Local Government Energy Audit:
Energy Audit Report

Municipal Building

Borough of Folsom

1700 12th Street

Folsom, NJ 08037

October 14, 2016

Final Report by:

TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities associated with recommended upgrades to the facility's systems at this site. Approximate saving are included in this report to make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. It should be noted that detailed design efforts are required in order to implement several of the improvements evaluated as part of this energy analysis.

The energy conservation measures and estimates of energy consumption contained in this report have been reviewed for technical accuracy. However, all estimates contained herein of energy consumption at the site are not guaranteed, because energy consumption ultimately depends on behavioral factors, the weather, and many other uncontrollable variables. The energy assessor and New Jersey Board of Public Utilities (NJBPU) shall in no event be liable should the actual energy consumption vary from the estimated consumption shown herein.

Estimated installation costs are based on a variety of sources, including our own experience at similar facilities, our own pricing research using local contractors and vendors, and cost estimating handbooks such as those provided by RS Means. The cost estimates represent our best judgment for the proposed action. The Owner 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 a particular installation, and for conditions which cannot be known prior to in-depth investigation and design, the energy assessor does not guarantee installed cost estimates and shall in no event be liable should actual installed costs vary from the estimated costs herein.

New Jersey's Clean Energy Program (NJCEP) incentive values provided in this report are estimates and are based on program information available at the time this report is written. The NJBPU reserves the right to extend, modify, or terminate programs without prior or further notice, including incentive levels and eligibility requirements. The Owner should review available program incentives and requirements prior to selecting and/or installing any recommended 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 Municipal Building.

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, as part of a comprehensive effort to assist The Borough of Folsom in controlling energy costs and protecting our environment by offering a full spectrum of energy management options.

1.1 Facility Summary

The Municipal Building is a 5,046 square foot single story facility comprised of various office space types; town offices, a conference room, and courthouse.

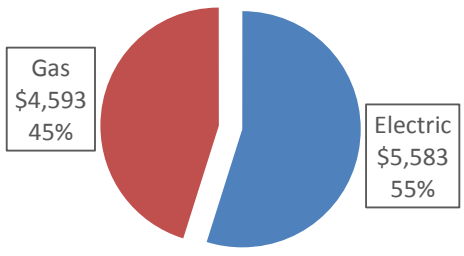
The Municipal Building consists mostly of systems that have been partially upgraded and could do with further improvement. A thorough description of the facility and our observations are located in Section 2 "Facility Information and Existing Conditions"

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

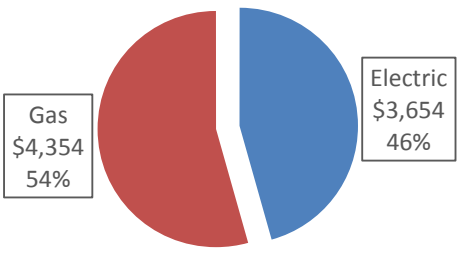
TRC Energy Services evaluated five (5) projects which represent an opportunity for the Municipal Building to reduce annual energy costs by roughly $2,167. The measures would pay for themselves in roughly 8 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce the Municipal Building's annual energy use by an estimated 13.4%, and results in a reduction in greenhouse gas emissions (GHG) of 16,041 lbs CO_2e.

Figure 1 –12 Month Utility Costs



$10,175

Figure 2 – Potential Post-Implementation Costs



$8,009

A detailed description of the Municipal Building's existing energy use can be found in Section 3, "Site Energy Use and Costs".

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 "Energy Conservation Measures".

