Local Government Energy Audit:
Energy Audit Report

Evergreen Senior Center

Township of Woodbridge

400 Inman Avenue
Colonia, NJ 07067

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 Evergreen Senior 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 Evergreen Senior Center is a one-story, 28,250 square-foot facility constructed in 1958. The building has a flat roof with a 95 kW photovoltaic (PV) array. Exterior walls are finished with brick masonry and windows are double pane with aluminum frames. Interior lighting consists of linear LED and T8 fixtures with electronic ballasts. They are controlled with occupancy sensors and manual wall switches. Exterior lighting is minimal and consists of LED and metal halide wall-mounted fixtures. They are controlled with photocells. Heating is provided by two gas-fired steam boilers and the cooling system consists of two roof-top packaged window units.

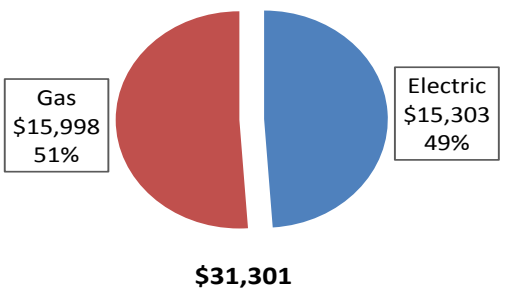
A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

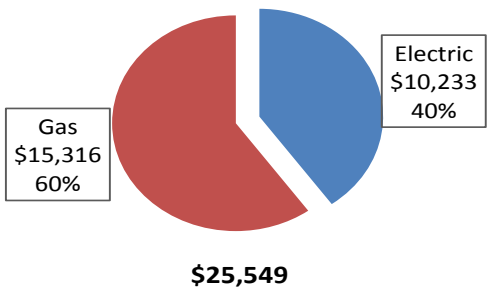
TRC evaluated six measures including five high priority which represent an opportunity for Evergreen Senior Center to reduce annual energy costs by $3,530.84 and annual greenhouse gas emissions by 34,362 lbs CO2e. The measures would pay for themselves in 7.72 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce Evergreen Senior Center's annual energy use by 8.2%.

Figure 1 – Previous 12 Month Utility Costs



$31,301

Figure 2 – Potential Post-Implementation Costs



$25,549

A detailed description of Evergreen Senior 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.

The measure without an "ECM #" in the table below has 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			**20,472**	**5.5**	**0.0**	**$2,118.32**	**$22,417.89**	**$1,935.00**	**$20,482.89**	**9.67**	**20,615**
ECM 1	Install LED Fixtures	Yes	1,370	0.6	0.0	$141.79	$899.89	$125.00	$774.89	5.47	1,380
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	19,102	4.8	0.0	$1,976.53	$21,518.00	$1,810.00	$19,708.00	9.97	19,235
Lighting Control Measures			**6,201**	**1.6**	**0.0**	**$641.66**	**$1,856.00**	**$320.00**	**$1,536.00**	**2.39**	**6,245**
ECM 3	Install Occupancy Sensor Lighting Controls	Yes	6,201	1.6	0.0	$641.66	$1,856.00	$320.00	$1,536.00	2.39	6,245
Electric Unitary HVAC Measures			**5,838**	**3.5**	**0.0**	**$604.08**	**$3,810.66**	**$0.00**	**$3,810.66**	**6.31**	**5,879**
ECM 4	Install High Efficiency Electric AC	Yes	5,838	3.5	0.0	$604.08	$3,810.66	$0.00	$3,810.66	6.31	5,879
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**86.6**	**$682.53**	**$48,547.47**	**$2,612.00**	**$45,935.47**	**67.30**	**10,139**
	Install High Efficiency Steam Boilers	No	0	0.0	86.6	$682.53	$48,547.47	$2,612.00	$45,935.47	67.30	10,139
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$166.78**	**$1,437.60**	**$0.00**	**$1,437.60**	**8.62**	**1,623**
ECM 5	Vending Machine Control	Yes	1,612	0.0	0.0	$166.78	$1,437.60	$0.00	$1,437.60	8.62	1,623
TOTALS FOR RECOMMENDED MEASURES			**34,123**	**10.5**	**0.0**	**$3,530.84**	**$29,522.15**	**$2,255.00**	**$27,267.15**	**7.72**	**34,362**
TOTALS FOR ALL MEASURES			**34,123**	**10.5**	**86.6**	**$4,213.36**	**$78,069.62**	**$4,867.00**	**$73,202.62**	**17.37**	**44,501**

* - 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 conditions allow. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

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.

