Local Government Energy Audit Report

Storm Water Pump Stations

June 10, 2020

Prepared for:

Borough of Avalon

Various Locations

Avalon, NJ 08202

Prepared by:

TRC

900 Route 9 North

Woodbridge, NJ 07095

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.

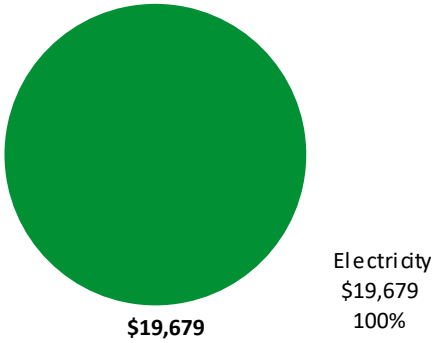
The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

Table of Contents

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) report for the Storm 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: $19,679 Electricity: 47,668 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.

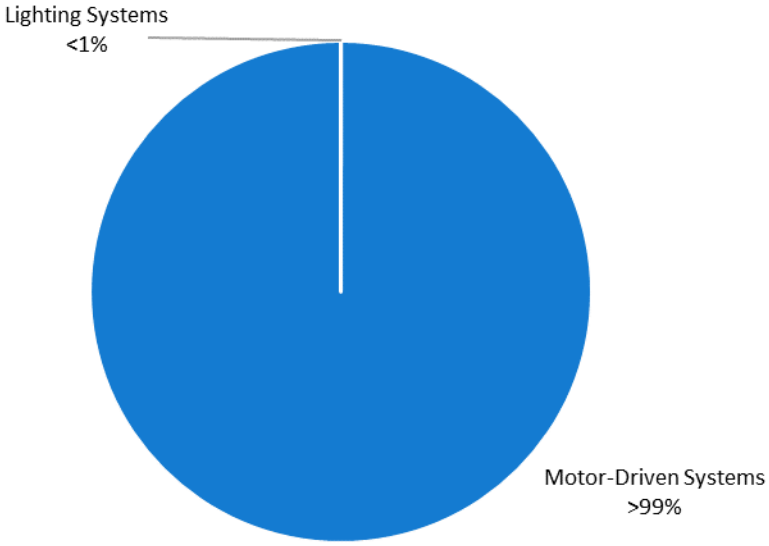


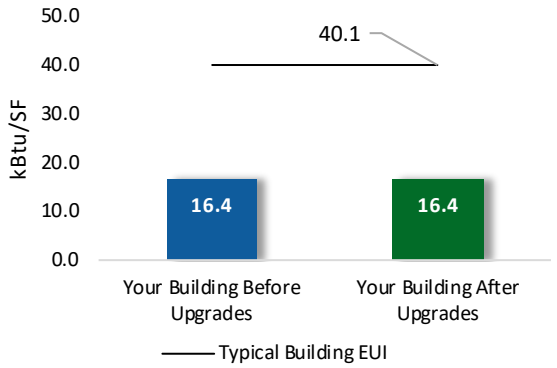
Figure 1 - Energy Use by System

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.

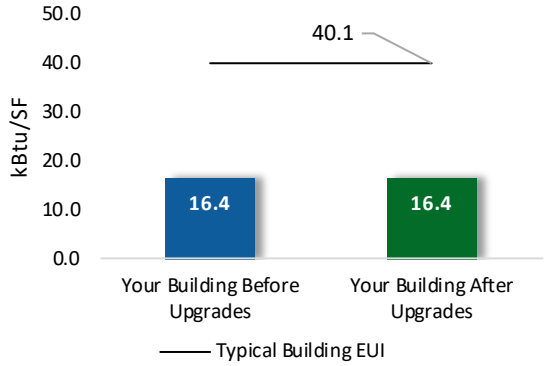
Scenario 1: Full Package (all evaluated measures)

Installation Cost	$34
Potential Rebates & Incentives[1]	$4
Annual Cost Savings	$1
Annual Energy Savings	Electricity: 3 kWh
Greenhouse Gas Emission Savings	0 Tons
Simple Payback	25.1 Years
Site Energy Savings (all utilities)	0%



Scenario 2: Cost Effective Package[2]

Installation Cost	$34
Potential Rebates & Incentives	$4
Annual Cost Savings	$1
Annual Energy Savings	Electricity: 3 kWh
Greenhouse Gas Emission Savings	0 Tons
Simple Payback	25.1 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			**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	3	0.0	0	$1	$34	$4	$30	25.1	3
TOTALS (COST EFFECTIVE MEASURES)			**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**
TOTALS (ALL MEASURES)			**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**

* - 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	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 Storm 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 the storm 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 storm water pumping locations. Water supply and sewer pumping facilities are addressed in a companion report.

The storm water pump stations are located throughout the Borough of Avalon. This report combines analysis of eleven storm water pump stations, totaling approximately 9,900 square-feet of pump stations and associated open areas. Construction dates for these pump stations are unknown according to facility personnel. They have all been estimated to have been built in 2000 for analysis purposes. Spaces include: open areas, small sheds, and underground pumps.

The sites contained in this report are listed below:

Site Name	Location	Square Footage
21st Street Storm Water Pump Station	21st Street & Dune Drive (North West Corner)	900
8th Street Storm Water Pump Station	8th Street & Ocean Drive (West Side)	900
19th Street Storm Water Pump Station	19th Street & Ocean Drive (West Side)	900
23rd Street Storm Water Pump Station	23rd Street & Ocean Drive (North West Corner)	900
26th Street Storm Water Pump Station	26th Street & Ocean Drive (South West Corner)	900
29th Street Storm Water Pump Station	29th Street & Ocean Drive (West Side)	900
32nd Street Storm Water Pump Station	32nd Street & Ocean Drive (South West Corner)	900
33rd Street Storm Water Pump Station	33rd Street & Ocean Drive (South West Corner)	900
34th Street Storm Water Pump Station	34th Street & Ocean Drive (South West Corner)	900
11th Street & Beach Storm Water Pump Station	11th Street (Beach Path Entrance)	900
22nd Street & Beach Storm Water Pump Station	22nd Street (East Side of Boardwalk)	900

2.2 Building Occupancy

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

Building Name	Weekday/Weekend	Operating Schedule
21st Street P.S.	Weekday	24/7
	Weekend	24/7
8th Street P.S.	Weekday	24/7
	Weekend	24/7
19th Street P.S.	Weekday	24/7
	Weekend	24/7
23rd Street P.S.	Weekday	24/7
	Weekend	24/7
26th Street P.S.	Weekday	24/7
	Weekend	24/7
29th Street P.S.	Weekday	24/7
	Weekend	24/7
32nd Street P.S.	Weekday	24/7
	Weekend	24/7
33rd Street P.S.	Weekday	24/7
	Weekend	24/7
34th Street P.S.	Weekday	24/7
	Weekend	24/7
11th Street & Beach P.S.	Weekday	24/7
	Weekend	24/7
22nd Street & Beach P.S.	Weekday	24/7
	Weekend	24/7

Figure 4 - Building Occupancy Schedule

2.3 Building Envelope

Most of the storm water pump stations do not have a building structure. Instead, they have a metal cabinet containing the pump controls. These are all located on the side of the road, with the pumps underground.

Only the 11th Street & Beach Storm Water Pump Station and 22nd Street & Beach Storm Water Pump Station have building structures. At these pump stations, there is a small shed constructed of vinyl and bolted together. These sheds have no windows and contain the controls for the underground pumps. The shed at the 11th Street & Beach Storm Water Pump Station is protected by a wooden fence, while the shed at the 22nd Street & Beach Storm Water Pump Station is enclosed by a chain-link fence. Both are in fair condition.

21st Street P.S. Site

8th Street P.S. Site

19th Street P.S. Site

23rd Street P.S. Site

26th Street P.S. Site

29th Street P.S. Site

32nd Street P.S. Site

33rd Street P.S. Site

34th Street P.S. Site

11th Street & Beach P.S. Site

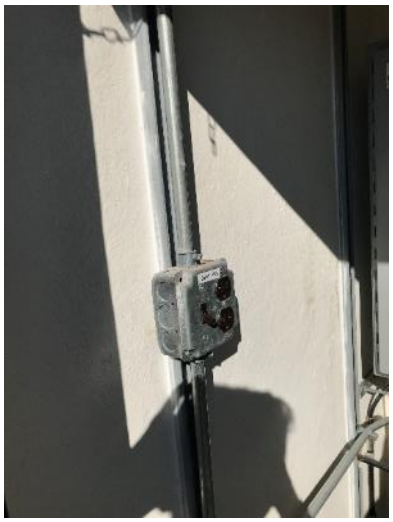
22nd Street & Beach P.S. Site

2.4 Lighting Systems

At the 11th Street & Beach Storm Water Pump Station there is one 26-Watt compact fluorescent lamp in an explosion-proof enclosure, controlled manually by a wall switch. At the 22nd Street & Beach Storm Water Pump Station there is one 23-Watt compact fluorescent lamp in an explosion-proof enclosure, controlled manually by a wall switch. These lights have low usage compared to the overall energy use of the pump station because they are only used when someone is coming to collect information or check operation of the pump stations. These fixtures are in good condition. Interior lighting levels were generally sufficient.