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated NJCEP Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		7,418	1.8	0.0	0.0	$1,035.78	$7,594.74	$1,240.00	$6,354.74	6.14	7,470
ECM 1	Install LED Fixtures	3,599	0.8	0.0	0.0	$502.55	$2,734.74	$700.00	$2,034.74	4.05	3,624
ECM 2	Retrofit Fixtures with LED Lamps	3,819	1.0	0.0	0.0	$533.23	$4,860.00	$540.00	$4,320.00	8.10	3,845
Electric Unitary HVAC Measures		5,720	4.8	0.0	0.0	$798.76	$11,969.76	$736.00	$11,233.76	14.06	5,760
ECM 3	Install High Efficiency Electric AC	5,720	4.8	0.0	0.0	$798.76	$11,969.76	$736.00	$11,233.76	14.06	5,760
HVAC System Improvements		471	0.0	18.2	18.2	$304.11	$10.00	$0.00	$10.00	0.03	2,609
ECM 4	Install Programmable Thermostats	471	0.0	18.2	18.2	$304.11	$10.00	$0.00	$10.00	0.03	2,609
Domestic Water Heating Upgrade		200	0.0	0.0	0.0	$27.98	$35.85	$0.00	$35.85	1.28	202
ECM 5	Install Low-Flow DHW Devices	200	0.0	0.0	0.0	$27.98	$35.85	$0.00	$35.85	1.28	202
TOTALS		13,810	6.55	18.23	18.23	2,166.63	19,610.35	1,976.00	17,634.35	8.14	16,041

* - All incentives presented in this table are based on NJ Smart Start Building equipment Incentives and assume proposed equipment meets minimum performance criteria for that program.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Lighting Upgrades generally involve the replacement of existing lighting components such as lamps and ballasts (or the entire fixture) with higher efficiency lighting components. These measure save energy by reducing the power used by the lighting components due to improved electrical efficiency.

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.

HVAC System Improvements generally involve the installation of automated controls to reduce heating and cooling demand when conditions allow. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperatures. These measures save energy by reducing the demand on the systems and the amount of time systems operate.

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 Energy Services also identified five (5) no/low 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 Municipal Building include:

- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

For details on these Energy Efficient Practices, please refer to Section 5 "Energy Efficient Practices"

On-Site Generation Measures

TRC Energy Services also evaluated the potential for installing on-site generation sources for the Municipal Building. Based on the configuration of the site and its loads there is a low potential for installing any PV or combined heat and power on-site generation measures.

For details on our evaluation and the on-site generation potential, please refer to Section 6 "On-Site Generation Measures".

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 (SS)
- Direct Install (DI)
- 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 (SS) 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 SS incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SS program and will be explained further in Section 8 "Project Funding/Incentives", as well as the other programs as mentioned below.

This facility also qualifies for the Direct Install (DI) 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 8.4 “Energy Savings Improvement Program” for additional information on the ESIP Program.

Additional descriptions of all relevant incentive programs are located in Section 8 “Project Funding/Incentives”. You may also check the following website for further information on available rebates and incentives: 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 is consistent 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			
Patricia Gatto	Municipal Clerk	pgatto@folsomborough.com	609-561-3178
Designated Representative			
John LaPollo	Public Works Supervisor	N/A	N/A
TRC Energy Services			
Ignacio Badilla	Auditor	ibadilla@trcsolutions.com	212-221-7822

2.2 General Site Information

On May 12, 2016, TRC Energy Services performed an energy audit at the Municipal Building located in the Borough of Folsom. TRC Energy Services' team met with John LaPollo, Public Works Supervisor, to review the facility operations and focus the investigation on specific energy-using systems.

The Municipal Building, constructed in 1995, is a 5,046 square foot single story facility comprised of various office space types; town offices, a conference room, and courthouse. Over the last five years the facility has replaced all of its existing T12 fluorescent fixtures with T8 fluorescent fixtures as well as installed two new condensing furnaces in the drop ceiling.

2.3 Building Occupancy

The Municipal Building is open Monday through Friday from 8:30 am to 4:00 pm and from 7:00pm to 9:00 pm. The facility has about three (3) full time staff with an average of 15-25 visitors per day. Twice a month the court house is open, and on these days the facility sees approximately 100 visitors.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Municipal Building	Weekday	8:30 AM - 9:00 PM

2.4 Building Envelope

The facility is wood framed construction with drywall interior. The building has a gable and valley type roof with asphalt shingles in good condition. The building has double pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum and are in good condition.

2.5 On-site Generation

The Municipal Building does not have any on-site electric generation equipment.

