Local Government Energy Audit:
Energy Audit Report

Maple Glen Water Treatment Plant

Jackson Township Municipal Utilities Authority

19A Boxwood Drive
Jackson, NJ 08527

May 25, 2018

Final Report by:
TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

The energy conservation measures and estimates of energy savings have been reviewed for technical accuracy. However, estimates of final energy savings are not guaranteed, because final savings may depend on behavioral factors and other uncontrollable variables. TRC Energy Services (TRC) and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy savings vary.

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility 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 certain 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. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

Table of Contents

Table of Figures

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Maple Glen Water Treatment 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 (TRC), as part of a comprehensive effort to assist New Jersey municipal utility authorities in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

Maple Glen Water Treatment Plant (WTP) is comprised of a 1,100 square foot building, a single treatment tank, and a leach field. The treatment building includes a mechanical space housing blowers and storage rooms.

Maple Glen WTP mostly contains aging and inefficient lighting that should be upgraded and a very basic waste water processing system. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC Energy Services evaluated five measures which represent an opportunity for Maple Glen WTP to reduce annual energy costs by $4,566 and annual greenhouse gas emissions by 40,868 lbs CO_2e. The measures would pay for themselves in 3.97 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 Maple Glen WTP's annual energy use by 28.9%.

Figure 1 – Previous 12 Month Utility Costs

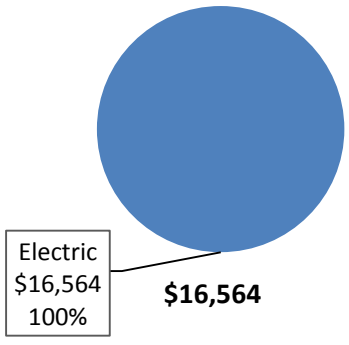
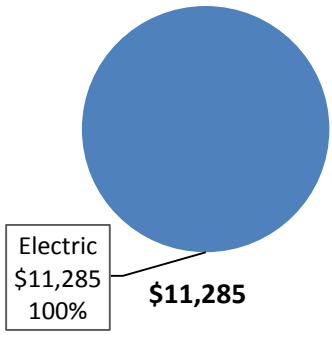


Figure 2 – Potential Post-Implementation Costs



A detailed description of Maple Glen WTP's existing energy use can be found in Section 3.

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.

Figure 3 – Summary of Energy Reduction Opportunities

	Energy Conservation Measure	Recommend?	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			**3,123**	**1.1**	**0.0**	**$351.35**	**$1,202.66**	**$110.00**	**$1,092.66**	**3.11**	**3,145**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	236	0.4	0.0	$26.55	$809.17	$0.00	$809.17	30.48	238
ECM 2	Retrofit Fixtures with LED Lamps	Yes	2,887	0.7	0.0	$324.80	$393.49	$110.00	$283.49	0.87	2,907
Motor Upgrades			**2,085**	**0.2**	**0.0**	**$234.56**	**$1,846.72**	**$0.00**	**$1,846.72**	**7.87**	**2,099**
ECM 3	Premium Efficiency Motors	Yes	2,085	0.2	0.0	$234.56	$1,846.72	$0.00	$1,846.72	7.87	2,099
Variable Frequency Drive (VFD) Measures			**30,955**	**3.5**	**0.0**	**$3,482.66**	**$15,213.60**	**$0.00**	**$15,213.60**	**4.37**	**31,172**
ECM 4	Install VFDs on Blower Fans w/ DO Control	Yes	30,955	3.5	0.0	$3,482.66	$15,213.60	$0.00	$15,213.60	4.37	31,172
Domestic Water Heating Upgrade			**3,741**	**0.0**	**0.0**	**$420.85**	**$96.47**	**$0.00**	**$96.47**	**0.23**	**3,767**
ECM 5	Install Low-Flow Domestic Hot Water Devices	Yes	3,741	0.0	0.0	$420.85	$96.47	$0.00	$96.47	0.23	3,767
TOTALS			**39,904**	**4.8**	**0.0**	**$4,489.42**	**$18,359.45**	**$110.00**	**$18,249.45**	**4.06**	**40,183**

* - 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.