Plug Load Equipment control measures generally involve installing automation that limits the power use or operation of equipment plugged into an electrical receptacle based on occupancy.

Energy Efficient Practices

TRC also identified 11 low cost (or no cost) 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 Evergreen Senior Center include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Turn Off Unneeded Motors
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- 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 on-site generation sources for Evergreen Senior 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 self-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	(732) 634-4500
Designated Representative			
Steve Zelizi	Head Custodian		(732) 726-6261
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On September 1, 2016, TRC performed an energy audit at Evergreen Senior Center located in Colonia, New Jersey. TRC's auditor met with Brian Burke to review the facility operations and focus the investigation on specific energy-using systems.

The Woodbridge Township Evergreen Senior Center is a 28,250 square-foot facility serving the senior citizens of Woodbridge Township by providing social, recreational, educational, and physical programs. The facility produces part of the electricity via a 95 kW PV array on its flat roof. A significant part of the interior and exterior lighting is retrofitted to LED fixtures. One of the old steam boilers has been replaced with a new boiler. The Township is still interested in exploring more cost-effective options that can make the building and its systems more efficient.

2.3 Building Occupancy

The building is open Monday through Friday and is used year-round by the community. The typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Evergreen Senior Center	Weekday	7:00 AM - 6:00 PM
Evergreen Senior 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 black membrane that is in good condition.

The windows are double pane and are in good condition as well. Exterior doors are constructed of metal. Overall the building envelope was observed to be in good condition with no apparent signs of outside air infiltration.

2.5 On-Site Generation

The Evergreen Senior Center has a 95 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.

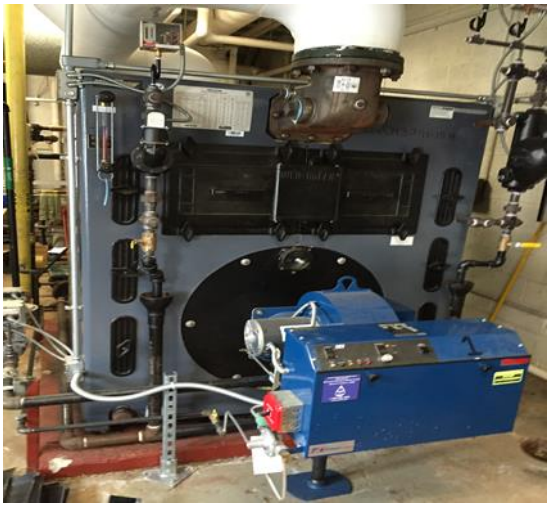
Lighting System

The facility underwent a lighting retrofit two years ago. This retrofit included interior and exterior lights.

Interior lighting now consists of a combination of LED linear tubes and linear 32-Watt fluorescent T8 lamps with electronic ballasts. Most of the building spaces use 2-lamp 4-foot long troffers. A small area of space is primarily lit with 9-Watt LED downlight recessed lamps. Lighting control is provided by a combination of occupancy sensors and manual wall switches.

There is minimal exterior lighting which consists of 70-Watt recessed halogen incandescent lamps, 400-Watt metal halide, and 40-Watt LED wall-mounted fixtures. They are controlled with photocells.

Steam System



The steam system consists of two Weil McLain induced draft steam boilers. The boilers are three and twenty-seven years old and have an output rating of 2,607 kBtu/hr and 2,612 kBtu/hr with a combustion efficiency of 86.7% and 75% respectively.

Each boiler has a 1.5 hp forced draft fan with discharge dampers to control the volume of combustion air. Each boiler has 0.8 hp feed water pump and there are two 1 hp condensate pumps. Steam is supplied to the facility at 15 psig. Seventy-five percent of the condensate is returned to the feed water system. The boilers operate in a lead/lag configuration with one operating at a time. The boilers have a modern self-contained control system, which has a night and weekend timer and reset based on outside air temperature to save energy. The old boiler is in need of replacement.

The corridors are heated by recessed radiators incorporated in the walls. The all-purpose room or gymnasium is heated and vented by two units located above the ceiling. The units are controlled with manual thermostats.

Air Conditioning (DX)



Two 7.5-ton Carrier rooftop units and 19 window units provide air conditioning. The rooftop units are constant air volume with a single 1.5 hp supply fan and no return fan. They provide two-stage cooling and utilize a scroll compressor and a direct-expansion (DX) coil. They are seven years old and are running in good condition as mentioned by the site contact. The units are controlled by individual programmable thermostats.

