Local Government Energy Audit:
Energy Audit Report

Department of Public Works

555 Atlantic Ave

Spring Lake, NJ 07762

Spring Lake Heights

October 17, 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 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 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.

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Department of Public Works.

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 facilities 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 (TRC), as part of a comprehensive effort to assist New Jersey local governments in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

Department of Public Works is a 10,350 square-foot facility comprised of various space types within three buildings and two garages. All buildings at the facility are 1-story. The main building (Building 1) includes offices, a break room, truck bays, and mechanical and storage space. Buildings 2 and 3, as well as Garages 1 and 2 consist of truck bays and storage space.

Lighting consists of a mixture of aging and inefficient fluorescent lighting and new LED fixtures. Heating is supplied by gas-fired unit heaters. Cooling is supplied by window air conditioners. Domestic hot water production is limited to the Building 1 and is provided by an electric water heater. A thorough description of the facility and our observations are in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 5 measures, and recommends 3, which together represent an opportunity to reduce annual energy costs by $1,550 and annual greenhouse gas emissions by 10,967 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4.4 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Department of Public Works' annual energy use by 3%.

Figure 1 – Previous 12 Month Utility Costs

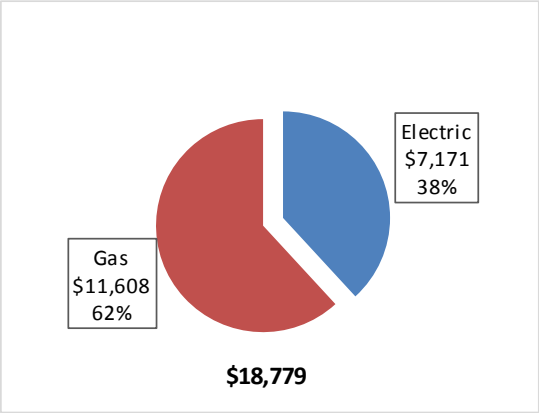
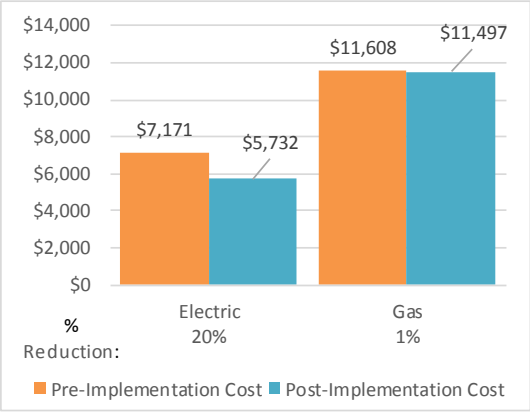


Figure 2 – Potential Post-Implementation Costs



A detailed description of Department of Public Works' 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		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			**9,589**	**2.0**	**0.0**	**$1,438.94**	**$7,133.37**	**$1,330.00**	**$5,803.37**	**4.0**	**9,656**
ECM 1	Install LED Fixtures	Yes	2,603	0.4	0.0	$390.65	$1,953.39	$500.00	$1,453.39	3.7	2,622
ECM 2	Retrofit Fixtures with LED Lamps	Yes	6,986	1.7	0.0	$1,048.28	$5,179.99	$830.00	$4,349.99	4.1	7,035
Lighting Control Measures			**2,079**	**0.5**	**0.0**	**$311.99**	**$6,750.00**	**$735.00**	**$6,015.00**	**19.3**	**2,094**
	Install Occupancy Sensor Lighting Controls	No	2,079	0.5	0.0	$311.99	$6,750.00	$735.00	$6,015.00	19.3	2,094
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**95.5**	**$944.21**	**$17,346.31**	**$400.00**	**$16,946.31**	**17.9**	**11,176**
ECM 3	Install High Efficiency Furnaces	Yes	0	0.0	11.2	$110.76	$1,450.07	$400.00	$1,050.07	9.5	1,311
	Install High Efficiency Unit Heaters	No	0	0.0	84.3	$833.46	$15,896.24	$0.00	$15,896.24	19.1	9,865
TOTALS FOR HIGH PRIORITY MEASURES			**9,589**	**2.0**	**11.2**	**$1,549.70**	**$8,583.44**	**$1,730.00**	**$6,853.44**	**4.4**	**10,967**
TOTALS FOR ALL EVALUATED MEASURES			**11,668**	**2.6**	**95.5**	**$2,695.14**	**$31,229.69**	**$2,465.00**	**$28,764.69**	**10.7**	**22,926**

* - 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 measures save energy by reducing the power used by the lighting components due to improved electrical efficiency.

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

Energy Efficient Practices

TRC Energy Services also identified 11 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 Department of Public Works include:

- Reduce Air Leakage
- Close Doors and Windows
- Perform Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Clean and/or Replace HVAC Filters

- Check for and Seal Duct Leakage
- Perform Furnace Maintenance
- Perform Maintenance on Compressed Air Systems
- Water Conservation

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 Department of Public Works. 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 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, 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)
- Direct Install (DI)
- 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.

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives than SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated DI contractor and, in most cases, they will perform the installation work.

