Local Government Energy Audit:

Energy Audit Report

Shorrock Street Complex

Lakewood Township
Municipal Utilities Authority

2000 Shorrock Street
Lakewood, NJ 08701

May 27, 2017

Draft 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 savings 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 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 Shorrock Street Complex.

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help tour facility implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

This study was conducted by TRC Energy Services, as part of a comprehensive effort to assist New Jersey local government agencies and public authorities with efforts to control energy costs and protect our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

The Shorrock Street Complex is one of two water treatment facilities owned by Lakewood Township Municipal Utilities Authority (LTMUA), which supply potable water to Lakewood Township. The two sites together pump and treat on average more than 2.2 million gallons per day (MGD). Average production at Shorrock Street water treatment facility is 1.5 MGD, while approximately .72 MGD is produced by the New Hampshire Avenue site.

The Shorrock Street Complex is a 9,374 square foot facility comprised of three (3) buildings: the Shorrock Street Water Treatment Plant, Wellhouse #16 and the GAC Building (1,008 ft^2) (which stands for "Granulated Activated Carbon"). The site also contains two ground-based water tanks - a large 3 million gallon tank and a smaller backwash tank – and a back-up generator. The facility pumps, filters, and treats about 720,000 gallons of well water per day, which is supplied to Lakewood Township.

- Water treatment plant (~6,777 ft^2)
- Wellhouse #16 (1,589 ft^2)
- Granulated Activated Carbon (GAC) Building (1,008 ft^2)

We estimate that about 70 percent of the energy used onsite is for process pumps, chemical mixing, fans, compressors, and other motor-driven equipment. Most of the remaining 30 percent is used for space heating. A relatively modest amount of energy is needed for space cooling, facility lighting and, electronic control systems. A thorough description of the facility's energy usage and equipment are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC Energy Services evaluated three (3) energy conservation measures which together represent an opportunity for Shorrock Street Complex to reduce its annual energy costs by roughly $1,487 and its annual greenhouse gas emissions by about 12,073 lbs CO_2e. We estimate that if all measures are implemented as recommended, the project would pay for itself in energy savings in roughly 4.4 years. A breakdown of existing utility costs and potential savings after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce the Shorrock Street Complex's annual energy use by about 1%.

The savings opportunities were small compared to the site's typical process energy usage. We found no ECM upgrades for any of the motors at the site. We saw no pumps, fans, or compressors with motors that were in need of replacement. All of the largest motors at the site appeared to be only a few years old and already were employing energy savings measures such as variable frequency drives (VFDs) and other control systems.

Figure 1 – Previous 12 Month Utility Costs

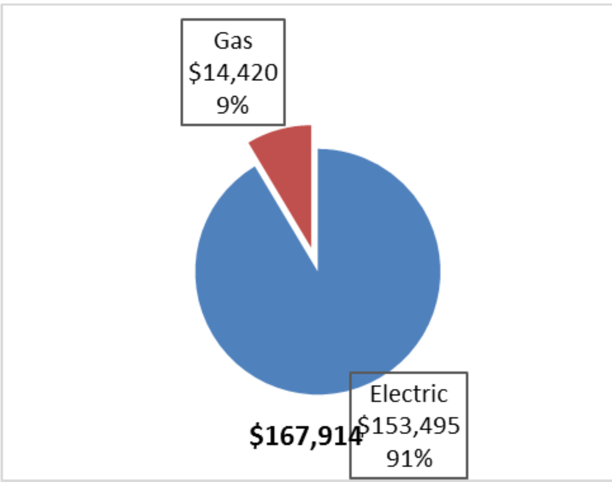
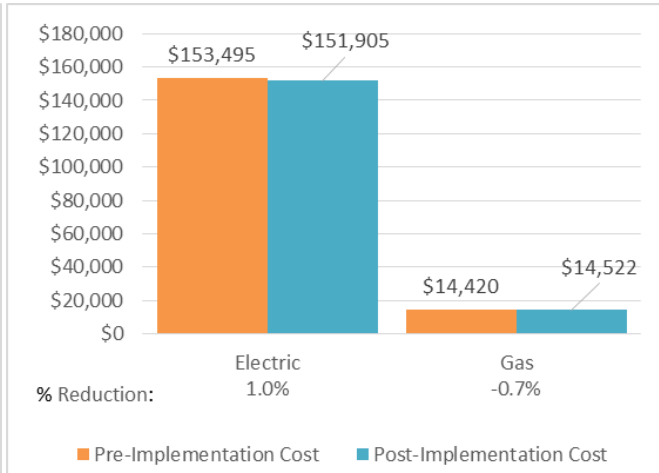


Figure 2 – Potential Post-Implementation Costs



A detailed description of Shorrock Street Complex's existing energy use can be found in Section 3 "Site Energy Use and Costs".

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category can be found below and a description of savings opportunities can be found in **Section 4**, **"Energy Conservation Measures"**.

Figure 3 – Summary of Energy Reduction Opportunities

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		9,952	2.9	0.0	$1,186.49	$6,366.26	$820.00	$5,546.26	4.7	10,022
ECM 1	Retrofit Fixtures with LED Lamps	8,744	2.8	0.0	$1,042.51	$5,505.82	$820.00	$4,685.82	4.5	8,805
ECM 2	Install LED Exit Signs	1,208	0.1	0.0	$143.98	$860.44	$0.00	$860.44	6.0	1,216
ECM 3	Install High Efficiency Gas Water Heater	3,377	5.4	-11.5	$300.63	$1,067.76	$50.00	$1,017.76	3.4	2,051
TOTALS		13,329	8.3	-11.5	$1,487.13	$7,434.02	$870.00	$6,564.02	4.4	12,073

* - 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.

Domestic Hot Water upgrade measures generally involve replacing older inefficient domestic water heating systems with modern energy efficient systems. New domestic hot water heating systems can provide equivalent, or greater, water heating capacity compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel used for domestic hot water heating due to improved heating efficiency or reducing standby losses.