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient that usage a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

Domestic Water Heating upgrade measures generally involve replacing old inefficient domestic water heating systems with modern energy efficient systems. New domestic water heating systems can provide equivalent or greater capacity as older systems, but use less energy. These measures save energy by reducing the fuel used by the domestic water heating systems due to improved efficiency or the removal of standby losses.

Energy Efficient Practices

TRC also identified one low cost (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 Maple Glen WTP include:

- Ensure Lighting Controls Are Operating Properly

For details on these energy efficient practices, please refer to Section 5.

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation sources for Maple Glen WTP. 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.

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

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, the equipment changes outlined for each ECM need to be selected and installed through project implementation. One of the first considerations is if there is capital available for project implementation. Another consideration is whether to pursue individual ECMs, a group of ECMs, or a comprehensive approach wherein all ECMs are pursued, potentially in conjunction with other facility projects or improvements.

Rebates, incentives, and financing are available from the NJBPU, NJCEP, as well as some of the state's investor-owned utilities, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any project, please review the appropriate incentive program guidelines before proceeding. This is important because in most cases you will need to submit an application for the incentives before purchasing materials and beginning installation.

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

- SmartStart

For facilities with capital available for implementation of selected individual measures or phasing 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 design the ECM(s), select the equipment and apply for the incentive(s). Program pre-approval is required for some SmartStart incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SmartStart program and will be explained further in Section 8, as well as the other programs as mentioned below.

For facilities without capital available 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 external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.2 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. Refer to Section 7 for additional information on this program.

Additional descriptions of all relevant incentive programs are located in Section 8 or: www.njcleanenergy.com/ci.

To ensure projects are implemented such that maximum savings and incentives are achieved, bids and specifications should be reviewed by your procurement personnel and/or consultant(s) to ensure that selected equipment coincides with LGEA recommendations, as well as applicable incentive program guidelines and requirements.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Dave Harpell	Executive Director	dharpell@jacksonmua.com	7329282222 x 240
Carolann Weisel	Purchasing Department	cweisel@jacksonmua.com	7329282222 x 214
TRC Energy Services			
Tom Page	Auditor	tpage@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On August 23, 2016, TRC performed an energy audit at Maple Glen Water Treatment Plant located in Jackson, New Jersey. TRC's team met with Drew Ricciardi to review the facility operations and focus the investigation on specific energy-using systems.

Maple Glen WTP is comprised of a 1,100 square foot building, a single treatment tank, and a leach field. The treatment building includes a mechanical space housing blowers, storage rooms and inefficient lighting that should be upgraded. The waste water processing system is very basic.

The buildings were constructed in 1976. Due to the relatively small size of the wastewater process system, no upgrades have been pursued.

2.3 Building Occupancy

The wastewater treatment building is unoccupied except during regular maintenance and testing. The wastewater processing equipment, however, operates continuously.

2.4 Building Envelope

The building is constructed of concrete block and has a pitched roof covered with composite shingles. The building has a few windows that are only single pane and show signs of some air infiltration. The exterior doors are constructed of aluminum and were found to be in satisfactory condition.

2.5 On-site Generation

Maple Glen WTP does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of the facility's equipment.

Lighting System

Linear 32-Watt linear fluorescent T8 lamps provide most of the lighting at the Maple Glen WTP. The building is also illuminated by 40-Watt fluorescent T12 lamps, as well as incandescent lamps. Most of the building spaces use 4-lamp, 2-foot wide by 4-foot long surface mounted fixtures.

Lighting control in most spaces is provided by manual wall switches.

The building has minimal exterior lighting, which primarily consists of halogen and incandescent fixtures that are controlled with photocells.

Domestic Hot Water

The wastewater treatment building has a 30 gallon electric domestic water heater with an input rating of 4.5 kW. Hot water is used for a single restroom with a shower.

Wastewater Treatment System

The wastewater treatment system was installed to accommodate a nearby housing development. Wastewater from the sanitary system is pumped into an open tank of roughly 55,000 gallons (12 ft tall and 28ft in diameter). An Excelsior blower system supplies coarse air bubbles to aerate the wastewater in the tank. One of the two 15 hp constant speed positive displacement blowers operates continuously. A 1/3 hp motor drives a mixing paddle within the tank. Effluent from the tank is discharged into a leach field south of the tank.