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.

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Joe May	Engineer	jmay@springlakehts.com	732-449-3500
Designated Representative			
Joe May	Engineer	jmay@springlakehts.com	732-449-3500
TRC Energy Services			
Alexander Klieverik	Auditor	aklieverik@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On April 03, 2018, TRC performed an energy audit at Department of Public Works located in Spring Lake, NJ. TRC's team met with Joe May to review the facility operations and help focus our investigation on specific energy-using systems.

Department of Public Works is a 10,350 square-foot facility comprised of various space types within three buildings and two garages. All buildings at the facility are 1-story. The main building (Building 1) includes offices, a break room, truck bays, and mechanical and storage space. Buildings 2 and 3, as well as Garages 1 and 2 consist of truck bays and storage space.

The building was constructed in 1970. Over the last two years the facility has been in the process of replacing its existing T8 fluorescent fixtures with LED linear tube fixtures. The site is interested in converting all lighting to LED, but has been unable to fund the project.

2.3 Building Occupancy

The facility is open Monday through Saturday and is open from 7:00 AM to 3:30 PM. The typical schedule is presented in the table below. The entire facility is used year-round. During a typical day, the facility is occupied by approximately 14 staff.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Public Works	Weekday	7:00 AM to 3:30 PM
Public Works	Weekend	Saturdays: 7:00 AM to 3:30 PM

2.4 Building Envelope

All three buildings and both garages are constructed of concrete block and structural steel. The buildings have pitched roofs covered with corrugated metal sheets that are in fair condition. Only the main building has double pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum and in good condition. All buildings have high bay truck doors, which are a major source of air infiltration.



2.5 On-Site Generation

Department of Public Works does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting is provided mostly by linear 32-Watt linear fluorescent T8 lamps with electronic ballasts, as well as some compact fluorescent lamps (CFL), incandescent lamps, and LED fixtures. Most of the linear fluorescent fixtures are 2-lamp, 4-foot long ceiling-mounted utility fixtures without diffusers.



Lighting control in most spaces is provided by wall switches.

The building's exterior lighting is minimal and consists of compact fluorescent and mercury vapor fixtures. All exterior lighting is controlled by photocells, though the lights were seen on during a cloudy day.





Heating and Cooling Systems

The facility is heated by seven gas-fired unit heaters and one gas-fired furnace. The furnace is in the main building crawlspace, and conditions the break room, offices, storage space, and the restroom. The furnace is a Goodman model GDH80080, has an output capacity of 64,000 Btuh, and has a rated efficiency of 80%.



The gas-fired unit heaters are located throughout the facility and condition the high ceiling truck bays and storage areas. Building 1 has a Sterling 160 kBtuh output capacity unit, Building 2 has two Sterling 100 kBtuh output capacity units, and Building 3 has two Lennox units with an output capacity of 92 kBtu and 89 kBtuh. Garages 1 and 2 each have a Modine 102 kBtuh output capacity units.

All unit heaters have an efficiency between 78% and 82%.

The site does not have any centralized cooling system installed. There are 3 window air conditioners which cool the offices and break room of the main building. The units are approximately 12,000 Btuh each, and are removed from the windows and stored on site during the heating season.

Domestic Hot Water Heating System

The domestic hot water heating system consists of one Rheem electric water heater with an input rating of 4.5 kW and a storage capacity of 80 gallons. The unit is in the main building and supplies hot water to the restroom and one wash sink.

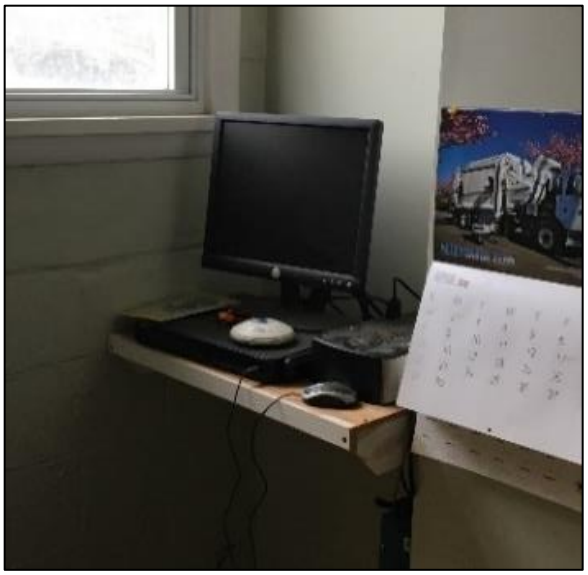
The unit was installed within the last 5 years and is in good condition.

Building Plug Load

There are 3 computer work stations throughout the facility. The computers are desktop units with LCD monitors. The computers have limited use, as they are not critical to daily operations.

There are 3 refrigerators, 3 microwaves, an LCD TV, a water cooler, and a vehicle lift at the facility.

The facility also has four diesel trucks which are plugged in overnight when the temperature is below freezing. This accounts for a large portion of electric consumption during the winter months.



2.7 Water-Using Systems

There is one restroom and two wash sinks at this facility. The faucets are rated for 2.2 gpm or higher, and the toilet is rated at 2.5 gallons per flush.