There were no exterior fixtures at any of the sites.

11th Street & Beach P.S. Light Fixture



11th Street & Beach P.S. Wall Switch

22nd Street & Beach P.S. Light Fixture

22nd Street & Beach P.S. Wall Switch

2.5 Process Equipment

21st Street Storm Water Pump Station

At the 21st Street Storm Water Pump Station, there are two constant speed 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter indicating how many hours each pump has been running. There are alarms to indicate if there is overheating or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

21st Street Storm Water Underground Pumps

Pump Controls

8th Street Storm Water Pump Station

At the 8th Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter indicating how many hours each pump has been running. There are alarms to indicate if there is overheating or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit. They could be seen from above through the grate.

8th Street Storm Water Underground Pumps

Underground Pump

Pump Controls

19th Street Storm Water Pump Station

At the 19th Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter indicating how many hours each pump has been running. There are alarms to indicate if there is overheating or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

19th Street Storm Water Underground Pumps

Pump Controls

23rd Street Storm Water Pump Station

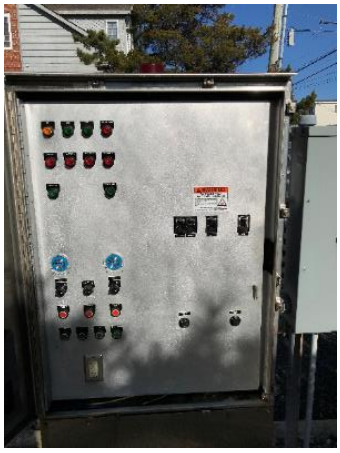
At the 23rd Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where Pump #2 leads. The controls also display a meter indicating how many hours each pump has been running. There are alarms to indicate if there is overheating, overloading, or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

23rd Street Storm Water Pump Control

26th Street Storm Water Pump Station

At the 26th Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter indicating how many hours each pump has been running. There are alarms to indicate if there is overheating, overloading, or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

26th Street Storm Water Underground Pumps



Pump Controls

29th Street Storm Water Pump Station

At the 29th Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter indicating how many hours each pump has been running. There are alarms to indicate if there is overheating, overloading, or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

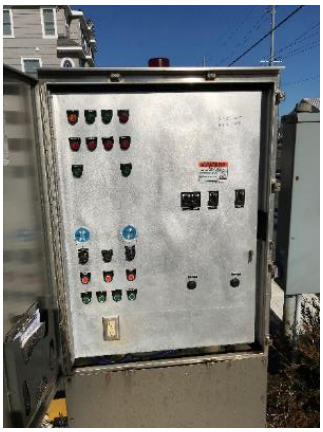
29th Street Storm Water Underground Pumps

Pump Controls

32nd Street Storm Water Pump Station

At the 32nd Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter of how many hours each pump has been running. There are alarms to indicate if there is overheating, overloading, or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

32nd Street Storm Water Underground Pumps



Pump Controls

33rd Street Storm Water Pump Station

At the 33rd Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter indicating how many hours each pump has been running. There are alarms to indicate if there is overheating, overloading, or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

33rd Street Storm Water Underground Pumps

Pump Controls

34th Storm Water Pump Station

At the 34th Street Storm Water Pump Station, there are two 30 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where they alternate between which pump leads. The controls also display a meter of indicating how many hours each pump has been running. There are alarms to indicate if there is overheating, overloading, or moisture in the pumps. Because these pumps are underground, under the sewer grates, they were inaccessible the day of the site-visit.

34th Street Storm Water Underground Pumps

Pump Controls

11th Street & Beach Storm Water Pump Station

At the 11th Street & Beach Storm Water Pump Station, there are two 35 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where Pump #1 leads. There are alarms to indicate if the pumps have a seal leak, overheat, or are overloaded. Each pump also has its own circuit breaker. Because these pumps are underground, underground beneath locked metal doors, they were inaccessible the day of the site-visit.

11th Street Storm Water Underground Pumps

Pump Controls

Pump #1 Controls

Pump #2 Controls

22nd Street & Beach Storm Water Pump Station

At the 22nd Street & Beach Storm Water Pump Station, there are two 25 HP submersible type pumps serving the storm water system. These pumps operate 24/7, year-round based on system demand. On the day of the site visit, the control panel indicated that both pumps were set to automatic operation. These pumps are operated in a lead-lag control scheme, where Pump #1 leads. There are alarms to indicate if the pumps have a seal leak, overheat, or are overloaded. Each pump also has its own circuit breaker. Because these pumps are underground, underground beneath locked metal doors, they were inaccessible the day of the site-visit.

22nd Street Storm Water Underground Pumps

Pump Controls

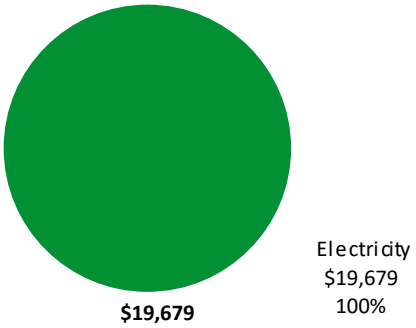
Pump #1 Controls

Pump #2 Controls

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	47,668 kWh	$19,679
Total		**$19,679**



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. 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.

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

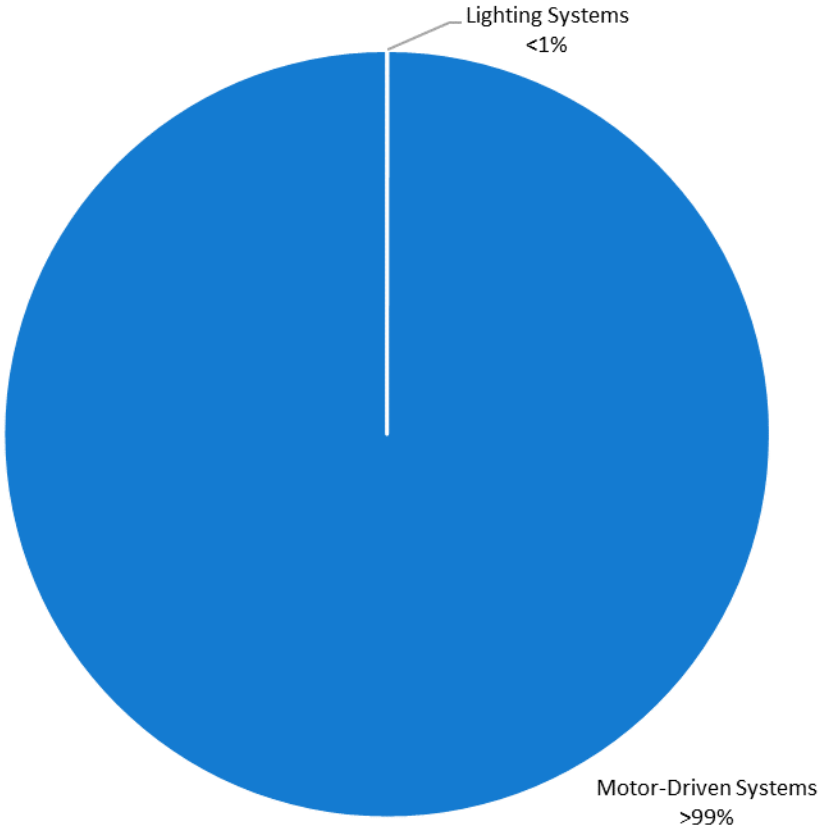
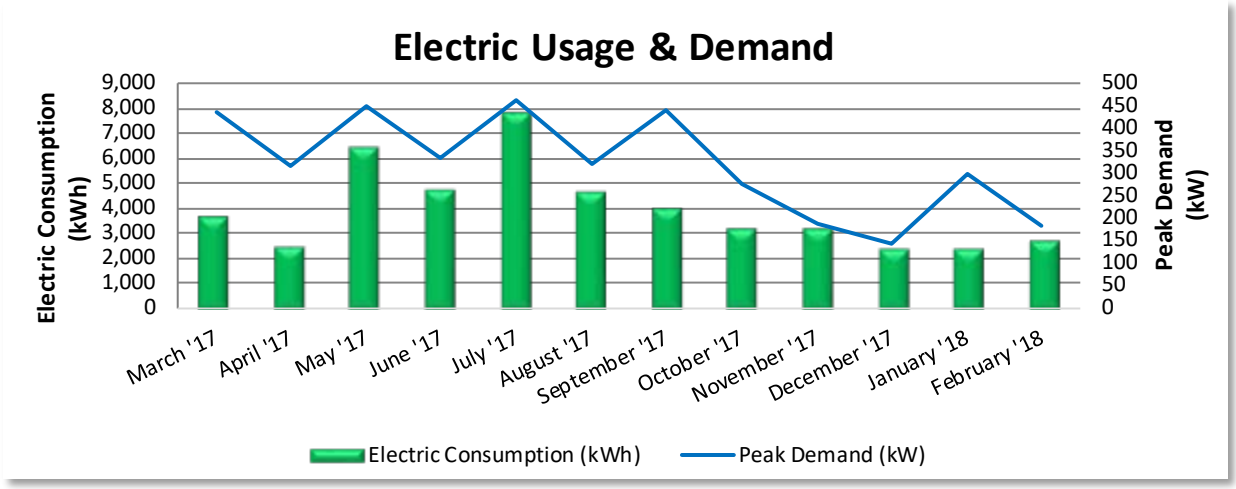


