Local Government Energy Audit Report

Wells and Pump Stations

November 9, 2021

Prepared for:

City of Orange Township

Various

Orange, West Orange, Short Hills, Millburn, New Jersey 07050

Prepared by:

TRC

900 Route 9 North

Woodbridge, New Jersey 07095

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.

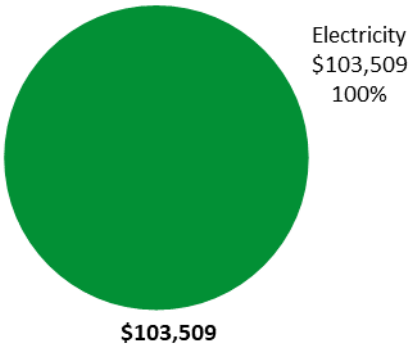
These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). All of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs and 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 the Wells and Pump Stations. 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: $103,509 Electricity: 817,107 kWh	
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.

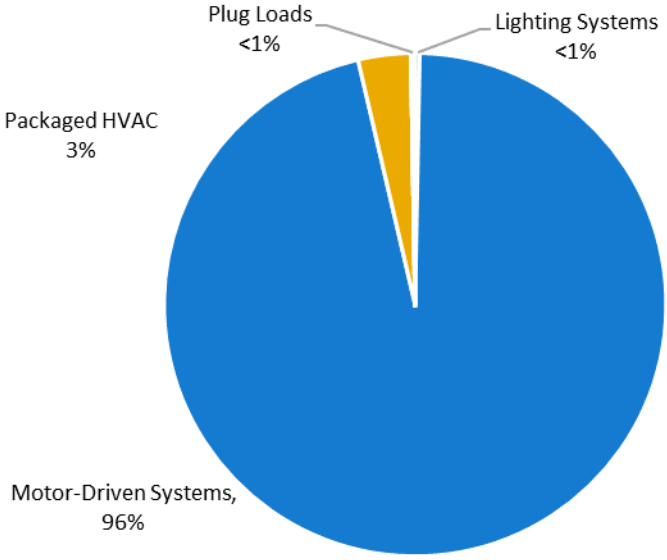


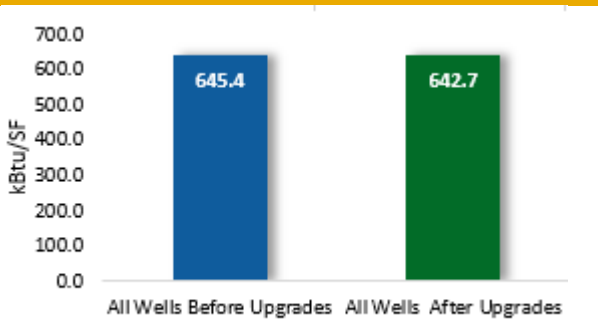
Figure 1 - Energy Use by System

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.

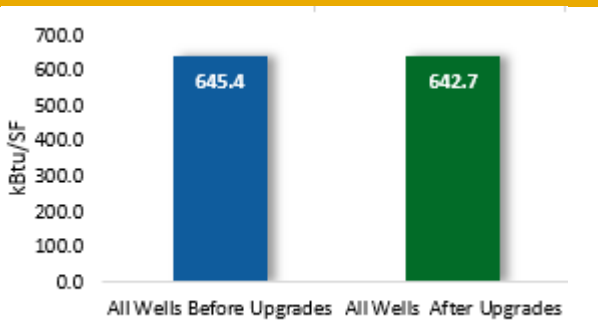
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$5,718
Potential Rebates & Incentives[1]	$315
Annual Cost Savings	$435
Annual Energy Savings	Electricity: 3,434 kWh
Greenhouse Gas Emission Savings	2 Tons
Simple Payback	12.4 Years
Site Energy Savings (all utilities)	0%



Scenario 2: Cost Effective Package[2]

Installation Cost	$4,473
Potential Rebates & Incentives	$175
Annual Cost Savings	$426
Annual Energy Savings	Electricity: 3,361 kWh
Greenhouse Gas Emission Savings	2 Tons
Simple Payback	10.1 Years
Site Energy Savings (all utilities)	0%



On-site Generation Potential

Photovoltaic	None
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			**1,508**	**0.5**	**0**	**$191**	**$1,834**	**$175**	**$1,659**	**8.7**	**1,519**
ECM 1	Install LED Fixtures	Yes	1,103	0.0	0	$140	$1,200	$20	$1,180	8.4	1,111
ECM 2	Retrofit Fixtures with LED Lamps	Yes	405	0.5	0	$51	$634	$155	$479	9.3	408
Lighting Control Measures			**73**	**0.1**	**0**	**$9**	**$1,245**	**$140**	**$1,105**	**119.7**	**73**
ECM 3	Install Occupancy Sensor Lighting Controls	No	73	0.1	0	$9	$1,245	$140	$1,105	119.7	73
HVAC System Improvements			**1,852**	**0.0**	**0**	**$235**	**$2,639**	**$0**	**$2,639**	**11.2**	**1,865**
ECM 4	Install Programmable Thermostats	Yes	1,852	0.0	0	$235	$2,639	$0	$2,639	11.2	1,865
TOTALS (COST EFFECTIVE MEASURES)			**3,361**	**0.5**	**0**	**$426**	**$4,473**	**$175**	**$4,298**	**10.1**	**3,384**
TOTALS (ALL MEASURES)			**3,434**	**0.6**	**0**	**$435**	**$5,718**	**$315**	**$5,403**	**12.4**	**3,458**

* - 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 the Wells and Pump Stations. 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 Wells and Pump Stations located in Orange, West Orange, Short Hills, and Millburn, New Jersey. TRC met with John Dombrauskas to review the facility operations and help focus our investigation on specific energy-using systems.

There are a total of six buildings that were included in this review of the Wells and Pump Stations for a total of 4,320 square feet. The various buildings were constructed between 1942 and 1952. Each building includes a single open space for the mechanical equipment. The facilities are all-electric, and approximately 96% of the associated energy use is attributed to water pumping.

Recent improvements include the installation of supervisory control and data acquisition (SCADA) equipment, new variable frequency drive (VFD) pump controls, and upgrades to pump motors.

2.2 Building Occupancy

These facilities are rarely occupied as there is remote control of the pumps through the SCADA system, although staff can access the buildings 24/7 as needed.