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 several 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 0 for additional information.

3.1 Total Cost of Energy

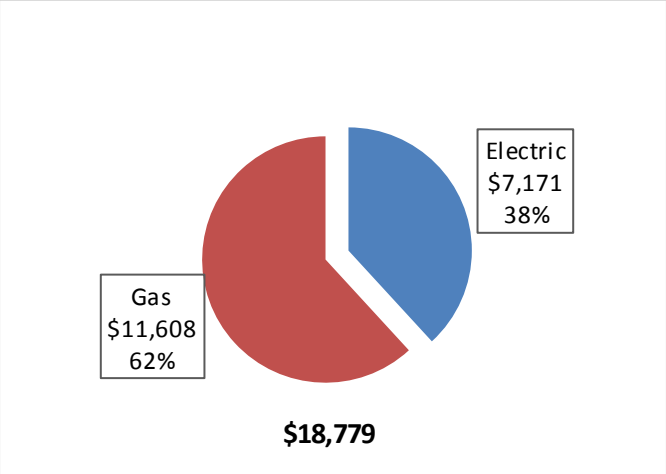
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Department of Public Works		
Fuel	**Usage**	**Cost**
Electricity	47,785 kWh	$7,171
Natural Gas	11,735 Therms	$11,608
Total		**$18,779**

The current annual energy cost for this facility is $18,779 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.150/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 electric energy profile (pattern of consumption) indicates spikes in consumption during the winter months due to increased load from the plug-in diesel trucks. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 8 - Graph of Electric Usage & Demand

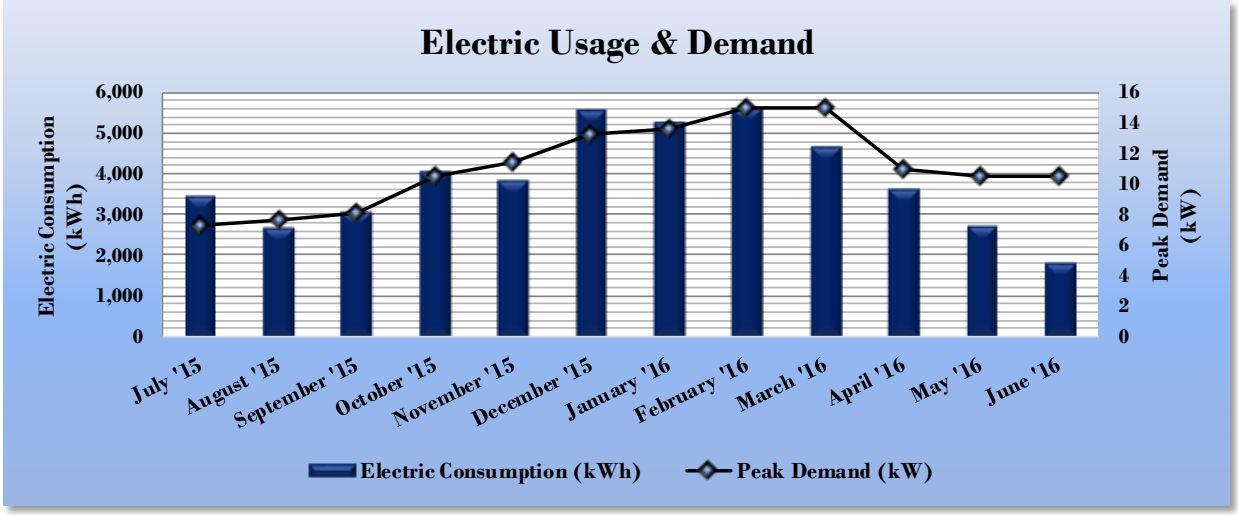


Figure 9 - Table of Electric Usage & Demand

Electric Billing Data for Department of Public Works					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
7/22/15	32	3,482	7	$0	$552
8/21/15	29	2,676	8	$0	$449
9/22/15	31	3,072	8	$0	$495
10/23/15	30	4,050	11	$0	$592
11/19/15	26	3,841	11	$0	$561
12/22/15	32	5,562	13	$0	$785
1/22/16	30	5,262	14	$0	$752
2/22/16	30	5,632	15	$0	$797
3/22/16	28	4,687	15	$0	$687
4/21/16	29	3,654	11	$0	$548
5/19/16	27	2,723	11	$0	$429
6/20/16	31	1,835	11	$0	$328
Totals	**355**	**46,476**	**15**	**$0**	**$6,974**
Annual	**365**	**47,785**	**15**	**$0**	**$7,171**

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average gas cost for the past 12 months is $0.989/therm, which is the blended rate used throughout the analyses in this report. The usage profile is typical of a gas-heated facility with minimal domestic hot water use. Summer gas usage is believed to be from the gas stove. The monthly gas consumption is shown in the chart below.

