Local Government Energy Audit:
Energy Audit Report

Pollution Control Plant

Willingboro Municipal Utilities Authority

Ironside Court
Willingboro, NJ 08046

November 28, 2017

Final Report by:
TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities associated with recommended upgrades to the facility's systems at this site. Approximate savings are included in this report to make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. It should be noted that detailed design efforts are required in order to implement several of the improvements evaluated as part of this energy analysis.

The energy conservation measures and estimates of energy consumption contained in this report have been reviewed for technical accuracy. However, all estimates contained herein of energy consumption at the site are not guaranteed, because energy consumption ultimately depends on behavioral factors, the weather, and many other uncontrollable variables. The energy assessor and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy consumption vary from the estimated consumption shown herein.

Estimated installation costs are based on a variety of sources, including our own experience at similar facilities, our own pricing research using local contractors and vendors, and cost estimating handbooks such as those provided by RS Means. The cost estimates represent our best judgment for the proposed action. The Owner is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for a particular installation, and for conditions which cannot be known prior to in-depth investigation and design, the energy assessor does not guarantee installed cost estimates and shall in no event be liable should actual installed costs vary from the estimated costs herein.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates and are based on program information available at the time this report is written. The NJBPU reserves the right to extend, modify, or terminate programs without prior or further notice, including incentive levels and eligibility requirements. The Owner should review available program incentives and requirements prior to selecting and/or installing any recommended measures.

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for the Pollution Control Plant.

The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

This study was conducted by TRC Energy Services, as part of a comprehensive effort to assist Willingboro Municipal Utilities Authority (WMUA) in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

The Water Pollution Control Plant is located at the end of Ironside Court and is comprised of the five buildings included in the table below. A thorough description of the facility and our observations are located in Section 2, "Facility Information and Existing Conditions".

Building Name	SF	Construction Year
Pump and Control	5,100	1958
Chemical	1,430	1992
Sludge Digester	2,100	1958
Filter	1,900	1958
Garage	3,050	1958
Total:	**13,580**	

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC Energy Services recommends six (6) measures which together represent an opportunity for the Pollution Control Plant to reduce annual energy costs by roughly $191,346 and annual greenhouse gas emissions by 1,569,482 lbs CO_2e. We estimate that the measures would pay for themselves in roughly 1.15 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce the Pollution Control Plant's annual energy use by 52.0%.

Figure 1 – Previous 12 Month Utility Costs

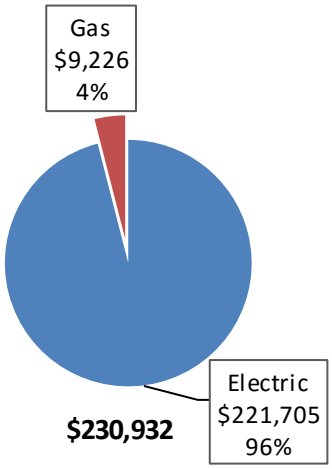
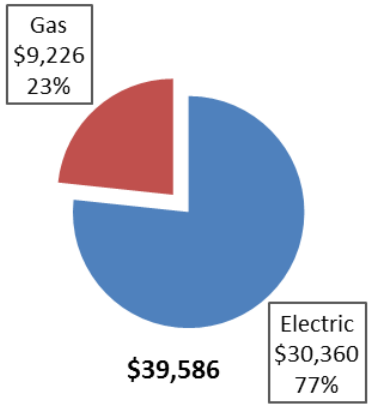


Figure 2 – Potential Post-Implementation Costs



A detailed description of the Pollution Control Plant's existing energy use can be found in Section 3, "Site Energy Use and Costs".

The evaluated measures have been listed and grouped into major categories as shown in Figure 3. Brief descriptions of the categories can be found below and descriptions of the individual opportunities can be found in Section 4, "Energy Conservation Measures".

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**128,327**	**17.4**	**$15,754.56**	**$19,003.77**	**$850.00**	**$18,153.77**	**1.15**	**129,224**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	25,740	3.2	$3,160.09	$5,018.64	$760.00	$4,258.64	1.35	25,920
ECM 2	Retrofit Fixtures with LED Lamps	Yes	101,637	14.1	$12,477.80	$12,264.25	$90.00	$12,174.25	0.98	102,347
ECM 3	Install LED Exit Signs	Yes	950	0.1	$116.67	$1,720.88	$0.00	$1,720.88	14.75	957
Lighting Control Measures			**8,201**	**1.0**	**$1,006.85**	**$3,476.00**	**$530.00**	**$2,946.00**	**2.93**	**8,258**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	8,201	1.0	$1,006.85	$3,476.00	$530.00	$2,946.00	2.93	8,258
Motor Upgrades			**42,442**	**9.9**	**$5,210.60**	**$88,287.88**	**$0.00**	**$88,287.88**	**16.94**	**42,739**
ECM 5	Premium Efficiency Motors	Yes	42,442	9.9	$5,210.60	$88,287.88	$0.00	$88,287.88	16.94	42,739
Variable Frequency Drive (VFD) Measures			**1,379,614**	**315.0**	**$169,373.64**	**$114,119.90**	**$0.00**	**$114,119.90**	**0.67**	**1,389,260**
ECM 6	Install VFDs on WW Process Pumps	Yes	1,379,614	315.0	$169,373.64	$114,119.90	$0.00	$114,119.90	0.67	1,389,260
TOTALS			**1,558,585**	**343.3**	**$191,345.65**	**$224,887.55**	**$1,380.00**	**$223,507.55**	**1.17**	**1,569,482**

* - All incentives presented in this table are based on NJ Smart Start Building 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).

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measure save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when conditions allow. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Motor Upgrades generally involve replacing old standard efficiency motors with motors of the current efficiency standard (IHP 2014). Motors will be replaced with the same size motors. This measure saves energy by reducing the power used by the motors due to improved electrical efficiency.

Variable Frequency Drives measures generally involve controlling the speed of a motor to achieve a flow or temperature rather than using a valve, damper, or no means at all. These measures save energy by slowing a motor which is an extremely efficient method of control.

Energy Efficient Practices

TRC Energy Services also identified five (5) low (or no) cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at the Pollution Control Plant include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Perform Routine Motor Maintenance
- Clean Evaporator/Condenser Coils on AC Systems
- Perform Maintenance on Compressed Air Systems

For details on these Energy Efficient Practices, please refer to Section 5.

On-Site Generation Measures

TRC Energy Services evaluated the potential for installing self-generation sources for the Pollution Control Plant. Based on the configuration of the site and its loads, there is a low potential for installing any PV and combined heat and power self-generation measures beyond what WMUA has already implemented.

For details on our evaluation and the self-generation potential, please refer to Section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

The ECMs outlined in this report may qualify under the following program(s):

- SmartStart (SS)
- Pay for Performance – Existing Buildings

For facilities wanting 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 in this program you may utilize internal resources, or an outside firm or contractor, to do the

final design of the ECM(s) and do the installation. Program pre-approval is required for some SS incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 are based on the SS program. More details on this program and others are available in Section 8.