The window units range in size from 1 to 3 tons. Two units need replacement as the occupants have complained about their efficiency.

Outdoor ventilation air is provided in classrooms primarily by unit ventilators. There are seventeen-unit ventilators that take outside fresh air via a fan and blow it across a heating coil and into the room. They are turned on manually as needed. Air is exhausted in common areas by roof-mounted exhaust fans.

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 199,000 kBtu/hr, a nominal efficiency of 80%, and a storage tank of 81 gallons. The water heater is eight years old and appears to be in good condition.

Plug load & Vending Machines

There are approximately 45 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 1-ton window unit. There are one refrigerated beverage vending machine and one non-refrigerated vending machine all located in the youth center.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that all of the faucets are rated for 2.0 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf. There are no restrooms with showers. There is no water-using system upgrade.

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: Center/Meeting Hall. 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.

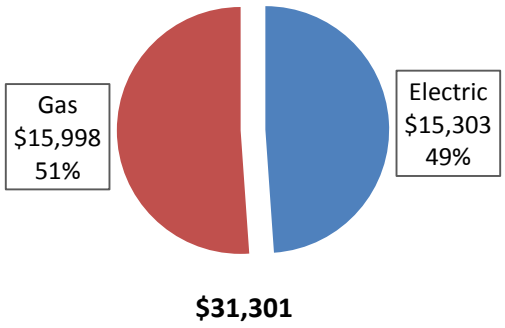
This annual consumption also takes into account the facility's solar production.

Figure 6 - Utility Summary

Utility Summary for Evergreen Senior Center		
Fuel	**Usage**	**Cost**
Electricity	130,964 kWh	$15,303
Natural Gas	20,297 Therms	$15,998
Total		**$31,301**

The current utility cost for this site is $31,301 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 $0.103/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

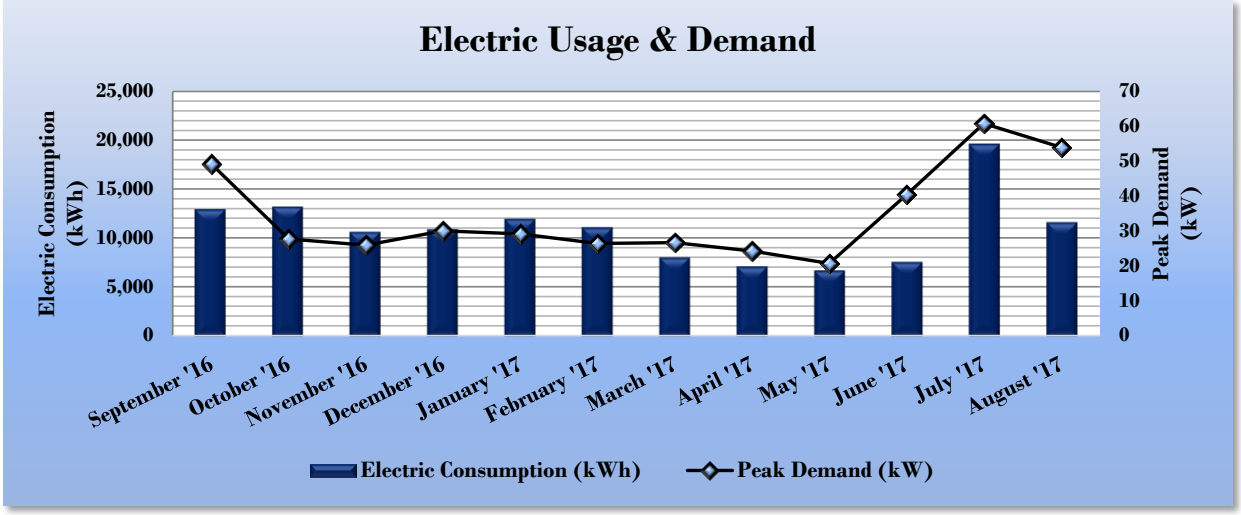


Figure 9 -Electric Usage & Demand

Electric Billing Data for Evergreen Senior Center					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
9/23/16	31	12,901	49	$134	$1,750
10/24/16	29	13,169	28	$116	$1,316
11/22/16	31	10,599	26	$124	$1,074
12/23/16	30	10,862	30	$219	$1,216
1/25/17	29	11,935	29	$227	$1,333
2/24/17	32	11,054	26	$244	$1,196
3/27/17	30	8,001	27	$140	$827
4/26/17	29	7,092	24	$115	$689
5/25/17	29	6,681	21	$100	$607
6/26/17	32	7,550	40	$114	$1,118
7/26/17	30	19,541	61	$109	$2,470
8/24/17	33	11,579	54	$111	$1,707
Totals	**365**	**130,964**	**60.8**	**$1,752**	**$15,303**
Annual	**365**	**130,964**	**60.8**	**$1,752**	**$15,303**