Figure 10 - Graph of Natural Gas Usage

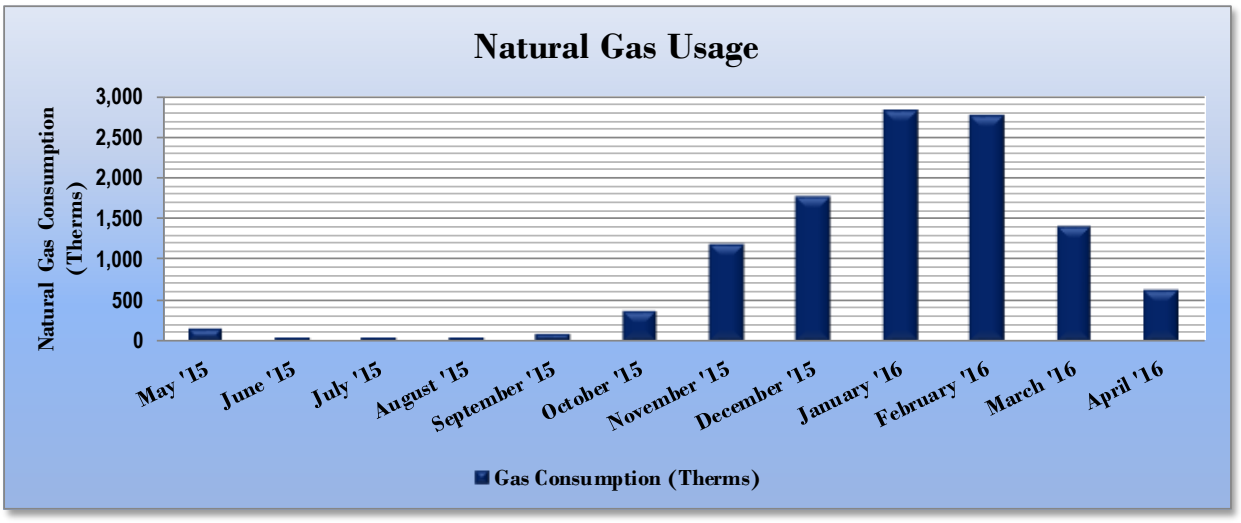


Figure 11 - Table of Natural Gas Usage

Gas Billing Data for Department of Public Works			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
6/10/15	29	158	$364
7/15/15	34	53	$330
8/12/15	27	41	$274
9/9/15	27	40	$272
10/7/15	27	102	$317
11/6/15	29	372	$511
12/9/15	32	1,197	$1,125
1/11/16	32	1,782	$1,579
2/10/16	29	2,826	$2,319
3/14/16	32	2,764	$2,229
4/12/16	28	1,406	$1,233
5/11/16	28	640	$705
Totals	**354**	**11,381**	**$11,258**
Annual	**365**	**11,735**	**$11,608**

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 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Department of Public Works	National Median Building Type: Garage
Source Energy Use Intensity (kBtu/ft^2)	168.5	123.1
Site Energy Use Intensity (kBtu/ft^2)	129.1	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 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Department of Public Works	National Median Building Type: Garage
Source Energy Use Intensity (kBtu/ft^2)	157.5	123.1
Site Energy Use Intensity (kBtu/ft^2)	124.9	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. This building type does not currently qualify to receive a score.

A Portfolio Manager Statement of Energy Performance (SEP) was generated for this facility, see

Appendix B: ENERGYSTAR® Statement of Energy Performance.

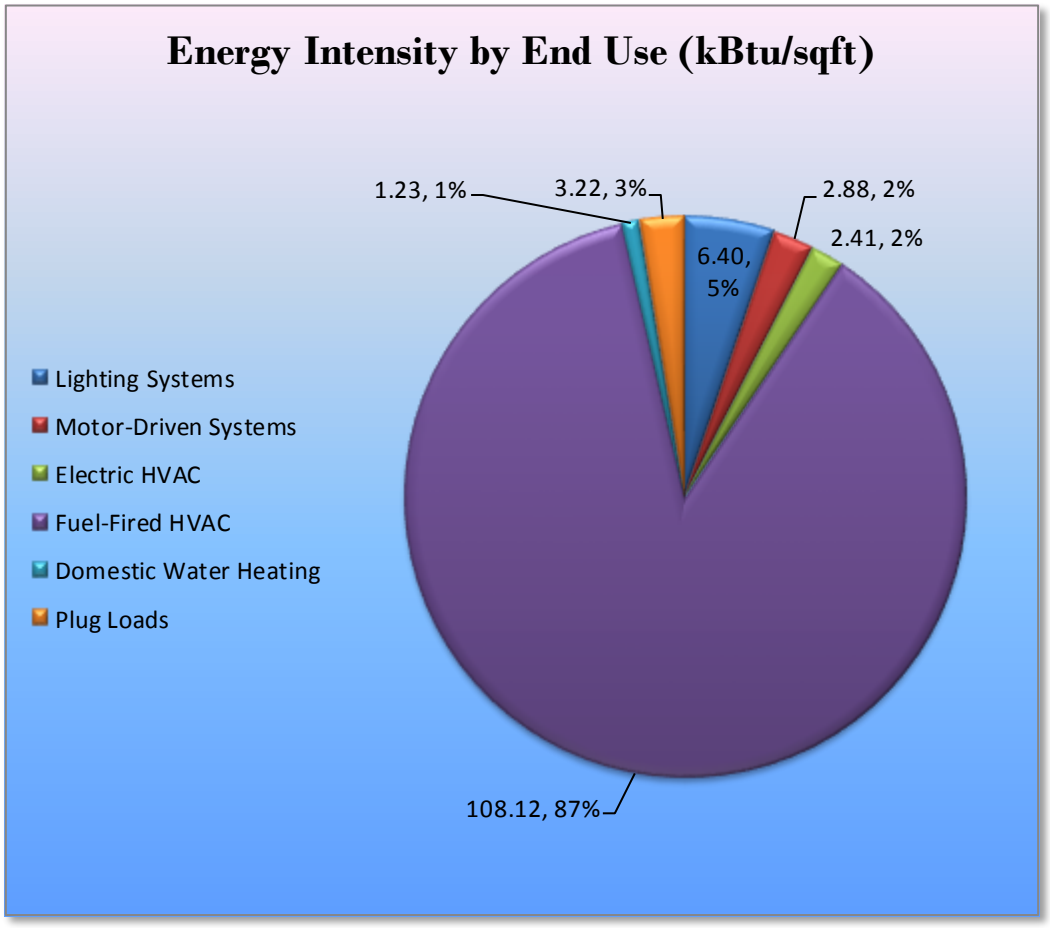
For more information on Energy Star certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the 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