Building Name	Weekday/Weekend	Operating Schedule
Well 2	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
Well 3	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
Well 4	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
Well 6	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
Walker Holding Tank	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM
Walker Holding Tank	Weekday	12:00 AM - 12:00 AM
	Weekend	12:00 AM - 12:00 AM

Figure 3 - Building Occupancy Schedule

2.3 Building Envelope

Well 2

Well 2 is constructed of concrete block with a brick façade. The roof is pitched with shingles and appears to be in fair condition. The roof encloses conditioned space, as the well building is heated during the winter months.

There are two windows that appear to be singled paned with aluminum frames. There is a single exterior door with an aluminum frame in fair condition.

Well 2 Exterior

Well 2 Window

Well 3

Well 3 is constructed of concrete block with a brick façade. The roof is pitched with asphalt shingles and supported with a wood structure. The roof appears to be in poor condition with significant moss growing on the shingles. The roof encloses conditioned space, as the building is heated during the winter months.

There are two windows which appear to be singled paned with aluminum frames. There is a single exterior door with an aluminum frame in fair condition.

Well 3 Exterior

Well 3 Window

Well 3 Building Interior

Well 4

Well 4 is constructed of concrete block with a brick façade. The roof is pitched with asphalt shingles and supported with a wood structure. The roof appears to be in fair condition. The roof encloses conditioned space, as the building is heated during the winter months.

There are two windows that appear to be singled paned with aluminum frames. There is a single exterior door with an aluminum frame in fair condition.

Well 4 Building

Well 4 Building Interior

Well 4 Interior- Roof Support

Well 6

Well 6 is constructed of concrete block with a brick façade. The roof is flat, but was not directly observed while on site, but it appears to be in fair condition. The roof encloses conditioned space, as the building is heated during the winter months.

There are four windows that appear to be singled paned with aluminum frames. There is a single exterior door with an aluminum frame in fair condition.

Well 6 Exterior

Well 6 Windows

Walker Holding Tank

There are two similar vaults located on the Walker Holding Tank site. One is referred to as Winding Way and the other as the North American Interconnect. Both are almost entirely below grade and comprised of a concrete structure. The interior walls are plywood and appear to be in fair shape. There is no insulation in the construction of these vaults, but the temperatures are moderate due to the underground location.

Each vault has a single metal vault door that is always closed when staff are not on site.

Winding Way Vault Door

Winding Way Concrete Vault

North American Interconnect Vault Entry

North American Interconnect Vault Interior

2.4 Lighting Systems

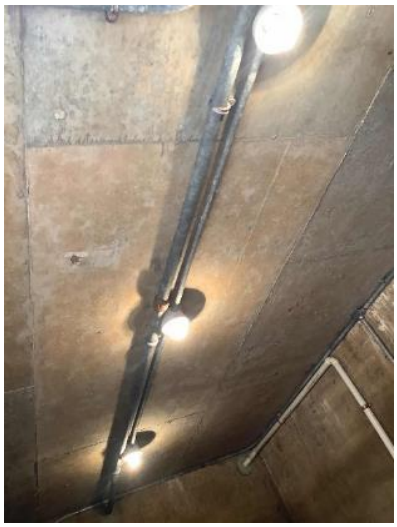
The primary interior lighting systems in the four well buildings consists of fluorescent fixtures with 32-Watt linear T8 lamps. Typically, T8 fluorescent lamps use electronic ballasts. The two vaults at Walker Holding Tank use 60-Watt incandescent bulbs.

Fixture types include 2-lamp 4-foot surface mounted or suspended fixtures. Most fixtures are in fair condition. Interior lighting levels were generally sufficient.

Well 3 Fluorescent Fixture

Well 4 Fluorescent Fixtures

Well 2 Fluorescent Fixture



Walker Holding Tank Incandescent Fixtures

Light fixtures in all four well buildings are controlled by wall switches.

The light fixtures in the two buildings at Walker Holding Tank are controlled by pressure switch sensors connected to the vault door. These sensors act as occupancy sensors, as fixtures operate any time the vault door is open. As soon as the door closes, which should not occur when the space is occupied, the lights are turned off.

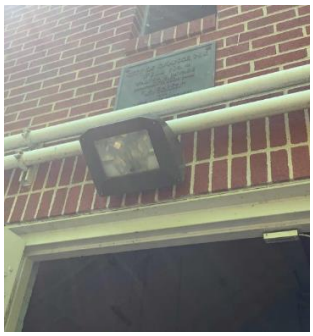
Well 2 Wall Switch

Well 6 Wall Pack and Photocell

Well 2 Time Clock

Walker Holding Tank Pressure Sensor

Exterior lighting is provided by wall pack fixtures with high intensity discharge (HID) lamps. Exterior light fixtures are controlled by either a time clock or a wall mounted photocell, depending on the fixture. It was observed that the timeclock at Well 3 was not operable, and the associated exterior fixture does not currently operate.



Well 3 Wall Pack

Well 6 Wall Pack

2.5 Air Handling Systems

Unitary Heating Equipment

All buildings, except for the North American Water Interconnect vault at the Walker Holding Tank site are heated by electric resistance fan heaters. These vary in capacity between 2 and 5 kW. The units are generally in fair condition. Equipment is controlled by a manual thermostat, which had different set points in each building, but they were set in the range of 65 - 70 °F at the time of the audit.

The North American Interconnect Vault at the Walker Holding Tank site is heated with a portable 1.2 kW electric resistance heater that was unplugged at the time of the audit.

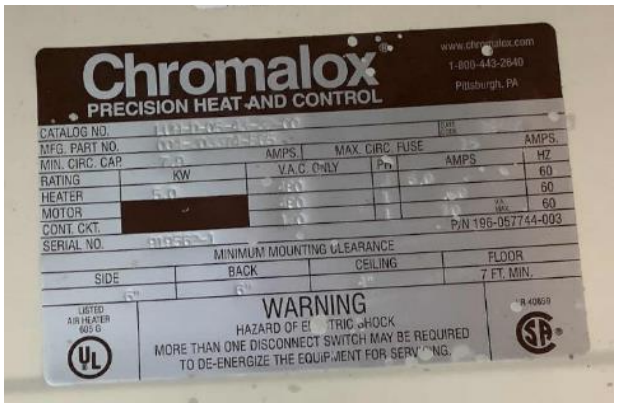
Well 2 Unit Heater

Well 3 Manual Thermostat

Well 4 Thermostat

Well 4 Unit Heater

Well 6 Unit Heater



Well 6 Heater Nameplate

North American Water Interconnect Vault-Unplugged Electric Heater

2.6 Motors, Pumps, and Generators

Well 2

Well 2 has an average flow rate of 0.7 MGD, calculated based on the pump capacity in gallons per minute (GPM) over an annualized basis. The average flow rate was calculated for other wells in the same manner. Equipment operation, however, varies based on flow and water demand. The system is comprised of one well pump. The Well 2 pump is a 75 hp pump, which appears in good condition. This pump and motor were installed around 2014, and the motor was rebuilt within the last four years. This pump has a VFD controller that can be remotely adjusted with the SCADA system, and it is located in the pump room.