Energy Efficient Practices

TRC Energy Services also identified 8 low cost or no cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Shorrock Street Complex include:

- Close Doors and Windows
- Turn Off Unneeded Motors
- Reduce Motor Short Cycling
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance

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

On-Site Generation Measures

TRC Energy Services evaluated the potential for installing on-site generation for Shorrock Street Complex. Based on the configuration of the site and its electric load, there appears to be a high potential there for cost-effective installation a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	243	kW-DC
Electric Generation	316,244	kWh/yr
Displaced Cost	$37,700	/yr
Installed Cost	$821,300	

We estimate that the site could cost-effectively utilize available space on rooftops, on top of the main tank, and unshaded ground areas to install up to 371 kW of solar generating capacity. Sizing an array based on the facility average annual peak demand instead, would mean a slightly smaller array with 243 kW_{DC} of solar electric generating capacity. An array of that size would occupy roughly 17,438 ft^2 and could offset nearly 25% of the sites annual electric load. At current market rates for installation and current Solar Renewable Energy Credits (SRECs) values, we estimate that such a system would likely pay for itself in about 7.4 years.

For details on our evaluation of the site's electric generation potential, please see **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)
- Energy Savings Improvement Program (ESIP)

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 (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. 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. By enabling grid operators to call upon commercial facilities to reduce their 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 facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to 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 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Daniel Rappoccio	Chief Finance Officer	drappoccio@lakewoodmua.com	732-363-4422 Ext 126
Bob Farina	Technical Operations Supervisor	bfarina@lakewoodmua.com	732-905-0712
TRC Energy Services			
Tom Page	Auditor	tpage@TRCsolutions.com	(732) 855-0033

2.2 General Site Information

On October 11, 2016, TRC Energy Services performed an energy audit at Shorrock Street Complex located in Lakewood, NJ. TRC Energy Services' team met with Dan Rappoccio and Bob Farina to review the facility operations and help focus our investigation on specific energy-using systems.

The Shorrock Street Complex is a 9,374 square foot facility comprised of three (3) buildings: the Shorrock Street Water Treatment Plant, Wellhouse #16 and the GAC Building (1,008 ft^2) (which stands for "Granulated Activated Carbon"). The site also contains two ground-based water tanks - a large 3 million gallon tank and a smaller backwash tank – and a back-up generator. The facility pumps, filters, and treats about 720,000 gallons of well water per day, which is supplied to Lakewood Township.

- Water treatment plant (~6,777 ft^2)
- Wellhouse #16 (1,589 ft^2)
- Granulated Activated Carbon (GAC) Building (1,008 ft^2)

The Water Treatment Plant was built in 2005. It is the only building on the site with regular daily occupancy. It is typically occupied by 1 to 5 people. It has a control room and a lab for monitoring and testing the water treatment process. It is staffed during regular business hours from Monday through Friday and for half a day on Saturdays and Sundays. The Water Treatment Plant contains most of the site's major energy using equipment. It contains (2)100-HP pumps 100 HP and (2) 120-HP pumps, plus many small to medium-sized motors and compressors used in the water treatment process.

Wellhouse #16 and the GAC Building are occupied only when routine maintenance is required for the well pumps or other equipment housed in those areas. Otherwise the equipment there is monitored remotely. Wellhouse #16 is the oldest building on the site. It was the original Water Treatment Plant for the site. It was regularly occupied then, but since 2005, it is occupied only as needed. The GAC building was added in 2009.

2.3 Building Occupancy

Water Treatment Plant is the only building on the site with regular daily occupancy. It is typically occupied by 1 to 5 people. It has a control room and a lab for monitoring and testing the water treatment process. It is staffed during regular business hours from Monday through Friday and for half a day on Saturdays and Sundays.

Wellhouse #16 and the GAC Building are occupied only when routine maintenance is required for the well pumps or other equipment housed in those areas. Otherwise the equipment there is monitored remotely.

Figure 6 - Building Schedule

Building Occupancy Schedule		
Building Name	Weekday/Weekend	Operating Schedule
Shorrock Street Complex	Weekday	8AM - 6PM
Shorrock Street Complex	Weekend	8AM - 12:30PM

2.4 Building Envelope

The Shorrock Street Water Treatment Plant is a rectangular block-shaped brick building with a flat white roof. It has no windows. Door seals of the front and sides of the building seemed tight. No excessive air infiltration was noted.

The GAC Building is pre-fabricated warehouse-type structure with a high ceiling, two garage doors in the front, no windows, and a sloped metal roof. It has minimal insulation, but is only a few years old, so no excessive air infiltration was noted. More importantly, it has only a few occupants during the day. So, adequate heat is provided simply as needed, by ceiling-mounted electric warm air unit heaters.

Wellhouse #16 is the oldest building on the site. It was once occupied on a daily basis, but since 2005 it has been used only as a well house. It is constructed of masonry block with a sloped shingled roof. It has few windows. No excessive air leakage was noted around doors. Because it is no longer occupied daily, heating there is kept at a minimum. It is turned up to normal room temperature, only when work is being done there.

The minimal occupancy of the GAC and Wellhouse #16 buildings mean that only a minimum level of heating is needed there. Consequently, any improvements to building insulation (or improvements in heating equipment efficiency) would likely have very long payback period. In other words, such an investment would like be too long to justify the cost of the installation on the basis of energy savings alone.



Image 1: *(left to right)* ***Shorrock Street Water Treatment Plant, GAC Building, and Wellhouse #16***

2.5 On-Site Generation

Shorrock Street Complex has a 650-kW emergency backup generator. It uses diesel fuel and is typically used only a few hours per year, during regular required system tests.

2.6 Energy-Using Systems

Lighting Systems

The Water Treatment Plant is provided mostly lit be 2-tube T8 fluorescent fixtures. The lights in the main pump room have recently been upgraded to LEDs. Some spotlights around the perimeter of the building and near the back-up generator have also been upgraded recently to LEDs.

The GAC Building only has a few T8 fluorescent fixtures inside and some metal halide spotlights outside.