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (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. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a program (non-NJCEP) designed to reduce consumer electric load when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability locally. By enabling grid operators to call upon Curtailment Service Providers and energy consumers to reduce electric usage 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 DR programs. Program participation is voluntary and participants will receive payments whether or not their facility is called upon to curtail their load. Please see Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Andrew Weber	Executive Director	Andrew@wmua.info	609-877-2900 x 15
James J. Mackie, PE	Director of Operations & Maintenance	jmackie@wmua.info	609-877-2900 x 105
TRC Energy Services			
Moussa Traore	Auditor	MTraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On August 2, 2016, TRC Energy Services performed an energy audit of the Pollution Control Plant located in Willingboro, NJ. TRC Energy Services' team met with Victor DeMaise to review the facility operations and focus the investigation on specific energy-using systems.

The Water Pollution Control Plant is located at the end of Ironside Court. The following five buildings make up the Water Pollution Control Plant.

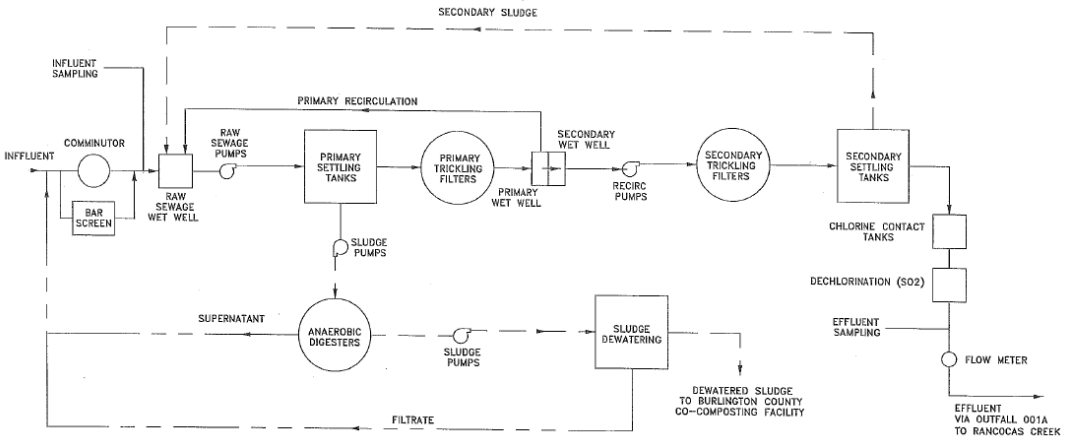
Building Name	SF	Construction Year
Pump and Control	5,100	1958
Chemical	1,430	1992
Sludge Digester	2,100	1958
Filter	1,900	1958
Garage	3,050	1958
Total:	**13,580**	

The Pump and Control building houses pumping and control equipment, offices and laboratory space. The Chemical Building contains chemical storage tanks, pumping equipment, sampling equipment and controls. The Sludge Digester building houses sludge pumping equipment and a natural gas/digester gas boiler. There is a filter press and pumping equipment controls in the Filter Building. The Garage is used for vehicle parking, vehicle maintenance and includes a lunchroom and locker/shower room.

This is a two-stage trickling filter plant with a design treatment capacity of 5.22 million gallons per day (MGD) and a typical processing rate of 3.2 MGD. The plant consists of:

- Headworks which include the raw sewage pumps
- Four primary settling tanks – 230,000 gallons each
- Two primary trickling filters – 450,000 gallons each
- Recirculation pumps
- Two secondary trickling filters – 450,000 gallons each
- Four secondary settling tanks – 200,000 gallons each

- Chlorine disinfection
- Anaerobic digesters
- Sludge dewatering



2.3 Building Occupancy

The plant operates two shifts per day, every day, with thirteen employees that move between these buildings as required. The typical building occupancy schedules are presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Pump and Control	Weekday	7:00 am - 11:00 pm
Pump and Control	Weekend	7:00 am - 11:00 pm
Chemical	Weekday	available 7 am - 11 pm
Chemical	Weekend	available 7 am - 11 pm
Sludge Digester	Weekday	available 7 am - 11 pm
Sludge Digester	Weekend	available 7 am - 11 pm
Filter	Weekday	available 7 am - 11 pm
Filter	Weekend	available 7 am - 11 pm
Garage	Weekday	available 7 am - 11 pm
Garage	Weekend	available 7 am - 11 pm

2.4 Building Envelope

All of the buildings are constructed of concrete masonry block (CMU) with a brick veneer.

2.5 On-site Generation

The site installed 3,398 solar panel modules rated for 230 watts per module (781 kW dc) near the end of 2010. A 65 kW microturbine was installed in 2010 at the Sludge Digester building. The microturbine was installed to utilize methane gas produced from the anaerobic digesters to generate electricity and to produce waste heat to supplement the heating requirements of the digesters. The microturbine has been shut down since 2013.

In January 2016 Richard A. Alaimo Associates provided an evaluation of lost revenue from under performance of the solar system at the Water Pollution Control Plant. Their analysis primarily focused on the difference between actual solar output and the potential solar output as calculated by PV Watts. They concluded that the lost revenue (at $0.20/kWh) ranged from $78,300 to $156,800.

The table below summarizes the Water Treatment plant monthly solar array output. The 2012 through 2014 data are from the Alaimo Associates study. The 2015 and 2016 data are from the Deck Monitoring website. This data indicates that the total solar array production has remained reasonably consistent over time. The annual production for 2016 is 97% of the 2012 production and effectively the same as the 2013 production. The variation in annual solar array output appears to be within the expected range due to variations in climate conditions. Since the array performance is comparable to when it was installed, it does not appear to have significant performance degradation at this time.

Month	2012 kWh	2013 kWh	2014 kWh	2015 kWh	2016 kWh
January	54,292	45,696	29,089	38,349	52,417
February	68,953	52,028	40,228	56,625	52,607
March	93,999	82,205	79,293	72,683	82,613
April	113,155	114,100	110,536	92,443	104,898
May	100,775	113,779	102,474	100,287	81,754
June	117,826	91,048	116,518	88,123	111,977
July	111,577	104,590	103,658	91,428	79,592
August	72,877	84,152	44,730	85,040	88,926
September	49,002	56,834	58,620	56,273	51,277
October	39,151	55,580	52,974	66,036	72,813
November	45,244	46,619	51,120	44,738	59,030
December	34,217	27,174	23,151	30,431	37,432
Total	901,068	873,805	812,391	822,456	875,336

2.6 Energy-Using Systems

Lighting System

Interior lighting is provided primarily by fixtures using fluorescent or high intensity discharge (HID) lamps. Most of the fixtures in the facility use one to three 4 foot fluorescent lamps and are a mix of T8 and T12 lamps. The HID fixtures typically use 175 W metal halide lamps. Light fixtures are controlled by manual switches.

Exterior lighting is provided by a mix of fixtures using metal halide lamps. The exterior light fixtures have photocell controls.

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of your equipment.

Heating, Ventilating, and Air Conditioning

Space heating and air conditioning is provided by distributed stand-alone equipment. The Garage, Filter, Pump and Control, and Digester buildings are heated by natural gas fired unit heaters. The Garage also has a furnace to heat the lunch room and locker room. The Chemical building is heated with electric resistance unit heaters. The Pump and Control building also has a four (4) ton rooftop package unit and three (3) through the wall heat pumps that provide heating and cooling.

