Local Government Energy Audit:
Energy Audit Report

Health Center

Township of Woodbridge

2 George Frederick Plaza
Woodbridge, NJ 07095

April 26, 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 in order to implement some of the measures recommended in this report.

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

Estimated installation costs are based on TRC's experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from *RS Means*. The owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Since actual installed costs can vary widely for certain measures and conditions, TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates based on program information available at the time of the report. Incentive levels are not guaranteed. The NJBPU reserves the right to extend, modify, or terminate programs without prior notice. The owner of the facility should review available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

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1 EXECUTIVE SUMMARY

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

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

This study was conducted by TRC Energy Services (TRC), as part of a comprehensive effort to assist New Jersey local government in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

The Health Center is a one-story building totaling 10,000 square-feet and was constructed in 1958. The building has a flat roof which has a 75 kW photovoltaic (PV) array. Exterior walls are finished with brick masonry and windows are double pane with aluminum frames. Interior and exterior lighting is LED fixtures which are controlled mainly with occupancy sensor and photocells. Heating is provided by one gas-fired boiler and one furnace. The cooling system consists of a combination of packaged unit, split AC, and window units. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated seven projects including four high priority which represent an opportunity for the Health Center to reduce annual energy costs by $1,299.47 and annual greenhouse gas emissions by 15,898 lbs CO_2e. The measures would pay for themselves in 3.18 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce the Health Center's annual energy use by 18.8%.

Figure 1 – Previous 12 Month Utility Costs

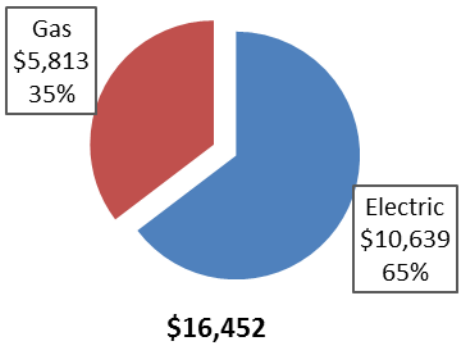
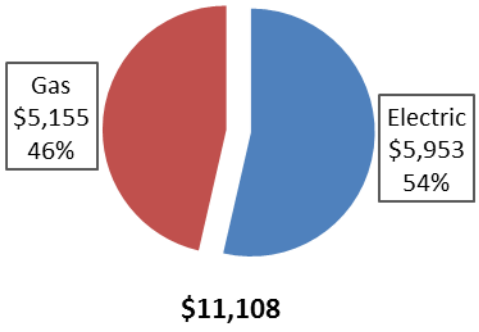


Figure 2 – Potential Post-Implementation Costs



A detailed description of the Health Center's existing energy use can be found in Section 3.

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

Measures without an "ECM #" in the table below have been evaluated, but are not recommended for implementation.

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			**335**	**0.2**	**0.0**	**$35.40**	**$127.30**	**$0.00**	**$127.30**	**3.60**	**337**
ECM 1	Install LED Fixtures	Yes	335	0.2	0.0	$35.40	$127.30	$0.00	$127.30	3.60	337
Motor Upgrades			**4,697**	**1.8**	**0.0**	**$496.28**	**$1,343.55**	**$0.00**	**$1,343.55**	**2.71**	**4,730**
ECM 2	Premium Efficiency Motors	Yes	4,697	1.8	0.0	$496.28	$1,343.55	$0.00	$1,343.55	2.71	4,730
Variable Frequency Drive (VFD) Measures			**12,190**	**4.4**	**0.0**	**$1,287.96**	**$9,265.66**	**$1,200.00**	**$8,065.66**	**6.26**	**12,275**
ECM 3	Install VFD on Supply Fan of Air Handler	Yes	10,047	3.6	0.0	$709.57	$3,807.95	$1,200.00	$2,607.95	3.68	10,117
	Install VFDs on Hot Water Pumps	No	2,143	0.7	0.0	$226.41	$5,457.71	$0.00	$5,457.71	24.11	2,158
Electric Unitary HVAC Measures			**15,682**	**9.3**	**0.0**	**$1,656.94**	**$29,769.28**	**$1,975.00**	**$27,794.28**	**16.77**	**15,792**
	Install High Efficiency Electric AC	No	15,682	9.3	0.0	$1,656.94	$29,769.28	$1,975.00	$27,794.28	16.77	15,792
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**78.3**	**$610.49**	**$29,966.84**	**$3,451.80**	**$26,515.04**	**43.43**	**9,172**
	Install High Efficiency Hot Water Boilers	No	0	0.0	78.3	$610.49	$29,966.84	$3,451.80	$26,515.04	43.43	9,172
Domestic Water Heating Upgrade			**0**	**0.0**	**6.1**	**$47.47**	**$14.34**	**$0.00**	**$14.34**	**0.30**	**713**
ECM 4	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	6.1	$47.47	$14.34	$0.00	$14.34	0.30	713
TOTALS (ALL EVALUATED MEASURES)			**32,904**	**15.6**	**84.4**	**$4,134.56**	**$70,486.97**	**$6,626.80**	**$63,860.17**	**15.45**	**43,019**
TOTALS (RECOMMENEDE MEASURES)			**15,079**	**5.6**	**6.1**	**$1,288.73**	**$5,293.14**	**$1,200.00**	**$4,093.14**	**3.18**	**15,898**

* - 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.