2.6 Energy-Using Systems

Lighting System

The interior building lighting is provided by T8 32 Watt linear fluorescent lamps with electronic ballasts. All of the spaces use 2-lamp, 2-foot wide by 4-foot long troffers with diffusers. John LaPollo indicated that the building had a comprehensive T-8 retrofit in 2010 through the DI program.

Lighting control in most spaces is already provided by occupancy sensors, which are either wall or ceiling mounted depending on the space layout.

Exterior building lighting is provided primarily by 175 watt metal halide fixtures that are controlled by timers. The building also had LED downlights in the exterior overhang in the front of the facility.

Standard T8 Lamp

175 Watt Metal Halide

Space Heating

Building space heating is provided by two (2) Bryant Pus 95S 140 MBtu/hr. condensing furnaces. The furnaces have an AFUE of 94% and were installed within the last five years. They are located in the drop ceiling of the facility and exhaust through the facility roof. The furnaces are in good condition and there were no problems reported by the facility staff.

Air Conditioning (DX)

Three (3) split systems are used to condition the facility. Two (2) Carrier split systems rated at 3 and 5 tons are 21 years old with noticeable wear but both in operable condition. The Rheem 5 ton system was installed in 2009 and is in good condition.

The 3 Ton split system's supply is an air handler located in the drop ceiling of the facility by the courtroom. The two (2) 5 Ton split systems feed into the new condensing furnaces located in the drop ceiling closer to the office areas. The units are controlled by two programmable thermostats, however, one thermostat was not programmed at all, while the other did not have an accurate schedule.

3 Ton Unit

5 Ton Unit

Domestic Hot Water (DHW)

The domestic hot water system for the facility consists of one (1) Bradford White 19 Gallon storage electric water heater. The water heater is in good condition and located in the maintenance closet of the facility.

Plug load & Vending Machines

Plug loads in the building consist mainly of office equipment, small kitchen appliances, and plug-in electric heaters (space heaters) that staff provided from home.

As mentioned above, it was observed that a number of space heaters were being used in office spaces for supplemental heating. This might be as a result of thermostats not being properly programmed, or the furnace not being adequately sized to meet the heating load of the building. It is our recommendation that you communicate with your facilities manager or an HVAC contractor to better understand why these space heaters are being used.

Please refer to Appendix A: Equipment Inventory & Recommendations for an inventory of all of your equipment.

2.7 Water-Using Systems

There are three (3) restrooms at this facility. All the faucets were found to have standard flow rates of 2.2 gallons per minute (gpm), the toilets and urinals have standard flush rates of 1.6 gallons per flush (gpf) and 1 gallon per flush (gpf) respectively.

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: Public Order/Safety. 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 Section 3.4 "Benchmarking" for additional information.

3.1 Total Cost of Energy

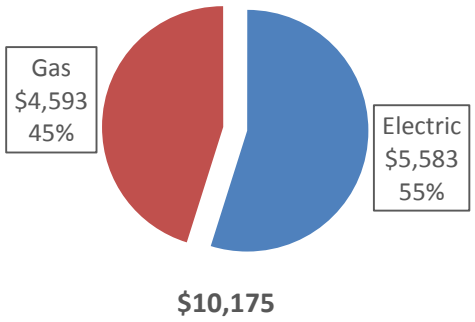
The following energy consumption and cost data is based on 12 months of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Municiapl Building		
Fuel	Usage	Cost
Electricity	39,981 kWh	$5,583
Natural Gas	3,513 Therms	$4,593
Total		$10,175

The annual utility cost for this site is $10,175 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost (combined for commodity, transmission and distribution) for 12 months of provided utility data is $0.140/kWh, which is the blended rate used throughout the analyses in this report. The facility is billed for demand, however, we were only provided with summary data that does not include demand charges. The monthly electricity consumption and peak demand is represented graphically in the chart below. The Municipal Building currently doesn't receive electricity from a 3rd party supplier.

