Local Government Energy Audit Report

Sewer and Water Pump Stations

June 10, 2020

Prepared for:

Borough of Avalon

Various Locations

Avalon, NJ 08202

Prepared by:

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Disclaimer

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

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

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

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

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

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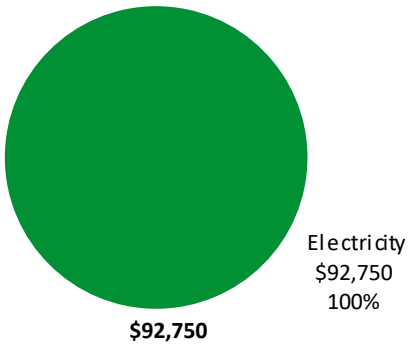
1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for the Sewer and Water 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: $92,750 Electricity: 520,862 kWh	
ENERGY STAR® Benchmarking Score	N/A *(1-100 scale)*	A standard energy use benchmark is not available for this facility type. This report contains suggestions about how to improve building performance and reduce energy costs.

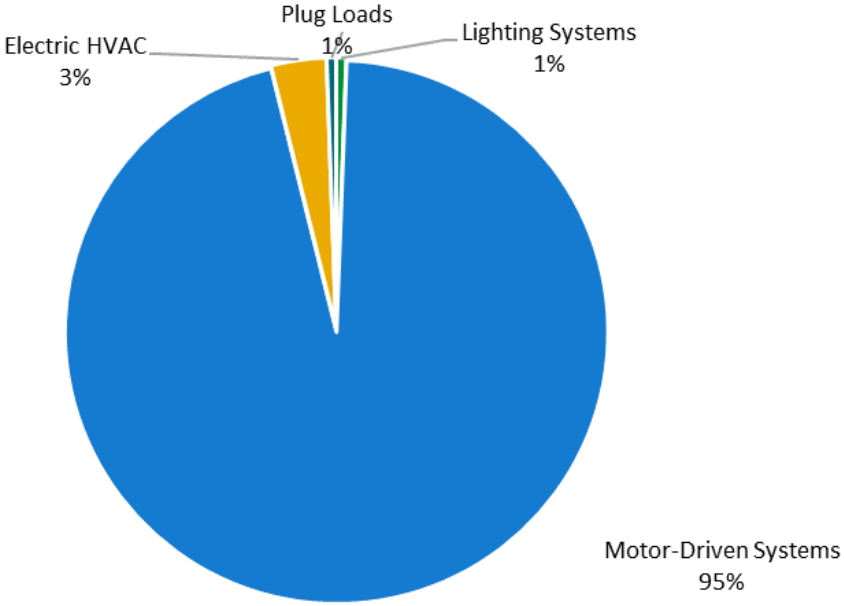


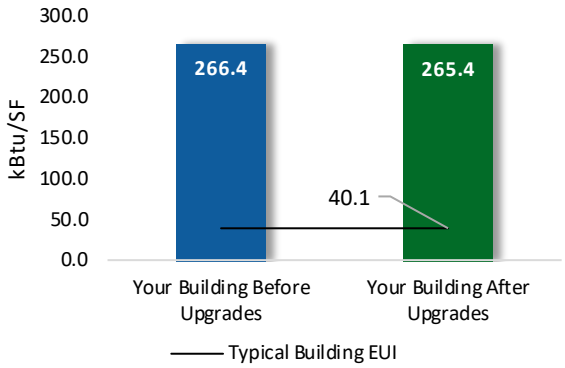
Figure 1 - Energy Use by System

POTENTIAL IMPROVEMENTS

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

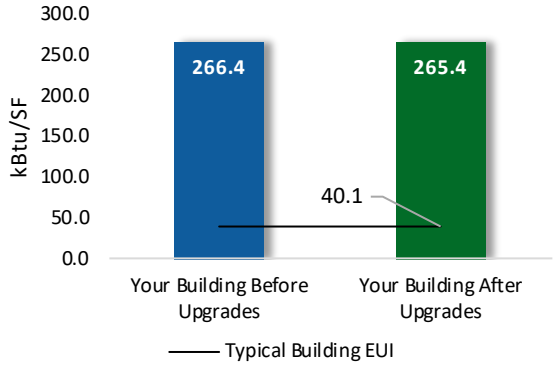
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$2,607
Potential Rebates & Incentives[1]	$1,114
Annual Cost Savings	$378
Annual Energy Savings	Electricity: 2,120 kWh
Greenhouse Gas Emission Savings	1 Tons
Simple Payback	4.0 Years
Site Energy Savings (all utilities)	0%



Scenario 2: Cost Effective Package[2]

Installation Cost	$1,500
Potential Rebates & Incentives	$754
Annual Cost Savings	$356
Annual Energy Savings	Electricity: 1,997 kWh
Greenhouse Gas Emission Savings	1 Tons
Simple Payback	2.1 Years
Site Energy Savings (all utilities)	0%



On-site Generation Potential

Photovoltaic	None
Combined Heat and Power	None

[1] Incentives are based on current SmartStart Prescriptive incentives. Other program incentives may apply.

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**2,120**	**1.3**	**0**	**$378**	**$2,607**	**$1,114**	**$1,493**	**4.0**	**2,135**
ECM 1	Install LED Fixtures	Yes	648	0.0	0	$115	$500	$400	$100	0.9	653
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	123	0.6	0	$22	$1,107	$360	$747	34.1	124
ECM 3	Retrofit Fixtures with LED Lamps	Yes	1,349	0.6	0	$240	$1,000	$354	$646	2.7	1,358
TOTALS (COST EFFECTIVE MEASURES)			**1,997**	**0.6**	**0**	**$356**	**$1,500**	**$754**	**$746**	**2.1**	**2,011**
TOTALS (ALL MEASURES)			**2,120**	**1.3**	**0**	**$378**	**$2,607**	**$1,114**	**$1,493**	**4.0**	**2,135**

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

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

Figure 2 – Evaluated Energy Improvements

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

1.1 Planning Your Project

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

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

Pick Your Installation Approach

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

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

Energy Conservation Measure		SmartStart	Direct Install	Pay For Performance
ECM 1	Install LED Fixtures	x		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		
ECM 3	Retrofit Fixtures with LED Lamps	x	x	

Figure 3 – Funding Options

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

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

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

Individual Measures with SmartStart

For facilities wishing to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate, you can use internal resources or an outside firm or contractor to perform the final design of the ECM(s) and install the equipment. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation.

Turnkey Installation with Direct Install

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

Whole Building Approach with Pay for Performance

Pay for Performance can be a good option for medium to large sized facilities to achieve deep energy savings. Pay for Performance allows you to install as many measures as possible under a single project as well as address measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also use this program. Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings.

More Options from Around the State

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

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

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

The CHP program provides incentives for combined heat and power (aka cogeneration) and waste heat to power projects. Combined heat and power systems generate power on-site and recover heat from the generation system to meet on-site thermal loads. Waste heat to power systems use waste heat to generate power. You will work with a qualified developer who will design a system that meets your building's heating and cooling needs.

Ongoing Electric Savings with Demand Response

The Demand Response Energy Aggregator program reduces electric loads at commercial facilities when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. By enabling commercial facilities to reduce electric demand during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment service providers provide regular payments to medium and large consumers of electric power for their participation in demand response (DR) programs. Program participation is voluntary, and facilities receive payments regardless of whether they are called upon to curtail their load during times of peak demand.

2 Existing Conditions

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Sewer and Water Pump Stations for the Borough of Avalon. This report provides information on how your facility uses energy, identifies energy conservation measures (ECMs) that can reduce your energy use, and provides information and assistance to help you implement the ECMs. This report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

TRC conducted this study as part of a comprehensive effort to assist New Jersey educational and local government facilities in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

2.1 Site Overview

On December 12, 2019, TRC performed an energy audit at various sewer and water pump stations located in Avalon, New Jersey. TRC met with Art Ridler to review the facility operations and help focus our investigation on specific energy-using systems. This report addresses a portion of the water supply and sewer pumping locations; mainly those not linked to other utility meters. Stormwater pumping facilities are addressed in a companion report.

Sewer and water pump stations are located throughout the Borough of Avalon. This report combines analysis of three water and five sewer pump stations, totaling 6,670 square-feet of building and open areas. The 67th Street Pump Station was built in 2011 and the 59th Street Pump Station was built in 2000. Construction dates for other pump stations are unknown, however, were all estimated to be in 2000 for analysis purposes. Spaces include pump rooms, chlorine tank rooms, an office, rest rooms, water tank room, storage areas, garage, an attic, and open areas. Sites contained in this report are listed below:

Site Name	Location	Square Footage
12th Street Water Pump Station	12th Street & Ocean Drive (North East Corner)	720
38th Street Water Pump Station	38th Street & Dune Drive (South West Corner)	570
67th Street Water Pump Station	67th Street & Dune Drive (North West Corner)	1612
42nd Street & Pelican Drive Sewer Pump Station	42nd Street & Pelican Drive (Traffic Island)	900
22nd Street & Harbor Avenue Sewer Pump Station	22nd Street & Harbor Avenue	900
24th Street & Harbor Avenue Sewer Pump Station	24th Street & Harbor Avenue	900
7th Street Sewer Pump Station	7th Street & 4th Avenue	900
59th Street Sewer Pump Station	5861 Ocean Drive	168

2.2 Building Occupancy

All of the facilities operate year-round, 24 hours a day, 7 days per week. Equipment operation is based on system demand.

The only site with an office space is the 38th Street Pump Station. This office is seldom used, mostly just to check the operation of the pump station.

Building Name	Weekday/Weekend	Operating Schedule
12th Street P.S.	Weekday	24/7
	Weekend	24/7
38th Street P.S.	Weekday	24/7
	Weekend	24/7
67th Street P.S.	Weekday	24/7
	Weekend	24/7
42nd Street P.S.	Weekday	24/7
	Weekend	24/7
22nd Street P.S.	Weekday	24/7
	Weekend	24/7
24th Street P.S.	Weekday	24/7
	Weekend	24/7
7th Street P.S.	Weekday	24/7
	Weekend	24/7
59th Street P.S.	Weekday	24/7
	Weekend	24/7

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

At the 12th Street Water Pump Station, there is a small building, with walls constructed of concrete masonry units (CMUs) covered by side paneling. The roof is pitched, constructed of wood, and covered in asphalt shingles. There are no windows and the doors are steel, with undamaged door seals.

At the 38th Street Water Pump Station, there is a small building, with walls constructed of CMUs covered by a painted wooden veneer. The roof is pitched, made of wood, and covered in asphalt shingles. The windows are operable, double-pane, clear, and have wooden frames. The doors are made of steel, have metal frames, and undamaged door seals.