Figure 5 - Energy Balance

3.1 Combined Electricity- All Sites

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



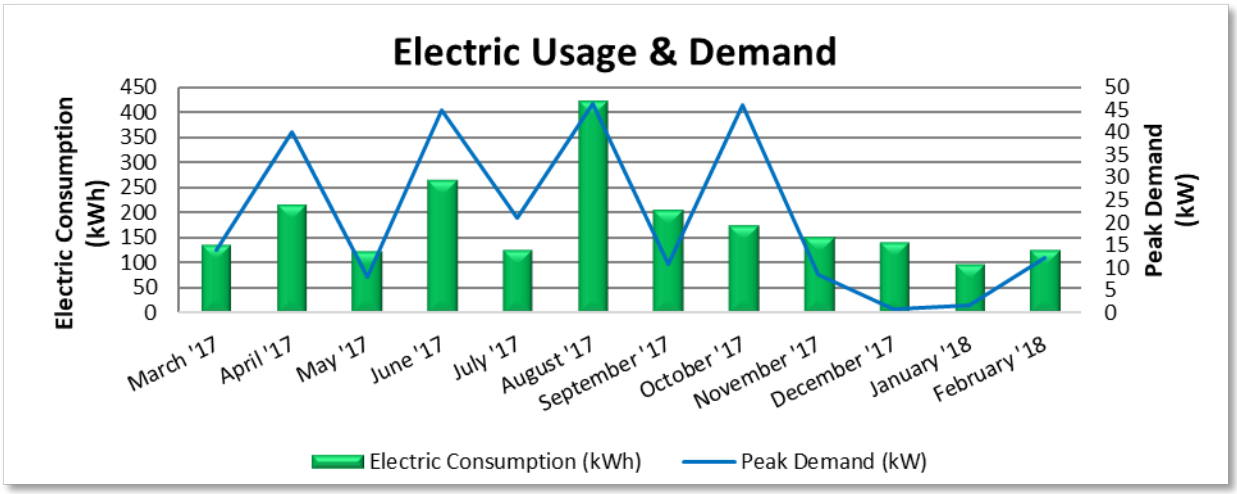
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
4/4/17	31	3,671	436	$0	$2,237	Yes
5/2/17	32	2,472	315	$0	$1,648	Yes
6/2/17	29	6,387	450	$0	$2,564	Yes
7/3/17	30	4,733	332	$0	$1,980	Yes
8/2/17	31	7,753	464	$0	$2,989	Yes
9/5/17	32	4,659	320	$0	$2,452	Yes
10/3/17	29	3,979	442	$0	$1,641	Yes
11/1/17	31	3,209	275	$0	$916	Yes
12/2/17	30	3,240	187	$0	$855	Yes
1/3/18	31	2,440	141	$0	$770	Yes
2/1/18	29	2,399	298	$0	$891	Yes
3/2/18	30	2,726	181	$0	$738	Yes
Totals	**365**	**47,668**	**464**	**$0**	**$19,679**	
Annual	**365**	**47,668**	**464**	**$0**	**$19,679**	

Notes:

- Peak demand of 464 kW occurred in July '17.
- Average demand over the past 12 months was 320 kW.
- The average electric cost over the past 12 months was $0.413/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.
- High demand relative to energy use is typical for intermittent pumping loads such as for this application, stormwater control.

21st Street Storm Water Pump Station

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



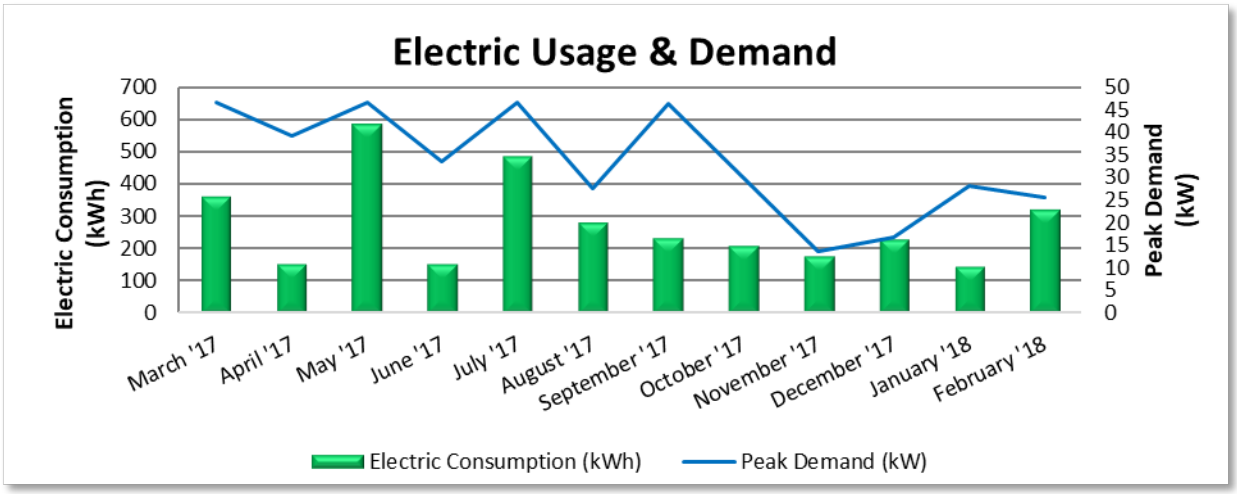
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
4/3/17	31	136	14	$0	$71	Yes
5/3/17	32	216	40	$0	$191	Yes
6/2/17	29	123	8	$0	$49	Yes
7/3/17	30	264	45	$0	$209	Yes
8/2/17	31	126	21	$0	$113	Yes
9/5/17	32	421	46	$0	$268	Yes
10/3/17	29	205	11	$0	$86	Yes
11/1/17	31	174	46	$0	$100	Yes
12/4/17	30	152	9	$0	$33	Yes
1/3/18	31	141	1	$0	$21	Yes
2/1/18	29	99	2	$0	$18	Yes
3/2/18	30	126	12	$0	$38	Yes
Totals	**365**	**2,183**	**46**	**$0**	**$1,198**	
Annual	**365**	**2,183**	**46**	**$0**	**$1,198**	

Notes:

- Data shown for Account Number 5500 1123 854, Meter number TEA014879588.
- Peak demand of 46.2 kW occurred in August '17.
- Average demand over the past 12 months was 21 kW.
- The average electric cost over the past 12 months for this meter was $0.549/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