There is a rooftop exhaust fan that staff confirmed does not operate and a fractional horsepower sump pump that operates only when water levels rise in the facility.

Well 2 VFD

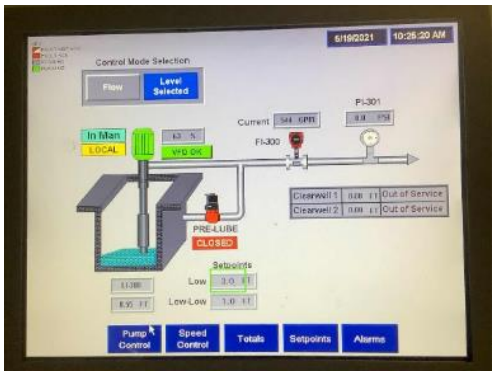
Well 2 Supply Pump

Well 3

Well 3 has an average flow rate calculated at 0.8 MGD. Equipment operation varies based on flow and water demand. The system is comprised of one well pump. The Well 3 pump is a 100 hp pump, which appears in good condition. This pump has a VFD controller that can be remotely adjusted with the SCADA system, and it is located in the pump room.

There is a rooftop exhaust fan that staff confirmed does not operate and a fractional horsepower sump pump that operates only when water levels rise in the facility.

Well 3 Supply Pump VFD Display



Well 3 SCADA Display

Well 3 Sump Pump

Well 3 Supply Pump

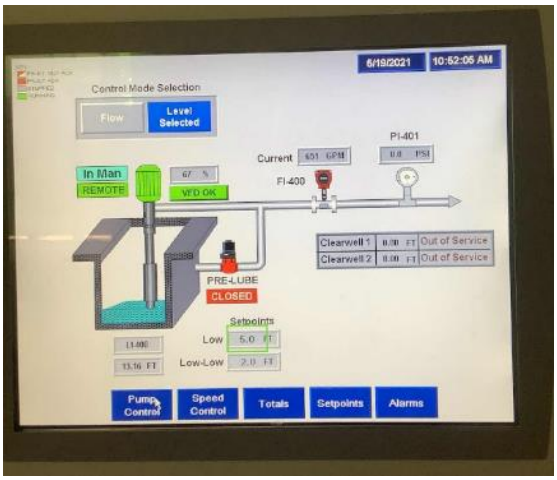
Well 4

Well 4 has an average flow rate calculated at 0.9 MGD. Equipment operation varies based on flow and water demand. The system is comprised of one well pump. The Well 4 pump is a submersible 50 hp pump, which appears in good condition. This pump and motor were installed around 2016. This pump has a VFD controller that can be remotely adjusted with the SCADA system, and it is located in the pump room.

There is a rooftop exhaust fan that staff confirmed does not operate and a fractional horsepower sump pump that operates only when water levels rise in the facility.

Well 4 VFD

Well 4 Submersible Pump Sticker (on VFD)

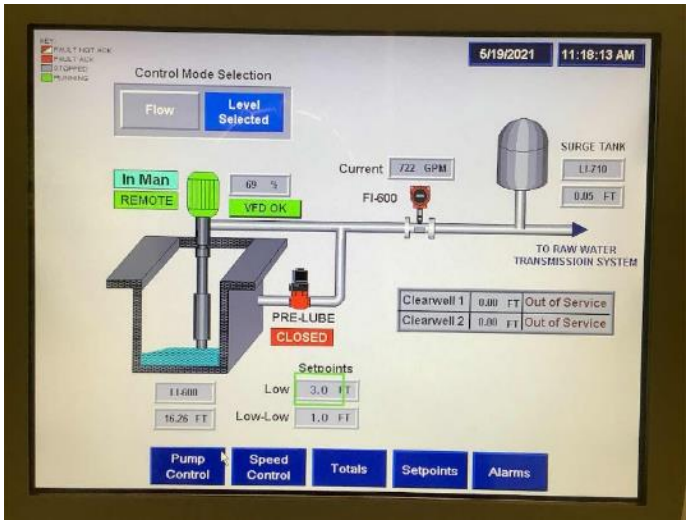


Well 4- SCADA Display

Well 4 – Sump Pump

Well 6

Well 6 has an average flow rate calculated at 1 MGD. Equipment operation varies based on flow and water demand. This site has two wells, one of which was retired 10 years ago. The current system operates with one well pump. The Well 6 pump is a submersible pump with an estimated 100 hp pump, which appears in good condition. This pump was installed 10 years ago. This pump has a VFD controller that can be remotely adjusted with the SCADA system, and it is located in the pump room.



Well 6 SCADA Display

Well 6 VFD

Walker Holding Tank

There are no supply pumps in either of the two vaults at Walker Holding Tank. Both facilities house manually operated valves, but do they not have supply pump capability, as the water is gravity fed from the Walker Holding Tank into the water distribution systems.

Each vault has a fractional horsepower sump pump that operates only when required.

North American Interconnect Sump Pump

Winding Way Sump Pump

Generators

Diesel generators provide backup power to Well #2, #3, #4, and #6 as needed. There is a mix of mobile and fixed site generators. They are rarely operated and were not included in the energy analysis for this report.

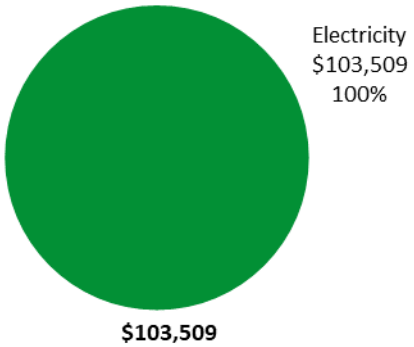
Well 3 Generator

Well 6 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	817,107 kWh	$103,509
Total		**$103,509**



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.