Motor Upgrades generally involve replacing old standard efficiency motors with motors of the current efficiency standard (EISA 2007). Motors will be replaced with the same size motors. This measure saves energy by reducing the power used by the motors due to improved electrical efficiency.

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

Electric Unitary HVAC measures generally involve replacing old inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide cooling equivalent to older air condition systems, but use less energy. These measures save energy by reducing the power used by the air condition system due to improved electrical efficiency.

Gas Heating (HVAC/Process) measures generally involve replacing old inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide heating equivalent to older systems, but use less energy. These measures save energy by reducing the fuel used by the heating due to improved combustion and heat transfer efficiency.

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

Energy Efficient Practices

TRC also identified 12 low-cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at the Health Center include:

- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing self-generation sources for the Health Center. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install
- Energy Savings Improvement Program (ESIP)

For facilities with capital available for implementation of selected individual measures or phasing implementation of selected measures over multiple years, incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or

contractor, to design the ECM(s), select the equipment and apply for the incentive(s). Program pre-approval is required for some SmartStart incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SmartStart program and will be explained further in Section 8, as well as the other programs as mentioned below.

This facility also qualifies for the Direct Install program which, through an authorized network of participating contractors, can assist with the implementation of a group of measures versus installing individual measures or phasing implementation. This program is designed to be turnkey and will provide an incentive up to 70% of the cost of the project identified by the designated contractor.

For facilities without capital available to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.3 for additional information on the ESIP Program.

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Brian B. Burke	Building Superintendent	brian.burke@twp.woodbridge.nj	(732) 634-4500
Designated Representative			
Brian B. Burke	Building Superintendent	brian.burke@twp.woodbridge.nj	(732) 634-4500
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On August 31, 2016, TRC performed an energy audit at the Health Center located in Woodbridge Township, New Jersey. TRC's auditor met with Brian B. Burke to review the facility operations and specific energy-using systems.

The 10,000 square foot, one-story building houses the Woodbridge Township Department of Health and Human Services. The building installed a 75 kW PV array on the flat roof. Two years ago, it also had a comprehensive interior and exterior lighting retrofit to LED. The township is interested in exploring more cost-effective options that can make the building and its systems more efficient.

2.3 Building Occupancy

The Department of Health and Human Services building is open Monday to Friday and the entire facility is used year-round. The typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Health Center	Weekday	7:30 AM - 5:30 PM
Health Center	Weekend	Closed

2.4 Building Envelope

The foundation consists of cast-in-place concrete perimeter wall footings. Exterior walls are finished with brick masonry. The building has a flat roof covered with a white membrane that is in good condition and contributes to cooling savings by reflecting solar radiation. The windows are double pane and are in good condition as well. The entrance doors are fully glazed with aluminum frames. Overall the building envelope was observed to be in good condition with few apparent signs of outside air infiltration.

2.5 On-Site Generation

The Health Center has a 75 kW PV array installed on the roof that provides a significant percentage of the electricity required by the facility.

2.6 Energy-Using Systems

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

Lighting System

Interior lighting is provided by LED linear tubes. Most of the building spaces use 2-lamp 4-foot long troffers. The corridors and some small areas contain 9-Watt LED downlight recessed fixtures. Exit signs throughout the facility are LED. Lighting control is predominantly provided by occupancy sensors. The facility has minimal exterior lighting which consists of 9-Watt or 45-Watt LED outdoor wall-mounted fixtures and two 100-Watt halogen incandescent lamps illuminating the rooftop. They are controlled with photocells.

Heating Hot Water System

The heating hot water system consists of one Cleaver Brooks gas-fired hot water boiler with an output rating of 1,569 kBtu/hr and an estimated combustion efficiency of 75%. The boiler is original to the building and was converted to gas in 1980. It has passed its useful service life and appeared in poor condition. Replacing it with a more efficient condensing boiler may contribute to energy savings.

Hot water is circulated to radiators in all occupied spaces by two hp pumps that run at constant speed. The hot water system is manually controlled. There is no reset based on outside air temperature or timer. Heating temperature in spaces is controlled with local thermostats.

Air Conditioning (DX)

Two 25-ton Trane condensing units located on the exterior ground were installed in 1993 to serve the original air handling unit. During the field audit, the site contact mentioned that one condensing unit has been taken out of service indefinitely. The air handler serves the building and is in poor condition. Also the Trane condensing unit is 29 years old and is in need of replacement as it has passed its useful service life.

The auditorium has a 10-ton York rooftop packaged unit with a gas-fired furnace and utilizes a scroll compressor and a direct-expansion (DX) coil. The gas-fired furnace provides heat as needed. The unit is six years old and is running in good condition. Cooling temperature in spaces is controlled with programmable thermostats. The data room has one 2-ton Mitsubishi split AC and the server closet also has 1-ton Frigidaire window unit. They all appeared to be in good condition.

Domestic Hot Water

The domestic hot water system for the facility consists of one A.O Smith gas-fired, non-condensing hot water heater with an input rating of 154,000 kBtu/hr, a nominal efficiency of 80%, and a storage tank of 81-gallons. The water heater is five years-old and appears to be in good condition.

Plug Load & Vending Machines

There are approximately 22 computer work stations throughout the facility and they are mostly desktop units with LCD monitors. There is no centralized PC power management software currently installed. There is one data room that has cooling provided by a 2-ton Mitsubishi split AC unit. There are no beverage vending machines in the facility.