8th Street Storm Water Pump Station

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



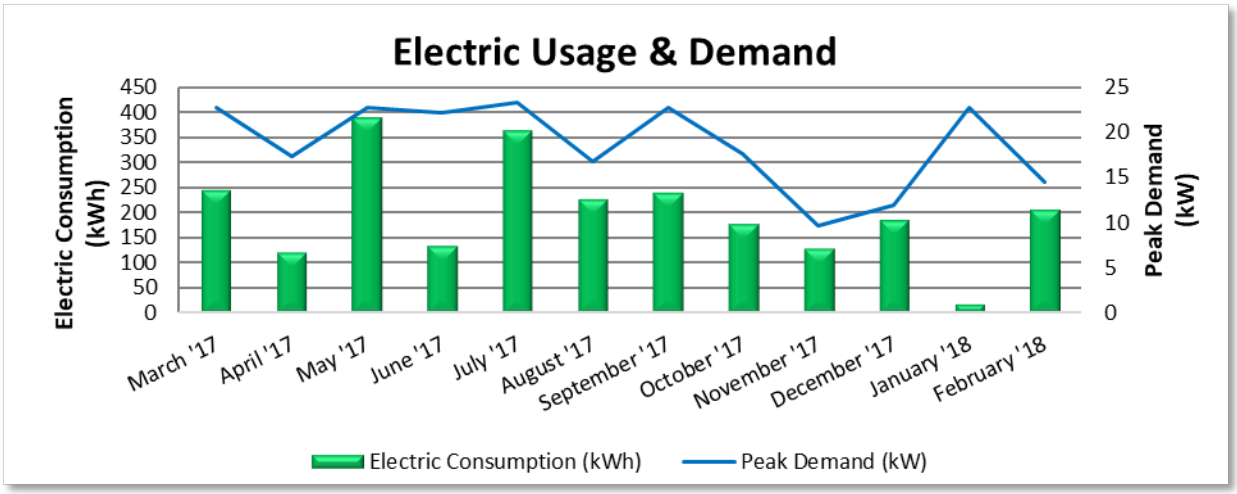
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/4/17	31	360	47	$0	$242	No
5/4/17	32	154	39	$0	$169	No
6/5/17	29	584	47	$0	$284	No
7/5/17	30	151	33	$0	$170	No
8/3/17	31	483	47	$0	$275	No
9/6/17	32	282	28	$0	$185	No
10/4/17	29	231	46	$0	$106	No
11/2/17	31	210	30	$0	$75	No
12/5/17	30	176	14	$0	$49	No
1/5/18	31	229	17	$0	$57	No
2/2/18	29	144	28	$0	$66	No
3/5/18	30	319	26	$0	$80	No
Totals	**365**	**3,323**	**47**	**$0**	**$1,757**	
Annual	**365**	**3,323**	**47**	**$0**	**$1,757**	

Notes:

- Data shown for Account number 5500 1123 516, Meter number TEA015696106.
- Peak demand of 46.7 kW occurred in July '17.
- Average demand over the past 12 months was 33 kW.
- The average electric cost over the past 12 months for this meter was $0.529/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

19th Street Storm Water Pump Station

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



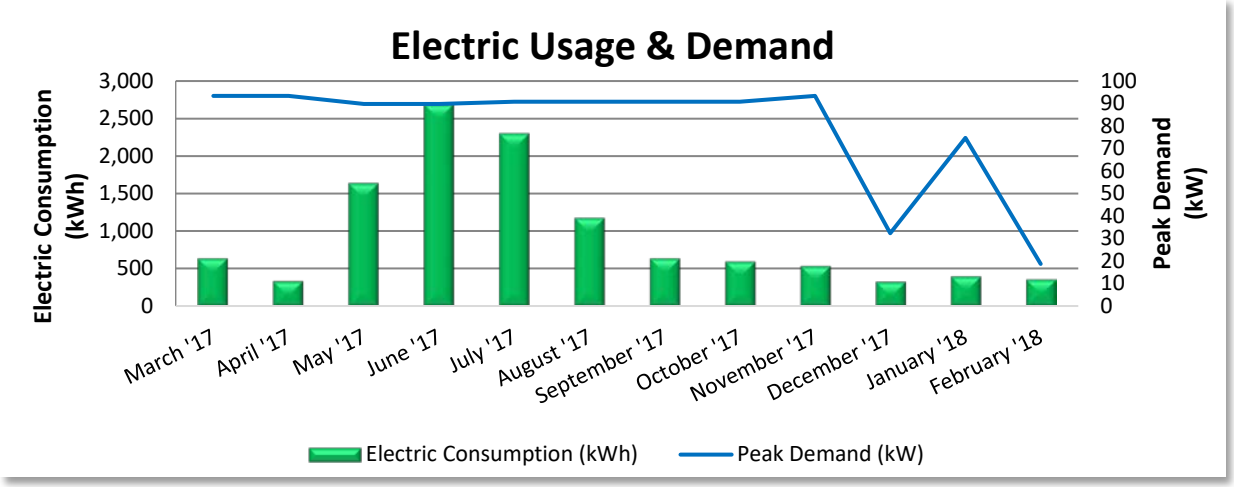
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/4/17	31	244	23	$0	$132	No
5/3/17	32	121	17	$0	$82	No
6/5/17	29	388	23	$0	$159	No
7/5/17	30	135	22	$0	$118	No
8/3/17	31	362	23	$0	$156	No
9/6/17	32	227	17	$0	$122	No
10/5/17	29	239	23	$0	$66	No
11/2/17	31	178	18	$0	$50	No
12/4/17	30	128	10	$0	$38	No
1/5/18	31	185	12	$0	$46	No
2/2/18	29	20	23	$0	$48	No
3/5/18	30	207	15	$0	$52	No
Totals	**365**	**2,434**	**23**	**$0**	**$1,069**	
Annual	**365**	**2,434**	**23**	**$0**	**$1,069**	

Notes:

- Data shown for Account number 5500 1148 679, Meter number TGE015030498.
- Peak demand of 23.3 kW occurred in July '17.
- Average demand over the past 12 months was 19 kW.
- The average electric cost over the past 12 months for this meter was $0.439/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

23rd Street Storm Water Pump Station

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



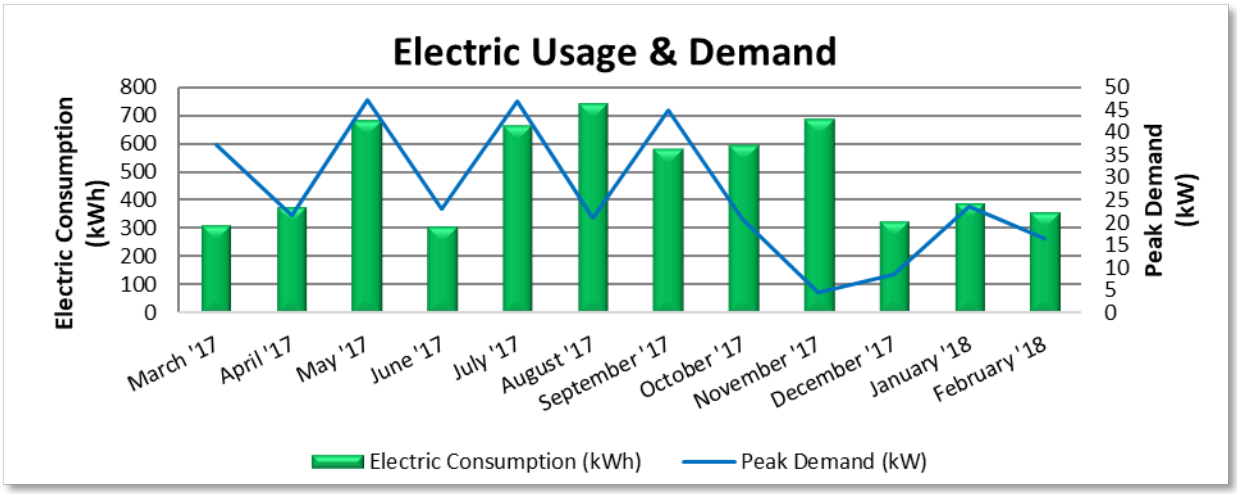
Electric Billing Data						
Period Ending	**Days in Period**	**Electric Usage (kWh)**	**Demand (kW)**	**Demand Cost**	**Total Electric Cost**	**TRC Estimated Usage?**
4/4/17	31	339	45	$0	$244	No
5/2/17	32	156	11	$0	$64	No
6/2/17	29	448	45	$0	$247	No
7/3/17	30	158	17	$0	$103	No
8/2/17	31	517	46	$0	$284	No
9/5/17	32	247	12	$0	$102	No
10/3/17	29	399	45	$0	$116	No
11/1/17	31	220	2	$0	$27	No
12/1/17	30	171	1	$0	$24	No
1/3/18	31	122	3	$0	$25	No
2/1/18	29	257	46	$0	$106	No
3/2/18	30	269	11	$0	$47	No
Totals	**365**	**3,303**	**46**	**$0**	**$1,388**	
Annual	**365**	**3,303**	**46**	**$0**	**$1,388**	

Notes:

- Data shown for Account number 5500 1148 273, Meter number TEG015030499.
- Peak demand of 46.1 kW occurred in July '17.
- Average demand over the past 12 months was 24 kW.
- The average electric cost over the past 12 months for this meter was $0.420/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