Figure 8 - Graph of 12 Months Electric Usage & Demand

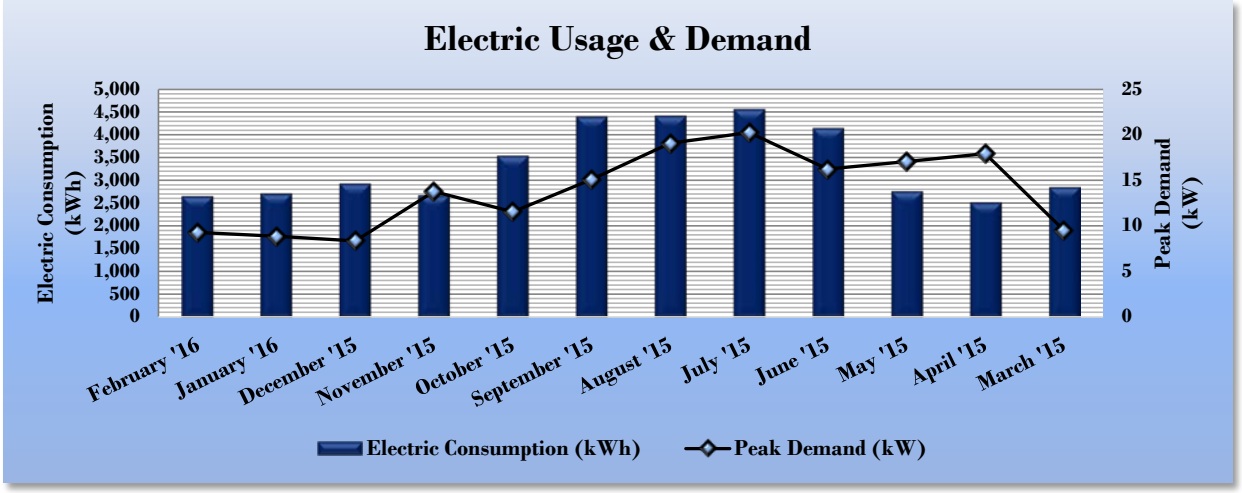


Figure 9 - Table of 12 Months Electric Usage & Demand

Electric Billing Data for Municiapl Building					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
2/23/16	31	2,655	9	$0	$426
1/23/16	31	2,717	9	$0	$436
12/23/15	32	2,933	8	$0	$470
11/21/15	26	2,683	14	$0	$435
10/26/15	32	3,546	12	$0	$576
9/24/15	30	4,399	15	$0	$725
8/25/15	29	4,416	19	$0	$733
7/27/15	35	4,565	20	$0	$763
6/22/15	33	4,147	16	$0	$366
5/20/15	28	2,763	17	$0	$234
4/22/15	30	2,518	18	$0	$217
3/23/15	30	2,858	10	$0	$232
Totals	367	40,200	20.25	$0	$5,613
Annual	365	39,981	20.25	$0	$5,583

3.3 Natural Gas Usage

Natural Gas is provided by South Jersey Gas, and 3rd party supply is from Woodruff Energy. The average gas cost for 12 months of provided data is $1.307/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 - Graph of 12 Months Natural Gas Usage