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of your equipment.

Domestic Hot Water

There are two large tank water heaters. The Chemical building has a 119 gallon electric water heater and the Garage has a 50 gallon natural gas fired water heater.

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of your equipment.

Process Systems

Process pumps that are used to move raw sewage and treated wastewater account for the majority of the power associated with process systems at this facility. There are two (2) 150 HP raw sewage pumps in the Pump and Control building that pump sewage to the primary settling tanks. There are two (2) 200 HP recirculation pumps in the Pump and Control building that move waste water from the primary trickling filters to the secondary trickling filters. Both sets of pumps are constant speed. These two sets of pumps account for over three-quarters of the process equipment electric load.

The sludge heating boiler in the Digester building accounts for most of the connected gas load at the facility. However, since the boiler runs off both gas produced by the digesters and purchased natural gas it accounts for a relatively low percentage of the purchased gas. Over 90% of the fuel used by the boiler is supplied by the digesters.

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of your equipment.

3 SITE ENERGY USE AND COSTS

Utility data for Electricity and Natural Gas was analyzed to identify opportunities for savings. In addition, data for Electricity and Natural Gas was evaluated to determine the annual energy performance metrics for the building in energy cost/ft^2 and energy use/ft^2. These energy use indices are indicative of the relative energy effectiveness of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy use for other facilities identified as: Water/Wastewater Treatment/Pumping. Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. Please refer to the Benchmarking section within Section 0 for additional information.

3.1 Total Cost of Energy

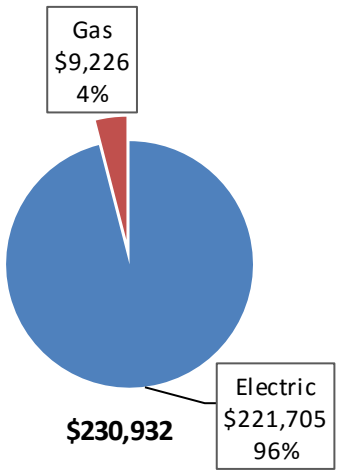
The following energy consumption and cost data is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Pollution Control Plant		
Fuel	**Usage**	**Cost**
Electricity	2,666,088 kWh	$221,705
Natural Gas	11,380 Therms	$9,226
Total		**$230,932**

The current utility cost for this site is $230,932 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G and generated on-site with PV panels. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.123/kWh, which is the blended rate used throughout the analyses in this report. PSE&G's rate schedule includes charges for energy, annual demand, and summer demand. The monthly electricity consumption and peak demand is represented graphically in the chart below. Approximately one third of the total electricity use is generated on-site.

Figure 8 - Graph of 12 Months Electric Usage & Demand

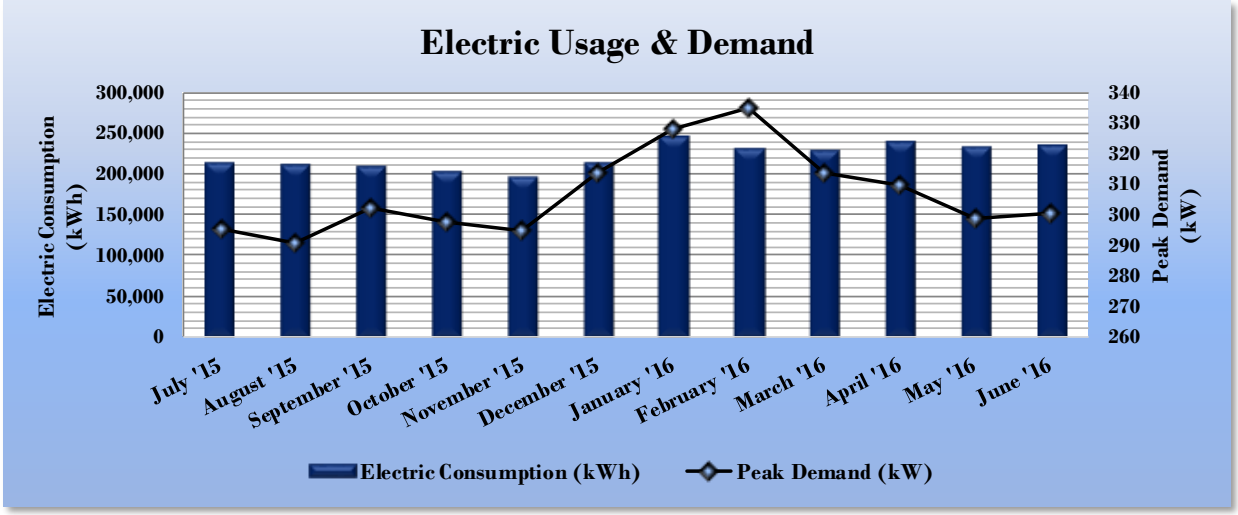


Figure 9 - Table of 12 Months Electric Usage & Demand

Electric Billing Data for Pollution Control Plant				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
7/23/15	30	215,059	295.5	$18,106
8/21/15	29	211,667	290.9	$18,164
9/21/15	31	208,861	301.9	$21,443
10/21/15	30	202,504	297.3	$16,749
11/19/15	29	197,929	294.5	$18,836
12/22/15	33	213,572	313.5	$21,379
1/22/16	31	246,889	328.3	$22,082
2/23/16	32	230,810	334.9	$19,945
3/23/16	29	228,906	313.9	$16,409
4/22/16	30	239,783	309.4	$15,037
5/23/16	31	233,462	298.5	$16,929
6/22/16	30	236,646	300.7	$16,627
Totals	**365**	**2,666,088**	**334.9**	**$221,705**
Annual	**365**	**2,666,088**	**334.9**	**$221,705**

3.3 Natural Gas Usage

Natural Gas is provided by PSE&G. The average gas cost for the past 12 months is $0.811/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below. Most of the gas used on-site is produced by the digesters and used in the sludge heating boiler.