Wellhouse #16 is lit mostly by older 8-ft T12 fluorescent fixtures inside and a few new LED spotlights outside.

Please see **Appendix A: Equipment Inventory & Recommendations** for an inventory of the facility's lighting equipment.

Air Conditioning Systems

The only space cooling onsite is provided by two (2) DAIKIN mini-split systems at the Water Treatment Plant. The mini-splits have a cooling capacity of 22,000 Btu/hr each. One supplies cool air to the Control Room and the other serves the Electric Room. No other buildings in the complex have air conditioning.

Image 2: DAIKIN Mini-Split System

Please see **Appendix A: Equipment Inventory & Recommendations** for an inventory of the facility's air conditioning equipment.

Building Heating Systems

Space heating is provided at the Water Treatment Plant by two (2) Laars Pennant PNCH-1500 hydronic boilers. They units operate in tandem. The boilers were installed in 2005 and appear to in good condition. The units are approximately 84% efficient. Newer condensing boilers may reach efficiencies of over 93%. So, they are fairly average in efficiencies for their size and age. The building occupancy is modest, so the annual run hours are less than average. So, early replacement of relatively lightly used boilers would not be cost effective. In a few years, when the boilers are showing further signs of wear, we recommend replacing them with higher efficiency condensing units.

Image 3: Boiler at Shorrock WTP

The building also has four (4) Roughneck warm air unit heaters in the pumps rooms for supplemental heating of those spaces.

Wellhouse #16 has a much older hydronic heating system. It is estimated to have be over 20 years old with an efficiency of about 82% and an output capacity of 308 MBH. This boiler shows signs of wear, though is not used much anymore, since the building is only occupied sporadically. The low annual run hours for this unit make replacement not cost-effective (i.e. based on annual energy savings alone). When this old boiler begins to fail we recommend replacing it with a higher efficiency unit or perhaps just using warm air units or mini-splits to heat this space in the future instead.

The GAC Building has no gas service and a low daily occupancy, so it is heated by five (5) electric Chromalox warm air unit heaters instead.

Please see **Appendix A: Equipment Inventory & Recommendations** for an inventory of the facility's domestic hot water equipment.

Domestic Hot Water Heating Systems

The domestic hot water heating for the facility consists of one (1) 120-gal *A.O. Smith* electric hot water heater at the Water Treatment Plant. There is also one (1) small 10-gal hot water heater which supplies the restroom at the Wellhouse #16.

The domestic hot water heater at the Shorrock Street Water Treatment Plant appears old. It shows signs of rust. Since the building has gas service, so it would likely be cheaper to replace this electric unit with a natural gas-fired domestic hot water heater. The cost and savings for the replacement are estimated in Section 4 below. In our calculations we assumed that the water heater would be replaced by a similarly sized gas-fired water heater, though the current unit may have more storage capacity that is necessary for the building's needs. Additional savings might be obtained by downsizing the unit, as well.

Please see **Appendix A: Equipment Inventory & Recommendations** for an inventory of the facility's domestic hot water equipment.

Motor Systems and Drives

We estimate that about 70 percent of all energy used onsite is for process pumps, chemical mixing, fans, compressors, and other motor-driven equipment.

Image 4: Pumps and Compressors at Facility

The largest motors on the site are the two (2) 150-HP high service pumps at the Water Treatment Plant. There are also two (2) 100-HP pumps there which pump to the large ground tank behind the building. These motors are only a few years old and all are controlled by variable frequency drives (VFDs). The Water Treatment Plant also contains two (2) supernatant pumps (7.5-HP ea.), two (2) "process air blowers" (Gardner-Denver 40-HP compressors), two (2) 5-HP compressors used for "instrument air", one (1) 5-HP sludge pump, two (2) 2-HP mixer motors, three (2) ¾-HP lime feedwater pumps, and two (2) 10-HP and two (2) 5-HP "stripper motors", which run continuously to provide water and neutralize pH levels. The building also has many small fractional horsepower motors powering exhaust fans or used for dust collection or other ancillary systems.

Wellhouse has (1) 20-HP well pump, which runs continuously, plus a few fractional horsepower exhaust fans. The GAC Building has only small fan motors.

None of the motors that we saw at the facility appeared to be at the end of their rated useful lifetime (usually about 15 years under normal usage conditions). All of the largest motors, and even many of the smaller motors are currently controlled by VFDs in order to minimize their power demands. We saw no motors that were not on VFDs that appeared to be good candidates for adding additional controls.

In order to be cost-effective, a VFD-controlled motors must large enough, have sufficient run hours per year, and must have a load needs that varies significantly (or can be variably controlled). All of the motors that we saw either were too small, ran too few hours, or ran many hours but always near full load. So, we have no motor or motor control upgrades ECMs to recommend for this facility. Process motors are by far the most energy-intensive use of energy on site. However, all of the facility's pumps, compressors, and other process equipment appear to be generally well-maintained and operated in an energy efficient manner. No motor upgrades are recommended at this time.

Please see **Appendix A: Equipment Inventory & Recommendations** for an inventory of the facility's motor systems.

Building Plug Loads

Besides the motor load, the Water Treatment Plant's other electric uses are fairly modest. The buildings only have a few computers, monitors, printers and some electronic control systems. There are no large servers or any other significant power draws on site.

Please see **Appendix A: Equipment Inventory & Recommendations** for an inventory of the facility's plug load equipment.

2.7 Water-Using Systems

There is one restroom at the Water Treatment Plant and one at Wellhouse #16. Both appeared to have low-flow commercial water fixtures (i.e. 2.5 gpm or less for sinks and 2.0 gallons per flush, or less, for toilets.