26th Street Storm Water Pump Station

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



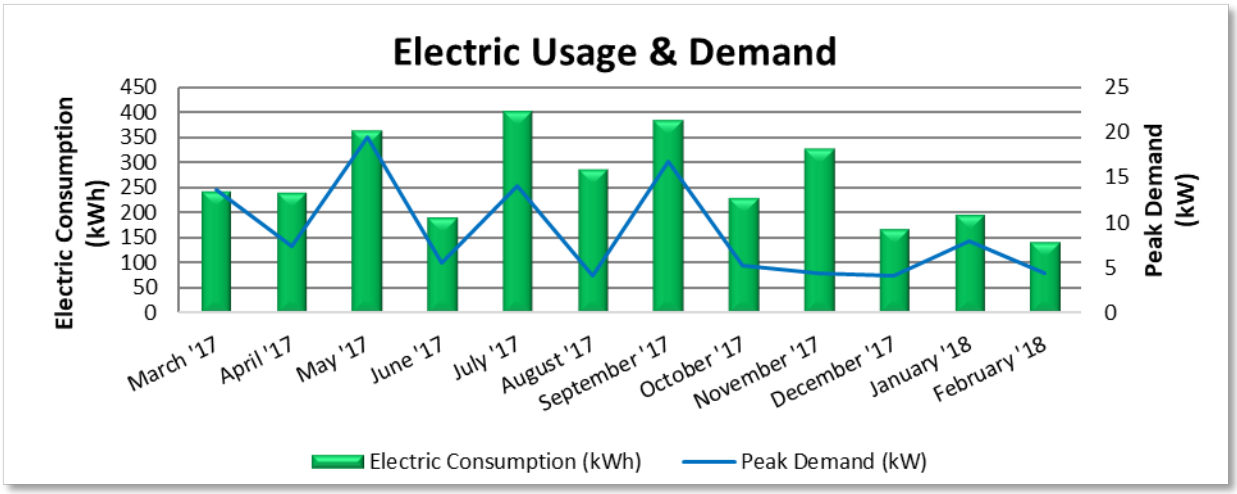
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/3/17	31	312	37	$0	$197	No
5/3/17	32	375	22	$0	$142	No
6/2/17	29	678	47	$0	$288	No
7/3/17	30	305	23	$0	$152	No
8/2/17	31	663	47	$0	$311	No
9/5/17	32	741	21	$0	$226	No
10/3/17	29	579	45	$0	$129	No
11/1/17	31	594	21	$0	$151	Yes
12/4/17	30	684	5	$0	$142	Yes
1/3/18	31	324	8	$0	$83	Yes
2/1/18	29	387	24	$0	$120	Yes
3/2/18	30	355	16	$0	$102	Yes
Totals	**365**	**5,997**	**47**	**$0**	**$2,042**	
Annual	**365**	**5,997**	**47**	**$0**	**$2,042**	

Notes:

- Data shown for Account number 5500 1147 622, Meter number TEG015030500.
- Peak demand of 47.3 kW occurred in July '17.
- Average demand over the past 12 months was 26 kW.
- The average electric cost over the past 12 months for this meter was $0.341/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

29th Street Storm Water Pump Station

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



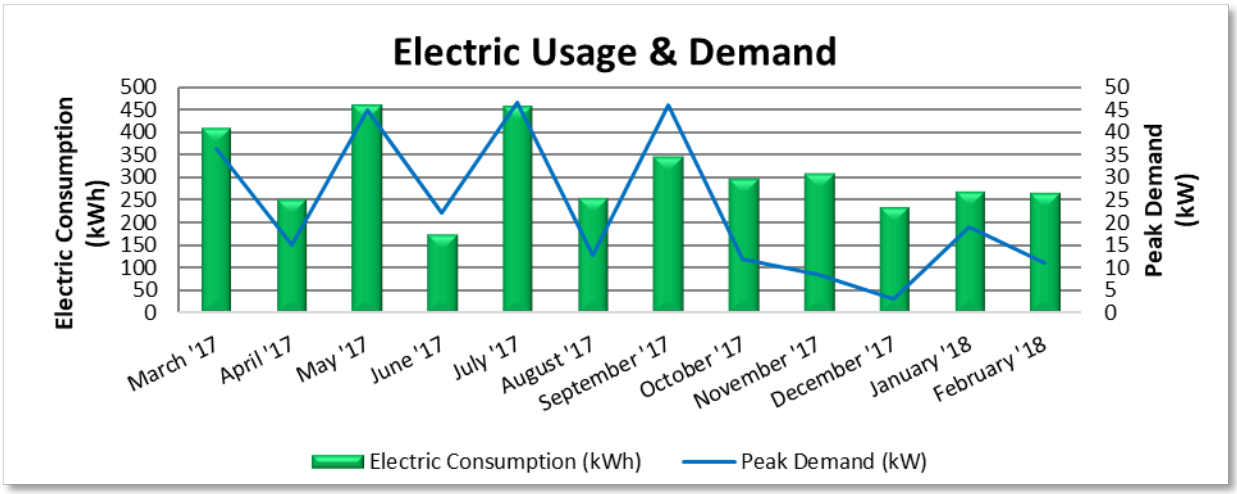
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/3/17	31	241	14	$0	$94	No
5/3/17	32	239	7	$0	$68	No
6/2/17	29	361	19	$0	$132	No
7/3/17	30	191	6	$0	$55	No
8/2/17	31	401	14	$0	$126	No
9/5/17	32	284	4	$0	$66	No
10/3/17	29	382	17	$0	$65	No
11/1/17	31	229	5	$0	$60	Yes
12/4/17	30	326	4	$0	$78	Yes
1/3/18	31	167	4	$0	$47	Yes
2/1/18	29	195	8	$0	$59	Yes
3/2/18	30	143	4	$0	$43	Yes
Totals	**365**	**3,159**	**19**	**$0**	**$892**	
Annual	**365**	**3,159**	**19**	**$0**	**$892**	

Notes:

- Data shown for Account number 5500 1147 960, Meter number TEG011948154.
- Peak demand of 19.4 kW occurred in May '17.
- Average demand over the past 12 months was 9 kW.
- The average electric cost over the past 12 months for this meter was $0.282/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

32nd Street Storm Water Pump Station

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



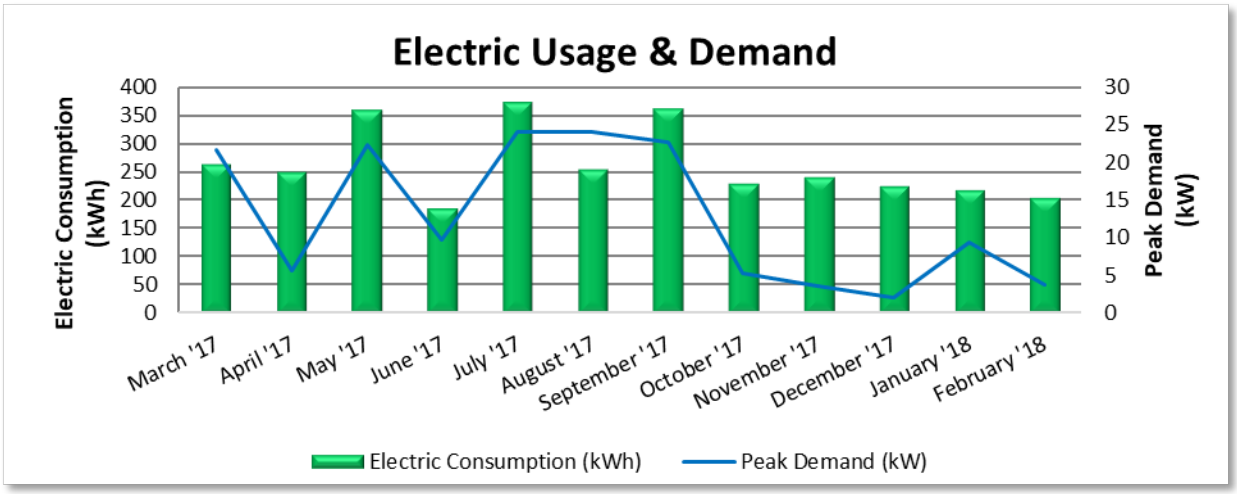
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/3/17	31	409	37	$0	$215	No
5/2/17	32	252	15	$0	$95	No
6/2/17	29	460	45	$0	$248	No
7/3/17	30	175	22	$0	$128	No
8/2/17	31	455	47	$0	$277	No
9/5/17	32	255	13	$0	$106	No
10/4/17	29	346	46	$0	$117	No
11/1/17	31	298	12	$0	$49	No
12/1/17	30	308	8	$0	$80	Yes
1/3/18	31	235	3	$0	$59	Yes
2/1/18	29	268	19	$0	$90	Yes
3/1/18	30	265	11	$0	$76	Yes
Totals	**365**	**3,726**	**47**	**$0**	**$1,539**	
Annual	**365**	**3,726**	**47**	**$0**	**$1,539**	

Notes:

- Data shown for Account number 5500 1146 897, Meter number TEG015030469.
- Peak demand of 46.7 kW occurred in July '17.
- Average demand over the past 12 months was 23 kW.
- The average electric cost over the past 12 months for this meter was $0.413/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