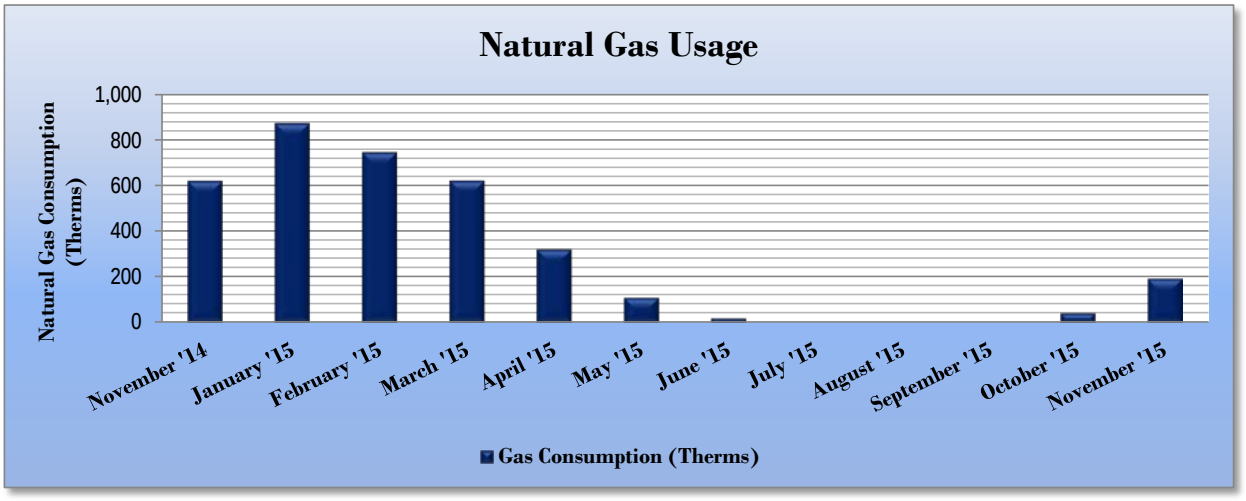


Figure 11 - Table of 12 Months Natural Gas Usage

Gas Billing Data for Municiapl Building			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/15/14	31	622	$826
1/21/15	37	875	$1,085
2/20/15	30	748	$924
3/23/15	31	623	$774
4/21/15	29	321	$413
5/20/15	29	109	$157
6/22/15	33	19	$54
7/23/15	31	0	$30
8/20/15	28	0	$27
9/18/15	29	0	$28
10/21/15	33	42	$79
11/18/15	28	193	$244
Totals	369	3,551	$4,643
Annual	365	3,513	$4,593

3.4 Benchmarking

This facility was benchmarked through Portfolio Manager, an online tool created and managed by the United State 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. Energy use intensity is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more 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		
	Municiapl Building	National Median Building Type: Public Order/Safety
Source Energy Use Intensity (kBtu/ft^2)	158.0	100.4
Site Energy Use Intensity (kBtu/ft^2)	96.7	49.6

By implementing all recommended measures covered in this reporting, the Project'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		
	Municiapl Building	National Median Building Type: Public Order/Safety
Source Energy Use Intensity (kBtu/ft^2)	124.9	100.4
Site Energy Use Intensity (kBtu/ft^2)	83.7	49.6

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 77.

The Portfolio Manager, Statement of Energy Performance can be found in Appendix B: EPA Statement of Energy Performance. A score of 77 makes your facility eligible for Energy Star certification. Please reference the website below for guidance on how to obtain certification.