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 per square foot and energy usage per square foot. These metrics are an estimate of the relative energy efficiency of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy usage profile for facilities with similar characteristics. Local weather conditions, building age and insulation levels, equipment efficiency, daily occupancy hours, changes in occupancy throughout the year, equipment operating hours, and energy efficient behavior of occupants all contribute to benchmarking scores. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

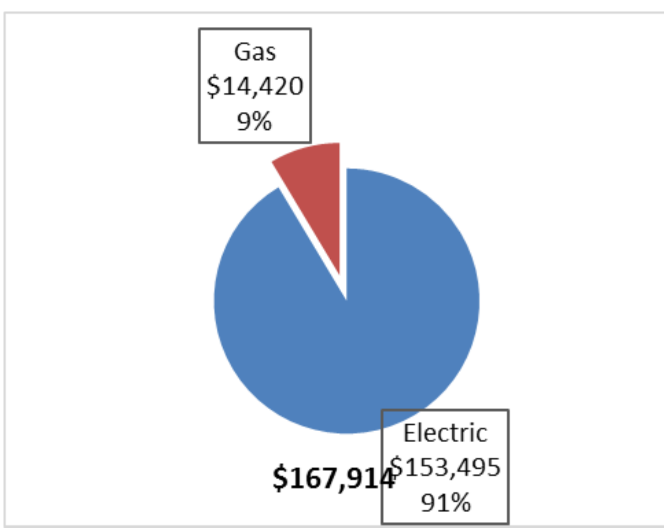
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Shorrock Street Complex		
Fuel	Usage	Cost
Electricity	1,287,468 kWh	$153,495
Natural Gas	16,298 Therms	$14,420
Total		$167,914

The current annual energy cost for this facility is $169,416 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.119/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Graph of 12 Months Electric Usage & Demand

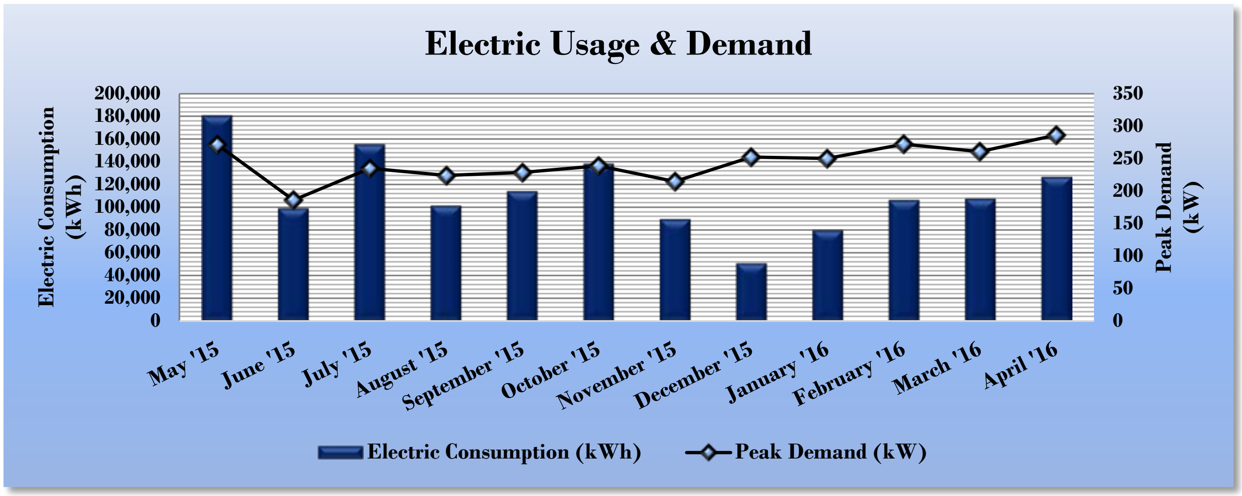


Figure 10 - Table of 12 Months Electric Usage & Demand

Electric Billing Data for Shorrock Street Complex				
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost
6/7/15	49	180,560	271	$23,085
7/6/15	29	99,360	186	$12,579
8/11/15	36	155,200	235	$19,370
9/4/15	24	101,360	224	$12,807
10/6/15	32	114,320	229	$14,516
11/5/15	30	138,320	239	$17,375
12/8/15	33	89,520	215	$11,583
1/7/16	30	51,040	252	$2,353
2/4/16	28	80,080	250	$8,465
3/7/16	32	106,560	272	$12,252
4/6/16	30	107,840	261	$12,318
5/6/16	30	126,800	286	$14,361
Totals	383	1,350,960	286.1	$161,064
Annual	365	1,287,468	286.1	$153,495

3.3 Natural Gas Usage

Natural Gas is provided by NJ Natural Gas. The average gas cost for the past 12 months is $0.885/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Graph of 12 Months Natural Gas Usage