At the 67th Street Water Pump station, there is a small building, constructed of wood, and covered with vinyl side paneling. The roof is pitched and covered with asphalt shingles. The windows are operable, clear, double-pane, and have a vinyl frame. The glass-to-frame seals are in fair condition. One exterior door is made of steel and two others are made of fiberglass. All door frames are wooden and in fair condition. There are also two wood framed metal garage doors.

At the 42nd Street & Pelican Drive Sewer Pump Station, there is a fenced in open area with a metal cabinet containing the pump controls. The pumps at this site are located underground.

At the 22nd Street & Harbor Avenue and 24th Street & Harbor Avenue Sewer Pump Stations, there is a metal cabinet containing the pump controls located on the side of the road.

At the 7th Street Sewer Pump Station, the metal cabinet containing the pump controls is raised on a fenced-in, wooden deck. The pumps at this location are located underground.

At the 59th Street Sewer Pump Station, there is a small building constructed of CMUs and covered with vinyl siding. The roof is pitched with asphalt shingles. There are no windows on this building. The doors are steel, have wooden frames, and undamaged door seals.

12th Street P.S. Building Envelope

38th Street P.S. Building Envelope

67th Street P.S. Building Envelope

42nd Street P.S. Site

22nd Street P.S. Site

24th Street P.S. Site

7th Street P.S. Site

59th Street P.S. Building Envelope

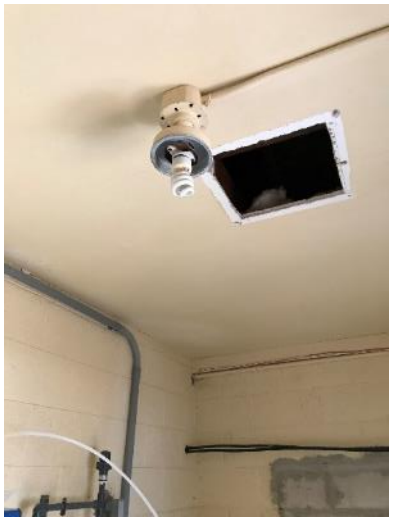
2.4 Lighting Systems

The primary interior lighting system uses compact fluorescent and incandescent lamps of various wattages. There are also several 32-Watt linear fluorescent T8 lamps, and both 40-Watt and 75-Watt T12 fixtures. Typically, T8 fluorescent lamps use electronic ballasts and T12 fluorescent lamps use magnetic ballasts. There are also some linear fluorescent T5 lamps and LED general purpose lamps.

Fixture types include screw-in and 2- or 4-lamp, 4- or 8-foot long troffer, surface mounted, ceiling mounted, and chain mounted fixtures.

Most fixtures are in fair condition, with some having missing lenses. Interior lighting levels were generally sufficient.

12th Street P.S. Fixtures



38th Street P.S. Fixture

67th Street P.S. Fixtures

42nd Street P.S. Fixture

For those pump stations that have lighting, all of the interior fixtures are controlled manually by wall switches.

59th Street P.S. Wall Switches

Exterior fixtures include wall packs and arm mounted fixtures with metal halide, LED, and incandescent lamps. Exterior fixtures are controlled by timeclocks, except at the 12th Street Pump Station, where fixtures are controlled by a photocell.

12th Street P.S. Exterior Wall Pack

38th Street P.S. Wall Pack

67th Street P.S. Arm Mounted Fixture

2.5 Air Handling Systems

Electric Heating

All of the sites that have a building structure have some form of electric resistance heating inside. These units are the only equipment used to serve the heating load of the buildings. The QMark heaters are in fair condition, while the unknown manufactured units are in poor condition. The baseboard electric resistance heaters are equipped with dials that allow for manual temperature control.

Information about these electric resistance heaters is provided below:

Location	Area Served	Quantity	Heating Capacity (MBh)	Manufacturer
12th Street Pump Station	Pump Room	2	17.06	QMark
12th Street Pump Station	Chlorine Tank Room	1	17.06	QMark
38th Street Pump Station	Chlorine Room	2	0.85	N/A
38th Street Pump Station	Pump Room	1	10.24	QMark
38th Street Pump Station	Office	1	5.12	N/A
38th Street Pump Station	Rest Room	1	1.71	N/A
67th Street Pump Station	Chlorine Room	1	2.56	N/A
67th Street Pump Station	Storage Area	2	6.82	N/A
67th Street Pump Station	Rest Room	1	3.41	Dayton
67th Street Pump Station	N/A	2	17.06	QMark
59th Street Pump Station	Pump Room	1	17.06	QMark

Refer to Appendix A for detailed information about each unit.

Air Conditioners

The 38th Street Pump Station has one Electrolux Home Products window air conditioning unit serving the office. This unit has a cooling capacity of 1.0-ton and an EER of 10.80. This unit is in good condition. The 67th Street Pump Station also has one Electrolux Home Products window air conditioning unit serving the rest room. This unit has a cooling capacity of 0.67-tons and an EER of 10.80. This unit is also in good condition.

12th Street P.S. Electric Resistance Heater

38th Street P.S. Electric Resistance Heater

38th Street P.S. Window AC

67th Street P.S. Electric Resistance Heater

67th Street P.S. Window AC

59th Street P.S. Electric Resistance Heater

2.6 Process Equipment

12th Street Water Pump Station

At the 12th Street Water Pump Station, there is one constant speed 75 HP vertical turbine type pump serving a production well. This pump operates 24/7, year-round based on system demand. The controls for this pump are set to automatic and equipped with alarms in case there is low flow, pump failure, leakage, high temperature, or motor overload. An air compressor provides pneumatic control capabilities. A diesel engine is used to run the back-up generator in case of power loss. For the purposes of our audit, we did not include the back-up generator with the diesel engine in our analysis.

12th Street Production Well Pump

Air Compressor

Back-Up Generator with Diesel Engine

Pump Station Controls

38th Street Water Pump Station

At the 38th Street Water Pump Station, there is one constant speed 75 HP vertical turbine type pump serving a production well. The controls on this pump are set to automatic and equipped with alarms in case there is a short circuit, over current, phase loss, high temperature, or if the motor is overloaded. This pump operates 24/7, year-round based on system demand.

38th Street Production Well Pump

67th Street Water Pump Station

At the 67th Street Water Pump Station, there is one constant speed 100 HP submersible type pump serving a production well. The pump was not accessible while on-site due to its underground location. This pump operates 24/7, year-round based on system demand. There is a water storage tank used to store water pumped from underground.

67th Street Water Storage Tank

42nd Street Sewer Pump Station

At the 42nd Street Sewer Pump Station, there are two constant speed 10 HP submersible type pumps serving the wastewater system. These pumps operate 24/7, year-round based on system demand. The pumps were not accessible while on-site because they are located underground. The pumps are set to operate in a lead-lag control scheme, with Pump #1 leading. Both pumps were set to automatic according to the control panel seen the day of the site visit.

42nd Street Pump Controls

22nd Street Sewer Pump Station

At the 22nd Street Sewer Pump Station, there are two constant speed 7.5 HP submersible type pumps serving the wastewater system. These pumps operate 24/7, year-round based on system demand. Due to their underground location, the pumps were not accessible the day of the site visit. The pumps are set to operate in a lead-lag control scheme, with Pump #1 leading. Based on a review of the control panel, both pumps were set to automatic operation. The controls are also equipped with alarms indicating if there is a leakage, high temperature, or overload.

22nd Street Pump Controls

24th Street Sewer Pump Station

At the 24th Street Sewer Pump Station, there are two constant speed 5.0 HP submersible type pumps serving the wastewater system. The pumps operate 24/7, year-round based on system demand. Due to their underground location, the pumps were not accessible the day of the site visit. The pumps are set to operate in a lead-lag control scheme, with Pump #2 leading. The control panel was reviewed on the day of the site visit. Pump #1 was set to automatic operation, while Pump #2 was set to off. The controls are also equipped with alarms indicating if there is a leakage, high temperature, or overload.

24th Street Pump Controls

7th Street Sewer Pump Station

At the 7th Street Sewer Pump Station, there are two constant speed 10.0 HP submersible type pumps serving the wastewater system. These pumps operate 24/7, year-round based on system demand. Due to their underground location, these pumps were not accessible the day of the site visit. There is a Gorman Rupp control panel that was locked during the day of the site visit.

7th Street Pump Control Panel

59th Street Sewer Pump Station

At the 59th Street Sewer Pump Station, there are two constant speed 25 HP submersible type pumps serving the wastewater system. These pumps operate 24/7, year-round based on system demand. The pumps are set to operate in a lead-lag control scheme, with Pump #2 being the lead. The control panel for these pumps indicates that both pumps are set to automatic operation. The system is also equipped with alarms to indicate if the pumps are being overloaded. There is also a natural gas engine used to run the back-up generator in case the power goes out. For the purposes of our audit, we did not include the back-up generator with the natural gas engine in our analysis.

59th Street Sewer Pumps

Natural Gas Engine

Pump Controls

2.7 Plug Load & Vending Machines

Plug loads at these pump stations are very minimal. Only a few items were noted aside from the motor driven pumping loads. At the 38th Street Pump Station office, there were two Dell computers. At the 67th Street Pump Station chlorine room, there was one Soleus Air dehumidifier.

Computers at 38th Street Pump Station

Dehumidifier at 67th Street Pump Station

2.8 Water-Using Systems

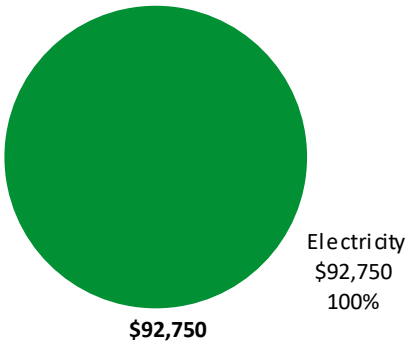
There are 2 restrooms with toilets, urinals, and sinks. There is one restroom located in the 38th Street Pump Station and another located at the 67th Street Pump Station. Both sites have faucet flow rates that are at 2.2 gallons per minute (gpm) or higher.

38th Street Pump Station Sink

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	520,862 kWh	$92,750
Total		**$92,750**



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. For this combined report with multiple facilities, the auditor was able to balance the energy usage for each building to the corresponding associated billing data.