https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1

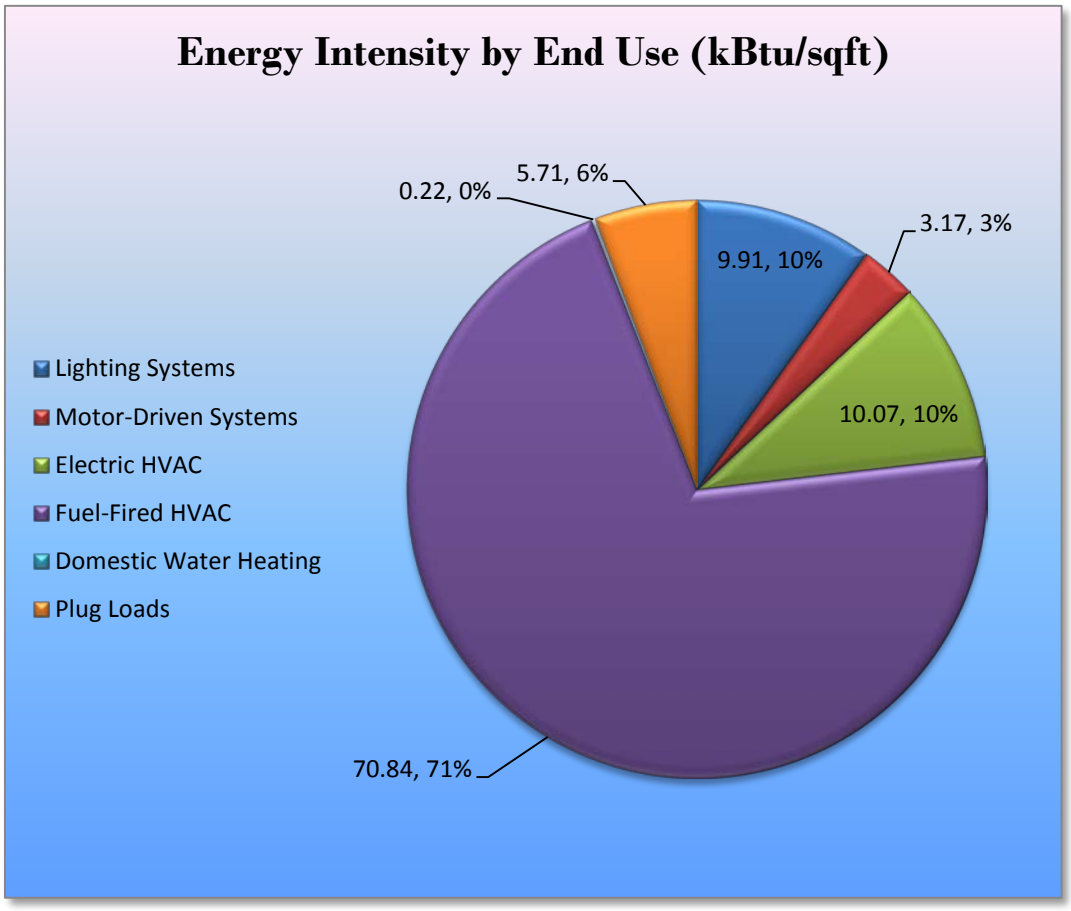
A Portfolio Manager account has been created for you, and you will be provided with your login information. We encourage you to keep up with updating your utility information in Portfolio Manager, so that you can keep track of your building's performance. There is free training available from Energy Star Portfolio Manager, which you can access at the following website:

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 and %)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy projects, help prioritize specific measures for implementation, and set the Municipal Building on the path to receive financial incentives. 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 considered sufficient to make "Go/No-Go" decisions and to prioritize energy projects. Savings are based on the New Jersey Board of Public Utilities, Clean Energy Program "Protocols to Measure Resource Savings" dated March 17, 2014. Further analysis or investigation may be required to calculate more accurate savings to support any custom SmartStart, Pay for Performance, or Large Energy Users incentive applications. *Financial incentives for the ECMs identified in this report have been calculated based on the NJ prescriptive SmartStart program*. Depending on your implementation strategy, the project may be eligible for more lucrative incentives through other programs as identified in Section 8 "Project Funding/Incentives".

The following sections describe the evaluated measures.

4.1 Lighting Upgrades

Lighting Upgrades include two (2) "submeasures" as outlined in Figure 15 below.

Figure 15 – 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 NJCEP Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		7,418	1.8	0.0	$1,035.78	$7,594.74	$1,240.00	$6,354.74	6.14	7,469
ECM	Install LED Fixtures	3,599	0.8	0.0	$502.55	$2,734.74	$700.00	$2,034.74	4.05	3,624
ECM	Retrofit Fixtures with LED Lamps	3,819	1.0	0.0	$533.23	$4,860.00	$540.00	$4,320.00	8.10	3,845
TOTALS		7,418	1.80	0.00	1,035.78	7,594.74	1,240.00	6,354.74	6.14	7,469

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 NJCEP Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Exterior	3,599	0.8	0.0	$502.55	$2,734.74	$700.00	$2,034.74	4.05	3,624

Measure Description

This measure evaluates replacing existing fixtures containing metal halides 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 that of 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 Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated NJCEP Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	3,819	1.0	0.0	$533.23	$4,860.00	$540.00	$4,320.00	8.10	3,845

Measure Description

This measure evaluates replacing linear fluorescent lamps with LED tube lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. Screw-in/plug-in LED lamps can be used as a direct replacement for most other screw-in/plug-in lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

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

4.2 Electric Unitary HVAC Measures

ECM 3: 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 NJCEP Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,720	4.8	0.0	$798.76	$11,969.76	$736.00	$11,233.76	14.06	5,760

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.