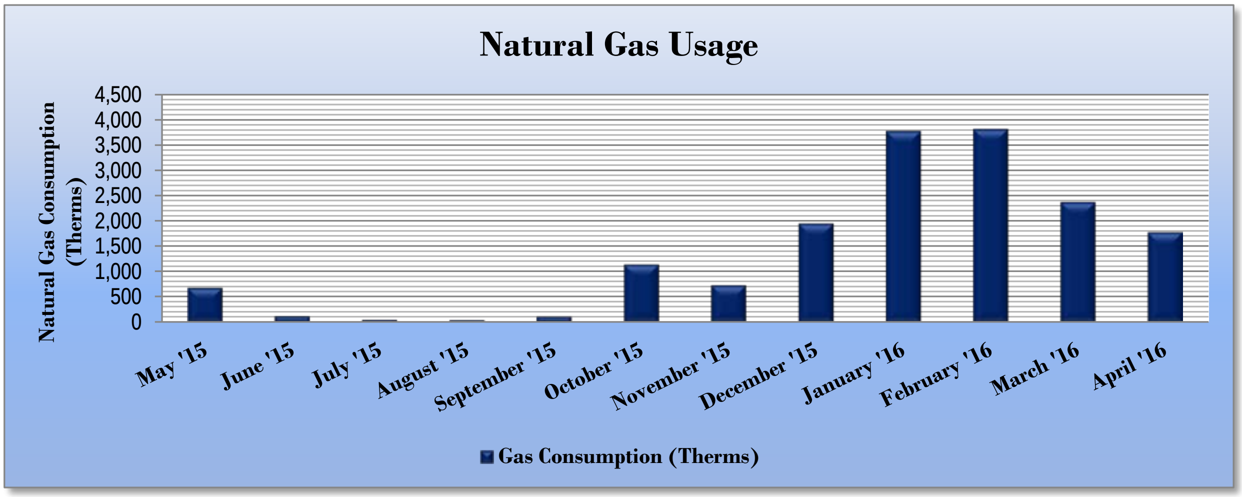


Figure 12 - Table of 12 Months Natural Gas Usage

Gas Billing Data for Shorrock Street Complex			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
5/28/15	35	684	$740
6/29/15	32	118	$144
7/29/15	30	45	$261
8/26/15	28	41	$257
9/24/15	29	105	$322
10/26/15	32	1,142	$1,050
11/24/15	29	728	$750
12/29/15	35	1,949	$1,712
1/29/16	31	3,780	$2,948
2/29/16	31	3,820	$3,010
3/28/16	28	2,376	$1,920
4/28/16	31	1,778	$1,544
Totals	371	16,566	$14,657
Annual	365	16,298	$14,420

3.4 Benchmarking

This facility was benchmarked using *Portfolio Manager*, an online tool created and managed by the U.S. Environmental Protection Agency (EPA) through the ENERGY STAR™ program. Portfolio Manager analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR Score for select building types.

Energy Use Intensity is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy". Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Shorrock Street Complex	National Median Building Type: Water/Wastewater Treatment/Pumping
Source Energy Use Intensity (kBtu/ft^2)	1654.0	123.1
Site Energy Use Intensity (kBtu/ft^2)	642.5	78.8

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, as shown in the Table below:

Figure 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Shorrock Street Complex	National Median Building Type: Water/Wastewater Treatment/Pumping
Source Energy Use Intensity (kBtu/ft^2)	1640.1	123.1
Site Energy Use Intensity (kBtu/ft^2)	638.9	78.8

Many types of commercial buildings are also eligible to receive an ENERGY STAR™ score. This score is a percentile ranking from 1 to 100. It 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. The buildings of the Shorrock Street Complex are not eligible to receive an ENERGY STAR® score, because they all share the same electric account. We calculated the EUI score for the combined square footage, but in this case because the buildings are mixed use and energy usage is predominantly process energy usage (i.e. pumping and water treatment), comparing the EUI of the complex to a national median for "Water/Wastewater Treatment" buildings may not be a very accurate comparison.

Benchmarking based on EUI generally gives a more useful reference value for other types of commercial buildings where site energy usage is primarily for occupant needs and therefore less variable.

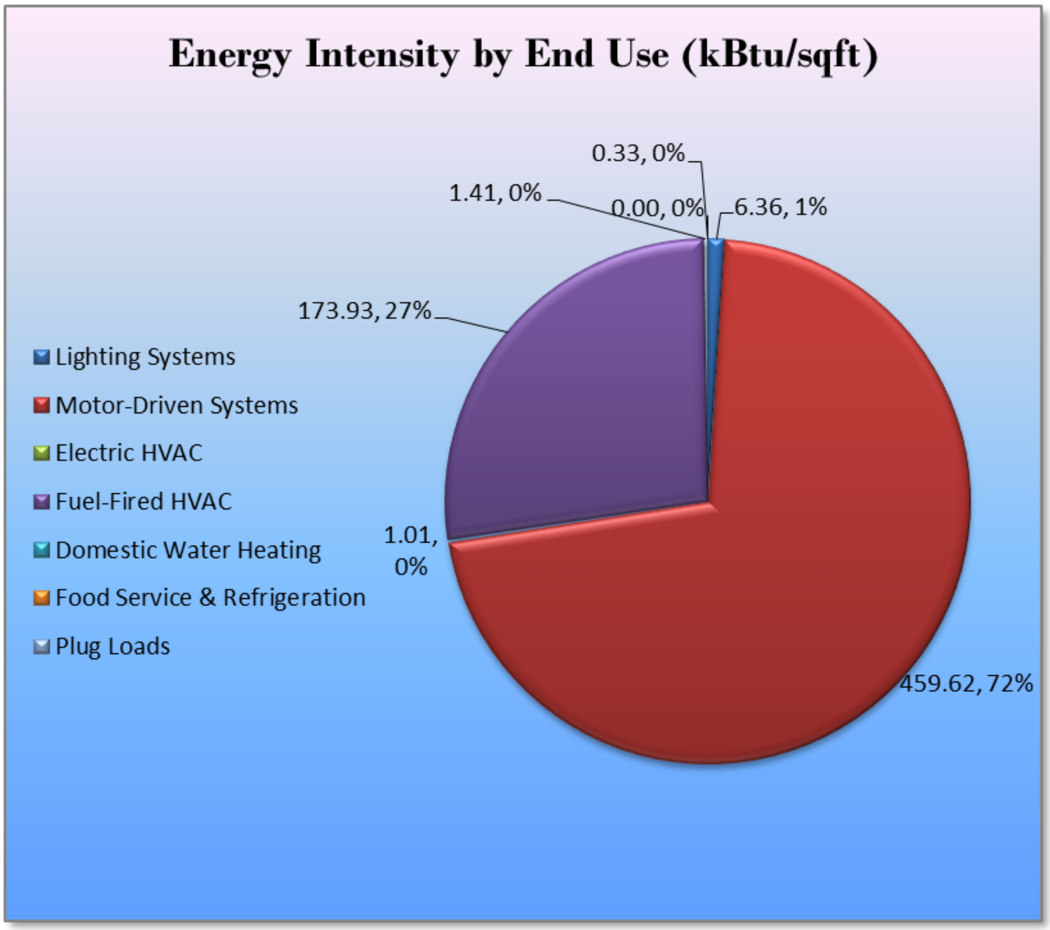
A Portfolio Manager Statement of Energy Performance (SEP) was generated for this facility, see **Appendix B: EPA Statement of Energy Performance**.