The system was designed for a flow rate of 17,000 gallons per day. Due to the small size of the system, the permit to operate does not require continuous monitoring of the dissolved oxygen (DO) levels (they are sampled) and no measurements of biological oxygen demand (BOD) are required. The entire system is operated manually based on peak influent flow.

2.7 Water-Using Systems

There is a single restroom at this facility. The faucet is rated for 3.0 gallons per minute (gpm) and the showerhead is rated at 3 gpm.

3 SITE ENERGY USE AND COSTS

Utility data for electricity was analyzed to identify opportunities for savings. In addition, data for Electricity 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 such as seasonal fluctuations, rainfall etc. Please refer to the Benchmarking section within Section 3.3 for additional information.

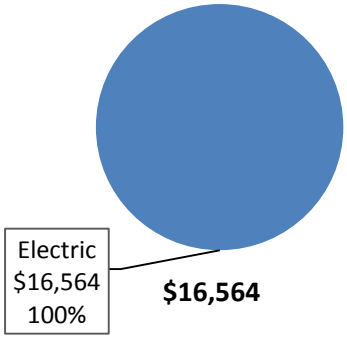
3.1 Total Cost of Energy

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. The current utility cost for this site is $16,564 as shown in Figure 5 and Figure 6 below.

Figure 5 - Utility Summary

Utility Summary for Maple Glen Water Treatment Plant		
Fuel	**Usage**	**Cost**
Electricity	140,342 kWh	$16,564
Total		**$16,564**

Figure 6 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.113/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below.

Figure 7 - Electric Usage & Demand

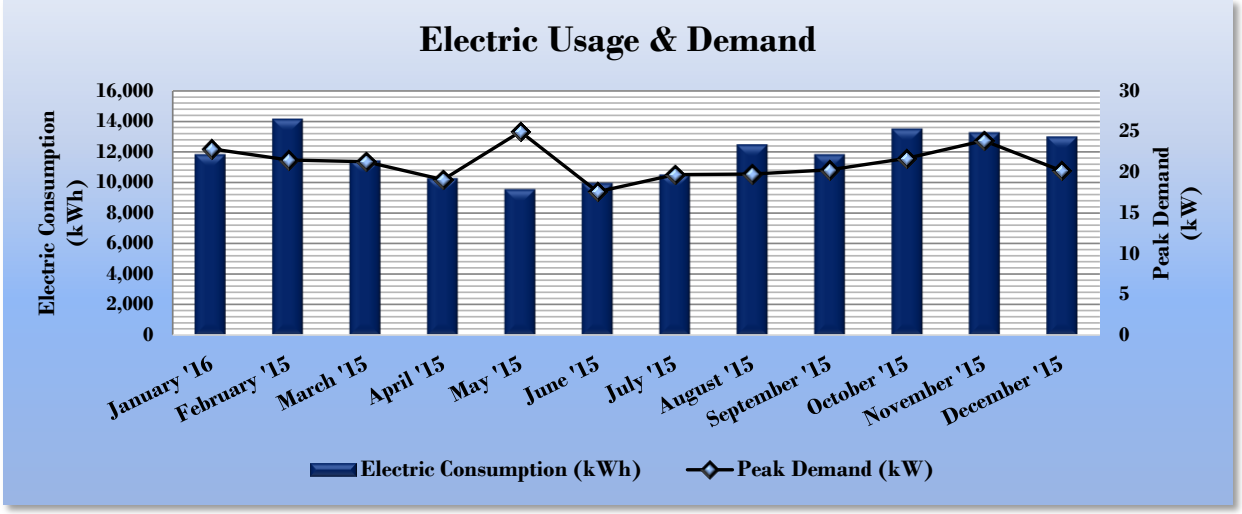


Figure 8 - Electric Usage & Demand

Electric Billing Data for Maple Glen Water Treatment Plant					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
2/1/16	28	11,840	23	$72	$1,423
3/3/15	34	14,160	22	$75	$1,602
3/31/15	28	11,440	21	$73	$1,321
4/30/15	30	10,280	19	$51	$1,187
6/1/15	32	9,560	25	$90	$1,155
7/1/15	30	9,960	18	$46	$1,192
7/31/15	30	10,520	20	$58	$1,265
9/1/15	32	12,480	20	$59	$1,479
10/1/15	30	11,840	20	$58	$1,405
11/2/15	32	13,520	22	$66	$1,598
12/2/15	30	13,280	24	$78	$1,584
1/4/16	33	13,000	20	$57	$1,533
Totals	**369**	**141,880**	**25**	**$783**	**$16,745**
Annual	**365**	**140,342**	**25**	**$774**	**$16,564**