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 14 - Energy Balance (% and kBtu/SF)



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 Department of Public Works 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 15 – 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		**9,589**	**2.0**	**0.0**	**$1,438.94**	**$7,133.37**	**$1,330.00**	**$5,803.37**	**4.0**	**9,656**
ECM 1	Install LED Fixtures	2,603	0.4	0.0	$390.65	$1,953.39	$500.00	$1,453.39	3.7	2,622
ECM 2	Retrofit Fixtures with LED Lamps	6,986	1.7	0.0	$1,048.28	$5,179.99	$830.00	$4,349.99	4.1	7,035
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**11.2**	**$110.76**	**$1,450.07**	**$400.00**	**$1,050.07**	**9.5**	**1,311**
ECM 3	Install High Efficiency Furnaces	0	0.0	11.2	$110.76	$1,450.07	$400.00	$1,050.07	9.5	1,311
TOTALS		**9,589**	**2.0**	**11.2**	**$1,549.70**	**$8,583.44**	**$1,730.00**	**$6,853.44**	**4.4**	**10,967**

* - 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).

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

4.1.1 Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – 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		**9,589**	**2.0**	**0.0**	**$1,438.94**	**$7,133.37**	**$1,330.00**	**$5,803.37**	**4.0**	**9,656**
ECM 1	Install LED Fixtures	2,603	0.4	0.0	$390.65	$1,953.39	$500.00	$1,453.39	3.7	2,622
ECM 2	Retrofit Fixtures with LED Lamps	6,986	1.7	0.0	$1,048.28	$5,179.99	$830.00	$4,349.99	4.1	7,035

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: Install LED Fixtures

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	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	2,603	0.4	0.0	$390.65	$1,953.39	$500.00	$1,453.39	3.7	2,622

Measure Description

We recommend replacing existing fixtures containing mercury vapor lamps with new high-performance LED light fixtures. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are much longer than mercury vapor lamps.

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	6,706	1.6	0.0	$1,006.34	$4,749.97	$830.00	$3,919.97	3.9	6,753
Exterior	280	0.0	0.0	$41.95	$430.02	$0.00	$430.02	10.3	282

Measure Description

We recommend retrofitting existing incandescent, linear fluorescent, and compact fluorescent fixtures 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 screw-in 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.

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

4.1.2 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 17 below.

Figure 17 - Summary of Gas-Fired Heating Replacement 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)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**11.2**	**$110.76**	**$1,450.07**	**$400.00**	**$1,050.07**	**9.5**	**1,311**
ECM 3	Install High Efficiency Furnaces	0	0.0	11.2	$110.76	$1,450.07	$400.00	$1,050.07	9.5	1,311

ECM 3: Install High Efficiency Furnaces

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)
0	0.0	11.2	$110.76	$1,450.07	$400.00	$1,050.07	9.5	1,311

Measure Description

We recommend replacing the existing standard efficiency furnace with a condensing furnace. Improved combustion technology and heat exchanger design optimize heat recovery from the combustion gases which can significantly improve furnace efficiency. Savings result from improved system efficiency.

4.2 ECMs Evaluated but Not Recommended

The measures below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 18 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures	**2,079**	**0.5**	**0.0**	**$311.99**	**$6,750.00**	**$735.00**	**$6,015.00**	**19.3**	**2,094**
Install Occupancy Sensor Lighting Controls	2,079	0.5	0.0	$311.99	$6,750.00	$735.00	$6,015.00	19.3	2,094
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**84.3**	**$833.46**	**$15,896.24**	**$0.00**	**$15,896.24**	**19.1**	**9,865**
Install High Efficiency Unit Heaters	0	0.0	84.3	$833.46	$15,896.24	$0.00	$15,896.24	19.1	9,865
TOTALS	**2,079**	**0.5**	**84.3**	**$1,145.45**	**$22,646.24**	**$735.00**	**$21,911.24**	**19.1**	**11,959**

* - 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).