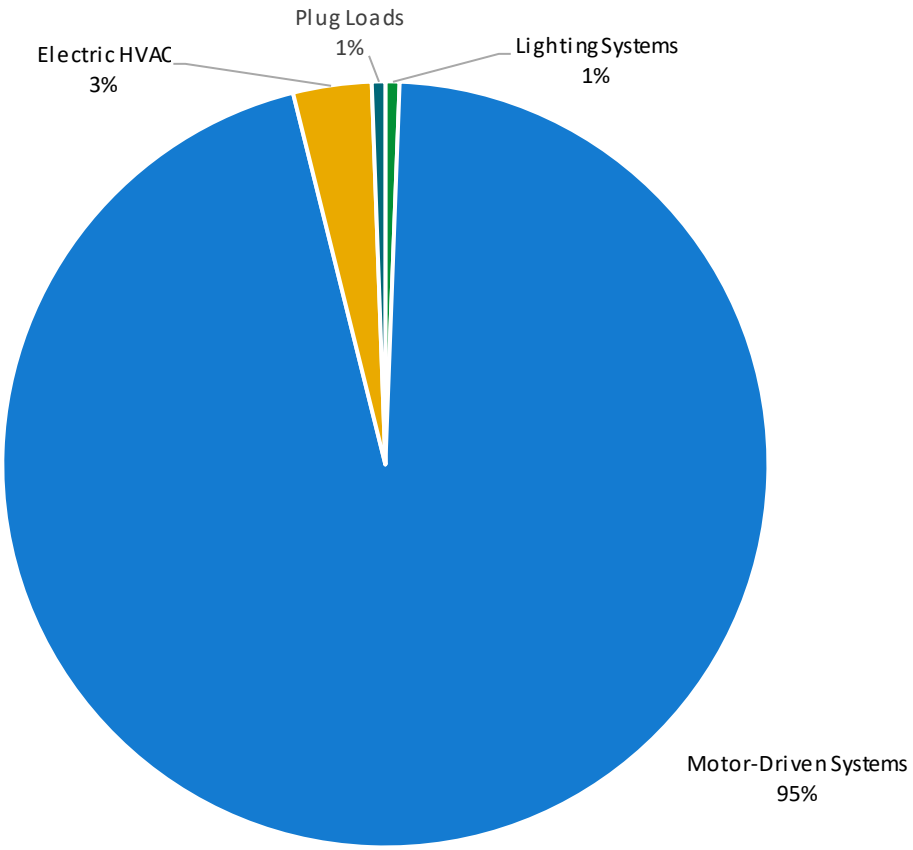
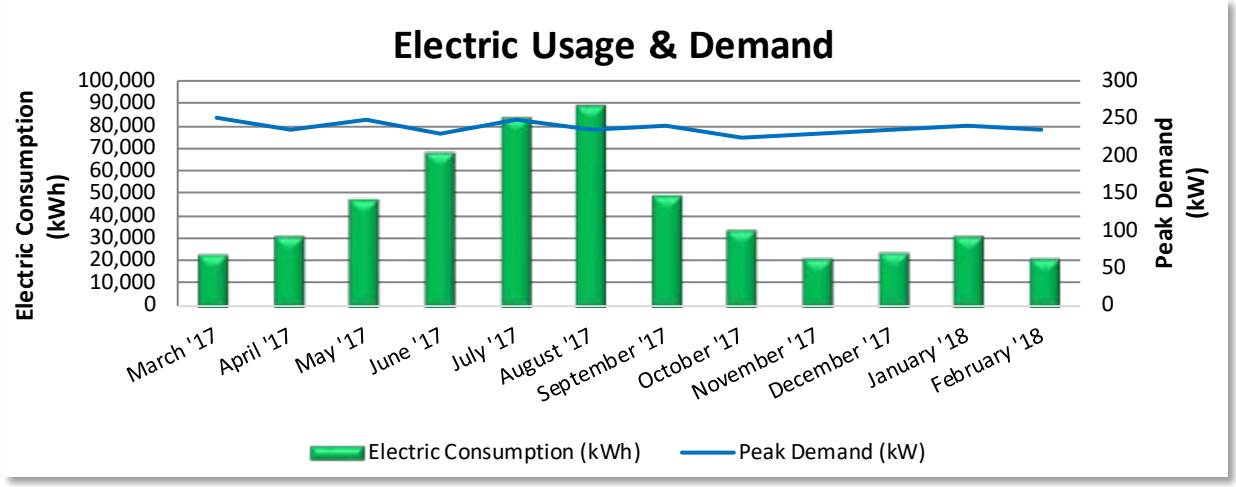


Figure 5 - Energy Balance

3.1 Combined Electricity- All Sites

For the majority of the pump stations, Atlantic City Electric supplies and delivers electricity under rate class General Service Secondary. For the pump stations located at 12th Street and 38th Street, electricity is supplied by Constellation New Energy, a third-party supplier.



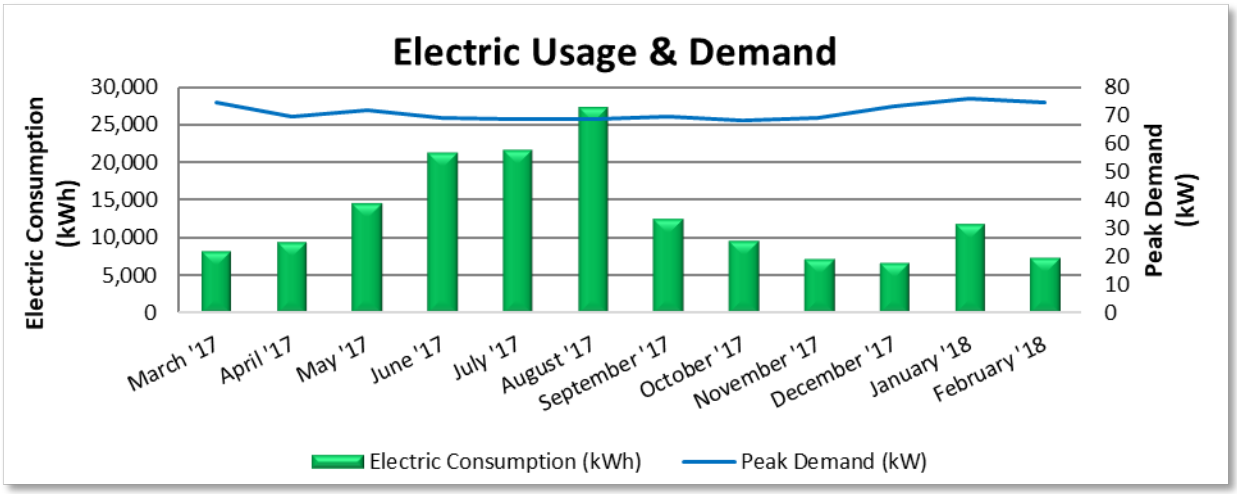
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
4/4/17	31	23,315	251	$0	$4,925	Yes
5/3/17	32	31,100	235	$0	$6,046	Yes
6/5/17	29	47,181	248	$0	$8,580	Yes
7/5/17	30	67,877	229	$0	$11,424	Yes
8/3/17	31	83,114	249	$0	$13,875	Yes
9/6/17	32	87,818	235	$0	$14,584	Yes
10/5/17	29	49,183	240	$0	$8,487	Yes
11/2/17	31	34,025	225	$0	$5,972	Yes
12/4/17	30	21,316	228	$0	$4,204	Yes
1/5/18	31	23,994	234	$0	$4,677	Yes
2/2/18	29	30,764	241	$0	$5,732	Yes
3/5/18	30	21,175	235	$0	$4,245	Yes
Totals	**365**	**520,862**	**251**	**$0**	**$92,750**	
Annual	**365**	**520,862**	**251**	**$0**	**$92,750**	

Notes:

- Peak demand of 251 kW occurred in March '17.
- Average demand over the past 12 months was 238 kW.
- The average electric cost over the past 12 months was $0.178/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.

12th Street Water Pump Station

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



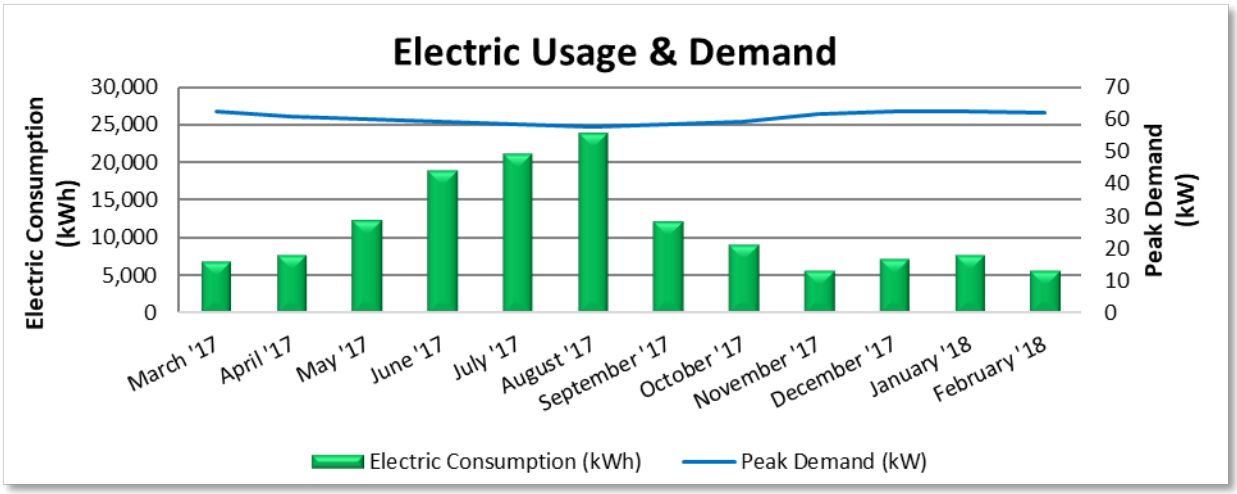
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
4/4/17	31	8,320	75	$0	$1,528	Yes
5/4/17	32	9,440	70	$0	$1,700	Yes
6/5/17	29	14,640	72	$0	$2,583	Yes
7/5/17	30	21,200	69	$0	$3,650	Yes
8/3/17	31	21,580	69	$0	$3,708	Yes
9/6/17	32	27,180	69	$0	$4,658	Yes
10/4/17	29	12,500	70	$0	$2,187	Yes
11/2/17	31	9,660	68	$0	$1,656	Yes
12/4/17	30	7,280	69	$0	$1,294	Yes
1/5/18	31	6,720	73	$0	$1,216	Yes
2/2/18	29	11,760	76	$0	$2,032	Yes
3/5/18	30	7,400	75	$0	$1,340	Yes
Totals	**365**	**157,680**	**76**	**$0**	**$27,554**	
Annual	**365**	**157,680**	**76**	**$0**	**$27,554**	