3.3 Natural Gas Usage

Natural gas is provided by Elizabethtown Gas. The average gas cost for the past 12 months is $0.788/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

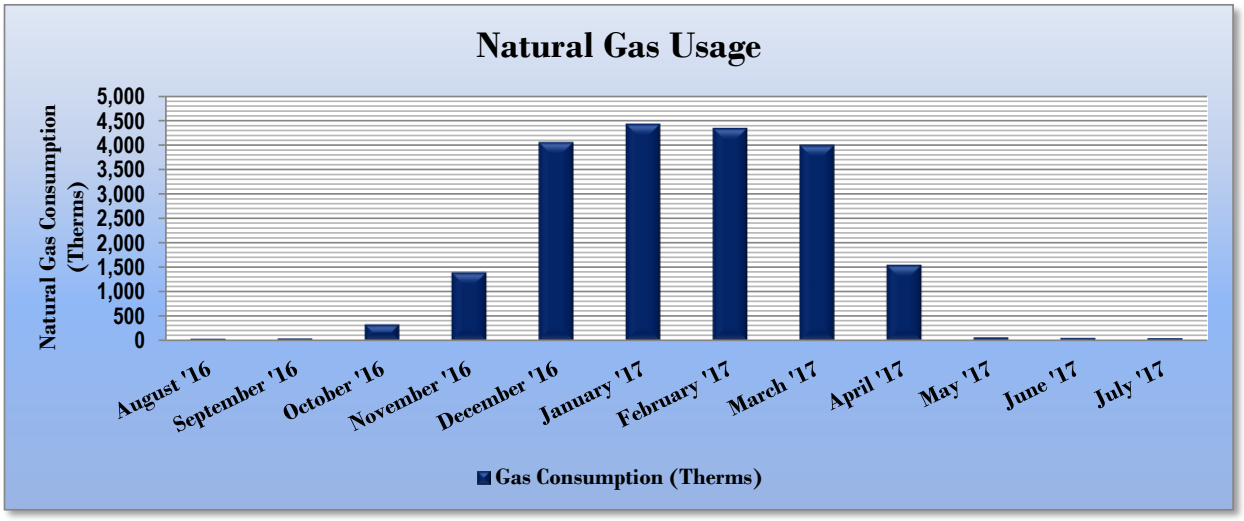


Figure 11 -Natural Gas Usage

Gas Billing Data for Evergreen Senior Center			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
9/1/16	31	34	$214
10/3/16	29	35	$218
11/1/16	30	327	$428
12/2/16	31	1,389	$1,122
1/3/17	30	4,051	$2,742
1/31/17	31	4,427	$3,834
3/1/17	30	4,341	$3,283
3/31/17	29	3,995	$2,461
5/1/17	32	1,543	$1,007
6/1/17	31	62	$233
6/30/17	30	52	$228
8/1/17	31	41	$229
Totals	**365**	**20,297**	**$15,998**
Annual	**365**	**20,297**	**$15,998**

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		
	Evergreen Senior Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	125.1	69.8
Site Energy Use Intensity (kBtu/ft^2)	87.7	45.3

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		
	Evergreen Senior Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	112.2	69.8
Site Energy Use Intensity (kBtu/ft^2)	83.5	45.3