3.3 Benchmarking

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

The EUI is a measure of a facility's energy consumption per gallon per day of influent (in the case of a Wastewater treatment plant) and it is the standard metric for comparing plant energy performance. Comparing the EUI of a plant with the national median EUI for that plant type illustrates whether that plant uses more energy than similar plant on a gallon per day basis or if that plant 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 plant 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 9 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Water Treatment Plant	National Median Wastewater Treatment
Source Energy Use Intensity (kBtu/sq.ft)	1365.6	N/A
Site Energy Use Intensity (kBtu/sq.ft)	434.9	N/A

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

Figure 10 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Water Treatment Plant	National Median Wastewater Treatment
Source Energy Use Intensity (kBtu/sq.ft)	977.9	N/A
Site Energy Use Intensity (kBtu/sq.ft)	311.5	N/A

Many buildings can also receive a 1 – 100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide — and may be eligible for ENERGY STAR® certification. This influent flow of this plant is not high enough to currently qualify to receive a score.

A Portfolio Manager Statement of Energy Performance (SEP) was generated for this facility, see Appendix B: ENERGY STAR® Statement of Energy Performance.

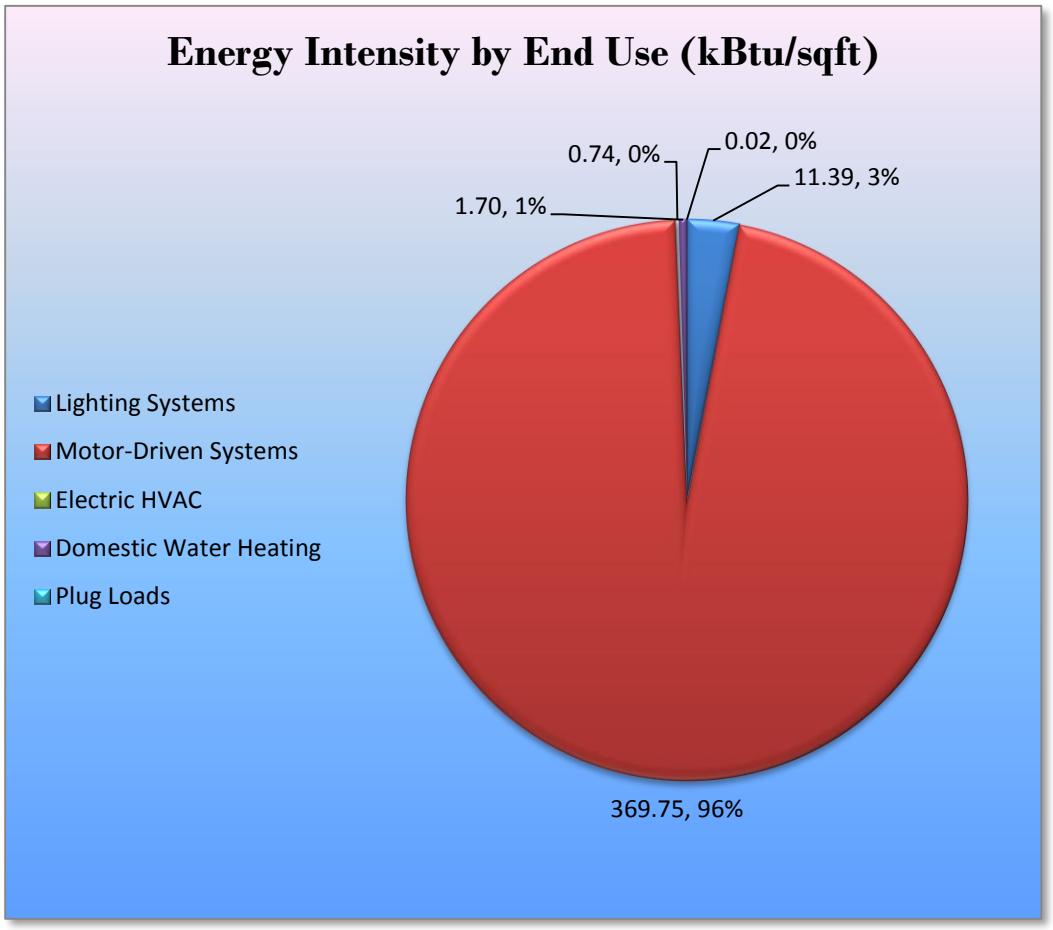
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the new online account. We encourage customers to update their energy usage data in Portfolio Manager regularly, to keep track of building energy 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.

