	**0**	**$48**	**$926**	**$125**	**$801**	**16.6**	**459**
ECM 4	Install Occupancy Sensor Lighting Controls	468	0.2	0	$48	$926	$125	$801	16.6	459

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: *Pumping station only*: office, pump room, sample room.

4.3 Gas-Fired Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**61**	**$540**	**$24,456**	**$4,000**	**$20,456**	**37.9**	**7,184**
ECM 5	Install High Efficiency Furnaces	0	0.0	61	$540	$24,456	$4,000	$20,456	37.9	7,184

ECM 5: Install High Efficiency Furnaces

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

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

Affected units: Reznor units in the pumping station's pump room.

4.4 Domestic Water Heating

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**311**	**0.0**	**0**	**$33**	**$29**	**$26**	**$3**	**0.1**	**313**
ECM 6	Install Low-Flow DHW Devices	311	0.0	0	$33	$29	$26	$3	0.1	313

ECM 6: Install Low-Flow DHW Devices

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

Device	Flow Rate
Faucet aerators (lavatory)	0.5 gpm
Faucet aerator (kitchen)	1.5 gpm

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.

Operation and maintenance (O&M) plans enhance the operational efficiency of HVAC and other energy intensive systems and could save between 5 to 20% of the energy usage in your building without substantial capital investment. A successful plan includes your records of energy usage trends and costs, building equipment lists, current maintenance practices, planned capital upgrades, and incorporates your ideas for improved building operation. Your plan will address goals for energy-efficient operation, provide detail on how to reach the goals, and will outline procedures for measuring and reporting whether goals have been achieved.

You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you 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[5] . Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Doors and Windows

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

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.

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

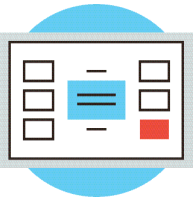
Lighting Controls

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

Motor Maintenance

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

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 5-10°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.

AC System Evaporator/Condenser Coil Cleaning

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

HVAC Filter Cleaning and Replacement

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

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

The lower the supply water temperature that is used for hand washing sinks, the less energy is needed to heat the water. Reducing the temperature results in energy savings and the change is often unnoticeable to users. Be sure to review the domestic water temperature requirements for sterilizers and dishwashers as you investigate reducing the supply water temperature.

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

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

Water Conservation

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

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

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

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

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

Procurement Strategies

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

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

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

6 On-site Generation

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

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

6.1 Solar Photovoltaic

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

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

This facility has a low potential for a cost-effective solar PV installation. To be cost-effective, a solar PV array needs certain minimum criteria, such as sufficient and 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.

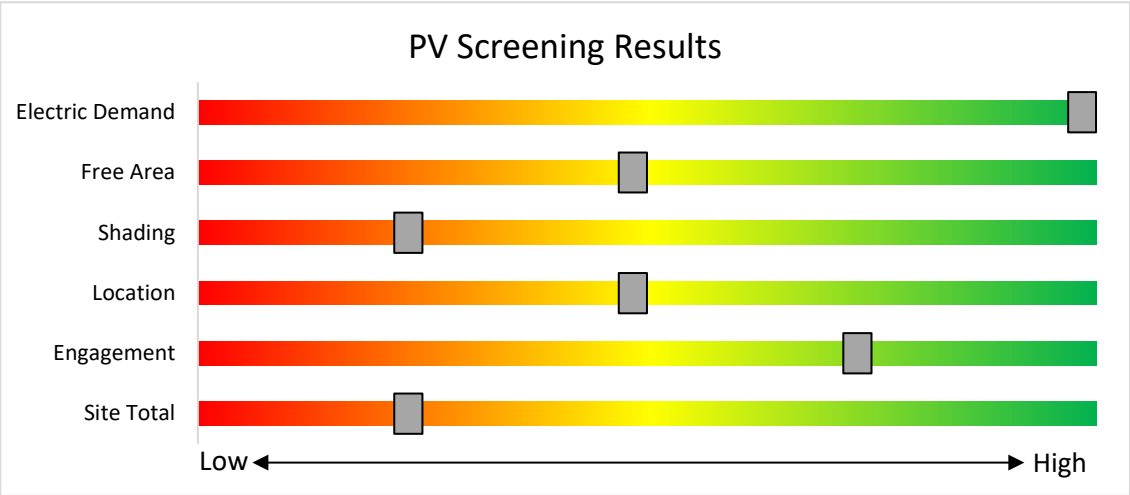


Figure 8 - Photovoltaic Screening

Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program 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 TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installation.