2.7 Water-Using Systems

The kitchen and bathrooms have 109 faucets that are rated for 2.5 gallons per minute (gpm) or higher, the toilets are rated at 2.2 gallons per flush (gpf) and the urinals are rated at 2 gpf. There are no restrooms with showers.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost/ft^2 and energy use/ft^2. These energy use indices are indicative of the relative energy effectiveness of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy use for other facilities identified as: Hospital/Healthcare. Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

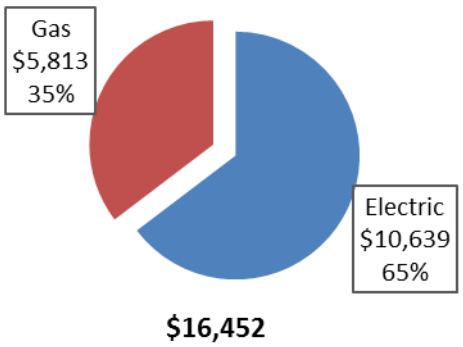
The following energy consumption and cost data is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for The Health Center		
Fuel	**Usage**	**Cost**
Electricity	88,055 kWh	$10,639
Natural Gas	7,458 Therms	$5,813
Total		**$16,452**

The current utility cost for this site is $16,452 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.106/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below.

Figure 8 -Electric Usage & Demand

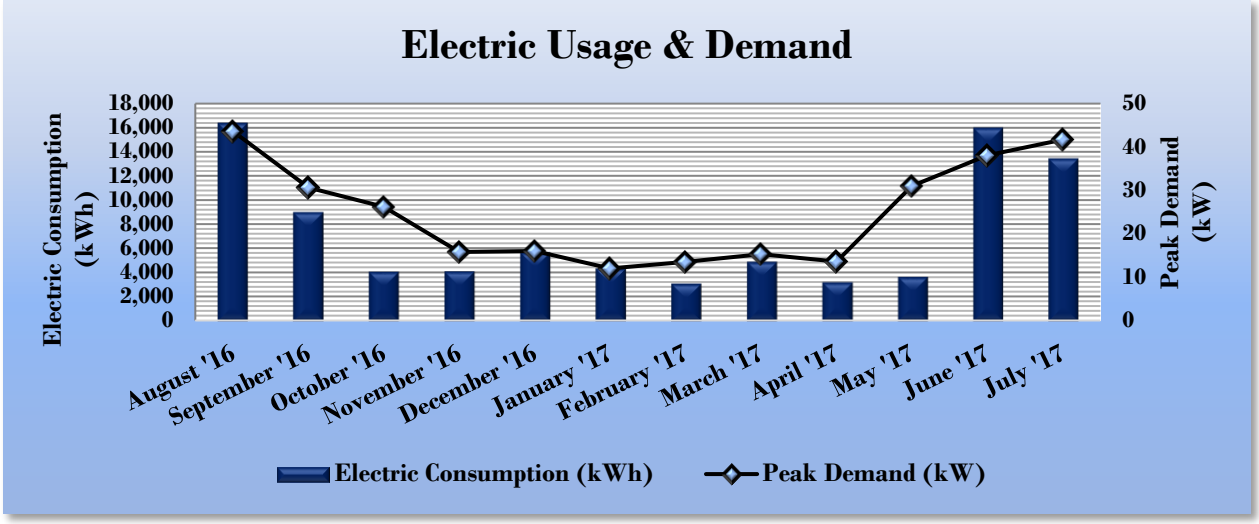


Figure 9 -Electric Usage & Demand

Electric Billing Data for The Health Center					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
9/8/16	32	16,388	44	$180	$2,213
10/7/16	29	9,010	31	$191	$970
11/7/16	30	4,106	26	$193	$462
12/8/16	29	4,128	16	$137	$440
1/10/17	31	5,685	16	$117	$616
2/8/17	31	4,370	12	$71	$449
3/10/17	32	3,107	14	$71	$317
4/10/17	29	4,912	15	$54	$479
5/10/17	29	3,231	14	$60	$297
6/9/17	31	3,676	31	$60	$680
7/11/17	31	15,997	38	$61	$1,932
8/9/17	31	13,445	42	$140	$1,784
Totals	**365**	**88,055**	**43.6**	**$1,335**	**$10,639**
Annual	**365**	**88,055**	**43.6**	**$1,335**	**$10,639**

3.3 Natural Gas Usage

Natural gas is provided by Elizabethtown Gas. The average gas cost for the past 12 months is $0.779/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below.