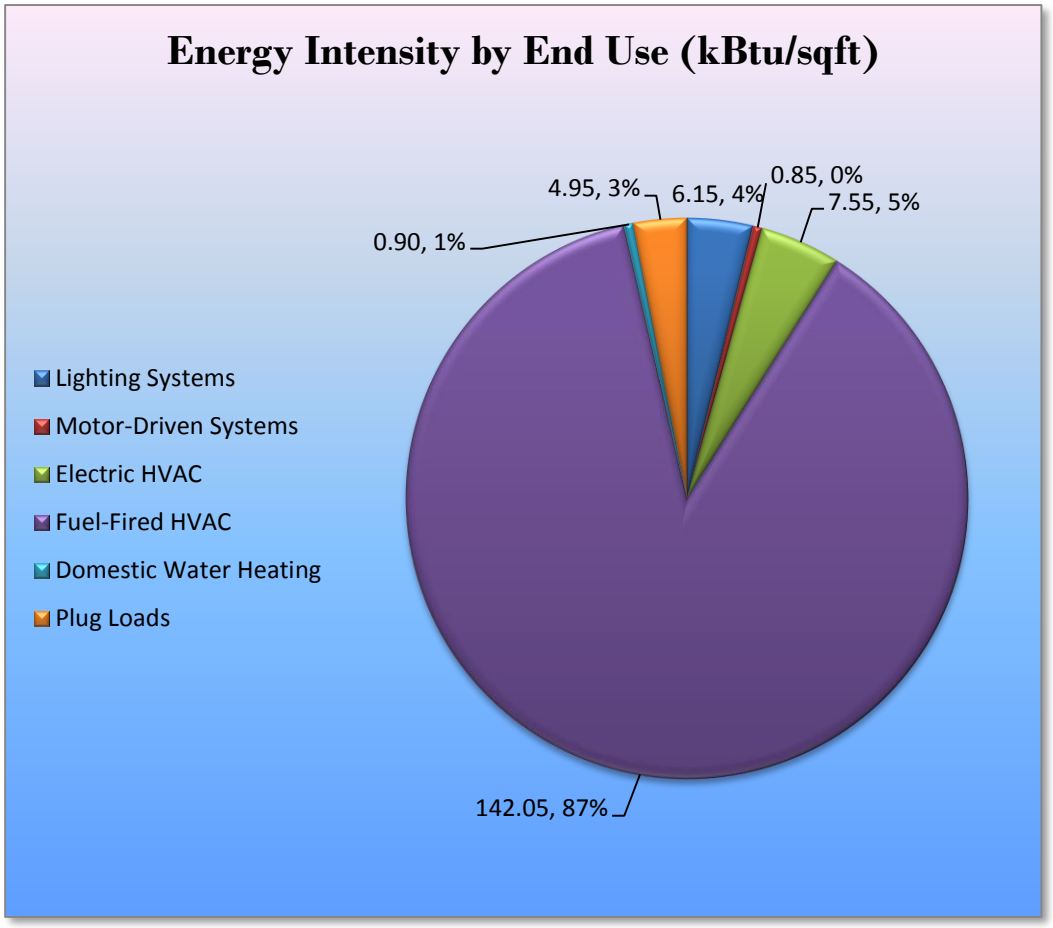
Many buildings can also receive a 1–100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This building is not eligible to receive a score because the property type falls under Social/Meeting Hall type, which is currently not being rated by ENERGY STAR® score.

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

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 Evergreen Senior 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 Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**20,472**	**5.5**	**$2,118.32**	**$22,417.89**	**$1,935.00**	**$20,482.89**	**9.67**	**20,615**
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ECM 3	Install Occupancy Sensor Lighting Controls	6,201	1.6	$641.66	$1,856.00	$320.00	$1,536.00	2.39	6,245
Electric Unitary HVAC Measures		**5,838**	**3.5**	**$604.08**	**$3,810.66**	**$0.00**	**$3,810.66**	**6.31**	**5,879**
ECM 4	Install High Efficiency Electric AC	5,838	3.5	$604.08	$3,810.66	$0.00	$3,810.66	6.31	5,879
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**$166.78**	**$1,437.60**	**$0.00**	**$1,437.60**	**8.62**	**1,623**
ECM 5	Vending Machine Control	1,612	0.0	$166.78	$1,437.60	$0.00	$1,437.60	8.62	1,623
TOTALS		**34,123**	**10.5**	**$3,530.84**	**$29,522.15**	**$2,255.00**	**$27,267.15**	**7.72**	**34,362**

* - 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

Recommended upgrades to 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		**20,472**	**5.5**	**0.0**	**$2,118.32**	**$22,417.89**	**$1,935.00**	**$20,482.89**	**9.67**	**20,615**
ECM 1	Install LED Fixtures	1,370	0.6	0.0	$141.79	$899.89	$125.00	$774.89	5.47	1,380
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	19,102	4.8	0.0	$1,976.53	$21,518.00	$1,810.00	$19,708.00	9.97	19,235