Notes:

- Data shown for Account number 5500 3528 191, Meter number KZA013642296
- Peak demand of 75.8 kW occurred in January '18.
- Average demand over the past 12 months was 71 kW.
- The average electric cost over the past 12 months for this meter was $0.175/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

38th Street Water Pump Station

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



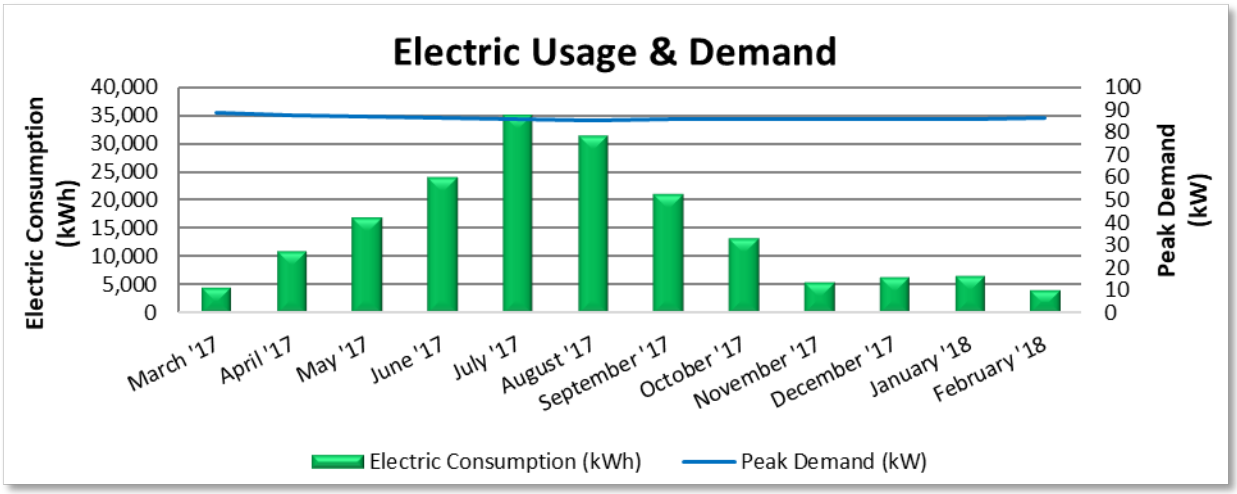
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
4/3/17	31	6,880	62	$0	$1,613	Yes
5/2/17	32	7,800	61	$0	$1,618	Yes
6/2/17	29	12,320	60	$0	$2,202	Yes
7/3/17	30	18,840	59	$0	$2,864	Yes
8/2/17	31	21,040	58	$0	$3,099	Yes
9/5/17	32	23,840	58	$0	$3,504	Yes
10/4/17	29	12,200	58	$0	$2,034	Yes
11/1/17	31	9,040	59	$0	$1,680	Yes
12/1/17	30	5,680	62	$0	$1,358	Yes
1/3/18	31	7,200	62	$0	$1,618	Yes
2/1/18	29	7,680	62	$0	$1,636	Yes
3/1/18	30	5,680	62	$0	$1,376	Yes
Totals	**365**	**138,200**	**62**	**$0**	**$24,602**	
Annual	**365**	**138,200**	**62**	**$0**	**$24,602**	

Notes:

- Data shown for Account number 5500 7063 906, Meter number KZG013103690
- Peak demand of 62.4 kW occurred in January '18.
- Average demand over the past 12 months was 60 kW.
- The average electric cost over the past 12 months was $0.178/kWh for this meter, which is the blended rate that includes energy supply, distribution, demand, and other charges.

67th Street Water Pump Station

Atlantic City Electric supplies and delivers electricity under rate class General Service Secondary.



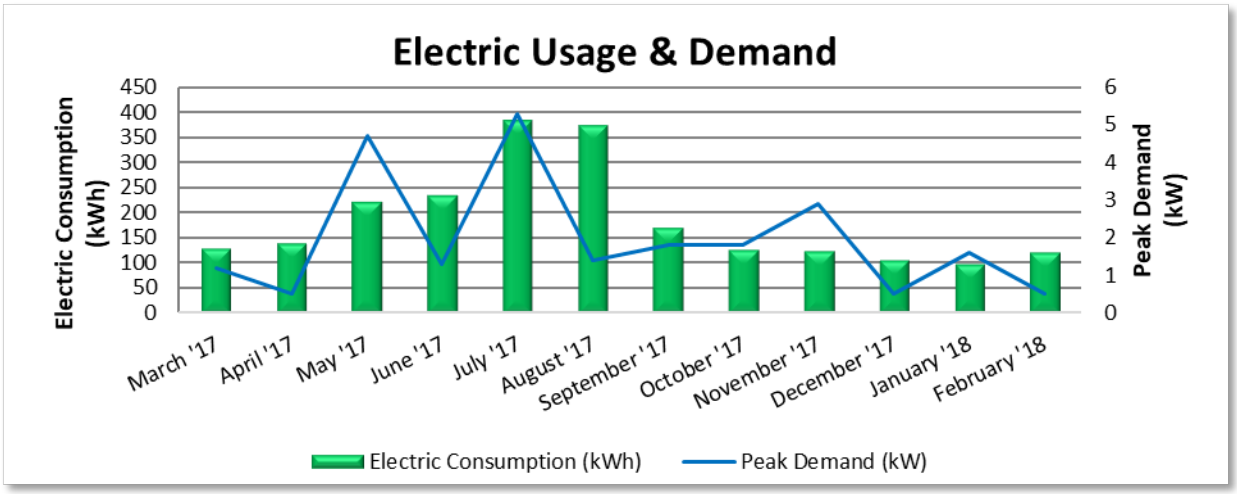
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/31/17	31	4,720	89	$0	$1,108	No
5/2/17	32	11,040	88	$0	$2,176	No
6/1/17	29	16,820	87	$0	$3,113	No
6/30/17	30	24,060	86	$0	$4,227	No
8/1/17	31	34,880	86	$0	$6,001	No
9/1/17	32	31,360	85	$0	$5,425	No
10/2/17	29	21,080	86	$0	$3,656	Yes
10/31/17	31	13,200	86	$0	$2,246	Yes
12/1/17	30	5,560	86	$0	$1,047	Yes
1/2/18	31	6,360	86	$0	$1,179	Yes
1/31/18	29	6,600	86	$0	$1,220	Yes
3/1/18	30	4,140	87	$0	$824	Yes
Totals	**365**	**179,820**	**89**	**$0**	**$32,221**	
Annual	**365**	**179,820**	**89**	**$0**	**$32,221**	

Notes:

- Data shown for Account number 5500 7825 874, Meter number 99G006983268
- Peak demand of 88.8 kW occurred in March '17.
- Average demand over the past 12 months was 86 kW.
- The average electric cost over the past 12 months was $0.179/kWh for this meter, which is the blended rate that includes energy supply, distribution, demand, and other charges.

42nd Street Sewer Pump Station

Atlantic City Electric supplies and delivers electricity under rate class General Service Secondary.



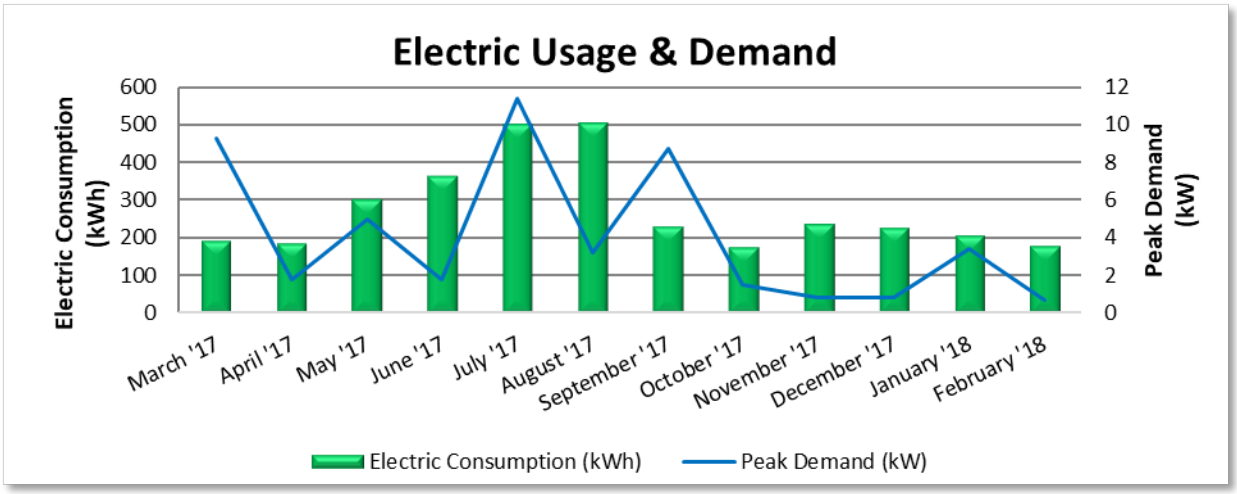
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/3/17	31	130	1	$0	$31	No
5/2/17	32	138	1	$0	$31	No
6/2/17	29	220	5	$0	$55	No
7/3/17	30	234	1	$0	$47	No
8/2/17	31	382	5	$0	$84	No
9/5/17	32	372	1	$0	$71	No
10/3/17	29	170	2	$0	$23	No
11/1/17	31	127	2	$0	$21	No
12/1/17	30	125	3	$0	$24	No
1/3/18	31	107	1	$0	$19	No
2/1/18	29	98	2	$0	$19	No
3/2/18	30	121	1	$0	$19	No
Totals	**365**	**2,224**	**5**	**$0**	**$445**	
Annual	**365**	**2,224**	**5**	**$0**	**$445**	

Notes:

- Data shown for Account number 5500 7326 055, Meter number 99G006363714
- Peak demand of 5.3 kW occurred in July '17.
- Average demand over the past 12 months was 2 kW.
- The average electric cost over the past 12 months was $0.200/kWh for this meter, which is the blended rate that includes energy supply, distribution, demand, and other charges.

22nd Street Sewer Pump Station

Atlantic City Electric supplies and delivers electricity under rate class General Service Secondary.