Figure 10-Natural Gas Usage

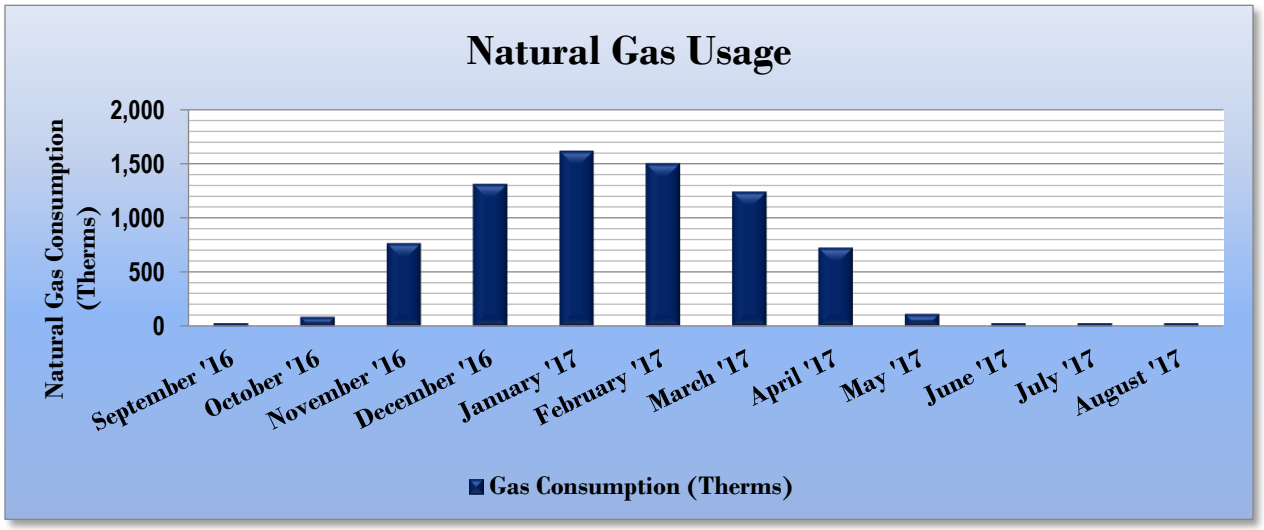


Figure 11-Natural Gas Usage

Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
9/29/16	29	29	$97
10/28/16	29	89	$127
11/30/16	29	767	$478
12/29/16	32	1,310	$946
1/27/17	30	1,615	$1,333
2/27/17	32	1,501	$950
3/28/17	30	1,241	$852
4/27/17	30	725	$579
5/30/17	32	114	$160
6/28/17	29	29	$100
7/28/17	30	30	$105
8/29/17	34	29	$102
Totals	**366**	**7,479**	**$5,829**
Annual	**365**	**7,458**	**$5,813**

3.4 Benchmarking

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

The EUI is a measure of a facility's energy consumption per 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 energy than similar buildings on a square foot basis or if that building performs better than the median. EUI is presented in both site energy and source energy. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy is the raw fuel consumed to generate the energy consumed at the site, factoring in energy production and distribution losses.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	The Health Center	National Median Building Type: Hospital/Healthcare
Source Energy Use Intensity (kBtu/ft^2)	172.7	389.8
Site Energy Use Intensity (kBtu/ft^2)	104.6	196.9

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

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

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	The Health Center	National Median Building Type: Hospital/Healthcare
Source Energy Use Intensity (kBtu/ft^2)	155.9	389.8
Site Energy Use Intensity (kBtu/ft^2)	98.9	196.9

Many buildings can also receive a 1–100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide — and may be eligible for ENERGY STAR® certification. This facility has a current score of 65.

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

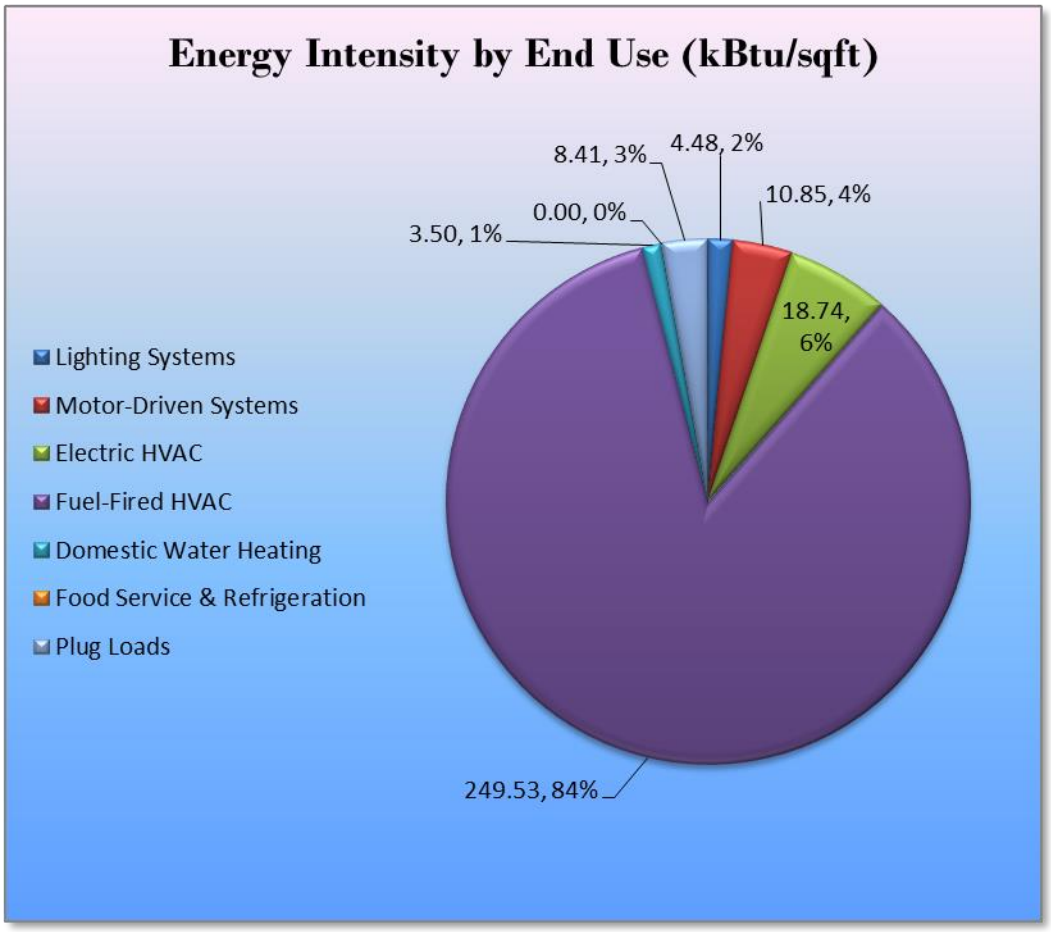
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the 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 and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 14 - Energy Balance (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 Health Center 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		**335**	**0.2**	**0.0**	**$35.40**	**$127.30**	**$0.00**	**$127.30**	**3.60**	**337**
ECM 1	Install LED Fixtures	335	0.2	0.0	$35.40	$127.30	$0.00	$127.30	3.60	337
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ECM 3	Install VFD on Supply Fan of Air Handler	10,047	3.6	0.0	$709.57	$3,807.95	$1,200.00	$2,607.95	3.68	10,117
Domestic Water Heating Upgrade		**0**	**0.0**	**6.1**	**$47.47**	**$14.34**	**$0.00**	**$14.34**	**0.30**	**713**
ECM 4	Install Low-Flow Domestic Hot Water Devices	0	0.0	6.1	$47.47	$14.34	$0.00	$14.34	0.30	713
TOTALS (RECOMMENEDE MEASURES)		**15,079**	**5.6**	**6.1**	**$1,288.73**	**$5,293.14**	**$1,200.00**	**$4,093.14**	**3.18**	**15,898**