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:

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

6.2 Combined Heat and Power

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

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

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

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

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

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

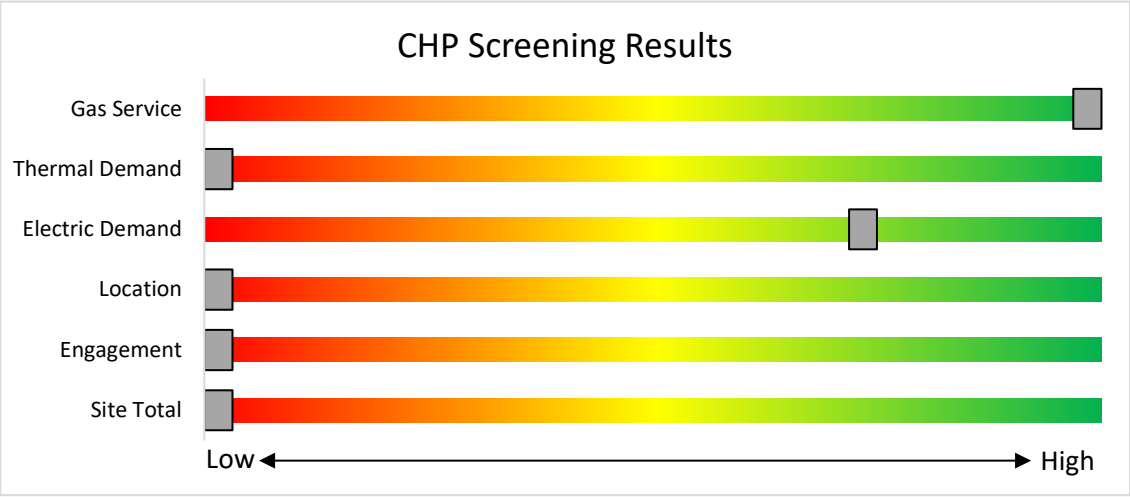


Figure 9 - Combined Heat and Power Screening

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

7 Project Funding and Incentives

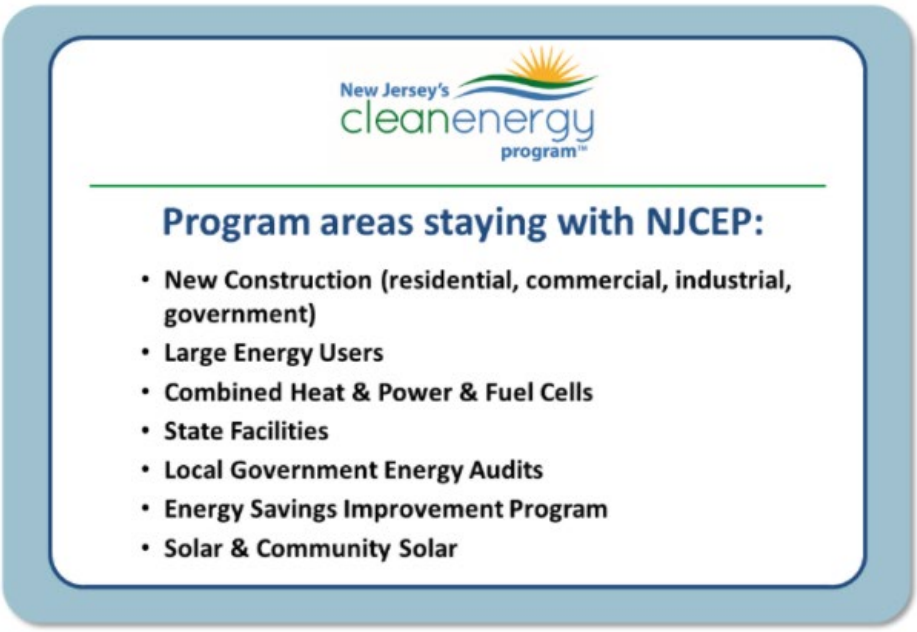
Ready to improve your building's performance? Your utility provider may be able to help.