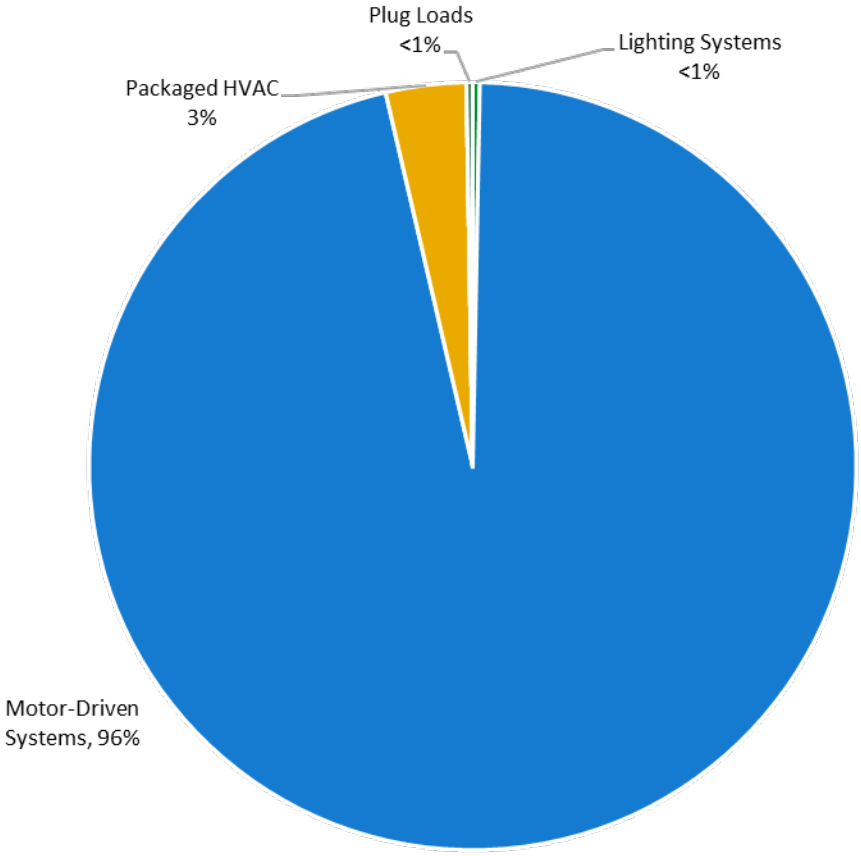
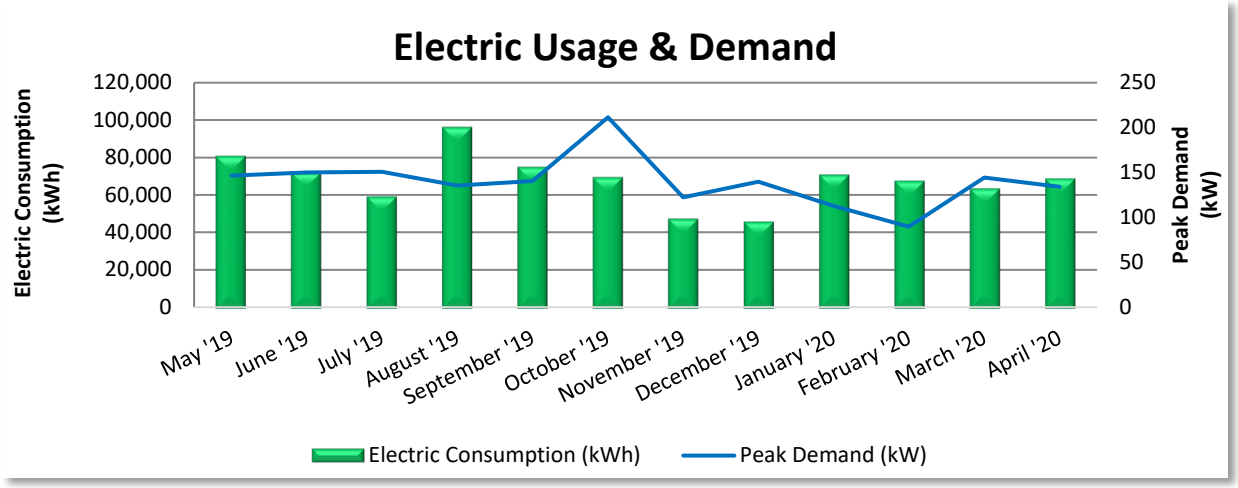


Figure 4 - Energy Balance

3.1 Electricity

JCP&L and PSE&G delivers electricity under rate class GSIS, GSS, GS1, GLP, with electric production for some sites provided by Hudson Energy, a third-party supplier.



Electric Billing Data					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
5/30/19	31	80,875	147	474	10,407
6/29/19	30	72,256	150	886	9,356
7/29/19	30	59,556	151	641	8,032
8/30/19	32	96,239	136	636	12,650
10/2/19	33	75,174	140	643	9,930
10/31/19	29	69,731	211	379	9,020
11/30/19	30	47,808	122	184	5,994
12/30/19	30	46,263	140	256	5,917
1/30/20	31	71,018	113	96	8,400
2/28/20	29	67,751	90	32	8,207
3/29/20	30	63,698	144	869	7,655
4/29/20	31	68,977	134	186	8,224
Totals	**366**	**819,346**	**211**	**$5,281**	**$103,793**
Annual	**365**	**817,107**	**211**	**$5,266**	**$103,509**

Notes:

- Peak demand of 211 kW occurred in October '19.
- Average demand over the past 12 months was 140 kW.
- The average electric cost over the past 12 months was $0.127/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 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.