* - 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 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		**335**	**0.2**	**0.0**	**$35.40**	**$127.30**	**$0.00**	**$127.30**	**3.60**	**337**
ECM 1	Install LED Fixtures	335	0.2	0.0	$35.40	$127.30	$0.00	$127.30	3.60	337

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	0.00	0
Exterior	335	0.2	0.0	$35.40	$127.30	$0.00	$127.30	3.60	337

Measure Description

This measure evaluates replacing the two existing rooftop fixtures containing halogen incandescent lamps with new high-performance LED light fixtures. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are generally more than twice that of a fluorescent source and more than 10 times incandescent sources. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

During planning and design for the installation of new fixtures, we recommend a holistic approach that considers both the technology of the lighting sources and how they are controlled.

4.1.2 Motor Upgrades

Recommended motor upgrades are summarized in Figure 17 below.

Figure 17 – Summary of Motor Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Motor Upgrades		**4,697**	**1.8**	**0.0**	**$496.28**	**$1,343.55**	**$0.00**	**$1,343.55**	**2.71**	**4,730**
ECM 2	Premium Efficiency Motors	4,697	1.8	0.0	$496.28	$1,343.55	$0.00	$1,343.55	2.71	4,730

ECM 2: Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
4,697	1.8	0.0	$496.28	$1,343.55	$0.00	$1,343.55	2.71	4,730

Measure Description

This measure evaluates replacing standard handler motor with EISA 2007 efficiency motors. The evaluation assumes existing motors will be replaced with the same size motors. It is important that the speed of each new motor match the speed of the motor it replaces as closely as possible. The base case motor efficiencies are obtained from nameplate information. Proposed case premium motor efficiencies are obtained from the New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016). Savings are based on the difference between baseline and proposed efficiencies and the annual operating hours.

4.1.3 Variable Frequency Drive Measures

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

Figure 18 – Summary of Variable Frequency Drive ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Variable Frequency Drive (VFD) Measures		**10,047**	**3.6**	**0.0**	**$709.57**	**$3,807.95**	**$1,200.00**	**$2,607.95**	**3.68**	**10,117**
ECM 3	Install VFD on Variable Air Volume (VAV) HVAC	10,047	3.6	0.0	$709.57	$3,807.95	$1,200.00	$2,607.95	3.68	10,117

ECM 3: Install VFD on Variable Air Volume (VAV) HVAC

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)
10,047	3.6	0.0	$709.57	$3,807.95	$1,200.00	$2,607.95	3.68	10,117

Measure Description

This measure evaluates replacing existing volume control devices on air handling unit, such as inlet vanes and variable pitch fan blades, with variable speed drives (VFDs). Inlet guide vanes and variable pitch fan blade are an inefficient means of controlling the air volume compared to VFDs. The existing volume control device would be removed or permanently disabled and the control signal would be redirected to determine VFD output speed. Energy savings result from improved motor turn down performance when there is a reduced load on the fan motors. The magnitude of energy savings is based on the amount of time at reduced loads.

Maintenance savings are anticipated since a VFD is solid state electronic device which generally requires less attention than a mechanical volume control device.

4.1.4 Domestic Water Heating Upgrade

Recommended upgrades to domestic water heating are summarized in Figure 19 below.