3.4 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building 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 in a building and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 11 - Energy Balance (% and kBtu/sqft)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Maple Glen WTP regarding financial incentives for which they may qualify to implement the recommended measures. 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 usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 12 – Summary of Recommended 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		**3,123**	**1.1**	**0.0**	**$351.35**	**$1,202.66**	**$110.00**	**$1,092.66**	**3.11**	**3,145**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	236	0.4	0.0	$26.55	$809.17	$0.00	$809.17	30.48	238
ECM 2	Retrofit Fixtures with LED Lamps	2,887	0.7	0.0	$324.80	$393.49	$110.00	$283.49	0.87	2,907
Motor Upgrades		**2,085**	**0.2**	**0.0**	**$234.56**	**$1,846.72**	**$0.00**	**$1,846.72**	**7.87**	**2,099**
ECM 3	Premium Efficiency Motors	2,085	0.2	0.0	$234.56	$1,846.72	$0.00	$1,846.72	7.87	2,099
Variable Frequency Drive (VFD) Measures		**30,955**	**3.5**	**0.0**	**$3,482.66**	**$15,213.60**	**$0.00**	**$15,213.60**	**4.37**	**31,172**
ECM 4	Install VFDs on Blower Fans w/ DO Control	30,955	3.5	0.0	$3,482.66	$15,213.60	$0.00	$15,213.60	4.37	31,172
Domestic Water Heating Upgrade		**3,741**	**0.0**	**0.0**	**$420.85**	**$96.47**	**$0.00**	**$96.47**	**0.23**	**3,767**
ECM 5	Install Low-Flow Domestic Hot Water Devices	3,741	0.0	0.0	$420.85	$96.47	$0.00	$96.47	0.23	3,767
TOTALS		**39,904**	**4.8**	**0.0**	**$4,489.42**	**$18,359.45**	**$110.00**	**$18,249.45**	**4.06**	**40,183**

* - 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).

4.1.1 Lighting Upgrades

Our recommended upgrades to existing lighting fixtures are summarized in Figure 13 below.

Figure 13 – Summary of Lighting Upgrade 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		**3,123**	**1.1**	**0.0**	**$351.35**	**$1,202.66**	**$110.00**	**$1,092.66**	**3.11**	**3,145**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	236	0.4	0.0	$26.55	$809.17	$0.00	$809.17	30.48	238
ECM 2	Retrofit Fixtures with LED Lamps	2,887	0.7	0.0	$324.80	$393.49	$110.00	$283.49	0.87	2,907

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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	236	0.4	0.0	$26.55	$809.17	$0.00	$809.17	30.48	238
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing T12 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 LED sources have burn hours 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.

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	69	0.2	0.0	$7.79	$243.13	$60.00	$183.13	23.52	70
Exterior	2,818	0.5	0.0	$317.01	$150.36	$50.00	$100.36	0.32	2,837

Measure Description

This measure evaluates replacing linear fluorescent lamps with LED tube lamps and replacing incandescent and halogen screw-in based lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. 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.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source and more than 10 times incandescent sources. LED lamps that use the existing fluorescent fixture ballast will be constrained by the remaining hours of the ballast. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

4.1.2 Motor Upgrades

Our recommended motor upgrades are summarized in Figure 14 below.