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

Tracking Your Energy Performance

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

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

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

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

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

4 Energy Conservation Measures

The goal of this audit report is to identify and evaluate potential energy efficiency improvements 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			**1,508**	**0.5**	**0**	**$191**	**$1,834**	**$175**	**$1,659**	**8.7**	**1,519**
ECM 1	Install LED Fixtures	Yes	1,103	0.0	0	$140	$1,200	$20	$1,180	8.4	1,111
ECM 2	Retrofit Fixtures with LED Lamps	Yes	405	0.5	0	$51	$634	$155	$479	9.3	408
Lighting Control Measures			**73**	**0.1**	**0**	**$9**	**$1,245**	**$140**	**$1,105**	**119.7**	**73**
ECM 3	Install Occupancy Sensor Lighting Controls	No	73	0.1	0	$9	$1,245	$140	$1,105	119.7	73
HVAC System Improvements			**1,852**	**0.0**	**0**	**$235**	**$2,639**	**$0**	**$2,639**	**11.2**	**1,865**
ECM 4	Install Programmable Thermostats	Yes	1,852	0.0	0	$235	$2,639	$0	$2,639	11.2	1,865
TOTALS			**3,434**	**0.6**	**0**	**$435**	**$5,718**	**$315**	**$5,403**	**12.4**	**3,458**

* - 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 5 – 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		**1,508**	**0.5**	**0**	**$191**	**$1,834**	**$175**	**$1,659**	**8.7**	**1,519**
ECM 1	Install LED Fixtures	1,103	0.0	0	$140	$1,200	$20	$1,180	8.4	1,111
ECM 2	Retrofit Fixtures with LED Lamps	405	0.5	0	$51	$634	$155	$479	9.3	408
Lighting Control Measures		**0**	**0.0**	**0**	**$0**	**$0**	**$0**	**$0**	**0.0**	**0**
ECM 3	Install Occupancy Sensor Lighting Controls	0	0.0	0	$0	$0	$0	$0	0.0	0
HVAC System Improvements		**1,852**	**0.0**	**0**	**$235**	**$2,639**	**$0**	**$2,639**	**11.2**	**1,865**
ECM 4	Install Programmable Thermostats	1,852	0.0	0	$235	$2,639	$0	$2,639	11.2	1,865
TOTALS		**3,361**	**0.5**	**0**	**$426**	**$4,473**	**$175**	**$4,298**	**10.1**	**3,384**

* - 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 – 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		**1,508**	**0.5**	**0**	**$191**	**$1,834**	**$175**	**$1,659**	**8.7**	**1,519**
ECM 1	Install LED Fixtures	1,103	0.0	0	$140	$1,200	$20	$1,180	8.4	1,111
ECM 2	Retrofit Fixtures with LED Lamps	405	0.5	0	$51	$634	$155	$479	9.3	408

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.

ECM 2: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: pump rooms and Walker holding tank vaults.

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		**73**	**0.1**	**0**	**$9**	**$1,245**	**$140**	**$1,105**	**119.7**	**73**
ECM 3	Install Occupancy Sensor Lighting Controls	73	0.1	0	$9	$1,245	$140	$1,105	119.7	73

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 3: Install Occupancy Sensor Lighting Controls

Evaluate 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. The payback is projected as long for these buildings since there is minimal connected lighting load and very little runtime for the fixtures.

Affected building areas: pump rooms.

4.3 HVAC Improvements

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**1,852**	**0.0**	**0**	**$235**	**$2,639**	**$0**	**$2,639**	**11.2**	**1,865**
ECM 4	Install Programmable Thermostats	1,852	0.0	0	$235	$2,639	$0	$2,639	11.2	1,865

ECM 4: Install Programmable Thermostats

Replace manual thermostats with programmable thermostats which provide energy savings by reducing heating energy usage. Manual thermostats are generally adjusted to a single heating and cooling setpoint and left at that setting regardless of occupancy and they provide the same level of heating and cooling regardless of whether the space is being used. Programmable thermostats can maintain different temperature settings for different times of day and for different days of the week. By reducing heating temperature setpoints and raising cooling temperature setpoints when spaces are unoccupied, the operation of the HVAC equipment is reduced while maintaining comfortable space temperatures for building usage.

In these buildings, because the spaces are occupied intermittently, we recommend you program the heaters to maintain a maximum of 55 degrees for freeze protection. If desired, you may be able to procure a unit that includes a pushbutton override feature that will permit an occupant to increase the space temperature on a temporary basis. With this type of unit, after a pre-determined interval, say 15 minutes, the temperature setting will reset at the standard minimum level if programmed correctly.

4.4 Measures for Future Consideration

There are additional opportunities for improvement that City of Orange Township may wish to consider. These potential upgrades typically require further analysis, involve substantial capital investment and/or include significant system reconfiguration. These measures are therefore beyond the scope of this energy audit. These measures are described here to support a whole building approach to energy efficiency and sustainability.

City of Orange Township may wish to consider the Energy Savings Improvement Program (ESIP) or other whole building approach. With interest in implementing comprehensive, largescale and/or complex system wide projects, these measures may be pursued during development of a future energy savings plan. We recommend that you work with your energy service company (ESCO) and/or design team to:

- evaluate these measures further
- develop firm costs
- determine measure savings
- prepare detailed implementation plans.

Other modernization or capital improvement funds may be leveraged for these types of refurbishments. As you plan for capital upgrades, be sure to consider the energy impact of the building systems and controls being specified.

Window Replacements

Energy efficient windows are an important consideration when improving the building envelope. The heat transfer through the glass panes is responsible for a significant portion of the facility's heating and cooling energy consumption. We recommend replacing single pane windows with double pane windows and considering models that are gas-filled with low-e coatings to reduce heat loss. Windows should be selected with low- U-factors to maximize energy savings. The U-factor is the rate at which the window conducts non-solar heat flow and is a key indicator of performance. The lower the U-factor, the higher the efficiency of the window. Window frames and sashes should be efficient as well. If metal frames are specified or required by code, the frame extrusions should have a thermal break to reduce conduction through the frame. As part of the installation, the window frames should be properly sealed with caulk materials to ensure the mitigation of air infiltration. Building envelopes that limit air infiltration and that have adequate fenestrations play a key role in optimizing heating and cooling efficiency, controlling moisture, and providing occupant comfort. Window system replacement is an expensive upgrade that generally involves architectural elements. In your case, improvements to the building envelope of the well buildings can help preserve the useful life of the pumping and controls equipment. We recommend this as a measure for further study.

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[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.

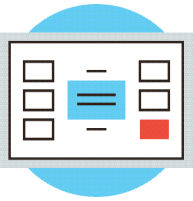
In addition to routine cleaning, developing a maintenance schedule can ensure that maintenance is performed regularly, and it can reduce the overall cost of fixture re-lamping and re-ballasting. Group re-lamping and re-ballasting maintains lighting levels and minimizes the number of site visits by a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

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 5-10°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.

Procurement Strategies

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

6 On-site Generation

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

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

6.1 Solar Photovoltaic

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

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has no potential for installing a PV array.