Install Occupancy Sensor Lighting Controls

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)
2,079	0.5	0.0	$311.99	$6,750.00	$735.00	$6,015.00	19.3	2,094

Measure Description

We evaluated occupancy sensors to control lighting fixtures that are currently controlled by manual switches in truck bays, offices areas, restrooms, storage areas, and the break room. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we would recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

Reasons for not Recommending

Due to the long payback period, we do not recommend installing occupancy sensors at this time.

Install High Efficiency Unit Heaters

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)
0	0.0	84.3	$833.46	$15,896.24	$0.00	$15,896.24	19.1	9,865

Measure Description

We evaluated replacing the existing standard gas-fired unit heaters with high efficiency gas-fired unit heaters. Improved combustion technology and heat exchanger design optimize the heat recovery from the combustion gases which can significantly improve unit heater efficiency. Savings result from improved system efficiency.

Reasons for not Recommending

Due to the long payback period, we do not recommend installing high-efficiency unit heaters at this time.

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.

Reduce Air Leakage

Air leakage, or infiltration, occurs when outside air enters a building uncontrollably through cracks and openings. Properly sealing such cracks and openings can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment. This includes caulking or installing weather stripping around leaky doors and windows allowing for better control of indoor air quality through controlled ventilation.

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.

Perform Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

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.

Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low-cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.

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 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.

Check for and Seal Duct Leakage

Duct leakage in commercial buildings typically accounts for 5 to 25 percent of the supply airflow. In the case of rooftop air handlers, duct leakage can occur to the outside of the building, significantly increasing cooling and heating costs. By sealing sources of leakage, cooling, heating, and ventilation energy use can be reduced significantly, depending on the severity of air leakage.

Perform Regular Furnace Maintenance

Preventative furnace maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should include tasks such as checking for gas / carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

Perform Maintenance on Compressed Air Systems

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

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™ (http://www3.epa.gov/watersense/products) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

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 deciding 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.

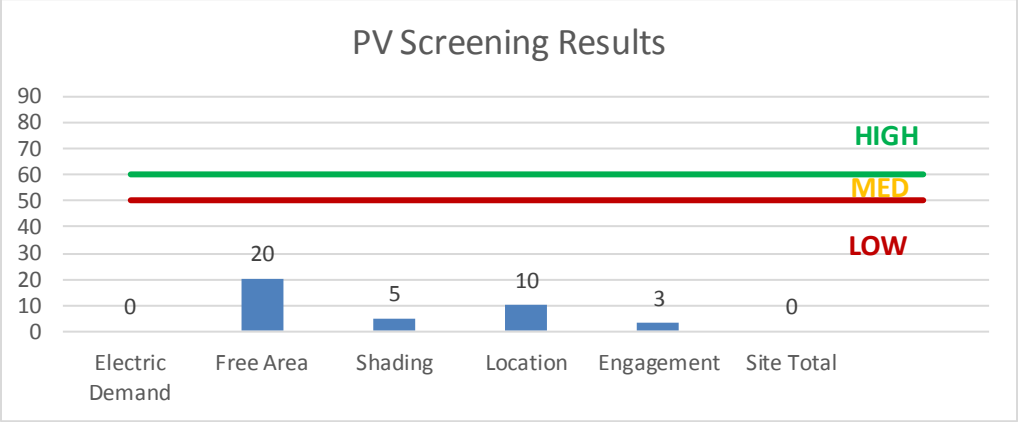
6.1 Photovoltaic

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.

To be cost-effective, a solar PV array needs certain minimum criteria, such as 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.

Figure 19 - Photovoltaic Screening



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.

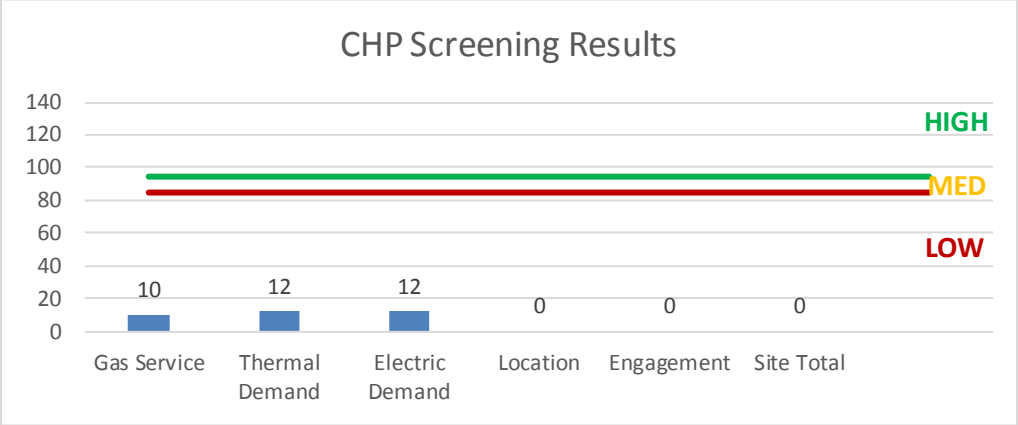
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for space heating and/or domestic hot water heating. Waste heat can also be routed through absorption chillers for space cooling. The key criteria used for screening, 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 gas service, low or infrequent thermal load, and lack of space near the existing boilers are 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/

Figure 20 - Combined Heat and Power Screening



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 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, 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.