Figure 10 - Graph of 12 Months Natural Gas Usage

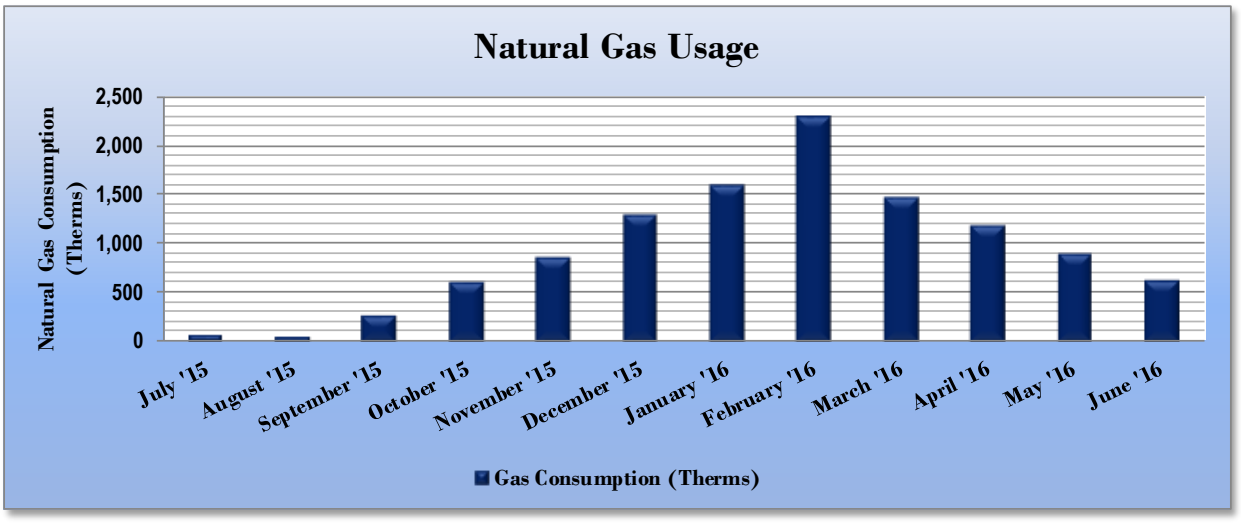


Figure 11 - Table of 12 Months Natural Gas Usage

Gas Billing Data for Pollution Control Plant			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
7/23/15	30	73	156
8/21/15	29	66	153
9/21/15	31	283	276
10/21/15	30	625	454
11/19/15	29	874	848
12/22/15	33	1,307	1,141
1/22/16	31	1,610	1,351
2/23/16	32	2,307	1,820
3/23/16	29	1,488	1,195
4/22/16	30	1,200	761
5/23/16	31	910	623
6/22/16	30	637	447
Totals	**365**	**11,380**	**$9,226**
Annual	**365**	**11,380**	**$9,226**

3.4 Benchmarking

This facility was benchmarked through Portfolio Manager, an online tool created and managed by the United State Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager analyzes your facility's consumption data, cost information, and operational use details and compares its performance against a yearly baseline, national medians, or similar facilities in your portfolio. Metrics used in this comparison are the energy use intensity (EUI) and ENERGY STAR® Score.

Energy use intensity is a measure of a facility's energy consumption per a standard metric. For wastewater facilities the EUI is kBtu/gal-day. Comparing the EUI of a facility with the national median EUI for that facility type illustrates whether that facility uses more energy than similar facilities or if that facility performs better than the median. EUI is presented in both site energy and source energy. Site energy is the amount of fuel and electricity consumed by a facility as reflected in utility bills. Source energy is the raw fuel consumed to generate the energy consumed at the site, factoring in energy production and distribution losses.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Pollution Control Plant	National Median Wastewater Treatment
Source Energy Use Intensity (kBtu/gal-day)	8.53	8.52
Site Energy Use Intensity (kBtu/gal-day)	2.94	2.89

By implementing all recommended measures covered in this reporting, the Project's estimated post-implementation EUI improves as shown in the Table below:

Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Pollution Control Plant	National Median Wastewater Treatment
Source Energy Use Intensity (kBtu/gal-day)	3.75	8.52
Site Energy Use Intensity (kBtu/gal-day)	1.41	2.89

Many buildings can also receive a 1 – 100 ENERGY STAR® score. This score compares your facility's energy performance to similar facilities nationwide. A score of 50 represents median energy performance, while a score of 75 means your facility performs better than 75 percent of all similar facilities nationwide — and may be eligible for ENERGY STAR® certification. **This facility has a current score of 45.**

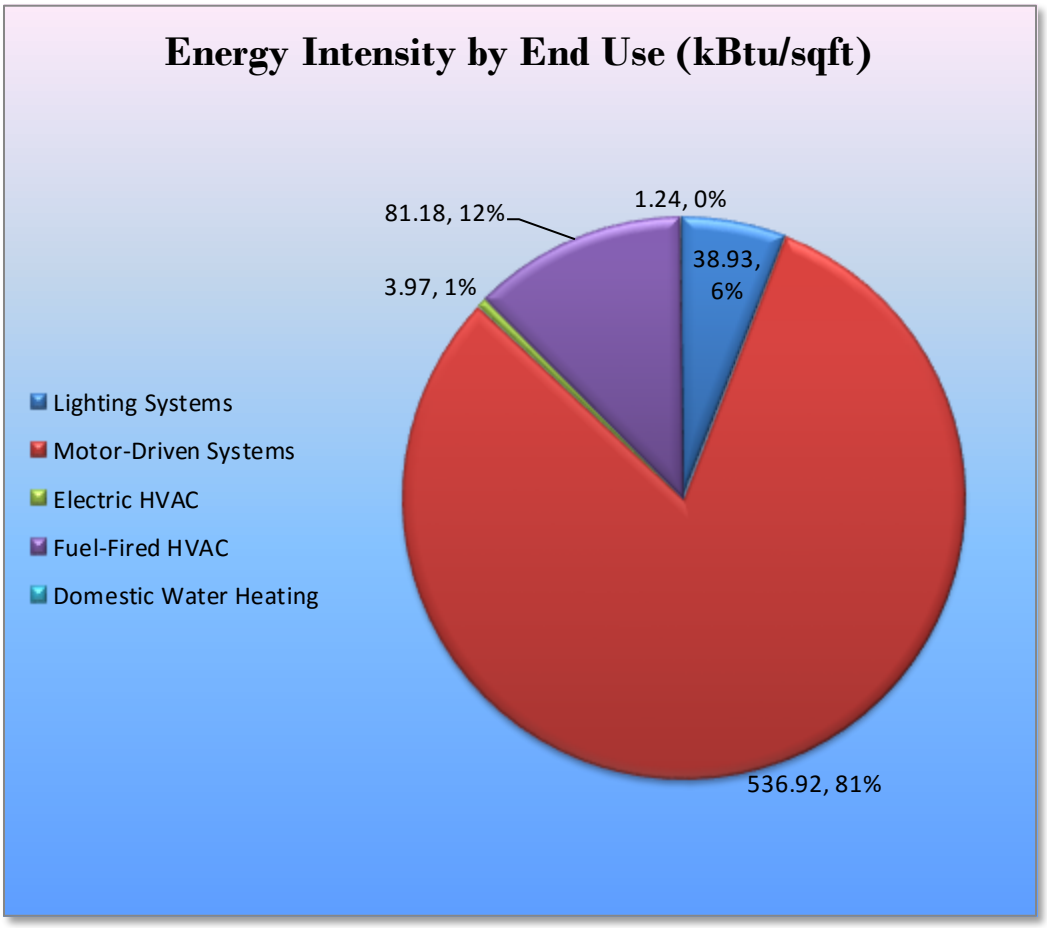
The Portfolio Manager, Statement of Energy Performance can be found in Appendix B: EPA Statement of Energy Performance.

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account. We encourage you to update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance. 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

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found at the facility and determine their proportional contribution to overall facility energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 14 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

4.1 Level of Analysis

The goal of this audit report is to identify potential energy projects, help prioritize specific measures for implementation, and set Pollution Control Plant on the path to receive financial incentives. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is considered sufficient to make "Go/No-Go" decisions and to prioritize energy projects. Savings are based on the New Jersey Board of Public Utilities New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016. Further analysis or investigation may be required to calculate more accurate savings to support any custom SmartStart, Pay for Performance, or Large Energy Users incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJ prescriptive SmartStart program. Depending on your implementation strategy, the project may be eligible for more lucrative incentives through other programs as identified in Section 8.