This facility does 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 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.

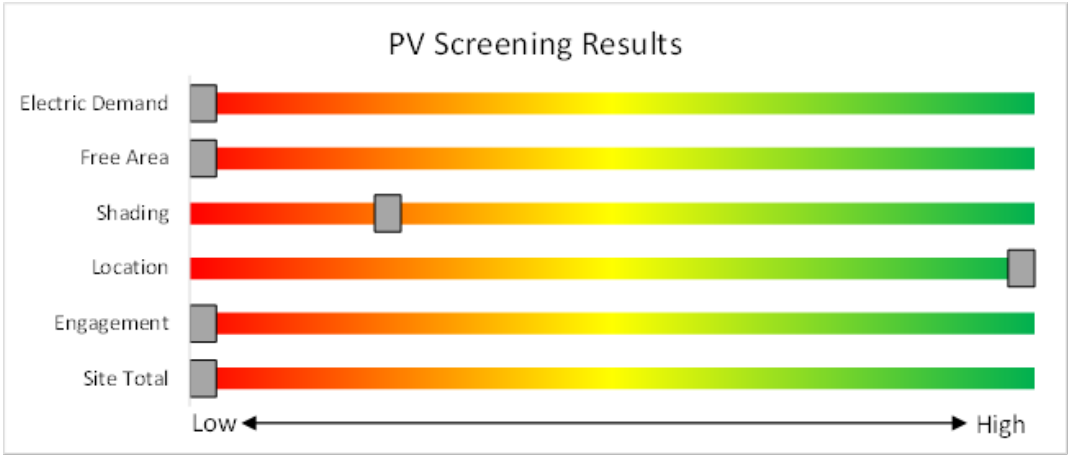


Figure 7 - Photovoltaic Screening

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 lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential.

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

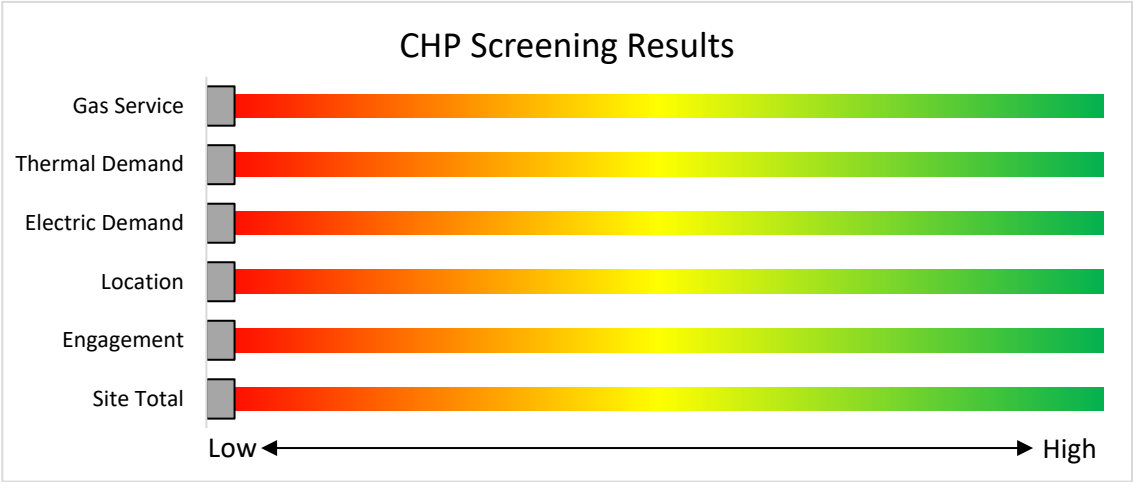


Figure 8 - Combined Heat and Power Screening

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

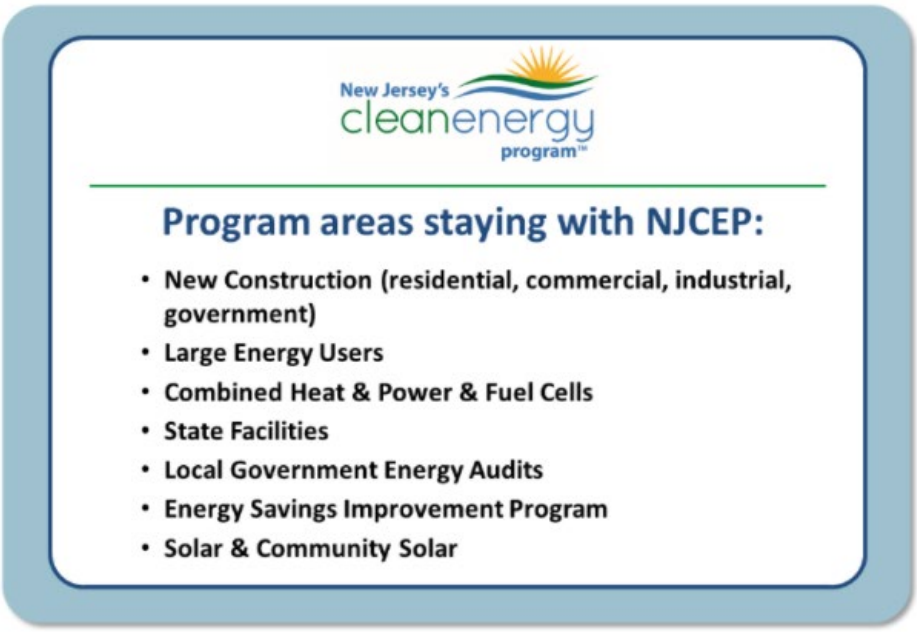
Ready to improve your building's performance? Your utility provider may be able to help.

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.