7.1 Utility Energy Efficiency Programs

New utility programs are expected to start rolling out in the spring and summer of 2021. Keep up to date with developments by visiting the NJCEP website.

8 New Jersey's Clean Energy Programs

New Jersey's Clean Energy Program will continue to offer some energy efficiency programs.



8.1 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] Gas Internal Combustion Engine	≤500 kW	$2,000	30-40%[2]	$2 million
	>500 kW - 1 MW	$1,000		
Gas Combustion Turbine Microturbine Fuel Cells with Heat Recovery	> 1 MW - 3 MW	$550	30%	$3 million
	>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.

8.2 Energy Savings Improvement Program

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

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

How to Participate

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

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

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

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

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

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

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

8.3 Transition Incentive (TI) Program

The TI program is a bridge between the Legacy SREC Program and a to-be determined Successor Incentive Program. The program 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 TRECs (Transition Incentive Renewable Energy Certificates). The Transition Incentive is structured as a factorized renewable energy certificate. The factors allow the TI Program to provide differentiated financial incentives for different types of solar installations. NJBPU calculates the value of a Transition Renewable Energy Certificate (TREC) by multiplying the base compensation rate ($152/MWh) by the project's assigned factor (i.e., $152 x 0.85 = $129.20/MWh). The TREC factors are defined based on the chart below:

Project Type	Factor
Subsection (t): landfill, brownfield, areas of historic fill	1.00
Grid supply (Subsection (r)) rooftop	1.00
Net metered non-residential rooftop and carport	1.00
Community solar	0.85
Grid supply (Subsection (r)) ground mount	0.60
Net metered residential ground mount	0.60
Net metered residential rooftop and carport	0.60
Net metered non-residential ground mount	0.60

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 TRECs.

Eligible projects may generate TRECs for 15 years following the commencement of commercial operations (also referred to as the "Transition Incentive Qualification Life"). After 15 years, projects may be eligible for a New Jersey Class I REC.

TRECs will be used by the identified compliance entities to satisfy a compliance obligation tied to a new Transition Incentive Renewable Portfolio Standard ("TI-RPS"), which will exist in parallel with, and completely separate from, the existing Solar RPS for Legacy SRECs. The TI-RPS is a carve-out of the current Class I RPS requirement. The creation of TRECs is based upon metered generation supplied to PJM-EIS General Attribute Tracking System ("GATS") by the owners of eligible facilities or their agents. GATS would create one TREC for each MWh of energy produced from a qualified facility.

TRECs will be purchased monthly by a TREC Administrator who will allocate the TRECs to the Load Serving Entities (BGS Providers and Third-Party Suppliers) annually based on their market share of retail electricity sold during the relevant Energy Year.

Solar projects help the State of New Jersey reach renewable energy goals outlined in the state's Energy Master Plan. The Transition Incentive Program online portal is now open to new applications effective May 1, 2020. There are instructions on "How and When to Transfer my SRP Registration to the Transition Incentive Program". If you are considering installing solar photovoltaics on your building, visit the following link for more information:

https://www.njcleanenergy.com/renewable-energy/programs/transition-incentive-program