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 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 to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

Figure 15 - Energy Balance (kBtu/SqFt and %)



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 Shorrock Street Complex 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 16 – 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		9,952	2.9	0.0	$1,186.49	$6,366.26	$820.00	$5,546.26	4.7	10,022
ECM 1	Retrofit Fixtures with LED Lamps	8,744	2.8	0.0	$1,042.51	$5,505.82	$820.00	$4,685.82	4.5	8,805
ECM 2	Install LED Exit Signs	1,208	0.1	0.0	$143.98	$860.44	$0.00	$860.44	6.0	1,216
Domestic Water Heating Upgrade		3,377	5.4	-11.5	$300.63	$1,067.76	$50.00	$1,017.76	3.4	2,051
ECM 3	Install High Efficiency Gas Water Heater	3,377	5.4	-11.5	$300.63	$1,067.76	$50.00	$1,017.76	3.4	2,051
TOTALS		13,329	8.3	-11.5	$1,487.13	$7,434.02	$870.00	$6,564.02	4.4	12,073

* - 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

Recommended upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – 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		9,952	2.9	0.0	$1,186.49	$6,366.26	$820.00	$5,546.26	4.7	10,022
ECM 1	Retrofit Fixtures with LED Lamps	8,744	2.8	0.0	$1,042.51	$5,505.82	$820.00	$4,685.82	4.5	8,805
ECM 2	Install LED Exit Signs	1,208	0.1	0.0	$143.98	$860.44	$0.00	$860.44	6.0	1,216

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.

Please see **Appendix A: Equipment Inventory & Recommendations** for a detailed list of the locations and recommended upgrades for each lighting measure.

ECM 1: 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	8,630	2.8	0.0	$1,028.87	$5,403.07	$815.00	$4,588.07	4.5	8,690
Exterior	114	0.0	0.0	$13.64	$102.75	$5.00	$97.75	7.2	115

Measure Description

We recommend retrofitting existing incandescent, halogen, HID or other lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

The cost and savings for all recommended lighting upgrades for the three buildings surveyed is summarized above. See Appendix A for precise locations of each recommended fixture replacement.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tubes and more than 10 times longer than many incandescent lamps.

ECM 2: Install LED EXIT Signs

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	1,208	0.1	0.0	$143.98	$860.44	$0.00	$860.44	6.0	1,216
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all incandescent or compact fluorescent EXIT signs with LED EXIT signs. LED EXIT signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.2 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 18 below.

Figure 18 - 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)
Lighting Upgrades		9,952	2.9	0.0	$1,186.49	$6,366.26	$820.00	$5,546.26	4.7	10,022
ECM 3	Install High Efficiency Gas Water Heater	3,377	5.4	-11.5	$300.63	$1,067.76	$50.00	$1,017.76	3.4	2,051

The Shorrock Street Water Treatment Plant uses A.O. Smith DSE-120 to generate domestic hot water. It is electric hot water heater with 120-gallon storage tank.

It is much cheaper to generate hot water with natural gas than electricity. The building is heated with natural gas, so we recommend replacing the current hot water heater with a comparably-sized high efficiency gas-fired unit.

Additional savings beyond the amount shown in the table above may be possible by downsizing the new DHW heater to one with a smaller storage capacity, which has been properly sized to meet the current hot water demand for the space.

Please see **Appendix A: Equipment Inventory & Recommendations** for more details on the facility's existing domestic hot water equipment and recommended system upgrades.

ECM 3: Install High Efficiency Gas-Fired Water Heater

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)
3,377	5.4	-11.5	$300.63	$1,067.76	$50.00	$1,017.76	3.4	2,051

Measure Description

We recommend replacing the existing tank water heater with a high efficiency tank water heater. Improvements in combustion efficiency and reductions in heat losses have improved the overall efficiency of storage water heaters. Energy savings results from using less gas to heat water, due to higher unit efficiency, and fewer run hours to maintain the tank water temperature.

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 many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M 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.

Close Doors and Windows

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Turn Off Unneeded Motors

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Reducing run hours for these motors can result in significant energy savings. Whenever possible, use automatic devices such as twist timers or occupancy sensors to ensure that motors are turned off when not needed.

Reduce Motor Short Cycling

Frequent stopping and starting of motors subjects rotors and other parts to substantial stress. This can result in component wear, reducing efficiency, and increasing maintenance costs. Adjust the load on the motor to limit the amount of unnecessary stopping and starting to improve motor performance.

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.

Practice Proper Use of Thermostat Schedules and Temperature Resets

Ensure thermostats are correctly set back. By employing proper set back temperatures and schedules, facility heating and cooling costs can be reduced dramatically during periods of low or no occupancy. As such, thermostats should be programmed for a setback of 5-10 °F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced further by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

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.

Clean and/or Replace HVAC Filters

Air filters work to reduce the amount of indoor air pollution and increase occupant comfort. Over time, filters become less and less effective as particulate buildup increases. In addition to health concerns related to clogged filters, filters that have reached saturation also restrict air flow through the facility's air conditioning or heat pump system, increasing the load on the distribution fans and decreasing occupant comfort levels. Filters should be checked monthly and cleaned or replaced when appropriate.

Perform Proper Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to retain proper functionality and efficiency of the heating system. Fuel burning equipment should undergo yearly tune-ups to ensure they are operating as safely and efficiently as possible from a combustion standpoint. A tune-up should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Buildup of dirt, dust, or deposits on the internal surfaces of a boiler can greatly affect its heat transfer efficiency. These deposits can accumulate on the water side or fire side of the boiler. Boilers should be cleaned regularly according to the manufacturer's instructions to remove this build up in order to sustain efficiency and equipment life.

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 High potential for installing a PV array.