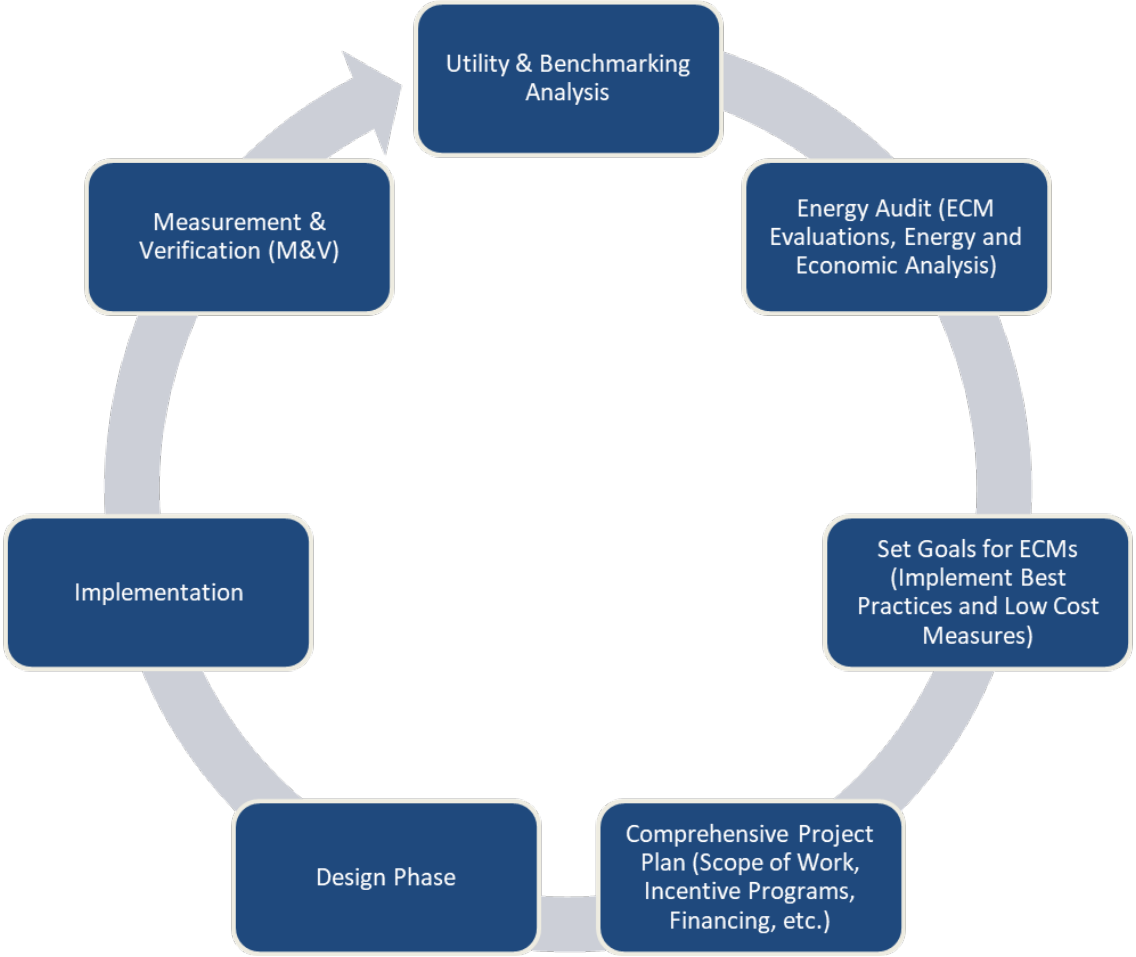


Figure 9 – Project Development Cycle

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[5].

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[6].

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

[6] 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
Well #2- Pump Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	730	2, 3	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	504	0.0	23	0	$3	$362	$45	110.2
Well #2- Pump Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	730	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	504	0.1	45	0	$6	$73	$20	9.2
Well #2- Exterior	1	Metal Halide: (1) 100W Lamp	Timeclock		128	3,103	1	Fixture Replacement	No	1	LED - Fixtures: Porch (Wall Mounted)	Timeclock	35	3,103	0.0	289	0	$37	$300	$5	8.1
Well #3- Pump Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	730	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	504	0.1	45	0	$6	$398	$55	59.7
Well #3- Pump Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	730	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	504	0.1	45	0	$6	$73	$20	9.2
Well #3- Exterior	1	Metal Halide: (1) 100W Lamp	Timeclock		128	0	1	Fixture Replacement	No	1	LED - Fixtures: Porch (Wall Mounted)	Timeclock	35	0	0.0	0	0	$0	$300	$5	0.0
Well #4- Pump Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	730	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	504	0.1	45	0	$6	$398	$55	59.7
Well #4- Pump Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	730	2, 3	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	504	0.1	45	0	$6	$73	$20	9.2
Well #4- Exterior	1	Metal Halide: (1) 100W Lamp	Timeclock		128	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Porch (Wall Mounted)	Timeclock	35	4,380	0.0	407	0	$52	$300	$5	5.7
Well #6- Pump Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	730	2, 3	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	504	0.1	91	0	$11	$416	$75	29.7
Well #6- Exterior	1	Metal Halide: (1) 100W Lamp	Photocell		128	4,380	1	Fixture Replacement	No	1	LED - Fixtures: Porch (Wall Mounted)	Photocell	35	4,380	0.0	407	0	$52	$300	$5	5.7
North American Water Interconnect- Walker Holding Tank	2	Incandescent: 60W Incandecent	Occupancy Sensor	S	60	730	2	Relamp	No	2	LED Lamps: LED A19-9W	Occupancy Sensor	9	730	0.1	55	0	$7	$34	$2	4.6
Winding Way- Walker Holding Tank	3	Incandescent: 60W Incandecent	Occupancy Sensor	S	60	730	2	Relamp	No	3	LED Lamps: LED A19-9W	Occupancy Sensor	9	730	0.1	83	0	$10	$52	$3	4.6