4.3 HVAC System Improvements

ECM 4: Install Programmable Thermostats

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated NJCEP Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
471	0.0	18.2	$304.11	$10.00	$0.00	$10.00	0.03	2,609

Measure Description

This measure evaluates programming the existing programmable thermostats which can be set to maintain different temperature settings for different times of day and days of the week. By setting the heating temperature setpoint down and the cooling temperature setpoint up, for times that the conditioned space is not occupied, the operation of the HVAC equipment is reduced while still maintaining reasonable space temperatures during unoccupied periods.

The thermostat provides savings by reducing heating and cooling energy when a room is unoccupied.

4.4 Domestic Water Heating Upgrade

ECM 5: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated NJCEP Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
200	0.0	0.0	$27.98	$35.85	$0.00	$35.85	1.28	202

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.

Installing low flow faucets or faucet aerators l 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 gallons per minute (gpm) for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

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

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4" Energy Conservation Measures", 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.

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.

Perform Proper Furnace Maintenance

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

Perform 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 galvanic anode annually.

Plug Load Controls

There are a variety of ways to limit the energy use of plug loads including increasing occupant awareness, removing under-utilized equipment, installing hardware controls, and using software controls. Some control steps to take are to enable the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips. For additional information refer to "Assessing and Reducing Plug and Process Loads in Office Buildings" http://www.nrel.gov/docs/fy13osti/54175.pdf, or "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices

Water Conservation

Conserving water is very closely linked to saving energy; electricity or gas is used to heat water, so the less hot water used, the less energy is needed to heat the water. Water conservation reduces the significant energy demands of local water companies to treat and pump water to your facilities, and to treat sewage. So, water conservation helps to reduce the system-wide demand for energy which helps control utility costs for everyone.

The following are tips that can set you on a path towards water conservation/efficiency:

- Audit your current water use: Energy Star Portfolio Manager can be used to track and understand your water use.
- Repair leaking pipes, fixtures, and seals. Small leaks can add up to many gallons of water and dollars wasted.
- Use water-saving faucets, showerheads, and toilets/urinals.
- In kitchen areas, use low-flow pre-rinse spray valves.
- Choose WaterSense® labelled equipment and appliances: (https://www3.epa.gov/watersense/products)
- Set water temperature only as hot as needed. A hot water setting of 110-120 degrees is recommended to prevent scalds and save energy
- Educate employees about the importance of water conservation.
- When landscaping, choose plants native to the climate that require minimal watering. If local code allows, consider diverting “gray water” (i.e. runoff collected from rooftops) for irrigation.
- Lawns and gardens require 1/5 inch of water per day during warm weather, less during spring, fall or cool weather. Water lawns every three to five days, rather than for a short period every day, and try and water during the cooler part of the day (morning or evening). Use sprinkler timers (shut-off/on-off) if possible, and do not leave sprinklers on all day!
- Cover your pool: The average pool takes 22,000 gallons of water to fill, and if it is not covered, hundreds of gallons of water per month can be lost due to evaporation.

Refer to Section 4.4 ‘Domestic Water Heating Upgrade” for any low-flow ECM recommendations.

6 On-site generation Measures

On-site generation measures include both renewable (e.g., solar, wind) and non-renewable (e.g., microturbines) 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 an on-site generation project could provide a cost-effective solution for this 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.