9 Project Development

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

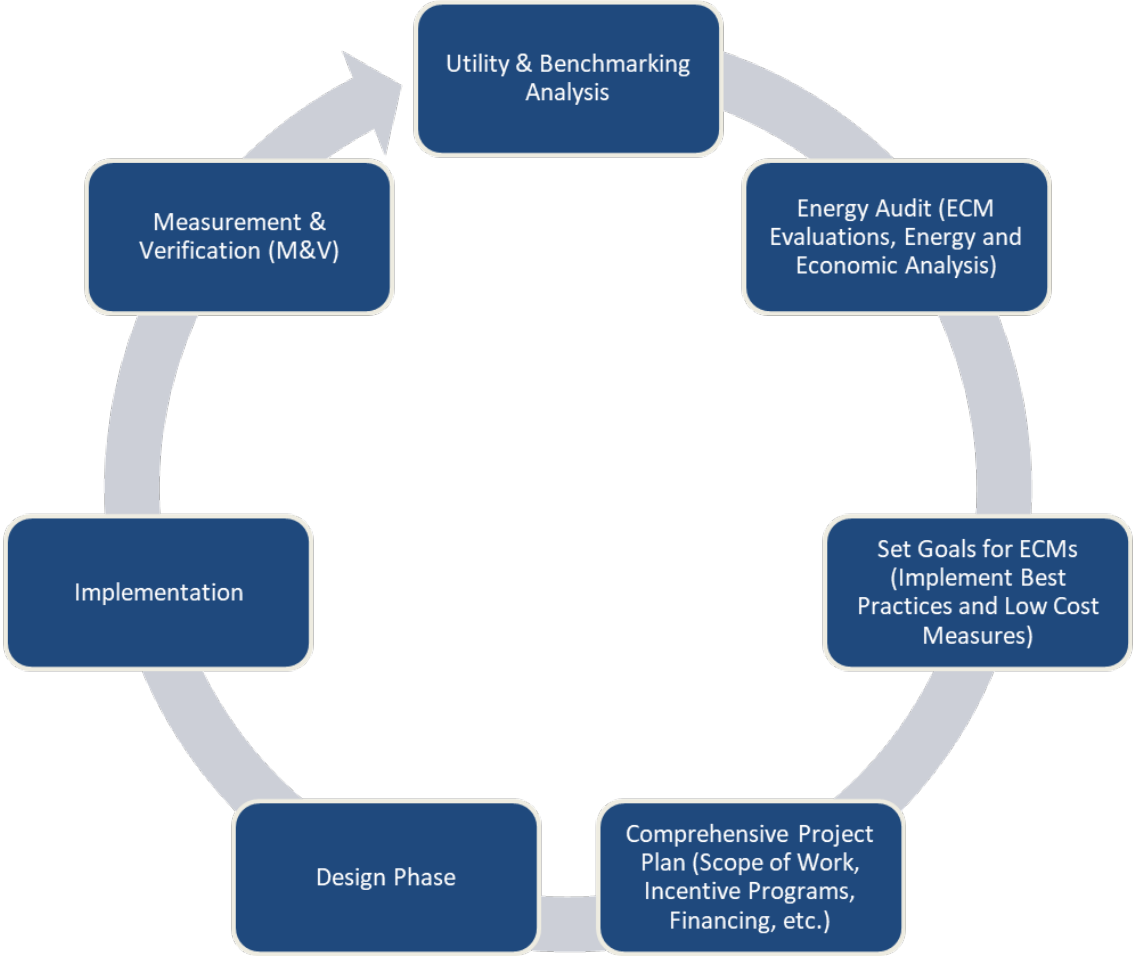


Figure 10 – Project Development Cycle

10 Energy Purchasing and Procurement Strategies

10.1 Retail Electric Supply Options

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

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

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

10.2 Retail Natural Gas Supply Options

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

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

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

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

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Chemical Storage	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	2,920	2	Relamp	No	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,920	0.5	1,769	0	$182	$621	$170	2.5
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,920	2, 4	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,015	0.1	530	0	$54	$416	$75	6.3
Pump room	2	Exit Signs: Fluorescent	None		14	8,760	3	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.0	151	0	$16	$145	$0	9.3
Pump room	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	2,920	2, 4	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,015	0.4	1,457	0	$150	$942	$180	5.1
Pump room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	0	2, 4	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	0	0.2	0	0	$0	$219	$60	0.0
Restroom - Unisex 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,460	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,460	0.0	78	0	$8	$55	$15	5.0
Sample room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	S	93	1,460	2, 4	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,007	0.1	199	0	$20	$226	$50	8.6
Treatment plant	7	Metal Halide: (1) 100W Lamp	Photocell		128	4,380	1	Fixture Replacement	No	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	30	4,380	0.0	3,005	0	$315	$1,838	$350	4.7
Exterior 1	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock		15	4,380		None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Timeclock	15	4,380	0.0	0	0	$0	$0	$0	0.0
Locker room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,564	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,564	0.1	112	0	$11	$73	$20	4.6
Office - 1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,564	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,564	0.1	112	0	$11	$73	$20	4.6
Office - 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,564	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,564	0.1	112	0	$11	$73	$20	4.6
Office - 3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,564	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,564	0.1	112	0	$11	$73	$20	4.6
Office - 4	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,564	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,564	0.1	112	0	$11	$73	$20	4.6
Office - 5	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	S	62	1,564	2	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,564	0.1	112	0	$11	$73	$20	4.6
Office lobby	2	Exit Signs: LED - 2 W Lamp	None		6	8,760		None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.0	0	0	$0	$0	$0	0.0
Office lobby	8	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	S	33	2,920	2	Relamp	No	8	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,920	0.1	404	0	$42	$260	$48	5.1
Office lobby	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,920	2	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,920	0.4	1,413	0	$145	$584	$160	2.9