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?	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
Well #2- Roof	Well #2	1	Exhaust Fan	0.3	65.0%	No	Unknown	Unknown	W	0		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #2- Pump Room	Well #2	1	Water Supply Pump	75.0	95.0%	Yes	Emerson	HO7SV2SLS-C	W	8,760		No	95.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #2- Pump Room	Well #2	1	Other	0.3	65.0%	No	Unknown	Unknown	W	730		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well# 2- Pump Room	Well #2	2	Supply Fan	0.1	65.0%	No	Dimplex	Unknown	W	1,800		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #3- Roof	Well #3	1	Exhaust Fan	0.3	65.0%	No	Unknown	Unknown	W	0		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #3- Pump Room	Well #3	1	Water Supply Pump	100.0	95.4%	Yes	Emerson	H0100V2SL6-C	W	8,760		No	95.4%	No		0.0	0	0	$0	$0	$0	0.0
Well #3- Pump Room	Well #3	1	Other	0.3	65.0%	No	Unknown	Unknown	W	365		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well# 3- Pump Room	Well #3	2	Supply Fan	0.1	65.0%	No	Dimplex	Unknown	W	1,800		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #4- Roof	Well #4	1	Exhaust Fan	0.3	65.0%	No	Unknown	Unknown	W	0		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #4- Pump Room	Well #4	1	Water Supply Pump	50.0	93.0%	Yes	Grundfos	18A19-22-023978	W	8,760		No	93.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #4- Pump Room	Well #4	1	Other	0.3	65.0%	No	Unknown	Unknown	W	365		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well# 4- Pump Room	Well #4	2	Supply Fan	0.1	65.0%	No	Chromalox	Unknown	W	1,800		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Well #6- Pump Room	Well #6	1	Water Supply Pump	100.0	95.4%	Yes	Grundfos	6355-300-2AA	W	8,760		No	95.4%	No		0.0	0	0	$0	$0	$0	0.0
Well #6- Pump Room	Well #6	2	Supply Fan	0.1	65.0%	No	Chromalox	LUH-D--5-45-31-00	W	1,800		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
North American Water Interconnect-Walker Holding Tank	North American Water Interconnect Vault	1	Other	0.3	65.0%	No	Unknown	Unknown	W	825		No	65.0%	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?	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
Winding Way-Walker Holding Tank	Winding Way Vault	1	Other	0.3	65.0%	No	Unknown	Unknown	W	730		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
Winding Way-Walker Holding Tank	Winding Way Vault	1	Supply Fan	0.1	65.0%	No	Chromalox	Unknown	W	0		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0

Packaged HVAC Inventory & Recommendations

		Existing Conditions									Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Manufacturer	Model	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/IEER/EER)	Heating Mode Efficiency	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Estimated M&L Cost ($)	Total Incentives	Simple Payback w/ Incentives in Years
Well #2- Pump Room	Well #2	2	Unit Heater		17.06		1 COP	Dimplex	6400101700	W		No							0.0	0	0	$0	$0	$0	0.0
Well #3- Pump Room	Well #3	2	Unit Heater		17.06		1 COP	Dimplex	6400101700	W		No							0.0	0	0	$0	$0	$0	0.0
Well #4- Pump Room	Well #4	2	Unit Heater		17.06		1 COP	Chromalox	VUH-C-05-43-32-00	W		No							0.0	0	0	$0	$0	$0	0.0
Well #6- Pump Room	Well #6	2	Unit Heater		17.06		1 COP	Chromalox	LUH-D--5-45-31-00	W		No							0.0	0	0	$0	$0	$0	0.0
North American Water Interconnect-Walker Holding Tank	Interconnect Vault	1	Electric Resistance Heat		4.09		1 COP	Comfort Zone	CZ7007J	W		No							0.0	0	0	$0	$0	$0	0.0
Winding Way-Walker Holding Tank	Winding Way Vault	1	Unit Heater		6.82		1 COP	Chromalox	Unknown	B		No							0.0	0	0	$0	$0	$0	0.0

Programmable Thermostat Recommendations

		Recommendation Inputs					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	ECM #	Thermostat Quantity	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	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
Well #2- Pump Room	Well #2	4	2.00	0.00	34.12		0.0	463	0	$59	$660	$0	11.2
Well #3- Pump Room	Well #3	4	2.00	0.00	34.12		0.0	463	0	$59	$660	$0	11.2
Well #4- Pump Room	Well #4	4	2.00	0.00	34.12		0.0	463	0	$59	$660	$0	11.2
Well #6- Pump Room	Well #6	4	2.00	0.00	34.12		0.0	463	0	$59	$660	$0	11.2

Plug Load Inventory

	Existing Conditions					
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?	Manufacturer	Model
Well #2, 3, 4, & 6- Pump Rooms	4	Scada Display and Controller	40	No	Various	Various
Well #2, 3, 4, & 6- Pump Rooms	4	VFD Controller	20	No	Various	Various

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]

Well 2 (City of Orange Township)

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 864
Built: 1950

For Year Ending: May 31, 2020
Date Generated: June 14, 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
Well 2 (City of Orange Township) 266 Brookside Drive Millburn, New Jersey 07078	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: 16331297

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
723 kBtu/ft²

Source EUI
2,024.4 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	624,659 (100%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	1,706
National Median Source EUI (kBtu/ft²)	4,776.7
% Diff from National Median Source EUI	-58%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	60

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)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

Well 3 (City of Orange Township)

N/A

ENERGY STAR® Score[1]

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 864
Built: 1950

For Year Ending: April 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
Well 3 (City of Orange Township) 266 Brookside Drive Millburn, New Jersey 07078	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: 16331296

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
621.9 kBtu/ft²

Source EUI
1,741.3 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	537,317 (100%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	1,900.9
National Median Source EUI (kBtu/ft²)	5,322.6
% Diff from National Median Source EUI	-67%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	51

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)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

Well 4 (City of Orange Township)

N/A

ENERGY STAR® Score[1]

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 864
Built: 1950

For Year Ending: May 31, 2020
Date Generated: June 14, 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
Well 4 (City of Orange Township) 266 Brookside Drive Millburn, New Jersey 07078	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: 16331299

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
836.2 kBtu/ft²

Source EUI
2,341.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	722,512 (100%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	2,290.9
National Median Source EUI (kBtu/ft²)	6,414.4
% Diff from National Median Source EUI	-64%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	69

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)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

Well 6 (City of Orange Township)

N/A

ENERGY STAR® Score[1]

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 864
Built: 1952

For Year Ending: May 31, 2020
Date Generated: June 14, 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
Well 6 (City of Orange Township) Cherry Lane West Orange, New Jersey 07075	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: 16331298

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
1,164.6 kBtu/ft²

Source EUI
3,260.8 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	1,006,195 (100%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	2,510.2
National Median Source EUI (kBtu/ft²)	7,028.6
% Diff from National Median Source EUI	-54%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	96

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)

ENERGY STAR® Statement of Energy Performance

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Walker Road Holding Tank

N/A

ENERGY STAR® Score[1]

Primary Property Type: Other - Public Services
Gross Floor Area (ft²): 864
Built: 1942

For Year Ending: April 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
Walker Road Holding Tank 34-36 Winding Way City of Orange Township, New Jersey 07075	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: 16331300

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
4.5 kBtu/ft²

Source EUI
12.6 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	3,895 (100%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	31.9
National Median Source EUI (kBtu/ft²)	89.3
% Diff from National Median Source EUI	-86%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	0

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.