33rd Street Storm Water Pump Station

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



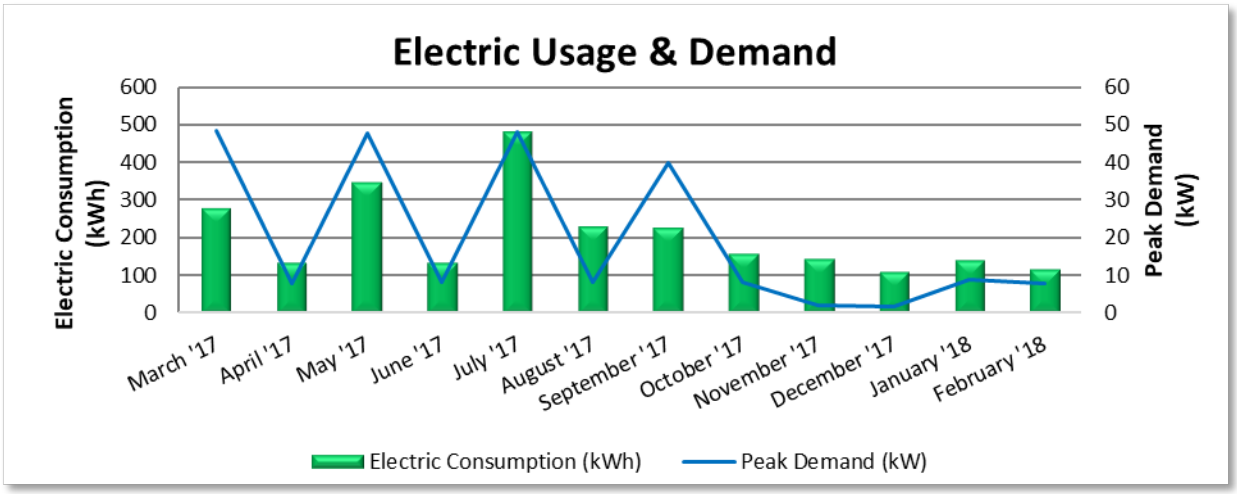
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/3/17	31	263	22	$0	$132	No
5/2/17	32	250	6	$0	$62	No
6/2/17	29	359	22	$0	$145	No
7/3/17	30	185	10	$0	$73	No
8/2/17	31	372	24	$0	$164	No
9/5/17	32	254	24	$0	$162	No
10/4/17	29	361	23	$0	$75	No
11/1/17	31	229	5	$0	$59	Yes
12/1/17	30	240	4	$0	$59	Yes
1/3/18	31	223	2	$0	$55	Yes
2/1/18	29	217	9	$0	$65	Yes
3/1/18	30	204	4	$0	$52	Yes
Totals	**365**	**3,157**	**24**	**$0**	**$1,104**	
Annual	**365**	**3,157**	**24**	**$0**	**$1,104**	

Notes:

- Data shown for Account number 5500 1147 218, Meter TEG011948144.
- Peak demand of 24 kW occurred in July '17.
- Average demand over the past 12 months was 13 kW.
- The average electric cost over the past 12 months for this meter was $0.350/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

34th Street Storm Water Pump Station

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



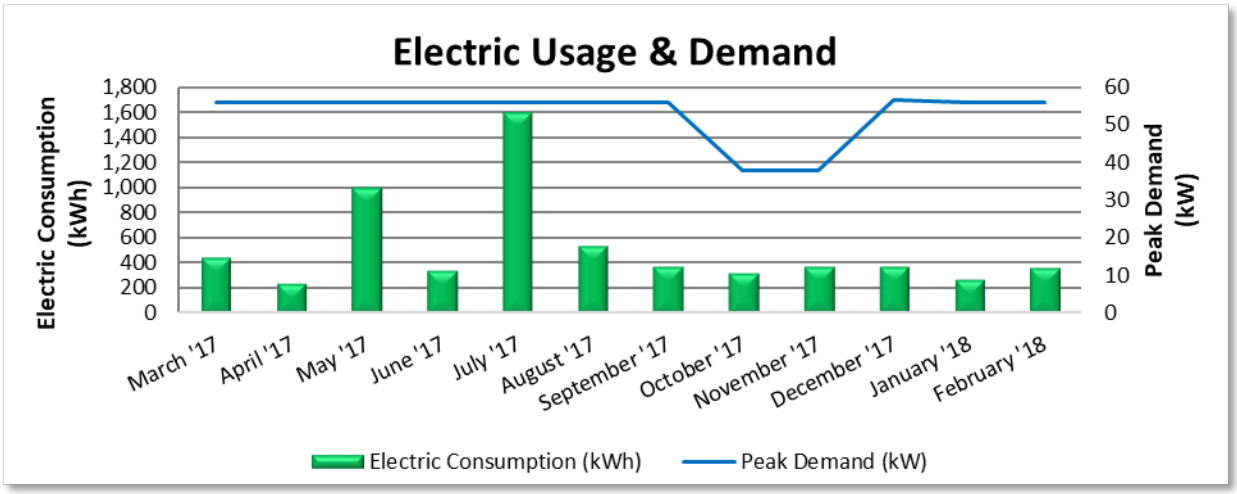
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/3/17	31	279	49	$0	$242	No
5/2/17	32	133	8	$0	$50	No
6/2/17	29	347	48	$0	$240	No
7/3/17	30	135	8	$0	$57	No
8/2/17	31	480	48	$0	$287	No
9/5/17	32	231	8	$0	$78	No
10/4/17	29	227	40	$0	$97	No
11/1/17	31	159	8	$0	$34	No
12/1/17	30	145	2	$0	$40	Yes
1/3/18	31	110	2	$0	$34	Yes
2/1/18	29	140	9	$0	$50	Yes
3/1/18	30	116	8	$0	$43	Yes
Totals	**365**	**2,502**	**49**	**$0**	**$1,253**	
Annual	**365**	**2,502**	**49**	**$0**	**$1,253**	

Notes:

- Data shown for Account number 5500 1146 426, Meter TEG015030467.
- Peak demand of 48.6 kW occurred in March '17.
- Average demand over the past 12 months was 20 kW.
- The average electric cost over the past 12 months for this meter was $0.501/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

11th Street & Beach Storm Water Pump Station

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



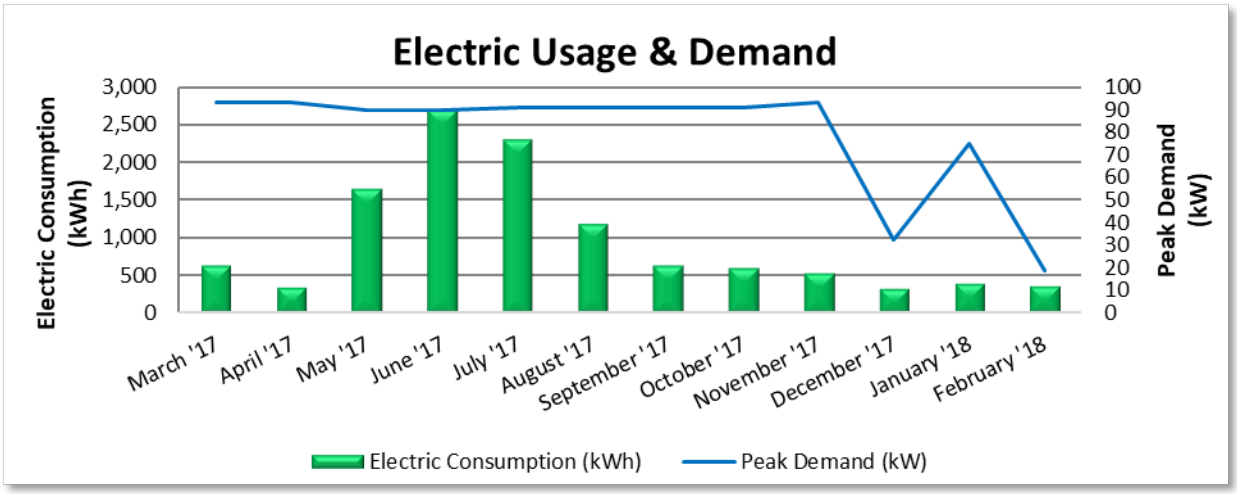
Electric Billing Data						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
4/5/17	31	448	56	$0	$306	No
5/3/17	32	236	56	$0	$230	No
6/5/17	29	999	56	$0	$397	No
7/5/17	30	342	56	$0	$299	No
8/3/17	31	1,594	56	$0	$492	No
9/6/17	32	537	56	$0	$372	No
10/4/17	29	370	56	$0	$133	No
11/2/17	31	318	38	$0	$96	No
12/4/17	30	370	38	$0	$107	No
1/5/18	31	373	57	$0	$143	No
2/2/18	29	268	56	$0	$103	No
3/5/18	30	360	56	$0	$138	No
Totals	**365**	**6,215**	**57**	**$0**	**$2,817**	
Annual	**365**	**6,215**	**57**	**$0**	**$2,817**	