Figure 14 – Summary of Motor Upgrade 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)
Motor Upgrades		**2,085**	**0.2**	**0.0**	**$234.56**	**$1,846.72**	**$0.00**	**$1,846.72**	**7.87**	**2,099**
ECM 3	Premium Efficiency Motors	2,085	0.2	0.0	$234.56	$1,846.72	$0.00	$1,846.72	7.87	2,099

ECM 3: 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)
2,085	0.2	0.0	$234.56	$1,846.72	$0.00	$1,846.72	7.87	2,099

Measure Description

This measure evaluates 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.

4.1.3 Variable Frequency Drive Measures

Our recommended variable frequency drive (VFD) measures are summarized in Figure 15 below.

Figure 15 – 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		**30,955**	**3.5**	**0.0**	**$3,482.66**	**$15,213.60**	**$0.00**	**$15,213.60**	**4.37**	**31,172**
ECM 4	Install VFDs on Blower Fans w/ DO Control	30,955	3.5	0.0	$3,482.66	$15,213.60	$0.00	$15,213.60	4.37	31,172

ECM 4: Install VFDs on Blower Fans w/ DO Control

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)
30,955	3.5	0.0	$3,482.66	$15,213.60	$0.00	$15,213.60	4.37	31,172

Measure Description

This measure evaluates installing a variable frequency drive (VFD) and dissolved oxygen (DO) controller on the aeration blower motors. There is currently no controls on this system; it is set to serve the worst case operating condition. As part of this measure, DO sensors would need to be installed in the wastewater tank. We recommend installing two DO sensors in separate locations. The VFD and DO controller will allow the aeration motors to operate at the minimum speed necessary to maintain a minimum DO setpoint. Energy savings result from reducing blower speed (and power) when there is a reduced influent flow. The magnitude of energy savings is based on the amount of time at reduced loads.

Savings are estimated based on a 20% average reduction in speed of the positive displacement blowers. Additional savings could be obtained if actual average speed reduction is greater.

4.1.4 Domestic Water Heating Upgrade

Our recommended domestic water heating measures summarized in Figure 16 below.

Figure 16 - Summary of Domestic Water Heating 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)
Domestic Water Heating Upgrade		**3,741**	**0.0**	**0.0**	**$420.85**	**$96.47**	**$0.00**	**$96.47**	**0.23**	**3,767**
ECM 5	Install Low-Flow Domestic Hot Water Devices	3,741	0.0	0.0	$420.85	$96.47	$0.00	$96.47	0.23	3,767

ECM 5: Install Low-Flow DHW Devices

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)
3,741	0.0	0.0	$420.85	$96.47	$0.00	$96.47	0.23	3,767

Measure Description

This measure evaluates the savings from installing low flow domestic water devices to reduce overall water flow in general and hot water flow in particular. Low flow showerheads and faucet aerators reduce the water flow, relative to standard showerheads and aerators, from the fixture. Pre-rinse spray valves—often used in commercial and institutional kitchens—are designed to remove food waste from dishes prior to dishwashing. Replacing standard pre-rinse spray valves with low flow valves will reduce water use.

All of the low flow devices reduce the overall water flow from the fixture which generally reduces the amount of hot water used resulting in energy and water savings.

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.

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) 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.

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

In order to be cost-effective, a solar PV array generally needs a minimum of 4,000 sq ft of flat or south-facing rooftop, or other unshaded space, on which to place the PV panels. In our opinion, **the facility does appear not meet these minimum criteria for cost-effective PV installation**.

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) 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

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

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.

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Lack of thermal load is the most significant factors contributing to the low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

For a list of qualified firms in New Jersey 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 facility(ies) 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 (http://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 (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR 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 other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 17 for a list of the eligible programs identified for each recommended ECM.

Figure 17 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x					
ECM 2	Retrofit Fixtures with LED Lamps	x					
ECM 3	Premium Efficiency Motors	x					
ECM 4	Install VFDs on Blower Fans w/ DO Control						
ECM 5	Install Low-Flow Domestic Hot Water Devices						

SmartStart 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.

Generally, the incentive values provided throughout the report assume the SmartStart 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 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.

Prescriptive Equipment Incentives 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 SmartStart prescriptive incentive program provides fixed incentives for specific energy efficiency measures, whereas the custom SmartStart program provides incentives for more unique or specialized technologies or systems that are not addressed through prescriptive incentive offerings for specific devices.