It is our opinion that this facility is not a good candidate for Demand Response (DR).

8 PROJECT FUNDING / INCENTIVES

The NJCEP can 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 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 21 - 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	Install LED Fixtures	X		X			
ECM 2	Retrofit Fixtures with LED Lamps	X		X			
ECM 3	Install High Efficiency Furnaces	X		X			

SmartStart 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 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

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.

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 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 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 apply 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 Direct Install

Overview

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

Incentives

The program pays up to **70%** of the total installed cost of eligible measures, up to $125,000 per project. Direct Install participants will also be held to a fiscal year cap of $250,000 per entity.

How to Participate

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

Since DI offers a free assessment of eligible measures, DI is also available to small businesses and other commercial facilities too that may not be eligible for the more detailed facility audits provided by LGEA.

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

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.

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 could 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 of 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 monthly. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third-party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier 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 of 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
Building 1 (B1) Bathroom	1	Incandescent: Screw-In: (60W) - 1L	Wall Switch	60	2,652	Relamp	Yes	1	LED Screw-In Lamps: Screw-In LED: (9W) - 1L	Occupancy Sensor	9	1,856	0.03	142	0.0	$21.37	$323.75	$5.00	14.92
B1 Storage Area	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,326	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	928	0.03	58	0.0	$8.63	$328.50	$10.00	36.91
B1 Storage Area	1	Compact Fluorescent: Screw-In: (13W) - 1L	Wall Switch	13	1,326	Relamp	Yes	1	LED Screw-In Lamps: Screw-In LED: (9W) - 1L	Occupancy Sensor	9	928	0.00	9	0.0	$1.39	$53.75	$0.00	38.77
B1 Bay Area 1	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.25	1,035	0.0	$155.33	$1,066.50	$160.00	5.84
B1 Bay Area 1	2	Incandescent: Scew-In: (48W) - 1L	Wall Switch	48	2,652	Relamp	Yes	2	LED Screw-In Lamps: Screw-In LED: (7W) - 1L	Occupancy Sensor	7	1,856	0.06	238	0.0	$35.68	$377.51	$45.00	9.32
B1 Bay Area 1	1	Compact Fluorescent: Screw-In: (13W) - 1L	Wall Switch	13	2,652	Relamp	Yes	1	LED Screw-In Lamps: Screw-In LED: (9W) - 1L	Occupancy Sensor	9	1,856	0.00	18	0.0	$2.77	$53.75	$0.00	19.38
B1 Bay Area 1	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,652	None	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,856	0.03	144	0.0	$21.60	$270.00	$35.00	10.88
B1 Break Room	8	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,652	Relamp	Yes	8	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,856	0.18	776	0.0	$116.38	$763.60	$155.00	5.23
B1 Office Area	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.08	345	0.0	$51.78	$445.50	$65.00	7.35
B1 Storage next to office	3	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	1,326	Relamp	Yes	3	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	928	0.07	145	0.0	$21.82	$455.10	$45.00	18.79
B1 Storage next to office	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
B1 Bay Area 2	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.25	1,035	0.0	$155.33	$1,606.50	$230.00	8.86
B1 Old Locker Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.16	690	0.0	$103.55	$621.00	$95.00	5.08
Building 2	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,652	None	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,856	0.03	144	0.0	$21.60	$270.00	$35.00	10.88
Building 2	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.25	1,035	0.0	$155.33	$1,336.50	$195.00	7.35
Building 3 (B3) Bay Area 1	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.38	1,610	0.0	$241.62	$1,359.00	$210.00	4.76
B3 Bay Area 1	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,652	None	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,856	0.02	96	0.0	$14.40	$270.00	$35.00	16.32
B3 Bay Area 2	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.16	690	0.0	$103.55	$1,161.00	$165.00	9.62
B3 Stoage Area	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,652	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,856	0.22	920	0.0	$138.07	$738.00	$80.00	4.77
Garage 1 (G1) Entry area	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,254	None	No	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,254	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
G1 Bay Area	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,254	None	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,254	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage 2 (G2) Bay Area	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,254	None	No	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,254	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B1 Exterior Building	4	Compact Fluorescent: Screw-In: (26W) - 1L	Wall Switch	26	4,368	Relamp	No	4	LED Screw-In Lamps: Screw-In LED: (18W) - 1L	Wall Switch	18	4,368	0.02	145	0.0	$21.81	$215.01	$0.00	9.86
B1 Exterior Building	1	Mercury Vapor: (1) 75W Lamp	Wall Switch	93	4,368	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	23	4,368	0.05	318	0.0	$47.72	$390.68	$100.00	6.09
B2 Exterior Building	3	Mercury Vapor: (1) 175W Lamp	Wall Switch	205	4,368	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	53	4,368	0.30	2,071	0.0	$310.85	$1,172.03	$300.00	2.81