Notes:

- Data shown for Account number 5501 0413 965, Meter TEA018398729.
- Peak demand of 56.7 kW occurred in December '17.
- Average demand over the past 12 months was 53 kW.
- The average electric cost over the past 12 months for this meter was $0.453/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

22nd Street & Beach Storm 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?**
4/4/17	31	640	93	$0	$361	No
5/2/17	32	340	93	$0	$493	No
6/2/17	29	1,640	90	$0	$375	No
7/3/17	30	2,692	90	$0	$615	No
8/2/17	31	2,300	91	$0	$505	No
9/5/17	32	1,180	91	$0	$766	No
10/3/17	29	640	91	$0	$651	No
11/1/17	31	600	91	$0	$214	No
12/2/17	30	540	93	$0	$205	No
1/3/18	31	331	32	$0	$200	No
2/1/18	29	404	75	$0	$166	No
3/2/18	30	362	19	$0	$67	No
Totals	**365**	**11,669**	**93**	**$0**	**$4,619**	
Annual	**365**	**11,669**	**93**	**$0**	**$4,619**	

Notes:

- Data shown for Account number 5500 9559 661, Meter 99G006246321.
- Peak demand of 93.4 kW occurred in March '17.
- Average demand over the past 12 months was 79 kW.
- The average electric cost over the past 12 months for this meter was $0.396/kWh, which is the blended rate that includes energy supply, distribution, demand, and other charges.

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.

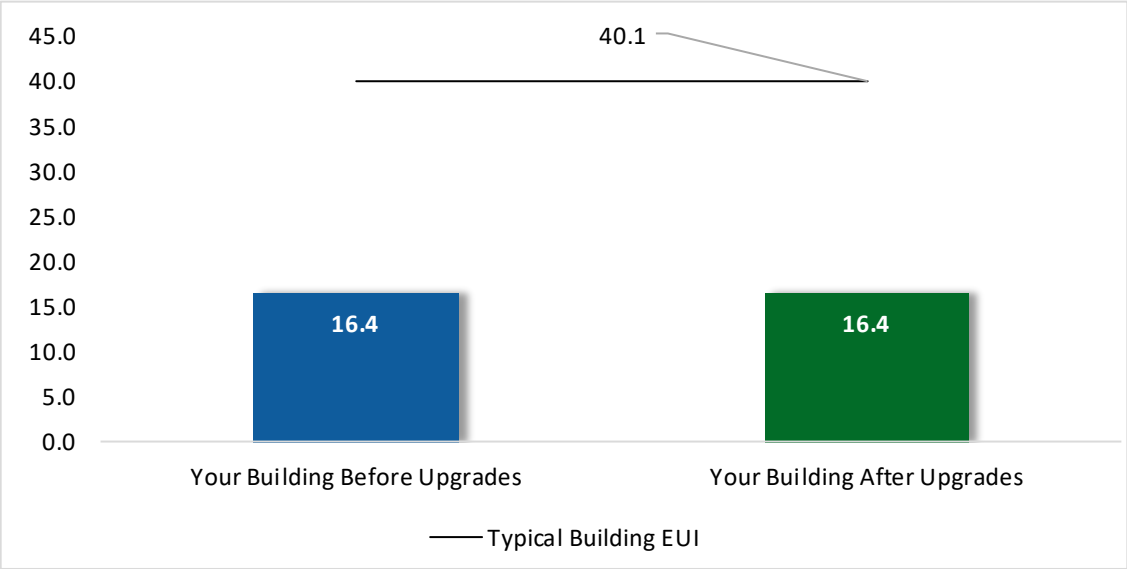


Figure 6 - Energy Use Intensity Comparison[3]

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.

[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			**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**
ECM 1	Retrofit Fixtures with LED Lamps	Yes	3	0.0	0	$1	$34	$4	$30	25.1	3
TOTALS			**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**

* - 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		**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**
ECM 1	Retrofit Fixtures with LED Lamps	3	0.0	0	$1	$34	$4	$30	25.1	3
TOTALS		**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**

* - 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		**3**	**0.0**	**0**	**$1**	**$34**	**$4**	**$30**	**25.1**	**3**
ECM 1	Retrofit Fixtures with LED Lamps	3	0.0	0	$1	$34	$4	$30	25.1	3

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: Retrofit Fixtures with LED Lamps

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

This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space. Although the projected payback period is long due to low operating hours, maintenance savings are an additional consideration since longer-lasting LEDs lamps will not need to be replaced as often as the existing lamps.

Affected building areas: compact fluorescent lamps at 11th Street & Beach Pump Station and 22nd Street & Beach Pump Station.

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.

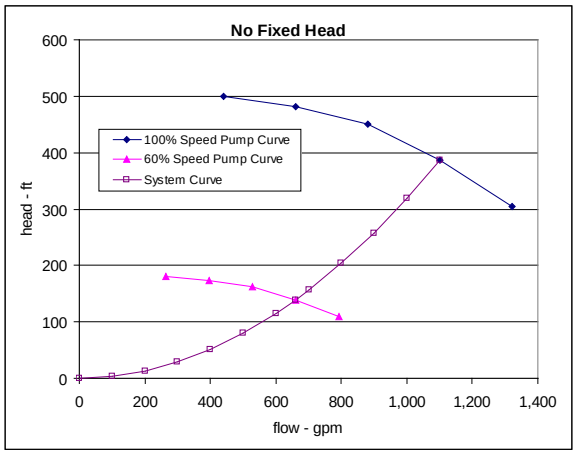
The Borough of Avalon may wish to consider the Energy Savings Improvement Program (ESIP). With interest in implementing comprehensive, largescale and/or complex system wide projects, these measures may be pursued during development of a future energy savings plan. We recommend that you work with your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

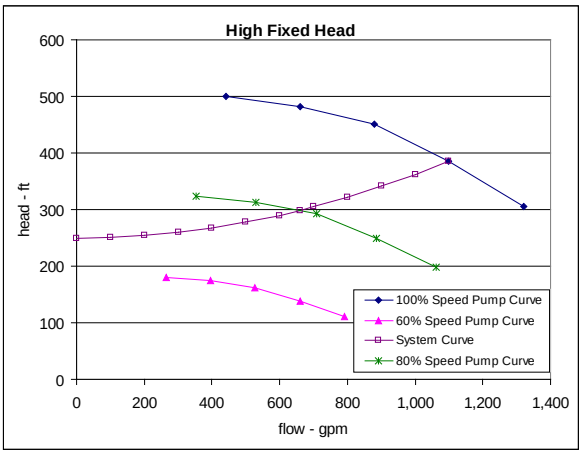
Variable Frequency Drives to Control Fixed Head Pump Motors

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.

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.

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.

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

Procurement Strategies

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

6 ON-SITE GENERATION

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

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

6.1 Solar Photovoltaic

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

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

For this analysis, the typical pump station was used 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.

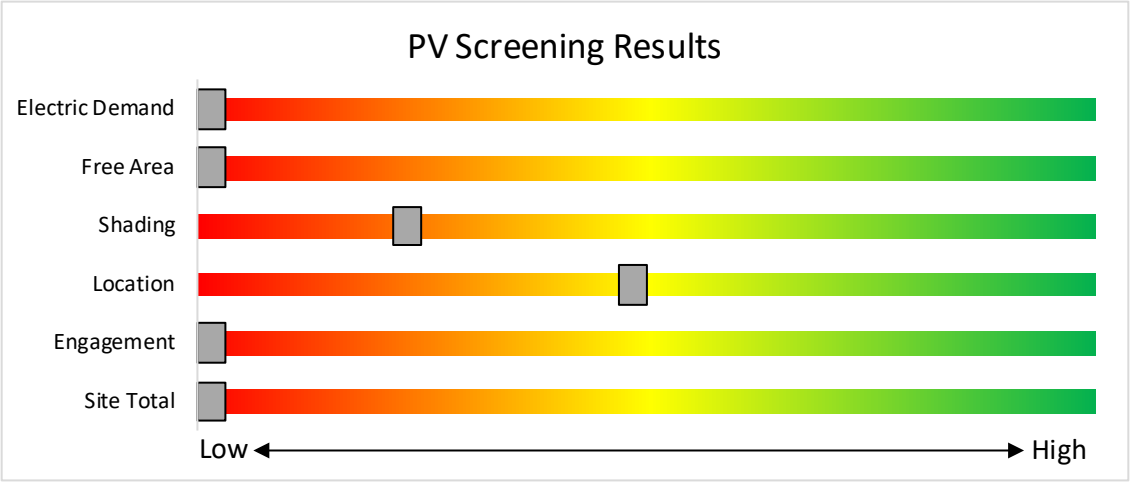


Figure 9 - Photovoltaic Screening

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.