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	242	0.1	0.0	$25.08	$190.95	$0.00	$190.95	7.61	244
Exterior	1,128	0.6	0.0	$116.71	$708.93	$125.00	$583.93	5.00	1,136

Measure Description

This measure evaluates replacing existing fixtures containing fluorescent, HID 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.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	19,102	4.8	0.0	$1,976.53	$21,518.00	$1,810.00	$19,708.00	9.97	19,235
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

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

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

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

4.1.1 Lighting Control Measures

Recommended lighting control measures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**6,201**	**1.6**	**0.0**	**$641.66**	**$1,856.00**	**$320.00**	**$1,536.00**	**2.39**	**6,245**
ECM 3	Install Occupancy Sensor Lighting Controls	6,201	1.6	0.0	$641.66	$1,856.00	$320.00	$1,536.00	2.39	6,245

ECM 3: 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)
6,201	1.6	0.0	$641.66	$1,856.00	$320.00	$1,536.00	2.39	6,245

Measure Description

This measure evaluates installing occupancy sensors to control light fixtures that are currently manually controlled in classrooms and private offices. Sensors detect occupancy using ultrasonic and/or infrared wave technologies. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Occupants will also be able to manually turn off fixtures. Energy savings result from only operating lighting systems when they are required.

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

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

4.1.2 Electric Unitary HVAC Measures

Recommended electric unitary HVAC measures are summarized in Figure 18 below.

Figure 18 - Summary of Unitary HVAC 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)
Electric Unitary HVAC Measures		**5,838**	**3.5**	**0.0**	**$604.08**	**$3,810.66**	**$0.00**	**$3,810.66**	**6.31**	**5,879**
ECM 4	Install High Efficiency Electric AC	5,838	3.5	0.0	$604.08	$3,810.66	$0.00	$3,810.66	6.31	5,879

ECM 4: 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)
5,838	3.5	0.0	$604.08	$3,810.66	$0.00	$3,810.66	6.31	5,879

Measure Description

This measure evaluates replacing two window units with high efficiency units. 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.

4.1.3 Plug Load Equipment Control - Vending Machine

Recommended plug load equipment control measures are summarized in Figure 19 below.

Figure 19 - Summary of Plug Load Equipment-Vending Machine ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	*Annual N/A Savings (MMBtu)*	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)
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**$166.78**	**$1,437.60**	**$0.00**	**$1,437.60**	**8.62**	**1,623**
ECM 5	Vending Machine Control	1,612	0.0	0.0	0.0	0.0	0.0	$166.78	$1,437.60	$0.00	$1,437.60	8.62	1,623

ECM 5: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,612	0.0	0.0	$166.78	$1,437.60	$0.00	$1,437.60	8.62	1,623

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor based controls to reduce the energy use. These controls power down the machine when the surrounding area is vacant, then monitor the surrounding temperature and power up the cooling system at regular intervals to keep the product cool. Savings are a function of the activity level around the vending machine.

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)
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**86.6**	**$682.53**	**$48,547.47**	**$2,612.00**	**$45,935.47**	**67.30**	**10,139**
Install High Efficiency Steam Boilers	0	0.0	86.6	$682.53	$48,547.47	$2,612.00	$45,935.47	67.30	10,139
TOTALS	**0**	**0.0**	**86.6**	**$682.53**	**$48,547.47**	**$2,612.00**	**$45,935.47**	**67.30**	**10,139**

* - 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 High Efficiency Steam 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	86.6	$682.53	$48,547.47	$2,612.00	$45,935.47	67.30	10,139

Measure Description

This measure evaluates replacing old inefficient steam boilers with high efficiency steam boilers. Significant improvements have been made in combustion technology resulting in increases in overall boiler efficiency. Savings result from improved combustion efficiency and reduced standby losses at low loads.

Reasons for not Recommending

The simple payback of this measure is 67 years which is four times the threshold of 16 years. As a result, the measure is 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.

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.

Turn Off Unneeded Motors

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

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.

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.

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.

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).

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.