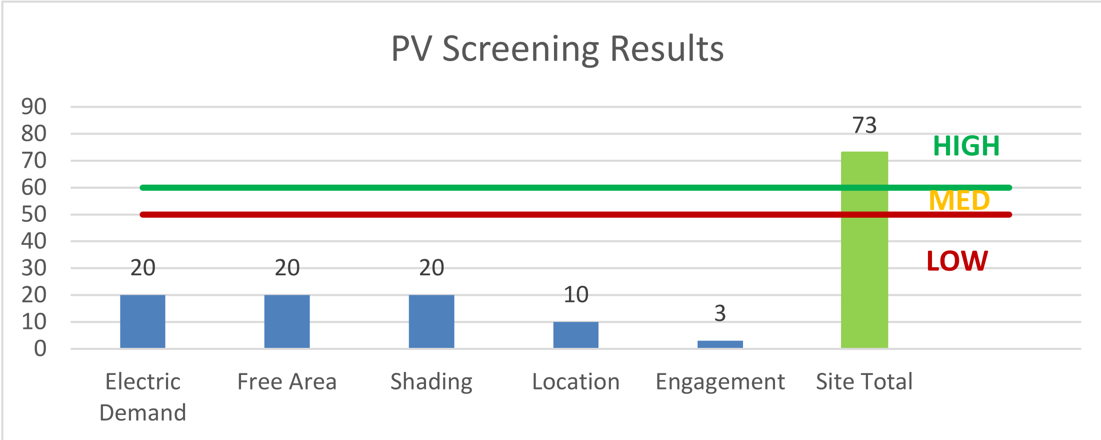
The amount of free area, ease of installation (location), and the lack of shading elements contribute to the **high potential** for PV at the site. A PV array located on the roof of the main building/ground next to the building/over the main parking lot may be feasible. If Shorrock Street Complex is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as flat or south-facing rooftop or other unshaded spaces in which to place a sufficient number of solar PV panels. In our opinion, the facility appears to be a good candidate for cost-effective PV installation. There site appears to have over 15,000 ft^2 of potentially usable unshaded roof space, including area on top of the main tank. We also estimate that the facility could utilize over 11,000 ft^2 of ground space adjacent to buildings without impeding facility operations.

We estimate that the facility could cost-effectively install over 243 kW of solar PV generating capacity onsite, using just 17,438 ft^2 of available space. An array this size would be roughly equivalent to the facility's average monthly power demand, so no upgrades to the site's power infrastructure would likely be necessary.

Such an array could offset nearly 25% of the site's annual electric load. At current market rates for installation and prices for Solar Renewable Energy Credits (SRECs), we estimate that such a system might pay for itself (through offset energy usage and subsidies) in about 7.4 years.

Figure 19 - Photovoltaic Screening



Potential	High	
System Potential	243	kW-DC
Electric Generation	316,244	kWh/yr
Displaced Cost	$37,700	/yr
Installed Cost	$821,300	

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 developed new solar projects and insight into future SREC pricing. Refer to Section 8.2 for additional information.

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 Wind Generation

Wind turbines convert the kinetic energy from wind into electricity. Conventional and building integrated wind turbines can be divided into three main components: rotor, generator with gear box, and support structure. Wind turbines produce direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter.

According to information published by NREL, most on-shore areas of NJ are generally not good candidates for economic development small wind power projects. For further information on wind power, go to: http://www.njcleanenergy.com/renewable-energy/home/home.

6.3 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 electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. 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. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation, due to low thermal demand.

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 the electric load of commercial facilities when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. Demand Response 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.

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities 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 receive payments whether or not their facility is called upon to curtail their electric usage.

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 programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric 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 curtailment event. DR program participants may need to install smart meters or 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 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 program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with 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 21 for a list of the eligible programs identified for each recommended ECM.

Figure 20 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
ECM 1	Retrofit Fixtures with LED Lamps	X			
ECM 2	Install LED Exit Signs	X			
ECM 3	Install High Efficiency Gas Water Heater	X			

SmartStart (SS) is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. Direct Install (DI) caters to small to mid-size facilities that can bundle multiple ECMs together. This can greatly simplify participation and may lead to higher incentive amounts, 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. It 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. LEUP applicants can use in-house staff or a preferred contractor.

Generally, the incentive values provided throughout the report assume the SS program is utilized because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: 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 custom SS 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 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less. Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

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 SREC Registration Program

The SREC Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the 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.