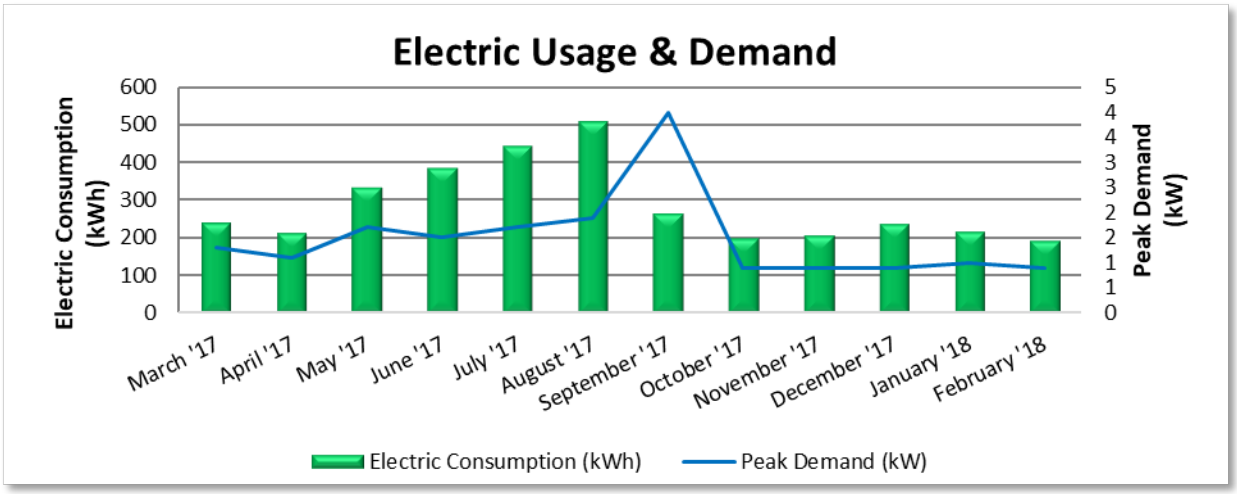
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/4/17	31	193	9	$0	$69	No
5/3/17	32	184	2	$0	$40	No
6/5/17	29	303	5	$0	$69	No
7/5/17	30	364	2	$0	$69	No
8/3/17	31	499	11	$0	$130	No
9/6/17	32	502	3	$0	$96	No
10/5/17	29	229	9	$0	$39	No
11/2/17	31	174	2	$0	$40	Yes
12/4/17	30	236	1	$0	$50	Yes
1/5/18	31	226	1	$0	$47	Yes
2/2/18	29	205	3	$0	$49	Yes
3/5/18	30	178	1	$0	$40	Yes
Totals	**365**	**3,293**	**11**	**$0**	**$739**	
Annual	**365**	**3,293**	**11**	**$0**	**$739**	

Notes:

- Data shown for Account number 5500 6767 770, Meter number TEG021009660
- Peak demand of 11.4 kW occurred in July '17.
- Average demand over the past 12 months was 4 kW.
- The average electric cost over the past 12 months was $0.224/kWh for this meter, which is the blended rate that includes energy supply, distribution, demand, and other charges.

24th Street Sewer Pump Station

Atlantic City Electric supplies and delivers electricity under rate class General Service Secondary.



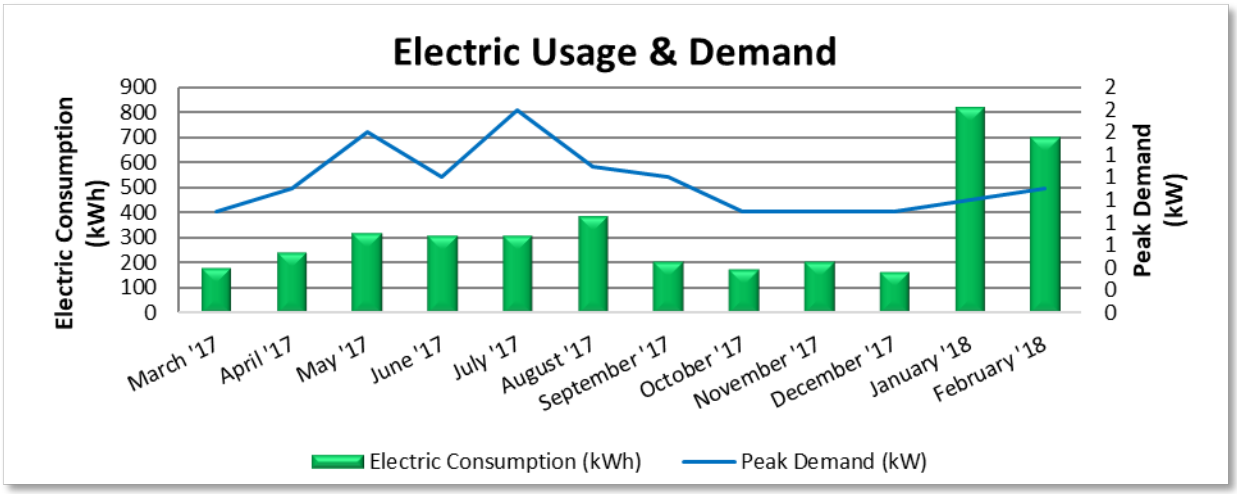
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/4/17	31	239	1	$0	$50	No
5/3/17	32	214	1	$0	$44	No
6/5/17	29	332	2	$0	$65	No
7/5/17	30	385	2	$0	$72	No
8/3/17	31	442	2	$0	$81	No
9/6/17	32	506	2	$0	$94	No
10/5/17	29	263	4	$0	$34	Yes
11/2/17	31	199	1	$0	$25	Yes
12/4/17	30	205	1	$0	$26	Yes
1/5/18	31	238	1	$0	$29	Yes
2/2/18	29	218	1	$0	$27	Yes
3/5/18	30	193	1	$0	$25	Yes
Totals	**365**	**3,434**	**4**	**$0**	**$571**	
Annual	**365**	**3,434**	**4**	**$0**	**$571**	

Notes:

- Data shown for Account number 5500 6768 182, Meter number 99D028355666
- Peak demand of 4 kW occurred in September '17.
- Average demand over the past 12 months was 1 kW.
- The average electric cost over the past 12 months was $0.166/kWh for this meter, which is the blended rate that includes energy supply, distribution, demand, and other charges.

7th Street Sewer Pump Station

Atlantic City Electric supplies and delivers electricity under rate class General Service Secondary.



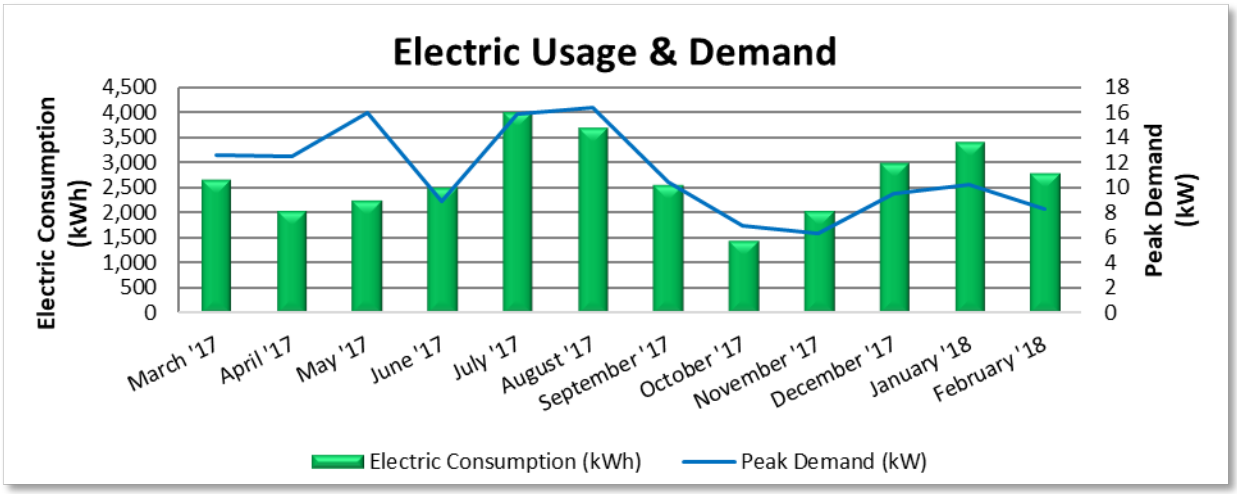
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
4/4/17	31	180	1	$0	$38	No
5/3/17	32	243	1	$0	$47	No
6/5/17	29	320	2	$0	$62	No
7/5/17	30	308	1	$0	$57	No
8/3/17	31	309	2	$0	$58	No
9/6/17	32	385	1	$0	$71	No
10/5/17	29	207	1	$0	$42	Yes
11/2/17	31	177	1	$0	$38	Yes
12/4/17	30	207	1	$0	$44	Yes
1/5/18	31	164	1	$0	$37	Yes
2/2/18	29	814	1	$0	$141	Yes
3/5/18	30	698	1	$0	$124	Yes
Totals	**365**	**4,012**	**2**	**$0**	**$759**	
Annual	**365**	**4,012**	**2**	**$0**	**$759**	

Notes:

- Data shown for Account number 5501 0267 486, Meter number TEG011947265
- Peak demand of 1.8 kW occurred in July '17.
- Average demand over the past 12 months was 1 kW.
- The average electric cost over the past 12 months was $0.189/kWh for this meter, which is the blended rate that includes energy supply, distribution, demand, and other charges.

59th Street Sewer Pump Station

Atlantic City Electric supplies and delivers electricity under rate class General Service Secondary.



Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
3/31/17	31	2,653	13	$0	$488	No
5/2/17	32	2,041	13	$0	$389	No
6/1/17	29	2,226	16	$0	$429	No
6/30/17	30	2,486	9	$0	$437	No
8/1/17	31	3,982	16	$0	$713	No
9/1/17	32	3,673	16	$0	$664	No
10/2/17	29	2,534	10	$0	$472	No
10/31/17	31	1,448	7	$0	$265	No
12/1/17	30	2,023	6	$0	$363	No
1/2/18	31	2,979	10	$0	$531	No
1/31/18	29	3,389	10	$0	$608	No
3/1/18	30	2,765	8	$0	$498	No
Totals	**365**	**32,199**	**16**	**$0**	**$5,857**	
Annual	**365**	**32,199**	**16**	**$0**	**$5,857**	

Notes:

- Data shown for Account number 5500 7671 716, Meter number 99A092075884
- Peak demand of 16.4 kW occurred in August '17.
- Average demand over the past 12 months was 11 kW.
- The average electric cost over the past 12 months was $0.182/kWh for this meter, which is the blended rate that includes energy supply, distribution, demand, and other charges.
- This site also had a natural gas meter, but because the natural gas engine was not included in our scope of work, the natural gas data was not used.

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.