Office lobby	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	S	114	2,920	2	Relamp	No	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,920	0.3	1,060	0	$109	$438	$120	2.9
Restroom - Female 1	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	730	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	730	0.0	39	0	$4	$55	$15	9.9
Restroom - Male	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	S	93	730	2	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	730	0.0	39	0	$4	$55	$15	9.9

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Storage 1	1	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Occupancy Sensor	S	22	500	2	Relamp	No	1	LED - Linear Tubes: (1) 2' Lamp	Occupancy Sensor	9	500	0.0	7	0	$1	$16	$3	17.7

Motor Inventory & Recommendations

		Existing Conditions									Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Manufacturer	Model	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Pump Room	Pump Room	1	Other	1.0	70.0%	No	Unknown	Unknown	W	30		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Pump Room	Pump Room	1	Water Supply Pump	400.0	95.4%	Yes	Emerson	7322-B6-Q2	W	4,380		No	95.4%	No		0.0	0	0	$0	$0	$0	0.0
Pump Room	Pump Room	1	Water Supply Pump	400.0	96.2%	Yes	Nidec	7226 BCBM Q2	W	4,380		No	96.2%	No		0.0	0	0	$0	$0	$0	0.0
Pump Room	Pump Room	1	Water Supply Pump	75.0	95.0%	Yes	Emerson	10705785-100	W	8,760		No	95.0%	No		0.0	0	0	$0	$0	$0	0.0
Ceiling Mounted	Bathroom, Kitchen, and Office	1	Supply Fan	0.5	70.0%	No	Unknown	Unknown	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Pump Room	Pump Room	3	Supply Fan	0.3	70.0%	No	Reznor	Unknown	W	1,830		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Pump Room	Pump Room	1	Supply Fan	0.3	70.0%	No	Reznor	Unknown	W	0		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Chemical Storage Room	Chemical Storage Room	2	Process Pump	0.2	49.0%	No	Baldor	L3400	W	8,760		No	49.0%	No		0.0	0	0	$0	$0	$0	0.0
Chemical Storage Room	Chemical Storage Room	2	Process Pump	0.1	65.0%	No	Emec	AAU15006K9803G1DA000	W	8,760		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Chemical Storage Room	Chemical Storage Room	2	Process Pump	0.2	65.0%	Yes	Pulsatron	LMH5TA-VTC3-U04	W	4,380		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Chemical Storage Room	Chemical Storage Room	2	Process Pump	0.1	65.0%	Yes	Pulsatron	LMB2TA-KTCJ-XXX	W	4,380		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Chemical Storage Room	Chemical Storage Room	2	Process Pump	0.5	70.0%	No	WEG	5036ES1BW56C1S	W	26		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Chemical Storage Room	Chemical Storage Room	2	Process Pump	0.5	70.0%	No	WEG	5036ES1BB56C	W	15		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
Chemical Storage Room	Chemical Storage Room	2	Process Pump	1.0	77.5%	No	WEG	00136ES3EB56C	W	20		No	77.5%	No		0.0	0	0	$0	$0	$0	0.0
Bathroom	Bathrooms	2	Exhaust Fan	0.2	65.0%	No	Unknown	Unknown	W	365		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Exterior	Office	3	Supply Fan	0.3	70.0%	No	Bard	Unknown	W	2,745		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Chemical Storage	Chemical Storage	1	Forced Air Furnace		250.00		0.8 AFUE	Unknown	Unknown	W	5	Yes	1	Forced Air Furnace		250.00		0.9 AFUE	0.0	0	32	$284	$7,075	$1,000	21.4
Pump room	Pump room	1	Split-System	3.00	36.00	11.00	1 COP	Unknown	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Pump room	Pump room	3	Forced Air Furnace		75.00		0.8 AFUE	Reznor	Unknown	W	5	Yes	3	Forced Air Furnace		75.00		0.9 AFUE	0.0	0	29	$256	$17,381	$3,000	56.2
Pump room	Pump room	1	Forced Air Furnace		75.00		0.8 AFUE	Reznor	Unknown	W		No							0.0	0	0	$0	$0	$0	0.0
Exterior	Water Dept. Office	3	Package Unit	3.00	51.18	9.00	1 COP	Bard	W36AA-A15	W		No							0.0	0	0	$0	$0	$0	0.0