	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
B2 Exterior Building	2	Compact Fluorescent: Screw-In: (26W) - 1L	Wall Switch	26	4,368	Relamp	No	2	LED Screw-In Lamps: Screw-In LED: (18W) - 1L	Wall Switch	18	4,368	0.01	73	0.0	$10.91	$107.51	$0.00	9.86
B3 Exterior Building	1	Compact Fluorescent: Screw-In: (26W) - 2L	Wall Switch	52	4,368	Relamp	No	1	LED Screw-In Lamps: Screw-In LED: (18W) - 2L	Wall Switch	36	4,368	0.01	73	0.0	$10.91	$107.51	$0.00	9.86
B3 Exterior Building	1	Mercury Vapor: (1) 75W Lamp	Wall Switch	93	4,368	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	23	4,368	0.05	318	0.0	$47.72	$390.68	$100.00	6.09

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 Building - Bay Area Ceiling	Truck Bay Area - Unit Heater	1	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building 2 - Bay Area Ceiling	Truck Bay Area - Unit Heater	2	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building 3 - Bay Area Ceiling	Truck Bay Area 1 - Unit Heater	1	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building 3 - Bay Area Ceiling	Truck Bay Area 2 - Unit Heater	1	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage 1	Garage 1 - Unit Heater	1	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage 2	Garage 2 - Unit Heater	1	Supply Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Building Crawlspace	Break/Lunch Room / 2 Offices	1	Supply Fan	0.3	70.0%	No	2,745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Yard	Cardboard Trash Compactor	1	Other	0.8	84.0%	No	745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Yard	Fuel Pump	1	Process Pump	0.3	70.0%	No	745	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Whole Site	Garage bay door openers	17	Other	0.5	75.0%	No	365	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Building 3	Mohawk Vehicle Lift	1	Process Pump	5.0	87.5%	No	365	No	87.5%	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
Building 3	Old Locker Room	1	Electric Forced Air Furnace		10.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Building	Offices/Break Room	3	Window AC	1.00		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
Celing Crawlspace	Main Building - Rooms	1	Furnace	64.00	Yes	1	Furnace	64.00	95.00%	AFUE	0.00	0	11.2	$110.76	$1,450.07	$400.00	9.48
Main Building - Bay Area Ceiling	Truck Bay Area	1	Warm Air Unit Heater	160.00	Yes	1	Warm Air Unit Heater	160.00	93.00%	Et	0.00	0	24.8	$245.13	$4,675.37	$0.00	19.07
Building 2 - Bay Area Ceiling	Truck Bay Area	2	Warm Air Unit Heater	100.00	Yes	2	Warm Air Unit Heater	100.00	93.00%	Et	0.00	0	31.0	$306.42	$5,844.21	$0.00	19.07
Building 3 - Bay Area Ceiling	Truck Bay Area 1	1	Warm Air Unit Heater	92.00	Yes	1	Warm Air Unit Heater	92.00	93.00%	Et	0.00	0	14.2	$140.95	$2,688.34	$0.00	19.07
Building 3 - Bay Area Ceiling	Truck Bay Area 2	1	Warm Air Unit Heater	92.00	Yes	1	Warm Air Unit Heater	92.00	93.00%	Et	0.00	0	14.2	$140.95	$2,688.34	$0.00	19.07
Garage 1	Garage 1	1	Warm Air Unit Heater	102.50	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Garage 2	Garage 2	1	Warm Air Unit Heater	102.50	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 Building Storage Closet	Main Building (1 slop sink & 1 bathroom)	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?
Yard	4	Plug-in diesel trucks	1,500.0	No
Main Building	2	Desktop Computers	150.0	Yes
Main Building	3	Refrigerators	152.0	Yes
Main Building	1	Water Cooler/Heater	500.0	No
Main Building	1	LCD TV	71.0	Yes
Mechanic Shop	1	Misc. Tools	500.0	No

Appendix B: ENERGYSTAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

Spring Lake Heights DPW Complex

Primary Property Type: Repair Services (Vehicle, Shoe, Locksmith, etc.)
Gross Floor Area (ft²): 10,350
Built: 1950

For Year Ending: April 30, 2016
Date Generated: May 14, 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
Spring Lake Heights DPW Complex 555 Atlantic Avenue Spring Lake Heights, New Jersey 07762	Borough of Spring Lake Heights 555 Brighton Avenue Spring Lake Heights, NJ 07762 732-449-3500	Joseph May 555 Brighton Avenue Spring Lake Heights, NJ 07762 732-449-3500 jmay@springlakehts.com

Property ID: 6341274

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
125.4 kBtu/ft²

Source EUI
165.2 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	1,131,186 (87%)
Electric - Grid (kBtu)	166,208 (13%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	76.2
National Median Source EUI (kBtu/ft²)	100.4
% Diff from National Median Source EUI	64%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	78

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)