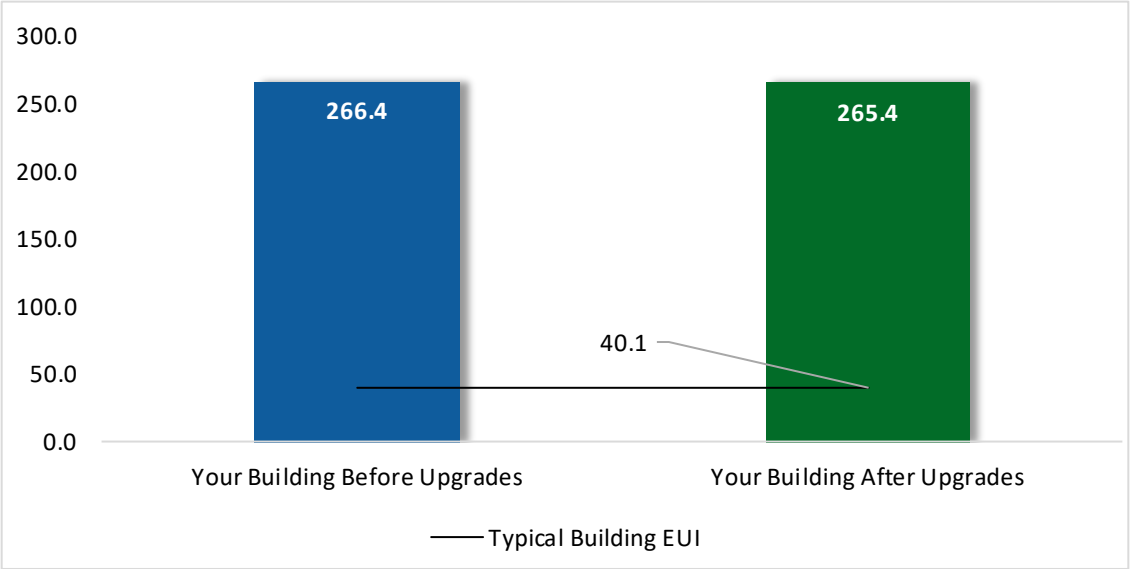


Figure 6 - Energy Use Intensity Comparison[3]

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.

None of the pump stations included in this report were eligible for an ENERGY STAR® benchmarking score. The site EUI above is combined for all of the sites included in this report, making it look much less efficient than the average site it is being compared to.

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

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

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

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

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

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**2,120**	**1.3**	**0**	**$378**	**$2,607**	**$1,114**	**$1,493**	**4.0**	**2,135**
ECM 1	Install LED Fixtures	Yes	648	0.0	0	$115	$500	$400	$100	0.9	653
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	No	123	0.6	0	$22	$1,107	$360	$747	34.1	124
ECM 3	Retrofit Fixtures with LED Lamps	Yes	1,349	0.6	0	$240	$1,000	$354	$646	2.7	1,358
TOTALS			**2,120**	**1.3**	**0**	**$378**	**$2,607**	**$1,114**	**$1,493**	**4.0**	**2,135**

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

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

Figure 7 – All Evaluated ECMs

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**1,997**	**0.6**	**0**	**$356**	**$1,500**	**$754**	**$746**	**2.1**	**2,011**
ECM 1	Install LED Fixtures	648	0.0	0	$115	$500	$400	$100	0.9	653
ECM 3	Retrofit Fixtures with LED Lamps	1,349	0.6	0	$240	$1,000	$354	$646	2.7	1,358
TOTALS		**1,997**	**0.6**	**0**	**$356**	**$1,500**	**$754**	**$746**	**2.1**	**2,011**

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

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

Figure 8 – Cost Effective ECMs

4.1 Lighting

#	Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**2,120**	**1.3**	**0**	**$378**	**$2,607**	**$1,114**	**$1,493**	**4.0**	**2,135**
ECM 1	Install LED Fixtures	648	0.0	0	$115	$500	$400	$100	0.9	653
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	123	0.6	0	$22	$1,107	$360	$747	34.1	124
ECM 3	Retrofit Fixtures with LED Lamps	1,349	0.6	0	$240	$1,000	$354	$646	2.7	1,358

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

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

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

Affected building areas: exterior fixtures at 12th Street Pump Station.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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

The measure uses the existing fixture housing but replaces the electric components with more efficient lighting technology which use less power than other lighting technologies but provides equivalent lighting output.

Although the projected payback is long due to low operating hours, maintenance savings are an additional consideration since LED tubes last longer than fluorescent tubes and therefore do not need to be replaced as often.

Affected building areas: T12 fixtures at 67th Street Pump Station in the storage area and garage, and T12 fixture at 59th Street Pump Station in the pump room.

ECM 3: Retrofit Fixtures with LED Lamps

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

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

Affected building areas: T5 lamps at 12th Street Pump Station in the pump room, T8 lamps at 12th Street Pump Station in the chlorine tank room. CFLs at 38th Street Pump Station in the chlorine room, pump room, and office, and incandescent lamp in the restroom. T8 lamps at the 67th Street Pump Station in the water tank room and incandescent lamps in the storeroom and attic. Exterior fixtures and incandescent lamp at the 42nd Street Pump Station. T8 lamp at the 59th Street Pump Station in the pump room.

4.2 Measures for Future Consideration

There are additional opportunities for improvement that the Borough of Avalon 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.

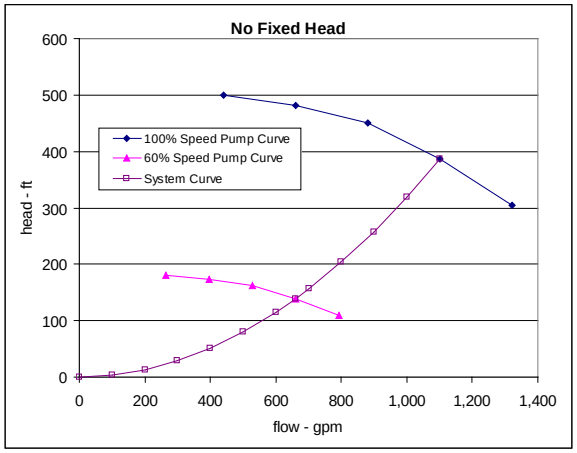
The Borough of Avalon may wish to consider the Energy Savings Improvement Program (ESIP). With interest in implementing comprehensive, largescale and/or complex system wide projects, these measures may be pursued during development of a future energy savings plan. We recommend that you work with your energy service company (ESCO) and/or design team to evaluate these measures further, develop firm costs, savings estimates and 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.

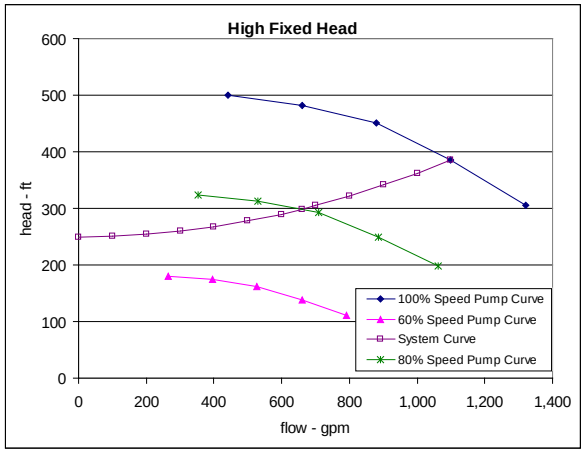
Variable Frequency Drives to Control Fixed Head Pump Motors

The site has a number of pumps which operate with fixed head. Investigation of potential energy savings measures for these pumps is beyond the scope of this study. Site staff may want to conduct further investigation of potential savings for variable speed pumping controls. Please review the following technical bulletin.

Variable frequency drives (VFDs) regulate pump flow by regulating the speed of the drive motor. This is a more efficient way of regulating a pump than throttling the discharge of the pump. In systems with minimal fixed system head (for example a closed loop circulation system) pump power follows the affinity laws. This means that the required pump power varies approximately with the cube of the motor speed. As a result, a small change in pump speed will produce a significant reduction in motor power. In pumping systems with a fixed head that must be overcome regardless of the flow rate the affinity laws no longer apply. Examples of fixed head systems are well and lift pumps. The lift required to move the water out of a well or sump to the surface is such a fixed head.

The figures below demonstrate the differences between a system with no fixed head and high fixed head. A pump will always operate at the intersection of the pump curve and the system curve. The pump curve is dictated by the pump design and operating speed while the system curve is dictated by the physical system the pump is distributing water through such as the length of pipe, flow restrictions, and fixed head.





With no fixed head as the pump speed is reduced the pump operation follows the system curve. In the No Fixed Head example above, reducing the pump speed from 100% to 60% reduces the flow from 1,100 gpm to 660 gpm with an associated head of approximately 140 ft. In addition, the pump efficiency will remain the same at the two different flows. The reduced speed operation requires significantly less power than throttling the pump to 660 gpm which would require 480 ft of head.

With the High Fixed Head condition, it can be seen that the system curve does not intersect the 60% speed curve. As a result, the pump cannot operate at 60% speed with this level of fixed head. Reducing the pump speed to 60% in this case would result in no flow and the pump would overheat. In order to achieve 660 gpm by reducing the pump speed the pump must operate at 80% speed now (see the intersection of the system curve and the 80% speed curve). In this case the pump will produce 300 ft of head to achieve the 660 gpm flow. The pump will also most likely be operating at a different efficiency than when it was producing 1,100 gpm. The pump efficiency at the new operation at 80% speed will be a function of the pump design and may be higher or lower than at the full speed, 1,100 gpm operation. However, if the pump was sized for optimal performance at full speed and 1,100 gpm it is likely that the pump efficiency will be lower when it is operating at 80% speed.

The following information is required to determine if installing a VFD to control a fixed head pump is feasible. The pump curves for the associated pump, the full speed flow and head, and the system fixed head. With that information the minimum feasible pump speed and associated power draw can be determined. To determine the potential energy savings the typical flow pattern of the system is required. With well or sump systems reducing the pump flow will increase the pump operating hours. Some system configurations will work with the pump operating at lower flow for longer hours. An example would be a well pump with excess flow capacity that is used to fill a large tank or reservoir. Other systems cannot function at significant reduced flows. An example would be a pump transferring fluid between two holding tanks if there are time constraints to the fluid transfer. If any of the pump systems at this site with motor capacities of 5 hp or more and a space to locate a VFD can operate for longer hours at reduced flow then the feasibility of installing a VFD could be evaluated.

5 Energy Efficient Best Practices

A whole building maintenance plan will extend equipment life; improve occupant comfort, health, and safety; and reduce energy and maintenance costs. You may already be doing some of these things— see our list below for potential additions to your maintenance plan. Be sure to consult with qualified equipment specialists for details on proper maintenance and system operation.