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom Measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at the lesser of 50% of the total installed incremental project cost, or a buy down to a one year payback. Program incentives 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 SmartStart program you will need to submit an application for the specific equipment 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.

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

8.2 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.

8.3 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 (http://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 (http://www.pjm.com/training/training%20material.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
Blower Motor Room	2	Incandescent: 60 Watt Bulb	Wall Switch	60	400	Relamp	No	2	LED Screw-In Lamps: LED replacement for 60W Incadescent	Wall Switch	9	400	0.08	46	0.0	$5.19	$31.00	$20.00	2.12
Restroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	400	0.05	30	0.0	$3.36	$117.00	$20.00	28.90
Restroom	2	Incandescent: 60 Watt Bulb	Wall Switch	60	200	Relamp	No	2	LED Screw-In Lamps: LED replacement for 60W Incadescent	Wall Switch	9	200	0.08	23	0.0	$2.59	$31.00	$20.00	4.24
Front Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	400	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	400	0.05	25	0.0	$2.85	$95.13	$20.00	26.38
Front Room	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	400	Relamp & Reballast	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	400	0.10	53	0.0	$6.00	$161.83	$20.00	23.64
2nd Rm	4	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	400	Relamp & Reballast	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	400	0.38	213	0.0	$24.00	$647.33	$80.00	23.64
Exterior Front	1	Incandescent: 60 Watt Bulb	Wall Switch	60	8,760	Relamp	No	1	LED Screw-In Lamps: LED replacement for 60W Incadescent	Wall Switch	9	8,760	0.04	505	0.0	$56.80	$15.50	$10.00	0.10
Exterior Front	1	Halogen Incandescent: 2 x 150W Spotlight Bulbs	Wall Switch	300	4,380	Relamp	No	1	LED Screw-In Lamps: LED replacemnt for 150W Par38 Flood light bulbs	Wall Switch	34	4,380	0.22	1,317	0.0	$148.12	$51.93	$10.00	0.28
Exterior Back	1	Halogen Incandescent: 2 x 150W Spotlight Bulbs	Wall Switch	300	4,380	Relamp	No	1	LED Screw-In Lamps: LED replacemnt for 150W Par38 Flood light bulbs	Wall Switch	34	4,380	0.22	1,317	0.0	$148.12	$51.93	$10.00	0.28

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
Maple Glenn	Blower (positive displacement)	1	Process Blower	15.0	91.0%	No	8,760	Yes	93.0%	Yes	2	0.18	63,218	0.0	$7,112.50	$9,060.32	$0.00	1.27
Maple Glenn	Blower (positive displacement)	1	Process Blower	15.0	91.0%	No	0	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Maple Glenn	Tank Mixer	1	Other	0.3	80.0%	No	8,760	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Maple Glenn	Pump	1	Other	3.0	88.0%	No	8,760	No	88.0%	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
Front Rm	Front Rm	2	Electric Resistance Heat		5.12	No							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
Restroom	Restroom	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Restroom	1	Faucet Aerator (Lavatory)	3.00	1.00	0.00	2,805	0.0	$315.64	$7.17	$0.00	0.02
Restroom	1	Showerhead	3.00	2.00	0.00	935	0.0	$105.21	$89.30	$0.00	0.85

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Blower Room	1	Floor Fan	0.2	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

Maple Glen Wastewater Treatment Plant

Primary Property Type: Wastewater Treatment Plant
Gross Floor Area (ft²): 1,100
Built: 1976

For Year Ending: January 31, 2016
Date Generated: May 07, 2018

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
Maple Glen Wastewater Treatment Plant 19A Boxwood Drive Jackson, New Jersey 08527	Jackson Township Municipal Utilities Authority 135 Manhattan Street Jackson, NJ 08527 (732) 928-2222	David Harpell 135 Manhattan Street Jackson, NJ 08527 (732) 928-2222 Ext. 240 dharpell@jacksonmua.com

Property ID: 5825355

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
434.9 kBtu/ft²

Source EUI
1,365.6 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	478,411	(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)	53

Signature & Stamp of Verifying Professional

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

Signature: _____ Date: _____

Licensed Professional

____ _____
,
(____)____-_____
_____

Professional Engineer Stamp (if applicable)