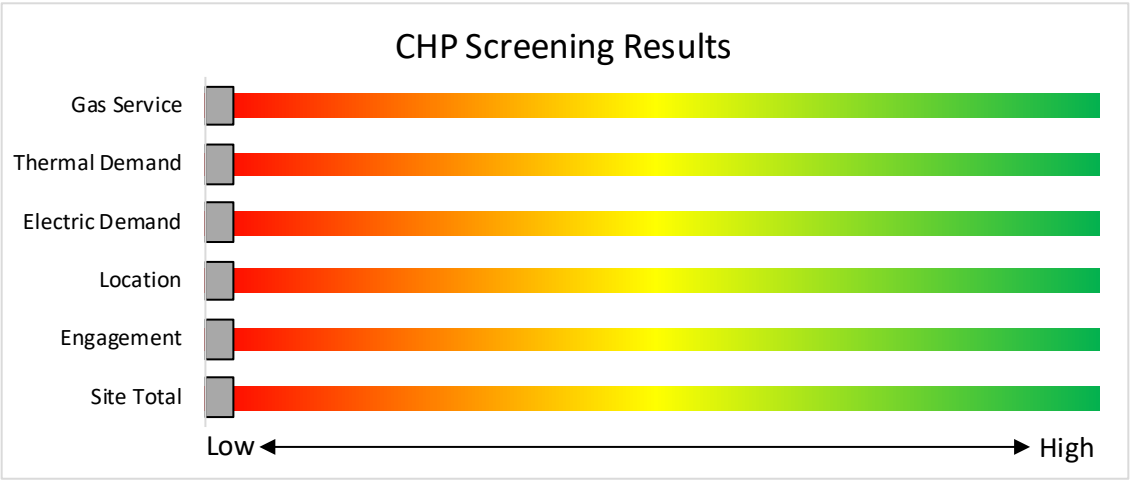


Figure 10 - Combined Heat and Power Screening

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[6].

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[7].

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

[7] 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
11th Street & Beach P.S.	1	Compact Fluorescent: (1) 26W Screw-In Lamp	Wall Switch	S	26	200	1	Relamp	No	1	LED Lamps: (1) 18W Screw-In Lamp	Wall Switch	18	200	0.0	2	0	$1	$17	$2	23.6
22nd Street & Beach P.S.	1	Compact Fluorescent: (1) 23W Screw-In Lamp	Wall Switch	S	23	200	1	Relamp	No	1	LED Lamps: (1) 16W Screw-In Lamp	Wall Switch	16	200	0.0	1	0	$1	$17	$2	26.7

Motor Inventory & Recommendations

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	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
21st Street P.S.	21st Street P.S.	1	Process Pump	30.0	92.4%	No	B	60		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
21st Street P.S.	21st Street P.S.	1	Process Pump	30.0	92.4%	No	B	60		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
8th Street P.S.	8th Street P.S.	1	Process Pump	30.0	92.4%	No	B	91		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
8th Street P.S.	8th Street P.S.	1	Process Pump	30.0	92.4%	No	B	91		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
19th Street P.S.	19th Street P.S.	1	Process Pump	30.0	92.4%	No	B	67		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
19th Street P.S.	19th Street P.S.	1	Process Pump	30.0	92.4%	No	B	67		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
23rd Street P.S.	23rd Street P.S.	1	Process Pump	30.0	92.4%	No	B	90		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
23rd Street P.S.	23rd Street P.S.	1	Process Pump	30.0	92.4%	No	B	90		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
26th Street P.S.	26th Street P.S.	1	Process Pump	30.0	92.4%	No	B	165		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
26th Street P.S.	26th Street P.S.	1	Process Pump	30.0	92.4%	No	B	165		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
29th Street P.S.	29th Street P.S.	1	Process Pump	30.0	92.4%	No	B	86		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
29th Street P.S.	29th Street P.S.	1	Process Pump	30.0	92.4%	No	B	86		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
32nd Street P.S.	32nd Street P.S.	1	Process Pump	30.0	92.4%	No	B	102		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
32nd Street P.S.	32nd Street P.S.	1	Process Pump	30.0	92.4%	No	B	102		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
33rd Street P.S.	33rd Street P.S.	1	Process Pump	30.0	92.4%	No	B	86		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
33rd Street P.S.	33rd Street P.S.	1	Process Pump	30.0	92.4%	No	B	86		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
34th Street P.S.	34th Street P.S.	1	Process Pump	30.0	92.4%	No	B	68		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
34th Street P.S.	34th Street P.S.	1	Process Pump	30.0	92.4%	No	B	68		No	92.4%	No		0.0	0	0	$0	$0	$0	0.0
11th Street & Beach P.S.	11th Street & Beach P.S.	1	Process Pump	35.0	92.7%	No	B	147		No	92.7%	No		0.0	0	0	$0	$0	$0	0.0
11th Street & Beach P.S.	11th Street & Beach P.S.	1	Process Pump	35.0	92.7%	No	B	147		No	92.7%	No		0.0	0	0	$0	$0	$0	0.0

		Existing Conditions							Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Remaining Useful Life	Annual Operating Hours	ECM #	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
22nd Street & Beach P.S.	22nd Street & Beach P.S.	1	Process Pump	25.0	91.7%	No	B	382		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0
22nd Street & Beach P.S.	22nd Street & Beach P.S.	1	Process Pump	25.0	91.7%	No	B	382		No	91.7%	No		0.0	0	0	$0	$0	$0	0.0

APPENDIX B: ENERGY STAR® STATEMENT OF ENERGY PERFORMANCE

EUI is presented in terms of *site energy* and *source energy*. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

LEARN MORE AT energystar.gov

ENERGY STAR® Statement of Energy Performance

N/A

ENERGY STAR® Score[1]

21st Street Pump Station - Storm Water

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
21st Street Pump Station - Storm Water 21st Street & Oceam 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: 7385165

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
8 kBtu/ft²

Source EUI
22.4 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	7,213 (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

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(____)____-_____
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Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

8th Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 05, 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
8th Street Pump Station - Storm Water 8th Street & Ocean Drive (West Side) 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: 7385169

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
12.5 kBtu/ft²

Source EUI
34.9 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	11,224 (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

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(____)____-_____
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Professional Engineer Stamp
(if applicable)

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

19th Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 05, 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
19th Street Pump Station - Storm Water 19th Street & Ocean Drive (West Side) 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: 7385170

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
9.1 kBtu/ft²

Source EUI
25.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	8,228 (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

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(____)____-_____
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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]

23rd Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 05, 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
23rd Street Pump Station - Storm Water 23rd Street & Ocean 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: 7385171

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
12.5 kBtu/ft²

Source EUI
34.9 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	11,225 (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

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(____)____-_____
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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]

26th Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 12, 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
26th Street Pump Station - Storm Water 26th Street & Ocean 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: 7385172

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
22.7 kBtu/ft²

Source EUI
63.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	20,421 (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)	2

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

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

29th Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 12, 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
29th Street Pump Station - Storm Water 29th Street & Ocean Drive (West Side) 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: 7385173

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
12 kBtu/ft²

Source EUI
33.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	10,783 (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

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(____)____-_____
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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]

32nd Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 12, 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
32nd Street Pump Station - Storm Water 32nd Street & Ocean 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: 7385174

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
14.1 kBtu/ft²

Source EUI
39.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	12,710 (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

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(____)____-_____
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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]

33rd Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 12, 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
33rd Street Pump Station - Storm Water 33rd Street & Ocean 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: 7385175

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
12 kBtu/ft²

Source EUI
33.5 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	10,768 (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

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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]

34th Street Pump Station - Storm Water

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

For Year Ending: February 28, 2018
Date Generated: August 12, 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
34th Street Pump Station - Storm Water 34th Street & Ocean 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: 7385176

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
9.5 kBtu/ft²

Source EUI
26.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	8,538 (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

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(____)____-_____
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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]

11th Street & Beach Storm Water Pump Station

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
11th Street & Beach Storm Water Pump Station 11th Street (Beach Path Entrance) 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: 7385177

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
23.4 kBtu/ft²

Source EUI
65.5 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	21,049 (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)	2

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

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

22nd Street & Beach Pump Station - Storm Water

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
22nd Street & Beach Pump Station - Storm Water 22nd Street (East Side of Boardwalk) 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: 7385178

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
44.2 kBtu/ft²

Source EUI
123.7 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	39,761 (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)	4

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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(____)____-_____
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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.