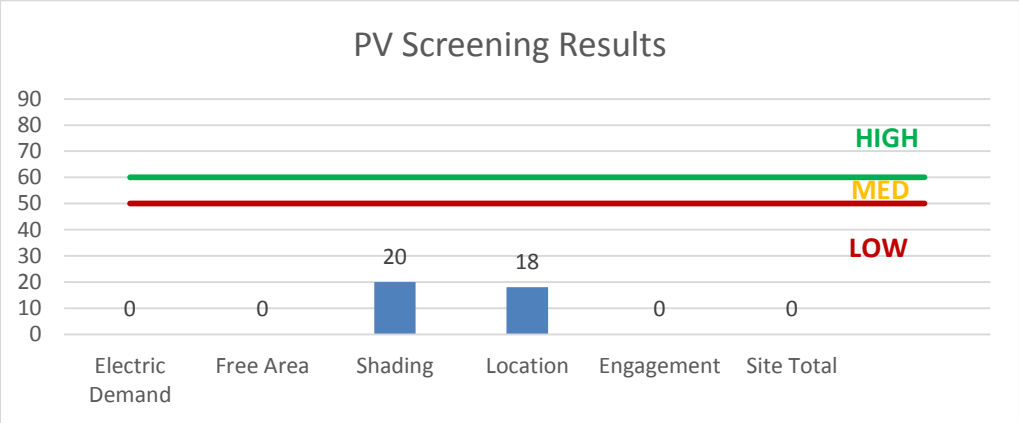
Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, 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 array and there are not anymore 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.

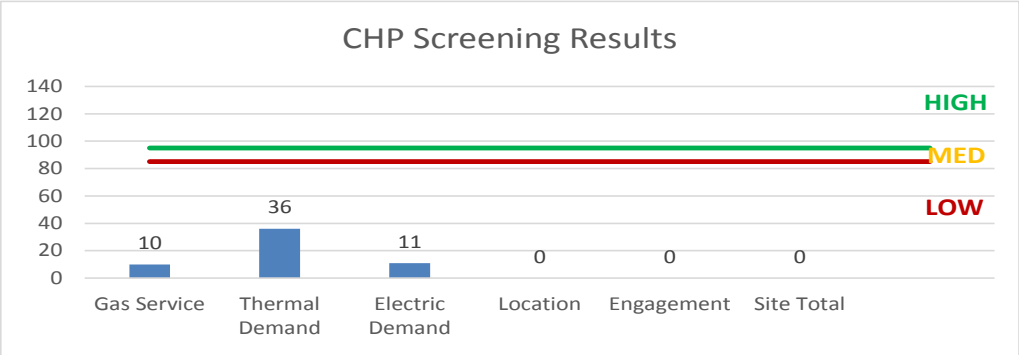
CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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		x
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x
ECM 3	Install Occupancy Sensor Lighting Controls			x
ECM 4	Install High Efficiency Electric AC	x		x
ECM 5	Vending Machine Control			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 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 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
Main Entrance Hallway	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Entrance Hallway	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	None	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
North-South Wing Hallway	7	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	None	No	7	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
East-West Wing Hallway	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	None	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
East-West Wing Hallway	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
Main Lobby	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Lobby	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Lobby	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gymnasium	10	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	None	No	10	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gymnasium	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gymnasium Storage	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,860	None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	None	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office - Senior Center	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,860	None	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room A	24	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	None	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.17	675	0.0	$69.82	$116.00	$20.00	1.37
Room A	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,860	0.02	94	0.0	$9.70	$117.00	$0.00	12.06
Men's Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,002	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,002	0.02	66	0.0	$6.79	$117.00	$0.00	17.24
Women's Bathroom	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,002	Relamp & Reballast	No	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,002	0.02	66	0.0	$6.79	$117.00	$0.00	17.24
Room B	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	None	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.11	422	0.0	$43.64	$116.00	$20.00	2.20
Room D	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Bathroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	None	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
After school Office	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	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	2,002	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room C	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	None	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Bathroom	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	2,860	0.00	0	0.0	$0.00	$107.00	$10.00	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
Room C2	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.02	84	0.0	$8.73	$467.00	$50.00	47.78
Closet	2	Compact Fluorescent: Spiral 32W	Wall Switch	32	2,860	Fixture Replacement	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	7	2,860	0.04	162	0.0	$16.72	$127.30	$0.00	7.61
Women's Bathroom	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Youth Center	48	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	None	No	48	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Youth Center	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Study Room	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,860	None	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,002	0.06	225	0.0	$23.27	$116.00	$20.00	4.12
Secretary Office	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	None	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	1	Compact Fluorescent: Recessed Spiral 32W	Wall Switch	32	2,860	Fixture Replacement	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	7	2,860	0.02	81	0.0	$8.36	$63.65	$0.00	7.61
Storage	2	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	None	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	None	Yes	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,002	0.06	240	0.0	$24.88	$116.00	$20.00	3.86
Storage	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	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	2,002	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Women's Bathroom	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	None	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	1	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	None	No	1	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room E	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Room 4	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Room 6	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Kitchen	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	No	15	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.40	1,600	0.0	$165.53	$1,755.00	$150.00	9.70
Room 7	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Room 5	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Boy's Bathroom	2	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	None	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Girl's Bathroom	2	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	None	No	2	LED - Fixtures: Downlight Recessed	Wall Switch	8	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 10	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.41	1,617	0.0	$167.34	$1,520.00	$140.00	8.25
Room 11	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Room 12	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13