Figure 19 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**6.1**	**$47.47**	**$14.34**	**$0.00**	**$14.34**	**0.30**	**713**
ECM 4	Install Low-Flow Domestic Hot Water Devices	0	0.0	6.1	$47.47	$14.34	$0.00	$14.34	0.30	713

ECM 4: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	6.1	$47.47	$14.34	$0.00	$14.34	0.30	713

Measure Description

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

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

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 20 – Summary of Evaluated But Not 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)
Variable Frequency Drive (VFD) Measures	**2,143**	**0.7**	**0.0**	**$226.41**	**$5,457.71**	**$0.00**	**$5,457.71**	**24.11**	**2,158**
Install VFDs on Hot Water Pumps	2,143	0.7	0.0	$226.41	$5,457.71	$0.00	$5,457.71	24.11	2,158
Electric Unitary HVAC Measures	**15,682**	**9.3**	**0.0**	**$1,656.94**	**$29,769.28**	**$1,975.00**	**$27,794.28**	**16.77**	**15,792**
Install High Efficiency Electric AC	15,682	9.3	0.0	$1,656.94	$29,769.28	$1,975.00	$27,794.28	16.77	15,792
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**78.3**	**$610.49**	**$29,966.84**	**$3,451.80**	**$26,515.04**	**43.43**	**9,172**
Install High Efficiency Hot Water Boilers	0	0.0	78.3	$610.49	$29,966.84	$3,451.80	$26,515.04	43.43	9,172
TOTALS	**17,825**	**10.0**	**78.3**	**$2,493.84**	**$65,193.83**	**$5,426.80**	**$59,767.03**	**23.97**	**27,121**

* - 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 VFDs on Hot Water Pumps

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)
2,143	0.7	0.0	$226.41	$5,457.71	$0.00	$5,457.71	24.11	2,158

Measure Description

This measure evaluates installing a variable frequency drive (VFD) to control a hot water pump. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings result from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the amount of time at reduced loads.

Reasons for not Recommending

The simple payback for this project is over ten years, and therefore probably not economically viable.

Install High Efficiency Electric AC

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)
15,682	9.3	0.0	$1,656.94	$29,769.28	$1,975.00	$27,794.28	16.77	15,792

Measure Description

This measure evaluates replacing package air conditioners with high efficiency package air conditioners. There have been significant improvements in both compressor and fan motor efficiencies in the past several years. Therefore, electricity savings can be achieved by replacing old units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the old and new unit, the cooling load, and the annual operating hours.

Reasons for not Recommending

The simple payback for this project is over 15 years, and therefore probably not economically viable.

Install High Efficiency Hot Water Boilers

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	78.3	$610.49	$29,966.84	$3,451.80	$26,515.04	43.43	9,172

Measure Description

This measure evaluates replacing old inefficient hot water boilers with high efficiency hot water boilers. Savings result from improved combustion efficiency and reduced standby losses at low loads.

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers were only evaluated when the return water temperature is less than 130°F during most of the operating hours. As a result condensing hydronic boilers is recommended for this site. It should be noted that condensing boilers produce acidic condensate that needs to be drained.

Reasons for not Recommending

The simple payback for this project is over 43 years, and therefore probably not economically viable.

5 ENERGY EFFICIENT PRACTICES

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

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 Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

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.

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 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.

Check for and Seal Duct Leakage

Duct leakage in commercial buildings typically accounts for 5% to 25% 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 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.

Perform Proper Water Heater Maintenance

At least once a year, drain a few gallons out of the water heater using the drain valve. If there is a lot of sediment or debris, then a full flush is recommended. Turn the temperature down and then completely drain the tank. Once a year check for any leaks or heavy corrosion on the pipes and valves. For gas water heaters, check the draft hood and make sure it is placed properly, with a few inches of air space between the tank and where it connects to the vent. Look for any corrosion or wear on the gas line and on the piping. If you noticed any black residue, soot or charred metal, this is a sign you may be having combustion issues and you should have the unit serviced by a professional. For electric water heaters, look for any signs of leaking such as rust streaks or residue around the upper and lower panels covering the electrical components on the tank. For water heaters over three to four years old have a technician inspect the sacrificial anode annually.

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 gpf and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.4 for any low-flow ECM recommendations.

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.

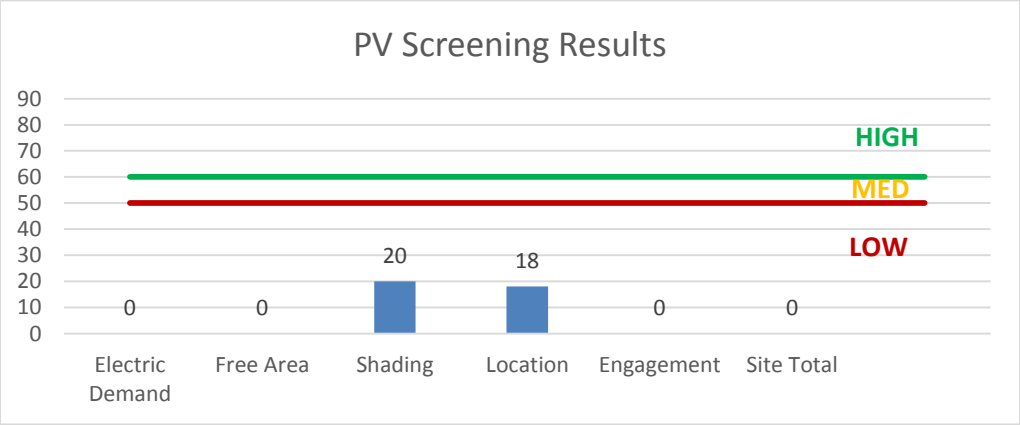
Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection,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

The facility has already used the rooftop free space to install a 75 kW PV arrays and there is no more significant free spaces. 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 an additional PV array.