Energy Tracking with ENERGY STAR® Portfolio Manager®

You've heard it before - you can't manage what you don't measure. ENERGY STAR® Portfolio Manager® is an online tool that you can use to measure and track energy and water consumption, as well as greenhouse gas emissions[5] . Your account has already been established. Now you can continue to keep tabs on your energy performance every month.

Weatherization

Caulk or weather strip leaky doors and windows to reduce drafts and loss of heated or cooled air. Sealing cracks and openings can reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. Materials used may include caulk, polyurethane foam, and other weather-stripping materials. There is an energy savings opportunity by reducing the uncontrolled air exchange between the outside and inside of the building. Blower door assisted comprehensive building air sealing will reduce the amount of air exchange which will in turn reduce the load on the buildings heating and cooling equipment and thus providing energy savings and increased occupant comfort.

Lighting Maintenance

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

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

Lighting Controls

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

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

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.

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.

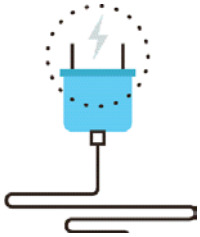
Compressed Air System Maintenance

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

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

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

Plug Load Controls



Reducing plug loads is a common way to decrease your electrical use. Limiting the energy use of plug loads can include increasing occupant awareness, removing under-used equipment, installing hardware controls, and using software controls. Consider enabling the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips[6]. Your local utility may offer incentives or rebates for this equipment.

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

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[7] or download a copy of EPA's "WaterSense® at Work: Best Management Practices for Commercial and Institutional Facilities"[8] 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.

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

[8] 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 **no** potential for installing a PV array.

For this analysis, we used the 67th Street Pump Station as the baseline for solar PV array eligibility. 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.

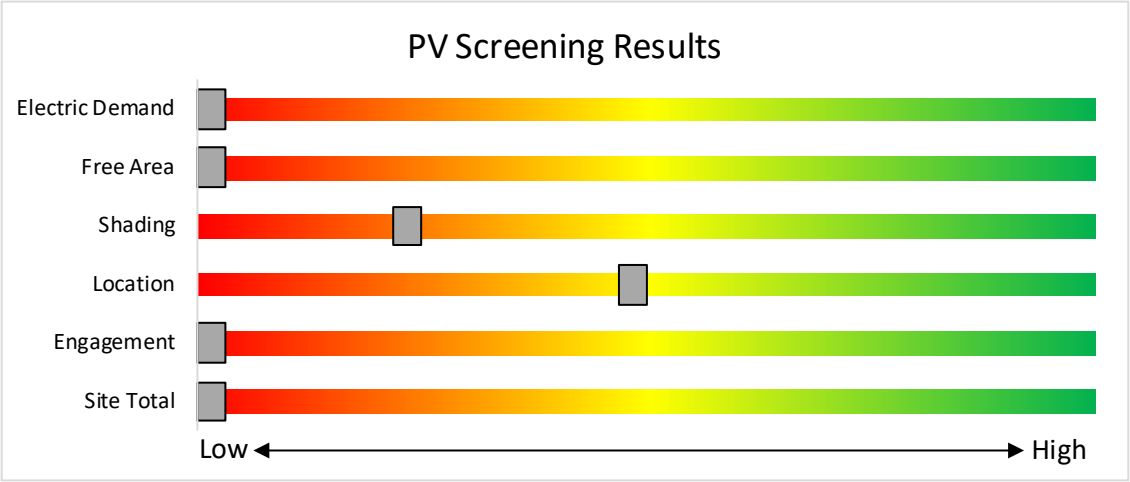


Figure 9 - Photovoltaic Screening

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

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

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

Get more information about solar power in New Jersey or find a qualified solar installer who can help you decide if solar is right for your building:

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

6.2 Combined Heat and Power

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

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

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

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

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

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

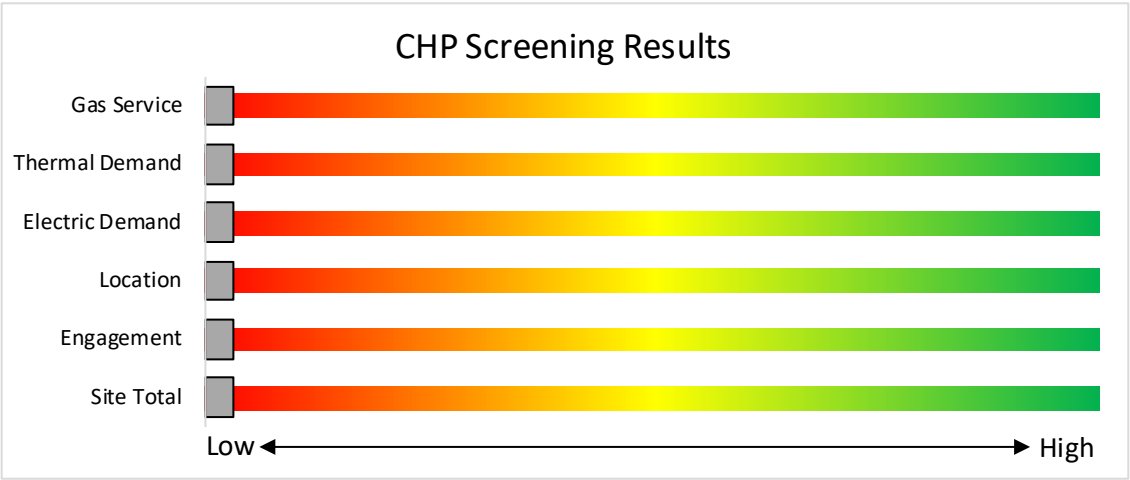


Figure 10 - Combined Heat and Power Screening

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

7 Project Funding and Incentives

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

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

7.1 SmartStart

SmartStart offers incentives for installing prescriptive and custom energy efficiency measures at your facility. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades. This program serves most common equipment types and sizes.

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

Equipment with Prescriptive Incentives Currently Available:

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

Incentives

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

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

How to Participate

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

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

7.2 Direct Install

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives, and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program, which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

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

7.3 Pay for Performance - Existing Buildings

Pay for Performance works for larger customers with a peak demand over 200 kW. The minimum installed scope of work must include at least two unique measures that results in at least 15% source energy savings, and lighting cannot make up the majority of the savings. P4P is a generally a good option for medium-to-large sized facilities looking to implement as many measures as possible under a single project to achieve deep energy savings. This program has an added benefit of addressing measures that may not qualify for other programs. Many facilities pursuing an Energy Savings Improvement Program loan also use this program.

Based on the site building and utility data provided, the facility does not meet the requirements of the current P4P program.

Incentives

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

How to Participate

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

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

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

7.4 Combined Heat and Power

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

Incentives

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

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

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

How to Participate

You work with a qualified developer or consulting firm to complete the CHP application. Once the application is approved the project can be installed. Information about the CHP program can be found at: www.njcleanenergy.com/CHP.

7.5 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) serves New Jersey's government agencies by financing energy projects. An ESIP is a type of performance contract, whereby school districts, counties, municipalities, housing authorities and other public and state entities enter 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.

7.6 SREC Registration Program

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

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

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

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

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

8 Energy Purchasing and Procurement Strategies

8.1 Retail Electric Supply Options

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

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

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

8.2 Retail Natural Gas Supply Options

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

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

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

A list of licensed third-party natural gas suppliers is available at the NJBPU website[10].

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

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

APPENDIX A: EQUIPMENT INVENTORY & RECOMMENDATIONS

Lighting Inventory & Recommendations

	Existing Conditions						Proposed Conditions								Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Light Level	Watts per Fixture	Annual Operating Hours	ECM #	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
12th Street P.S.- Pump Room	6	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	S	60	520	3	Relamp	No	6	LED - Linear Tubes: (2) 4' T5 (14.5W) Lamps	Wall Switch	30	520	0.1	69	0	$12	$342	$120	18.0
12th Street P.S	2	Metal Halide: (1) 70W Lamp	Photocell		95	4,380	1	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Photocell	21	4,380	0.0	648	0	$115	$500	$400	0.9
12th Street P.S.- Chlorine Tank Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	520	3	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.0	25	0	$5	$73	$40	7.3
38th Street P.S.- Chlorine Room	1	Compact Fluorescent: (1) 18W Screw-In Lamp	Wall Switch	S	18	520	3	Relamp	No	1	LED Lamps: (1) 13W Screw-In Lamp	Wall Switch	13	520	0.0	2	0	$0	$17	$2	41.1
38th Street P.S.- Pump Room	1	LED Lamps: (1) 18W Screw-In Lamp	Timeclock		18	4,380		None	No	1	LED Lamps: (1) 18W Screw-In Lamp	Timeclock	18	4,380	0.0	0	0	$0	$0	$0	0.0
38th Street P.S.- Pump Room	2	Compact Fluorescent: (1) 18W Screw-In Lamp	Wall Switch	S	18	520	3	Relamp	No	2	LED Lamps: (1) 13W Screw-In Lamp	Wall Switch	13	520	0.0	4	0	$1	$34	$4	44.4
38th Street P.S.- Pump Room	1	Compact Fluorescent: (1) 23W Screw-In Lamp	Wall Switch	S	23	520	3	Relamp	No	1	LED Lamps: (1) 16W Screw-In Lamp	Wall Switch	16	520	0.0	3	0	$0	$17	$2	32.2
38th Street P.S.- Office	1	Compact Fluorescent: (1) 18W Screw-In Lamp	Wall Switch	S	18	1,200	3	Relamp	No	1	LED Lamps: (1) 13W Screw-In Lamp	Wall Switch	13	1,200	0.0	4	0	$1	$17	$2	19.3
38th Street P.S.- Rest Room	1	Incandescent: (1) 60W	Wall Switch	S	60	200	3	Relamp	No	1	LED Lamps: (1) 9W Screw-In Lamp	Wall Switch	9	200	0.0	8	0	$1	$17	$2	11.3
67th Street P.S.- Chlorine Room	1	LED Lamps: (1) 10 Screw-In Lamp	Wall Switch	S	10	520		None	No	1	LED Lamps: (1) 10 Screw-In Lamp	Wall Switch	10	520	0.0	0	0	$0	$0	$0	0.0
67th Street P.S.- Water Tank Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	520	3	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	520	0.1	38	0	$7	$110	$60	7.3
67th Street P.S.- Water Tank Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	S	114	520	3	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	520	0.1	43	0	$8	$146	$80	8.6
67th Street P.S.- Storage Area	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	200	2	Relamp & Reballast	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	200	0.3	70	0	$12	$473	$160	25.2
67th Street P.S.- Rest Room	1	LED Lamps: (1) 18W Screw-In Lamp	Wall Switch	S	18	200		None	No	1	LED Lamps: (1) 18W Screw-In Lamp	Wall Switch	18	200	0.0	0	0	$0	$0	$0	0.0
67th Street P.S.- Garage	4	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	S	158	200	2	Relamp & Reballast	No	4	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	200	0.2	51	0	$9	$515	$160	39.1
67th Street P.S.- Store Room	2	Incandescent: (1) 60W	Wall Switch	S	60	200	3	Relamp	No	2	LED Lamps: (1) 9W Screw-In Lamp	Wall Switch	9	200	0.1	15	0	$3	$34	$4	11.3
67th Street P.S.- Attic	4	Incandescent: (1) 75W	Wall Switch	S	75	80	3	Relamp	No	4	LED Lamps: (1) 11W Screw-In Lamp	Wall Switch	11	80	0.2	15	0	$3	$69	$8	22.7
67th Street P.S	3	Incandescent: (1) 75W	Timeclock		75	4,380	3	Relamp	No	3	LED Lamps: (1) 11W Screw-In Lamp	Timeclock	11	4,380	0.0	841	0	$150	$52	$6	0.3
67th Street P.S	1	Incandescent: (1) 75W	Timeclock		75	4,380	3	Relamp	No	1	LED Lamps: (1) 11W Screw-In Lamp	Timeclock	11	4,380	0.0	280	0	$50	$17	$2	0.3
42nd Street P.S.	1	Incandescent: (1) 60W	Wall Switch	S	60	10	3	Relamp	No	1	LED Lamps: (1) 9W Screw-In Lamp	Wall Switch	9	10	0.0	0	0	$0	$17	$2	217.8
59th Street P.S.- Pump Room	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	S	176	25	2	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	25	0.1	2	0	$0	$118	$40	201.6
59th Street P.S.- Pump Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	S	62	25	3	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	25	0.0	1	0	$0	$37	$20	151.9