The following sections describe the evaluated measures.

4.2 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**128,327**	**17.4**	**$15,754.56**	**$19,003.77**	**$850.00**	**$18,153.77**	**1.15**	**129,224**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	25,740	3.2	$3,160.09	$5,018.64	$760.00	$4,258.64	1.35	25,920
ECM 2	Retrofit Fixtures with LED Lamps	Yes	101,637	14.1	$12,477.80	$12,264.25	$90.00	$12,174.25	0.98	102,347
ECM 3	Install LED Exit Signs	Yes	950	0.1	$116.67	$1,720.88	$0.00	$1,720.88	14.75	957
Lighting Control Measures			**8,201**	**1.0**	**$1,006.85**	**$3,476.00**	**$530.00**	**$2,946.00**	**2.93**	**8,258**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	8,201	1.0	$1,006.85	$3,476.00	$530.00	$2,946.00	2.93	8,258
Motor Upgrades			**42,442**	**9.9**	**$5,210.60**	**$88,287.88**	**$0.00**	**$88,287.88**	**16.94**	**42,739**
ECM 5	Premium Efficiency Motors	Yes	42,442	9.9	$5,210.60	$88,287.88	$0.00	$88,287.88	16.94	42,739
Variable Frequency Drive (VFD) Measures			**1,379,614**	**315.0**	**$169,373.64**	**$114,119.90**	**$0.00**	**$114,119.90**	**0.67**	**1,389,260**
ECM 6	Install VFDs on WW Process Pumps	Yes	1,379,614	315.0	$169,373.64	$114,119.90	$0.00	$114,119.90	0.67	1,389,260
TOTALS			**1,558,585**	**343.3**	**$191,345.65**	**$224,887.55**	**$1,380.00**	**$223,507.55**	**1.17**	**1,569,482**

* - All incentives presented in this table are based on NJ Smart Start Building 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).

4.2.1 Lighting Upgrades

Recommended lighting upgrades are summarized in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**128,327**	**17.4**	**$15,754.56**	**$19,003.77**	**$850.00**	**$18,153.77**	**1.15**	**129,224**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	25,740	3.2	$3,160.09	$5,018.64	$760.00	$4,258.64	1.35	25,920
ECM 2	Retrofit Fixtures with LED Lamps	Yes	101,637	14.1	$12,477.80	$12,264.25	$90.00	$12,174.25	0.98	102,347
ECM 3	Install LED Exit Signs	Yes	950	0.1	$116.67	$1,720.88	$0.00	$1,720.88	14.75	957

ECM 1: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Measure Description

We recommend replacing linear fluorescent lamps, ballasts, and reflectors with LED tube lamps, reflectors, and drivers specifically designed for existing linear fluorescent fixtures. The retrofit uses the existing fixture housing but replaces the rest of the components with an efficient source and reflectors designed for LEDs. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output and efficiently projects the light into the space.

Maintenance savings are anticipated since LEDs have rater lifetimes which are more than twice that of a fluorescent source. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

Please refer to Appendix A: Equipment Inventory & Recommendations for a detailed list of the locations and light fixtures affected by this measure.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	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)
Interior	62,660	7.7	0.0	$7,692.70	$7,098.25	$90.00	$7,008.25	0.91	63,098
Exterior	38,977	6.4	0.0	$4,785.10	$5,166.00	$0.00	$5,166.00	1.08	39,249

Measure Description

We recommend replacing incandescent, compact fluorescent and high intensity discharge (HID) screw-in based lamps with LED lamps. Screw-in LED lamps can be used as a direct replacement for most other screw-in lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Please refer to Appendix A: Equipment Inventory & Recommendations for a detailed list of the locations and light fixtures affected by this measure.

ECM 3: Install LED Exit Signs

Measure Description

We recommend replacing existing lighting in exit signs with LEDs. LEDs require virtually no maintenance and LED exit signs have a life expectancy of at least 20 years. Many manufacturers can provide retrofit kits that meet fire and safety code requirements. Retrofit kits are less expensive and simpler to install than replacement signs, however, new fixtures would have a longer useful life and are therefore recommended.

A reduction in maintenance costs will be realized with the proposed retrofit because lamps will not have to be replaced as frequently.

Please refer to Appendix A: Equipment Inventory & Recommendations for a detailed list of the locations and light fixtures affected by this measure.

4.2.2 Lighting Control Measures

Recommended lighting control measures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Control 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 Control Measures		**8,201**	**1.0**	**0.0**	**$1,006.85**	**$3,476.00**	**$530.00**	**$2,946.00**	**2.93**	**8,258**
ECM 4	Install Occupancy Sensor Lighting Controls	8,201	1.0	0.0	$1,006.85	$3,476.00	$530.00	$2,946.00	2.93	8,258

ECM 4: Install Occupancy Sensor Lighting Controls

Measure Description

We recommend installing occupancy sensors to control light fixtures throughout the facility. Occupancy sensors are not recommended for areas with HID fixtures, due to the long restart time for HID fixtures, unless the recommended LED retrofit for those fixtures is implemented. For process areas extra care should be taken when locating the sensors to make sure that the lights turn on as personnel pass through any entrance to the area.

Sensors detect occupancy using ultrasonic and/or infrared wave technologies. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Occupants will also be able to manually turn off fixtures. Energy savings result from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. Ceiling-mounted or remote-mounted sensors require the use of low voltage switching relays or a wireless signal to the switch. In general, use wall switch replacement sensors for single occupant offices and other small rooms. Install ceiling-mounted or remote mounted sensors in locations without local switching, in situations where the existing wall switches are not in the line-of-sight of the main work area, and in large spaces. We recommend a holistic design approach that considers both the technology of the lighting sources and how they are controlled.

Maintenance savings are anticipated due to reduced lamp operation, however, additional maintenance costs may be incurred because the occupancy sensors may require periodic adjustment; it is anticipated that the net effect on maintenance costs will be negligible.

Please refer to Appendix A: Equipment Inventory & Recommendations for a detailed list of the locations and light fixtures affected by this measure.

4.2.3 Motor Upgrades

ECM 5: Premium Efficiency Motors

Summary of Measure Economics

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)
42,442	9.9	0.0	$5,210.60	$88,287.88	$0.00	$88,287.88	16.94	42,739

Measure Description

We recommend replacing standard efficiency motors with IHP 2014 efficiency motors. The evaluation assumes existing motors will be replaced with the same size motors. It is important that the speed of each new motor match the speed of the motor it replaces as closely as possible. The base case motor efficiencies are obtained from nameplate information. Proposed case premium motor efficiencies are obtained from the New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016). Savings are based on the difference between baseline and proposed efficiencies and the annual operating hours.

Please refer to Appendix A: Equipment Inventory & Recommendations for more information about the equipment affected by this measure.

4.2.4 Variable Frequency Drive Measures

Recommended variable frequency drive (VFD) measures are summarized in Figure 18 below.

Figure 18 – Summary of Variable Frequency Drive 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)
Variable Frequency Drive (VFD) Measures		**1,379,614**	**315.0**	**0.0**	**$169,373.64**	**$114,119.90**	**$0.00**	**$114,119.90**	**0.67**	**1,389,260**
ECM 6	Install VFDs on WW Process Pumps	1,379,614	315.0	0.0	$169,373.64	$114,119.90	$0.00	$114,119.90	0.67	1,389,260

ECM 6: Install VFDs on Process Pumps

Measure Description

We recommend installing a variable frequency drives (VFDs) to control the 150 HP raw sewage and 200 HP recirculation pumps.