Figure 21 - Photovoltaic Screening



Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

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

- **Basic Info on Solar PV in NJ**: http://www.njcleanenergy.com/whysolar
- **NJ Solar Market FAQs**: http://www.njcleanenergy.com/renewable-energy/program-updates-and-background-information/solar-transition/solar-market-faqs
- **Approved Solar Installers in the NJ Market**: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/?id=60&start=1

6.2 Combined Heat and Power

In non-industrial settings, combined heat and power (CHP) is the on-site generation of electricity and recovery of heat which is put to beneficial use. Common prime movers in CHP applications include reciprocating engines, microturbines, fuel cells, and (at large facilities) gas turbines. Electricity is typically interconnected to the sites local distribution system. Heat is recovered from the exhaust stream and the ancillary cooling system and interconnected to the existing hot water (or steam) distribution system.

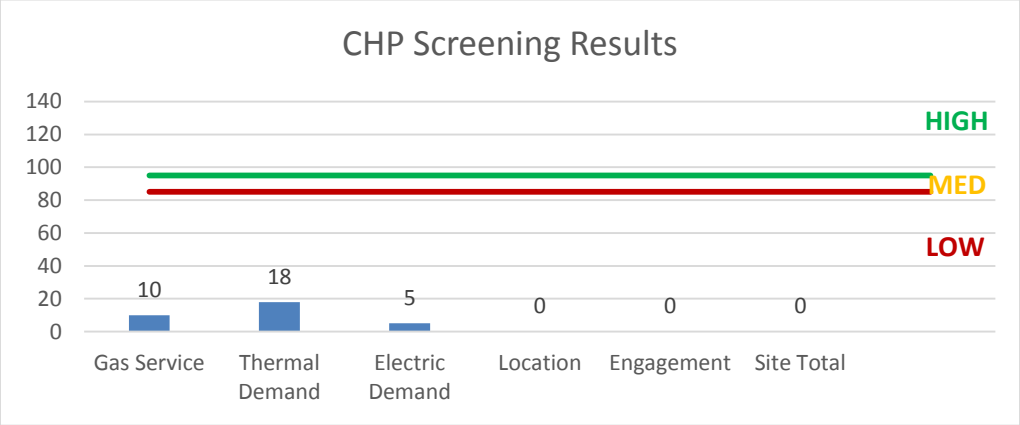
CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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.

Low or infrequent thermal load, and lack of space near the existing thermal generation 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 NJ specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

Figure 22 - 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 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 (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding 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 others, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's 1999 Electricity Restructuring Law which requires all customers of investor-owned electric and gas utilities to pay this charge on their monthly energy bills. As a contributor to the fund you were able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 23 for a list of the eligible programs identified for each recommended ECM.

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install
ECM 1	Install LED Fixtures			x
ECM 2	Premium Efficiency Motors			x
ECM 3	Install VFD on Supply Fan of Air Handler	x		x
ECM 4	Install Low-Flow Domestic Hot Water Devices			x

SmartStart is generally well suited for implementation of individual or small sets of measures, with the flexibility to install projects at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities to bundle measures and simplify participation, but requires the use of pre-approved contractors.

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

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

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Prescriptive Equipment Incentives Available:

Electric Chillers
Electric Unitary HVAC
Gas Cooling
Gas Heating
Gas Water Heating
Ground Source Heat Pumps
Lighting
Lighting Controls
Refrigeration Doors
Refrigeration Controls
Refrigerator/Freezer Motors
Food Service Equipment
Variable Frequency Drives

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

Incentives

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

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom Measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at the lesser of 50% of the total installed incremental project cost, or a buy down to a one-year payback. Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

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

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

8.2 Direct Install

Overview

Direct Install is a turnkey program available to existing small to mid-sized facilities with a peak electric demand that did not exceed 200 kW in any of the preceding 12 months. You will work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and install those 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 Direct Install program, you will need to contact the participating contractor assigned to the county where your facility is located; a complete list is provided on the Direct Install website identified below. The contractor will be paid the program incentive directly 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 mentioned above, and the remaining 30% of the cost is your responsibility to the contractor.

Since Direct Install offers a free assessment, LGEA applicants that do not meet the audit program eligibility requirements, but do meet the Direct Install requirements, may be moved directly into this program.

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

8.3 SREC Registration Program

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

8.4 Energy Savings Improvement Program

The Energy Savings Improvement Program (ESIP) is an alternate method for New Jersey's government agencies to finance the implementation of energy conservation measures. An ESIP is a type of "performance contract," whereby school districts, counties, municipalities, housing authorities and other public and state entities enter in to contracts to help finance building energy upgrades. This is done in a manner that ensures that annual payments are lower than the savings projected from the ECMs, ensuring that ESIP projects are cash flow positive in year one, and every year thereafter. ESIP provides government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. NJCEP incentive programs can be leveraged to help further reduce the total project cost of eligible measures.

This LGEA report is the first step to participating in ESIP. Next, you will need to select an approach for implementing the desired ECMs:

(1) Use an Energy Services Company or "ESCO."
(2) Use independent engineers and other specialists, or your own qualified staff, to provide and manage the requirements of the program through bonds or lease obligations.
(3) Use a hybrid approach of the two options described above where the ESCO is utilized for some services and independent engineers, or other specialists or qualified staff, are used to deliver other requirements of the program.

After adopting a resolution with a chosen implementation approach, the development of the Energy Savings Plan (ESP) can begin. The ESP demonstrates that the total project costs of the ECMs are offset by the energy savings over the financing term, not to exceed 15 years. The verified savings will then be used to pay for the financing.