DHW Inventory & Recommendations

		Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Manufacturer	Model	Remaining Useful Life	ECM #	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Sample Room	Bathroom and Sample Room	1	Storage Tank Water Heater (≤ 50 Gal)	A.O. Smith	EJC-6-200	W		No						0.0	0	0	$0	$0	$0	0.0
Restroom - Female 1	Bathroom and Kitchen	1	Tankless Water Heater	Eemax	EX65 SL	N		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	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Sample room	6	1	Faucet Aerator (Kitchen)	2.20	1.50	0.0	57	0	$6	$7	$4	0.5
Restroom - Unisex 1	6	1	Faucet Aerator (Lavatory)	2.20	0.50	0.0	139	0	$15	$7	$7	0.0
Restrooms	6	2	Faucet Aerator (Lavatory)	1.20	0.50	0.0	114	0	$12	$14	$14	0.0

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Office	2	Desktop	270	Yes	Unknown	Unknown
Pump room	1	Fan	100	No	Unknown	Unknown
Office lobby	1	Coffee Maker	900	No	Unknown	Unknown
Offices	13	Desktop	270	Yes	Unknown	Unknown
Office - 5	1	Electric Space Heater	1,000	No	Unknown	Unknown
Office lobby	1	Microwave	1,500	No	Unknown	Unknown
Storage 1	1	Server Equipment	1,000	No	Unknown	Unknown
Office lobby	1	Printer/Copier (Large)	600	No	Unknown	Unknown
Office lobby	1	Refrigerator (Residential)	550	No	Unknown	Unknown
Office lobby	1	Television	130	No	Unknown	Unknown
Office lobby	1	Toaster Oven	1,000	No	Unknown	Unknown

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.

This facility is not registering as mixed-use facility, therefore this building is not eligible for median site and source EUI. The SEP is shown below, but the value is blank for the national median comparison.

LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

Chestnut Street Water Office & Pumping Station

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 5,768
Built: 2008

For Year Ending: November 30, 2020
Date Generated: June 25, 2021

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
Chestnut Street Water Office & Pumping Station 632 Chestnut Street City of Orange Township, New Jersey 07050	Orange Township City Municipality 29 North Day Street Orange Township, City of, NJ 07050 862-438-0647	Kathrina Nease 29 North Day Street Orange Township, City of, NJ 07050 862-438-0647 knease@orangenj.gov

Property ID: 11867839

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
1,114.6 kBtu/ft²

Source EUI
2,952.3 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	555,114 (9%)
Electric - Grid (kBtu)	5,873,652 (91%)

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)	592

Signature & Stamp of Verifying Professional

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

LP Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer or Registered Architect Stamp (if applicable)

APPENDIX C: GLOSSARY

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

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

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