The raw sewage pumps are rated at 9,000 gpm. The typical plant operation is 3.2 MGD which is the equivalent of 2,200 gpm. This means that the pumps could typically operate at significantly reduced speed. Implementing this measure will require determining the minimum flow requirements of other systems at the plant and the minimum flow required to maintain effluent quality. Modifications would also need to be made to the current flow control system which uses a recirculation butterfly valve. An automated system to track the plant flow could be used or plant operators could adjust the VFD speed to track the plant flow. All of these decisions would need to be made during the design process.

Energy savings result from reducing the pump motor speed (and power) to more closely match the process flow through the plant. The savings calculations for this measure assume that the pumps operate at 50% speed continuously. The final savings will depend on how the pumps are actually operated. The pumps were also included in the energy efficient motor measure assuming that new inverter rated motors would be required when VFDs are installed. Only the least efficient raw sewage pump motor is a good candidate for an energy efficiency motor retrofit if the VFD measure is not implemented.

Please refer to Appendix A: Equipment Inventory & Recommendations for more information about the equipment affected by this measure.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of low or no-cost efficiency strategies. By employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20% - 60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6 – 12 months.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of 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.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Perform Maintenance on Compressed Air Systems

Like all electro-mechanical equipment, compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan should be developed for process related compressed air systems to include inspection, cleaning, and replacement of inlet filter cartridges, cleaning of drain traps, daily inspection of lubricant levels to reduce unwanted friction, inspection of belt condition and tension, checking for system leaks and adjustment of loose connections, and overall system cleaning. Contact a qualified technician for help with setting up periodic maintenance schedule.

6 SELF-GENERATION MEASURES

Self-generation measures include both renewable (e.g., solar, wind) and non-renewable (e.g., microturbines) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at 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 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

The Pollution Control Plant facility has a PV array that provides approximately one third of the total electricity used on site (see Section 2.5).

Rebates are not available for solar projects, but owners of solar projects must register their projects in the SREC Registration Program prior to the start of construction in order 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.

For more information on solar PV technology and commercial solar markets in New Jersey, or to find a qualified solar installer, who can provide a more detailed assessment of the specific costs and benefits of solar develop of the site, please visit the following links below:

- **Basic Info on Solar PV in NJ**: http://www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ Market**: http://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

In non-industrial settings, combined heat and power (CHP) is the on-site generation of electricity and recovery of heat which is put to beneficial use. Common prime movers in CHP applications include reciprocating engines, microturbines, fuel cells, and (at large facilities) gas turbines. Electricity is typically

interconnected to the sites local distribution system. Heat is recovered from the exhaust stream and the ancillary cooling system and interconnected to the existing hot water (or steam) distribution system.

CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for the purpose of space cooling. The key criteria used for screening, however, is the amount of time the system operates at full load and the facility's ability to use the recovered heat. Facilities with continuous use for large quantities of waste heat are the best candidates for CHP.

This Pollution Control Plant has a 65 kW microturbine that was installed in 2010 and has been shut down since 2013 (see Section 2.5). The Alaimo Group prepared an evaluation study of the microturbine in August 2016. The conclusion of their study was that the microturbine is financially viable to operate and they recommended further evaluation to determine what would be required to make the microturbine operational.

For a list of qualified firms in NJ specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/

7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce consumer electric load when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. DR service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability locally.

By enabling grid operators to call upon Curtailment Service Providers and energy consumers to reduce electric usage 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 DR programs. Program participation is voluntary and participants will receive payments whether or not their facility is called upon to curtail their load.

Typically an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR program often find it to be a valuable source of revenue for their facilities because the payments can significantly offset annual utility costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats so that air conditioning units run less frequently or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR event cycle. DR program participants often have to install smart meters and may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (www.pjm.com/training/trainingmaterial.aspx), along with a variety of other program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and others, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's 1999 Electricity Restructuring Law which requires all customers of investor-owned electric and gas utilities to pay this charge on their monthly energy bills. As a contributor to the fund you were able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to 19 for a list of the eligible programs identified for each recommended ECM.

Figure 19 - ECM Incentive Program Eligibility

		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X			X
ECM 2	Retrofit Fixtures with LED Lamps	X			X
ECM 3	Install LED Exit Signs				X
ECM 4	Install Occupancy Sensor Lighting Controls	X			X
ECM 5	Premium Efficiency Motors		X		X
ECM 6	Install VFDs on WW Process Pumps		X		X

SmartStart (SS) is generally well suited for implementation of individual or small sets of measures, with the flexibility to install projects at your own pace using in-house staff or a preferred contractor. Direct Install (DI) caters to small to mid-size facilities to bundle measures and simplify participation, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities and requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption; applicants can use in-house staff or preferred contractor.

Generally, the incentive values provided throughout the report assume the SS program is utilized because it provides a consistent comparison of available incentives.

Brief descriptions of all relevant alternative financing and incentive programs are located in the sections below. You may also check the following website for further information, including most current program availability, requirements, and incentive levels: www.njcleanenergy.com/ci

8.1 SmartStart

Overview

The SmartStart (SS) program offers incentives for installing *prescriptive* and *custom* energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency 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

Most equipment sizes and types are served by this program. This program provides an effective mechanism for securing incentives for energy efficiency measures installed individually or as part of a package of energy upgrades.

Incentives

The SS prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the SS custom program provides incentives for new and innovative technologies, or process improvements not defined through one of the prescriptive incentives listed above.

Although your facility is an existing building, and only the prescriptive incentives have been applied in the calculations, the SS custom measure path is recommended for ECM 5 (Premium Efficiency Motors) and ECM 6 (Install VFDs on Process Pumps). These incentives are calculated utilizing a number of factors, including project cost, energy savings and comparison to existing conditions or a defined standard. To qualify, the proposed measure(s) must be at least 2% more efficient than current energy code or recognized industry standard, and save at least 75,000 kWh or 1,500 therms annually.

SS custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, 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 in the SS program (inclusive of prescriptive and custom) are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SS prescriptive program you will need to submit an application for the specific equipment installed or to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report. Please note that SS custom application requirements are different from the prescriptive applications and will most likely require additional effort to complete.

Detailed program descriptions, instructions for applying and applications can be found at: www.njcleanenergy.com/SSB

8.2 Pay for Performance - Existing Buildings

Overview

The Pay for Performance – Existing Buildings (P4P EB) program is designed for larger customers with a peak demand over 200 kW in any of the preceding 12 months. Under this program 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. 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 in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing ESIP also utilize the P4P program.

Incentives

Incentives are calculated 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 $0.10/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

To participate in the P4B EB program you will need to contact one of the pre-approved consultants and contractors ("Partners"). Under direct contract to you, the Partner will help further evaluate the measures identified in this report through development of the Energy Reduction Plan (ERP), assist you in implementing selected measures, and verify actual savings one year after the installation. At each of these three milestones your Partner will also facilitate securing program incentives.