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

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

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

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

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 NJCEP incentive programs to help further reduce costs when developing 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
WTP																			
Control Room / Lab	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.08	343	0.0	$40.92	$175.50	$30.00	3.56
Control Room / Lab	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	2	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,068	0.05	201	0.0	$23.97	$126.40	$0.00	5.27
Control Room / Lab	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,068	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.21	884	0.0	$105.40	$175.50	$30.00	1.38
Hallway 1	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.13	572	0.0	$68.20	$292.50	$50.00	3.56
Hallway 1	2	Exit Signs: Fluorescent	None	10	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$9.44	$215.11	$0.00	22.78
Sodium Hypochlorite Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.16	686	0.0	$81.84	$351.00	$60.00	3.56
New Control Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.05	229	0.0	$27.28	$117.00	$20.00	3.56
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.03	37	0.0	$4.45	$58.50	$10.00	10.91
Hallway 2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.08	343	0.0	$40.92	$175.50	$30.00	3.56
Pump Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.27	1,144	0.0	$136.40	$585.00	$100.00	3.56
Pump Room	1	Exit Signs: Fluorescent	None	10	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.00	40	0.0	$4.72	$107.56	$0.00	22.78
Switch Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,000	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,000	0.08	112	0.0	$13.34	$175.50	$30.00	10.91
Chemical Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.11	458	0.0	$54.56	$234.00	$40.00	3.56
Main Pump Room	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.43	1,830	0.0	$218.23	$936.00	$160.00	3.56
Main Pump Room	1	Exit Signs: Fluorescent	Wall Switch	10	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.00	40	0.0	$4.72	$107.56	$0.00	22.78
Main Pump Room	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	None	No	7	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Utility Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	250	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	250	0.03	9	0.0	$1.11	$58.50	$10.00	43.64
Lime Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,068	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,068	0.24	1,030	0.0	$122.76	$526.50	$90.00	3.56
Lime Room	1	Exit Signs: Fluorescent	Wall Switch	10	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.00	40	0.0	$4.72	$107.56	$0.00	22.78
Backwash Tank	1	Halogen Incandescent: 50W Incandescent Spotlight	Wall Switch	50	3,068	Relamp	No	1	LED Screw-In Lamps: (2) 4' Lamps	Wall Switch	17	3,068	0.03	114	0.0	$13.64	$102.75	$5.00	7.17
Back-up Generator Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.11	45	0.0	$5.33	$234.00	$40.00	36.36
Building Perimeter	8	LED Screw-In Lamps: 17W LED Spotlights	Wall Switch	17	4,380	None	No	8	LED Screw-In Lamps: 17W LED Spotlights	Wall Switch	17	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	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
Wellhouse #16																			
Pump Room	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	1,000	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	1,000	0.08	113	0.0	$13.47	$95.13	$0.00	7.06
Pump Room	1	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	337	0.0	$40.13	$107.56	$0.00	2.68
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	150	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	150	0.01	3	0.0	$0.35	$35.90	$5.00	87.38
Boiler Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	200	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	200	0.01	4	0.0	$0.47	$35.90	$5.00	65.53
Stairwell	3	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,068	Relamp	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,068	0.04	182	0.0	$21.70	$107.70	$15.00	4.27
Storage Room	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	600	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	600	0.08	68	0.0	$8.08	$95.13	$0.00	11.77
Storage Room	2	Exit Signs: Incandescent	None	40	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.06	673	0.0	$80.25	$215.11	$0.00	2.68
Basement	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	200	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	200	0.16	45	0.0	$5.39	$190.27	$0.00	35.31
Closet	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	200	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	200	0.08	23	0.0	$2.69	$95.13	$0.00	35.31
Building Exterior	4	LED Screw-In Lamps: 17W LED Spotlights	Wall Switch	17	4,380	None	No	4	LED Screw-In Lamps: 17W LED Spotlights	Wall Switch	17	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
GAC Bldg																			
Interior	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	800	Relamp	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.24	268	0.0	$32.01	$526.50	$90.00	13.64
Interior	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	5	LED Screw-In Lamps: 17W LED Spotlights	Wall Switch	17	4,380	None	No	5	LED Screw-In Lamps: 17W LED Spotlights	Wall Switch	17	4,380	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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
Main Pump Room	Supernatant Pumps 1 & 2	2	Process Pump	7.5	88.5%	Yes	3,355	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Pump Room	Instrument Air	2	Air Compressor	5.0	87.5%	No	1,000	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Pump Room	Process Air Blower System	2	Process Blower	40.0	93.0%	No	52	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lime Room	Lime Water Feed Pumps	3	Process Pump	0.8	82.5%	Yes	2,237	No	82.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lime Room	Lime Slurry Mixers	2	Other	2.0	84.0%	No	4,380	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lime Room	Dust Colectors	2	Process Fan	0.5	84.0%	No	312	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Lime Room	Air Stripper Motors	2	Other	5.0	87.5%	No	4,380	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Water Treatment Plant	High Service Pumps	2	Water Supply Pump	150.0	95.0%	Yes	3,355	No	95.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Water Treatment Plant	Ground Tank Pumps	2	Water Supply Pump	100.0	94.1%	Yes	3,355	No	94.1%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Water Treatment Plant	6	Exhaust Fan	0.5	84.0%	No	1,000	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Water Treatment Plant	Sludge Pumps	2	Process Pump	5.0	87.5%	No	313	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Water Treatment Plant	Air Stripper Motors	2	Other	10.0	87.5%	No	4,380	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Control Room / Lab	Chemical Feed Pumps	3	Process Pump	0.1	87.5%	No	2,920	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Water Treatment Plant	HW Circulation Pumps	2	Heating Hot Water Pump	7.5	88.5%	No	1,000	No	88.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Wellhouse #16	Well #16	1	Water Supply Pump	20.0	91.0%	No	8,712	No	91.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Wellhouse #16	Restroom	1	Exhaust Fan	0.3	84.0%	No	30	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Wellhouse #16	Basement	1	Exhaust Fan	0.3	84.0%	No	100	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
GAC Bldg	Chromalox Heater	5	Supply Fan	0.3	84.0%	No	200	No	84.0%	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
Shorrock St Water Treatment Plant	Control Rm & Electric Rm	2	Ductless Mini-Split AC	1.83		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
Wellhouse #16	Wellhouse #16	1	Non-Condensing Hot Water Boiler	308.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Water Treatment Plant	Water Treatment Plant	2	Non-Condensing Hot Water Boiler	1,260.00	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
Main Pump Room	Water Treatement Plant	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	67.00%	EF	5.40	3,377	-11.5	$300.63	$1,067.76	$50.00	3.39
Wellhouse #16	Restroom	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Offices	4	Computers	109.0	Yes
Offices	4	Monitors	28.0	Yes
Offices	2	Med. Printers	90.0	Yes

Appendix B: EPA Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

Shorrock Street Water Treatment Complex

Primary Property Type: Drinking Water Treatment & Distribution
Gross Floor Area (ft²): 9,374
Built: 2005

For Year Ending: April 30, 2016
Date Generated: April 06, 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
Shorrock Street Water Treatment Complex 2000 Shorrock St. Lakewood, New Jersey 08701 **Property ID**: 5840684	Lakewood Township Municipal Utilities Authority 390 New Hampshire Ave. Lakewood, NJ 08701 (____)____-______	Daniel Rappoccio 390 New Hampshire Ave. Lakewood, NJ 08701 732-363-4422 ext 126 drappoccio@lakewoodmua.com

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
642 kBtu/ft²

Source EUI
1,649.6 kBtu/ft²

Annual Energy by Fuel

Electric - Grid (kBtu)	4,375,090 (73%)	
Natural Gas (kBtu)	1,642,966 (27%)	

National Median Comparison

National Median Site EUI (kBtu/ft²)	197.6
National Median Source EUI (kBtu/ft²)	507.8
% Diff from National Median Source EUI	225%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	589

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)