	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
Room 13	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Office	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Room 9	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,860	Relamp & Reballast	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,002	0.51	2,021	0.0	$209.17	$1,871.00	$170.00	8.13
Exterior Perimeter Light	5	Halogen Incandescent: Flood Light - Ceiling Mounted	Daylight Dimming	70	1,430	Fixture Replacement	No	5	LED - Fixtures: Downlight Solid State Retrofit	Daylight Dimming	7	1,430	0.26	509	0.0	$52.67	$318.26	$25.00	5.57
Exterior Perimeter Light	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	40	1,430	None	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	40	1,430	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	None	No	5	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,860	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	1	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	1,430	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	75	1,430	0.31	619	0.0	$64.04	$390.68	$100.00	4.54

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
Mechanical Room	Mechanical Room	1	Combustion Air Fan	1.5	82.0%	No	1,040	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	1	Combustion Air Fan	1.5	82.0%	No	0	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	2	Condenser Water Pump	1.0	81.0%	No	1,040	No	81.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Mechanical Room	2	Boiler Feed Water Pump	0.8	76.0%	No	1,040	No	76.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Restroom	5	Exhaust Fan	0.2	72.0%	No	1,300	No	72.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Senior Center	Classrooms	17	Other	0.2	77.0%	No	1,040	No	77.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room A	Room A	1	Window AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room B	Room B	1	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room D	Room D	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office	Office	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room C1	Room C1	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room C2	Room C2	1	Window AC	2.00		Yes	1	Window AC	2.00		12.00		No	1.58	2,673	0.0	$276.61	$2,177.52	$0.00	7.87
Youth Center	Youth Center	2	Window AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room E/Room4/Room6/Room7/ Room5	Room E/Room4/Room6/Room7/ Room5	5	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 10	Room 10	1	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 11	Room 11	1	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 12	Room 12	1	Window AC	1.97		Yes	1	Window AC	1.50		12.00		No	1.87	3,165	0.0	$327.47	$1,633.14	$0.00	4.99
Room 13	Room 13	1	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Office	Office	1	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 9	Room 9	1	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Gymnasium	2	Packaged AC	7.50		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
Mechanical Room	Facility	1	Induced Draft Steam Boiler	2,607.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Facility	1	Induced Draft Steam Boiler	2,612.00	Yes	1	Induced Draft Steam Boiler	2,612.00	86.70%	Et	0.00	0	86.6	$682.53	$48,547.47	$2,612.00	67.30

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
Mechanical Room	Building	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?
Facility	45	Desktop Computer with LCD Monitor	191.0	Yes
Facility	8	Microwave	1,000.0	No
Facility	5	Copy Machine	600.0	Yes
Facility	10	Printer	460.0	Yes
Facility	9	TV	128.0	Yes
Facility	3	Water Fountain	92.0	No
Facility	8	Refrigerator	250.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	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
Youth Center	1	Refrigerated	Yes	0.00	1,612	0.0	$166.78	$718.80	$0.00	4.31
Youth Center	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$718.80	$0.00	0.00

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

N/A

ENERGY STAR® Score[1]

Evergreen Senior Center

Primary Property Type: Social/Meeting Hall
Gross Floor Area (ft²): 28,250
Built: 1958

For Year Ending: July 31, 2017
Date Generated: September 05, 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
Evergreen Senior Center 400 Inman Ave Colonia, New Jersey 07067	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: 5880909

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
95.6 kBtu/ft²

Source EUI
117.2 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Electric - Solar (kBtu)	434,170 (16%)	National Median Site EUI (kBtu/ft²)	57
Natural Gas (kBtu)	2,029,936 (75%)	National Median Source EUI (kBtu/ft²)	69.8
Electric - Grid (kBtu)	237,555 (9%)	% Diff from National Median Source EUI	68%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	134

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)