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
12th Street P.S.-Pump Room	12th Street P.S.-Pump Room	1	Process Pump	75.0	95.0%	No	W	3,390		No	95.0%	No		0.0	0	0	$0	$0	$0	0.0
12th Street P.S.-Pump Room	12th Street P.S.-Pump Room	1	Air Compressor	0.5	70.0%	No	W	1,038		No	70.0%	No		0.0	0	0	$0	$0	$0	0.0
12th Street P.S.-Pump Room	12th Street P.S.-Pump Room	1	Exhaust Fan	0.3	65.0%	No	B	2,038		No	65.0%	No		0.0	0	0	$0	$0	$0	0.0
38th Street P.S.-Pump Room	38th Street P.S.-Pump Room	1	Process Pump	75.0	95.0%	No	W	3,059		No	95.0%	No		0.0	0	0	$0	$0	$0	0.0
67th Street P.S.	67th Street P.S.	1	Process Pump	100.0	94.1%	No	W	2,836		No	94.1%	No		0.0	0	0	$0	$0	$0	0.0
42nd Street & Pelican P.S.	42nd Street & Pelican P.S.	1	Process Pump	10.0	89.5%	No	W	177		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
42nd Street & Pelican P.S.	42nd Street & Pelican P.S.	1	Process Pump	10.0	89.5%	No	W	177		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
22nd Street & Harbor P.S.	22nd Street & Harbor P.S.	1	Process Pump	7.5	88.5%	No	W	347		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
22nd Street & Harbor P.S.	22nd Street & Harbor P.S.	1	Process Pump	7.5	88.5%	No	W	347		No	88.5%	No		0.0	0	0	$0	$0	$0	0.0
24th Street & Harbor P.S.	24th Street & Harbor P.S.	1	Process Pump	5.0	87.5%	No	W	537		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
24th Street & Harbor P.S.	24th Street & Harbor P.S.	1	Process Pump	5.0	87.5%	No	W	537		No	87.5%	No		0.0	0	0	$0	$0	$0	0.0
7th Street P.S.	7th Street P.S.	1	Process Pump	10.0	89.5%	No	W	320		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
7th Street P.S.	7th Street P.S.	1	Process Pump	10.0	89.5%	No	W	320		No	89.5%	No		0.0	0	0	$0	$0	$0	0.0
59th Street P.S.	59th Street P.S.	1	Process Pump	25.0	90.2%	No	W	973		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0
59th Street P.S.	59th Street P.S.	1	Process Pump	25.0	90.2%	No	W	973		No	90.2%	No		0.0	0	0	$0	$0	$0	0.0

Electric HVAC Inventory & Recommendations

		Existing Conditions					Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Remaining Useful Life	ECM #	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (MBh)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
12th Street P.S.- Pump Room	12th Street P.S.- Pump Room	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
12th Street P.S.- Pump Room	12th Street P.S.- Pump Room	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
12th Street P.S.- Chlorine Tank Room	12th Street P.S.- Chlorine Tank Room	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
38th Street P.S.- Chlorine Room	38th Street P.S.- Chlorine Room	1	Electric Resistance Heat		0.85	B		No							0.0	0	0	$0	$0	$0	0.0
38th Street P.S.- Chlorine Room	38th Street P.S.- Chlorine Room	1	Electric Resistance Heat		0.85	B		No							0.0	0	0	$0	$0	$0	0.0
38th Street P.S.- Pump Room	38th Street P.S.- Pump Room	1	Electric Resistance Heat		10.24	W		No							0.0	0	0	$0	$0	$0	0.0
38th Street P.S.- Office	38th Street P.S.- Office	1	Electric Resistance Heat		5.12	B		No							0.0	0	0	$0	$0	$0	0.0
38th Street P.S.- Office	38th Street P.S.- Office	1	Window AC	1.00		B		No							0.0	0	0	$0	$0	$0	0.0
38th Street P.S.- Rest Room	38th Street P.S.- Rest Room	1	Electric Resistance Heat		1.71	B		No							0.0	0	0	$0	$0	$0	0.0
67th Street P.S.- Chlorine Room	67th Street P.S.- Chlorine Room	1	Electric Resistance Heat		2.56	W		No							0.0	0	0	$0	$0	$0	0.0
67th Street P.S.- Storage Area	67th Street P.S.- Storage Area	1	Electric Resistance Heat		6.82	W		No							0.0	0	0	$0	$0	$0	0.0
67th Street P.S.- Storage Area	67th Street P.S.- Storage Area	1	Electric Resistance Heat		6.82	W		No							0.0	0	0	$0	$0	$0	0.0
67th Street P.S.- Rest Room	67th Street P.S.- Rest Room	1	Window AC	0.67		B		No							0.0	0	0	$0	$0	$0	0.0
67th Street P.S.- Rest Room	67th Street P.S.- Rest Room	1	Electric Resistance Heat		3.41	B		No							0.0	0	0	$0	$0	$0	0.0
67th Street P.S.	67th Street P.S.	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
67th Street P.S.	67th Street P.S.	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0
59th Street P.S.	59th Street P.S.	1	Electric Resistance Heat		17.06	W		No							0.0	0	0	$0	$0	$0	0.0

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
38th Street P.S.- Office	2	Computers	90	
67th Street P.S.- Chlorine Room	1	Dehumidifier	745	

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]

12th Street Pump Station - Water

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 720
Built: 2000

For Year Ending: February 28, 2018
Date Generated: August 03, 2019

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
12th Street Pump Station - Water 12th Street & Ocean Drive (North East Corner) Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385163

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
744.5 kBtu/ft²

Source EUI
2,084.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	536,014 (100%)

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)	54

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
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(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

38th Street Pump Station - Water

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 570
Built: 2000

For Year Ending: February 28, 2018
Date Generated: August 03, 2019

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
38th Street Pump Station - Water 38th Street & Dune Drive (South West Corner) Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385167

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
827.2 kBtu/ft²

Source EUI
2,316 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	471,480	(100%)

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)	48

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

67th Street Pump Station - Water

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 1,612
Built: 2011

For Year Ending: February 28, 2018
Date Generated: January 20, 2020

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
67th Street Pump Station - Water 67th Street & Dune Drive (North West Corner) Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385168

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
380.6 kBtu/ft²

Source EUI
1,065.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	613,487 (100%)

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)	62

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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N/A

ENERGY STAR® Score[1]

42nd & Pelican Drive Pump Station - Sewer

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 900
Built: 2000

For Year Ending: February 28, 2018
Date Generated: August 03, 2019

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
42nd & Pelican Drive Pump Station - Sewer 42nd Street & Pelican Drive (Traffic Island) Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385179

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
8.4 kBtu/ft²

Source EUI
23.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	7,585 (100%)

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)	1

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

22nd & Harbor Avenue Pump Station - Sewer

Gross Floor Area (ft²): 900
Built: 2000

For Year Ending: February 28, 2018
Date Generated: July 29, 2019

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
22nd & Harbor Avenue Pump Station - Sewer 22nd Street & Harbor Avenue Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385180

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
12.4 kBtu/ft²

Source EUI
34.7 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	11,169 (100%)

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)	1

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

24th & Harbor Avenue Pump Station - Sewer

Gross Floor Area (ft²): 900
Built: 2000

For Year Ending: February 28, 2018
Date Generated: July 29, 2019

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
24th & Harbor Avenue Pump Station - Sewer 24th Street & Harbor Avenue Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385181

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
13 kBtu/ft²

Source EUI
36.3 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	11,674 (100%)

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)	1

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

7th Street Pump Station - Sewer

Gross Floor Area (ft²): 900
Built: 2000

For Year Ending: February 28, 2018
Date Generated: July 29, 2019

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
7th Street Pump Station - Sewer 7th Street & 4th Avenue Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385182

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
14.8 kBtu/ft²

Source EUI
41.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	13,342 (100%)

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)	1

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

59th Street Pump Station - Sewer

Gross Floor Area (ft²): 168
Built: 2000

For Year Ending: February 28, 2018
Date Generated: July 29, 2019

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
59th Street Pump Station - Sewer 5861 Ocean Drive Avalon, New Jersey 08202	Borough of Avalon 235 32nd Street Avalon, NJ 08202 (609) 967-8200	Scott Wahl 3100 Dune Drive Avalon, NJ 08202 (609) 967-5917 swahl@avalonboro.org

Property ID: 7385185

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
653.6 kBtu/ft²

Source EUI
1,830.2 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	109,810 (100%)

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)	11

Signature & Stamp of Verifying Professional

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

Signature: _____Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp
(if applicable)

APPENDIX C: GLOSSARY

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