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

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

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
Facility Hallway	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Facility Hallway	29	LED - Fixtures: Downlight Recessed	Occupancy Sensor	13	2,080	None	No	29	LED - Fixtures: Downlight Recessed	Occupancy Sensor	13	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Waiting Area	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Waiting Area	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Ressource Center Room	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,040	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Fenn Office	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Women's Bathroom	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,080	None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Bathroom	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,080	None	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 139	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Meal Room	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Charity Room	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,820	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Charity Room	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	12	1,820	None	No	1	LED - Fixtures: Downlight Recessed	Occupancy Sensor	12	1,820	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Licensing Office	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 100	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen1	2	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,080	None	No	2	LED - Linear Tubes: (4) 2' Lamps	Occupancy Sensor	34	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 113	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 104	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 105	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Copy Room	1	LED - Fixtures: Downlight Recessed	Wall Switch	9	2,080	None	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	9	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen2	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 108	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Nursing Room	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Nursing Director Office	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	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
Women's Bathroom	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Janitorial Closet	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	1,560	None	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	12	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 109	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Bathroom	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 118 Auditorium	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	None	No	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 118 Auditorium	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
Data Room	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,300	None	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,300	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,300	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway Clinic Area	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Examination Room1	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,560	None	No	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Examination Room2	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Clinic Office	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Examination Room3	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,560	None	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Examination Room4	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,560	None	No	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 127	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	None	No	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,080	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 117 Boiler Room	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,560	None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Back Exterior Light	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	9	1,560	None	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	9	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior Perimeter Light	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	9	1,560	None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	9	1,560	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	2	Halogen Incandescent: Flood Light	Daylight Dimming	100	1,560	Fixture Replacement	No	2	LED - Fixtures: Downlight Solid State Retrofit	Daylight Dimming	9	1,560	0.15	335	0.0	$36.23	$127.30	$0.00	3.51
Exterior Perimeter Light	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	45	3,120	None	No	6	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	45	3,120	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
Boiler Room	Building	1	Supply Fan	10.0	69.0%	No	2,600	Yes	91.7%	Yes	1	5.43	14,744	0.0	$1,594.38	$5,151.50	$1,200.00	2.48
Boiler Room	Boiler Room	2	Heating Hot Water Pump	2.0	84.0%	No	1,170	No	84.0%	Yes	2	0.71	2,411	0.0	$260.68	$5,457.71	$0.00	20.94

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
Data Room	Data Room	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rear Building	Building	1	Split-System AC	25.00		Yes	1	Split-System AC	25.00		14.00		No	9.29	15,682	0.0	$1,695.81	$29,769.28	$1,975.00	16.39
Rooftop	Auditorium	1	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Data Room	Data Room	1	Split-System AC	2.00		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
Boiler Room	Building	1	Non-Condensing Hot Water Boiler	1,569.00	Yes	1	Condensing Hot Water Boiler	1,500.00	95.00%	Et	0.00	0	105.1	$789.16	$36,005.13	$3,300.00	41.44
Rooftop	Auditorium	1	Furnace	200.00	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
Boiler Room	Building	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	1.2	$9.15	$7.17	$0.00	0.78
Room 109	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	4.9	$36.59	$7.17	$0.00	0.20

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Facility	22	Desktop with LCD Monitor	191.0	Yes
Resource Center Room	1	Printer	325.0	No
Office	1	Printer	260.0	Yes
Fenn Room	1	Printer	570.0	No
Room 139	1	Printer	275.0	Yes
Meal Room	1	Microwave	1,000.0	No
Licensing Office	2	Printer	325.0	No
Room 100	1	Printer	25.0	Yes
Room 100	1	Printer	35.0	Yes
Kitchen	1	Microwave	1,000.0	No
Room 111	1	Microwave	1,000.0	No
Room 111	1	Printer	450.0	No
Room 111	1	Printer	190.0	No
Room 113	1	Microwave	1,000.0	No
Room 104	1	Printer	375.0	Yes
Room 105	1	Microwave	1,000.0	No
Nursing Room	1	Microwave	1,000.0	No
Nursing Room	1	Printer	175.0	Yes
Nursing Director Office	1	Printer	425.0	Yes
Room 127	1	Printer	567.0	No
Copy Room	1	Multifunction Printer	800.0	No
Kitchen	1	Refrigerator	300.0	No
Room 105	1	Refrigerator	250.0	No
Clinic Office	2	Refrigerator	250.0	No
Clinic Office	2	Refrigerator	300.0	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Health Center

Primary Property Type: Medical Office
Gross Floor Area (ft²): 10,000
Built: 1958

For Year Ending: July 31, 2017
Date Generated: August 31, 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
Health Center 2 George Frederick Plaza Woodbridge, New Jersey 07095	Township of Woodbridge 1 Main Street Woodbridge, NJ 07095 732-634-4450	Brian Burke 1 Main Street Woodbridge, NJ 07095 732-634-4450 Brian.Burke@twp.woodbridge.nj.us

Property ID: 5880907

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
118.6 kBtu/ft²

Source EUI
158.1 kBtu/ft²

Annual Energy by Fuel		
Electric - Solar (kBtu)	271,066	(23%)
Natural Gas (kBtu)	748,059	(63%)
Electric - Grid (kBtu)	166,944	(14%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	146.4
National Median Source EUI (kBtu/ft²)	195.1
% Diff from National Median Source EUI	-19%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	58

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)