Approval of the final scope of work is required by the program prior to installation completion. Although installation can be accomplished by a contractor of your choice (some P4P Partners are also contractors) or by internal personnel, the Partner must remain involved to ensure compliance with the program guidelines and requirements.

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

8.3 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. 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. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. 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 can be leveraged to help further reduce the total project cost of eligible measures.

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 utilized 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. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP

Please note that ESIP is a program delivered directly by the NJBPU and is not an NJCEP incentive program. As mentioned above, you may utilize the incentive programs to help further reduce costs when compiling the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

8.4 Demand Response Energy Aggregator

The first step toward participation in a Demand Response (DR) program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (www.pjm.com/training/trainingmaterial.aspx), along with a variety of other program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

See Section 7 for additional information.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e. non-utility) energy supplier.

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 is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: **www.state.nj.us/bpu/commercial/shopping.html**.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. 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 is typically dependent upon whether a customer seeks 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 is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: **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	Watts per Fixture	Annual Operating Hours	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
Filter building	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,840	LED Retrofit	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.47	3,853	0.0	$472.98	$1,070.94	$175.00	1.89
FB Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,840	LED Retrofit	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	4,088	0.10	826	0.0	$101.35	$246.02	$50.00	1.93
FB Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,840	LED Retrofit	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.10	826	0.0	$101.35	$287.63	$50.00	2.34
Filter building	4	Metal Halide: (1) 200W Lamp	None	232	5,840	LED Retrofit	No	4	LED Screw-In Lamps: MH screw-in replacement	None	45	5,840	0.61	4,936	0.0	$606.01	$504.00	$0.00	0.83
Chemical Building	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	5,840	LED Retrofit	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.22	1,787	0.0	$219.40	$344.84	$60.00	1.30
Chemical Building	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	5,840	LED Retrofit	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	4,088	0.02	144	0.0	$17.70	$131.00	$25.00	5.99
Chemical Building	6	Metal Halide: (1) 175W Lamp	Wall Switch	215	5,840	LED Retrofit	No	6	LED Screw-In Lamps: MH screw-in replacement	Wall Switch	45	5,840	0.83	6,731	0.0	$826.38	$756.00	$0.00	0.91
P&C 1st Floor	2	Metal Halide: (1) 150W Lamp	Wall Switch	190	5,840	LED Retrofit	Yes	2	LED Screw-In Lamps: MH screw-in replacement	Occupancy Sensor	45	4,088	0.26	2,092	0.0	$256.83	$522.00	$35.00	1.90
P&C 1st Floor	4	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	5,840	LED Retrofit	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.22	1,787	0.0	$219.40	$344.84	$60.00	1.30
P&C Mech Room	6	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	5,840	LED Retrofit	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,840	0.29	2,336	0.0	$286.80	$343.26	$60.00	0.99
P&C Super Ofc	5	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	5,840	LED Retrofit	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	4,088	0.39	3,186	0.0	$391.11	$441.05	$95.00	0.88
P&C Women RR	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	5,840	LED Retrofit	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.06	447	0.0	$54.85	$173.21	$20.00	2.79
P&C Women RR	2	Compact Fluorescent: screw in	Wall Switch	32	5,840	LED Retrofit	Yes	2	LED Screw-In Lamps: screw in	Occupancy Sensor	16	4,088	0.03	275	0.0	$33.70	$169.50	$20.00	4.44
P&C Men RR	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	5,840	LED Retrofit	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.06	447	0.0	$54.85	$173.21	$20.00	2.79
P&C Lab	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,840	LED Retrofit	No	14	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	5,840	0.38	3,049	0.0	$374.30	$800.94	$140.00	1.77
P&C Lab	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	5,840	LED Retrofit	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	5,840	0.01	106	0.0	$12.96	$57.21	$10.00	3.64
P&C Lab Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,840	LED Retrofit	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	4,088	0.10	826	0.0	$101.35	$246.02	$50.00	1.93
P&C Phone rm	1	Compact Fluorescent: screw in	Wall Switch	32	400	LED Retrofit	No	1	LED Screw-In Lamps: screw in	Wall Switch	16	400	0.01	7	0.0	$0.89	$26.75	$10.00	18.87
P&C Pump Room	8	Metal Halide: (1) 175W Lamp	Wall Switch	215	5,840	LED Retrofit	Yes	8	LED Screw-In Lamps: MH screw-in replacement	Occupancy Sensor	45	4,088	1.19	9,688	0.0	$1,189.34	$1,278.00	$35.00	1.05
P&C Pump Room 1	2	Linear Fluorescent - T8: 8' T8 (59W) - 2L	Wall Switch	110	5,840	LED Retrofit	Yes	2	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	4,088	0.10	787	0.0	$96.57	$120.00	$0.00	1.24
P&C Pump Room 2	6	Metal Halide: (1) 175W Lamp	Wall Switch	215	5,840	LED Retrofit	Yes	6	LED Screw-In Lamps: MH screw-in replacement	Occupancy Sensor	45	4,088	0.90	7,266	0.0	$892.00	$1,026.00	$35.00	1.11
Digester 1st Floor	17	Metal Halide: (1) 175W Lamp	Wall Switch	215	5,840	LED Retrofit	Yes	17	LED Screw-In Lamps: MH screw-in replacement	Occupancy Sensor	45	4,088	2.54	20,586	0.0	$2,527.34	$2,412.00	$35.00	0.94
Digester RR	1	Incandescent: bathroom	Wall Switch	100	5,840	LED Retrofit	No	1	LED Screw-In Lamps: screw in	Wall Switch	16	5,840	0.07	554	0.0	$68.05	$26.75	$10.00	0.25
Digester Bsmt	11	Metal Halide: (1) 175W Lamp	Wall Switch	215	5,840	LED Retrofit	Yes	11	LED Screw-In Lamps: MH screw-in replacement	Occupancy Sensor	45	4,088	1.64	13,320	0.0	$1,635.34	$1,656.00	$35.00	0.99
Garage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	5,840	LED Retrofit	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.11	894	0.0	$109.70	$230.42	$20.00	1.92

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	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
Garage main	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	5,840	LED Retrofit	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	4,088	0.10	826	0.0	$101.35	$246.02	$50.00	1.93
Garage main	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,840	LED Retrofit	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.20	1,651	0.0	$202.71	$459.26	$80.00	1.87
Garage main	1	Incandescent: general	Wall Switch	100	5,840	LED Retrofit	No	1	LED Screw-In Lamps: screw in	Wall Switch	16	5,840	0.07	554	0.0	$68.05	$26.75	$10.00	0.25
Garage women locker	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,840	LED Retrofit	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.07	550	0.0	$67.57	$230.42	$40.00	2.82
Garage women locker	2	Compact Fluorescent: screw in	Wall Switch	32	5,840	LED Retrofit	No	2	LED Screw-In Lamps: screw in	Wall Switch	16	5,840	0.03	211	0.0	$25.93	$53.50	$20.00	1.29
Garage men locker	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	5,840	LED Retrofit	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.17	1,376	0.0	$168.92	$402.05	$70.00	1.97
Garage men locker	4	Compact Fluorescent: screw in	Wall Switch	32	5,840	LED Retrofit	No	4	LED Screw-In Lamps: screw in	Wall Switch	16	5,840	0.05	422	0.0	$51.85	$107.00	$40.00	1.29
Garage mechanical	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	5,840	LED Retrofit	Yes	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	4,088	0.03	237	0.0	$29.04	$49.41	$0.00	1.70
Garage mechanical	9	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	5,840	LED Retrofit	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	4,088	0.50	4,021	0.0	$493.64	$630.89	$20.00	1.24
Various	16	Exit Signs: Fluorescent	None	22	8,760	LED Retrofit	No	16	LED Exit Signs: 2 W Lamp	None	16	8,760	0.08	950	0.0	$116.67	$1,720.88	$0.00	14.75
Filter Building	11	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,380	LED Retrofit	No	11	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	1.30	7,894	0.0	$969.17	$1,386.00	$0.00	1.43
Chemical Building	8	Metal Halide: (1) 175W Lamp	Daylight Dimming	215	4,380	LED Retrofit	No	8	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	1.11	6,731	0.0	$826.38	$1,008.00	$0.00	1.22
Pump & Control	1	Metal Halide: (1) 175W Lamp	Daylight Dimming	215	4,380	LED Retrofit	No	1	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	0.14	841	0.0	$103.30	$126.00	$0.00	1.22
Digester roof	1	Metal Halide: (1) 175W Lamp	Daylight Dimming	215	4,380	LED Retrofit	No	1	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	0.14	841	0.0	$103.30	$126.00	$0.00	1.22
Digester basin	12	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,380	LED Retrofit	No	12	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	2.44	14,848	0.0	$1,822.90	$1,512.00	$0.00	0.83
Digester basin	4	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,380	LED Retrofit	No	4	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	0.81	4,949	0.0	$607.63	$504.00	$0.00	0.83
Garage front	2	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,380	LED Retrofit	No	2	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	0.24	1,435	0.0	$176.21	$252.00	$0.00	1.43
Garage parking	2	Metal Halide: (1) 150W Lamp	Daylight Dimming	190	4,380	LED Retrofit	No	2	LED Screw-In Lamps: MH screw-in replacement	Daylight Dimming	45	4,380	0.24	1,435	0.0	$176.21	$252.00	$0.00	1.43

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?	Annual Operating Hours	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
Chemical Building	Chlorine Tanks	3	Process Pump	0.5	86.0%	No	2,920	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Chemical Building	Chlorine Tanks	3	Process Pump	0.5	74.0%	Yes	2,920	No	74.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outside Wall Chemical Building	Sodium Hypochloride Room	1	Exhaust Fan	0.1	60.0%	No	8,760	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outside Wall Chemical Building	Sodium Hypochloride Room	1	Exhaust Fan	0.3	69.5%	No	8,760	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Filter Building	Wash Water Pump	1	Process Pump	10.0	90.2%	No	1,095	No	90.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Filter Building	Polymer Feed Pumps	2	Process Pump	0.5	75.0%	Yes	4,380	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Filter Building	Compressor	2	Air Compressor	2.0	84.0%	No	1,095	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Side of Filter Building	Scrubber	2	Other	3.0	80.0%	No	4,380	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Side of Filter Building	Building	1	Exhaust Fan	5.0	87.5%	No	8,760	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Filter building	Filter Pressure Belt Drive	1	Other	3.0	87.5%	No	2,080	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control	Building	1	Exhaust Fan	0.8	81.1%	No	8,760	No	81.1%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control	Building	2	Supply Fan	2.0	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control	Raw Sewage Pumps	1	Process Pump	150.0	91.0%	No	4,380	Yes	95.4%	Yes	1	27.35	320,335	0.0	$39,327.11	$47,870.66	$0.00	1.22
Pump & Control	Raw Sewage Pumps	1	Process Pump	150.0	94.5%	No	4,380	Yes	95.4%	Yes	1	24.32	302,381	0.0	$37,123.01	$47,870.66	$0.00	1.29
Pump & Control	Raw Sludge Transfer Pumps	1	Process Pump	10.0	91.7%	No	1,460	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control	Raw Sludge Transfer Pumps	1	Process Pump	10.0	91.7%	No	1,460	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control	Recirculation pumps	2	Process Pump	200.0	95.0%	No	4,380	Yes	96.2%	Yes	2	64.96	803,445	0.0	$98,637.99	$100,493.30	$0.00	1.02
Pump & Control	Utility Water Pumps	3	Water Supply Pump	15.0	85.5%	No	2,920	Yes	90.2%	No		1.51	5,974	0.0	$733.41	$5,368.31	$0.00	7.32
Pump & Control	Macerator Pump	1	Other	3.0	76.0%	No	2,920	Yes	89.5%	No		0.33	1,297	0.0	$159.23	$804.84	$0.00	5.05
Pump & Control	Communitor	1	Other	1.5	84.0%	No	8,760	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sludge Digester	Sludge transfer pumps	2	Process Pump	20.0	91.0%	No	1,040	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sludge Digester	Filter Press	1	Other	10.0	91.0%	Yes	2,080	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sludge Digester	Primary Settling Tanks	6	Other	0.8	80.0%	No	8,760	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Sludge Digester	Secondary Settling Tanks	6	Other	0.8	80.0%	No	8,760	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	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
Filter Bldg Storage	Storage	1	Electric Forced Air Furnace		13.40	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control Building	Offices/Laboratory storage & office	3	Packaged Terminal HP	1.20	13.40	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control Building	Roof Top	1	Packaged AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Chemical Building	General	3	Electric Forced Air Furnace		6.83	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
FB Chemical Feed Room	Chemical Feed Room	1	Warm Air Unit Heater	75.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
FB Chemical Feed Room	Chemical Feed Room	1	Warm Air Unit Heater	75.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
FB Storage	Storage	1	Warm Air Unit Heater	75.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Digester	Sludge heating	1	Non-Condensing Hot Water Boiler	1,250.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control	Building Heat	2	Warm Air Unit Heater	75.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump & Control	Building Heat	1	Furnace	109.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	Building Heat	3	Warm Air Unit Heater	75.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Digester	Building Heat	2	Warm Air Unit Heater	75.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage	Building Heat	1	Furnace	100.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Chemical Building	Eye Wash	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage Mechanical Room	Garage	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

APPENDIX B: EPA STATEMENT OF ENERGY PERFORMANCE

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

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ENERGY STAR® Score[1]

Willingboro MUA Pollution Control Plant

Primary Property Type: Wastewater Treatment Plant
Gross Floor Area (ft²): 13,580
Built: 1958

For Year Ending: May 31, 2016
Date Generated: March 13, 2017

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
Willingboro MUA Pollution Control Plant 72 Ironside Court Willingboro Township, New Jersey 08046	_____ . (___)___-_____	___ _____ . (___)___-_____ _____

Property ID: 5735959

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
748.8 kBtu/ft²

Source EUI
1,726.8 kBtu/ft²

Annual Energy by Fuel	
Electric - Solar (kBtu)	2,870,973 (28%)
Natural Gas (kBtu)	1,117,406 (11%)
Electric - Grid (kBtu)	6,180,191 (61%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	712
National Median Source EUI (kBtu/ft²)	1,642.1
% Diff from National Median Source EUI	5%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,097

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)