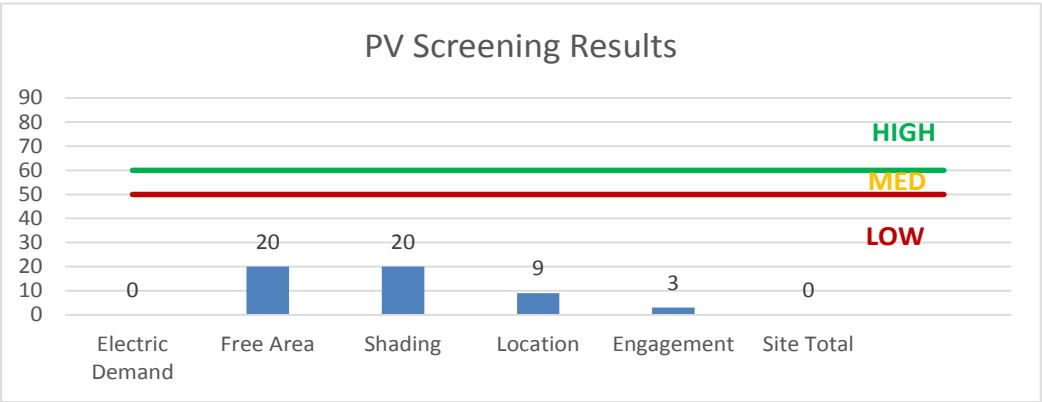
6.1 Photovoltaic

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.

As requested by the customer, the installation of a PV system was evaluated and a preliminary screening done. Based on the facility's electric demand, size and location of free area, and shading elements, it was determined that the facility has a low potential for installing a PV array.

In order to be cost-effective, a solar PV array generally needs a minimum of 4,000 sq ft of flat or south-facing rooftop (based on installing a 50kW array), or other unshaded space, on which to place the PV panels. The facilities kW usage is too low to warrant a PV system. In our opinion, the facility does not appear to meet these minimum criteria for cost-effective PV installation. If the Municipal Building is interested in pursuing the installation of PV, we recommend a full feasibility study be conducted.

Figure 16 - Photovoltaic Screening



Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC Registration Program prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing. Refer to Section 8.3 "SREC Registration Program" for additional information.

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

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

6.2 Wind Generation

According to information published by National Renewable Energy Lab (NREL), NJ is generally not a good candidate for wind power, however. For further information on wind power, contact the NREL.

6.3 Combined Heat and Power

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 limited to low potential for installing a cost-effective CHP system.

7 DEMAND RESPONSE

Demand Response (DR) is a program designed to reduce consumer electric load when electric wholesale prices are high or when the reliability of the electric grid is threatened due to peak demand. DR service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability locally.

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

Due to low demand during peak demand hours, there is limited to no opportunity to employ a Demand Response (DR) program.

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 are able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU is an alternative financing program described later in this section. Please refer to Figure 17 for a list of the eligible programs identified for each ECM.

Figure 17 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x		x			
ECM 2	Retrofit Fixtures with LED Lamps	x		x			
ECM 3	Install High Efficiency Electric AC	x		x			
ECM 4	Install Programmable Thermostats	x		x			
ECM 5	Install Low-Flow DHW Devices			x			

SmartStart (SS) 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 (DI) caters to small to mid-size facilities to bundle measures and simplify participation, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities and requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption; applicants can use in-house staff or preferred contractor.

Generally, the incentive values provided throughout the report assume the SS 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 (SS) program is comprised of New Construction and Retrofit components that offer incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives for various energy efficiency equipment based on national/market trends, new technologies or changes in efficiency baselines.

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*

All customer sizes and types may be served by this program. This program provides an effective mechanism for securing incentives for individual projects that may be completed at once or over several years.

Incentives

The prescriptive path provides fixed incentives for specific energy efficiency measures whereas the custom measure path provides incentives for unique or specialized technologies that are not addressed through prescriptive offerings.

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

** This program is not accepting applications at this time, but is expected to re-open in August 2016.*

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

8.3 SREC Registration Program

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

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

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

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

Information about the SRP can be found at: www.NJCleanEnergy.com/SREC

8.4 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 NJCEP Incentives	Simple Payback w/ Incentives in Years
kitchen/conference area	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.05	170	0.0	$23.69	$270.00	$30.00	10.13
hallway	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,250	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	40	3,250	0.11	485	0.0	$67.69	$540.00	$60.00	7.09
hallway	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,760	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	40	8,760	0.05	653	0.0	$91.23	$270.00	$30.00	2.63
mens	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	1,500	0.04	75	0.0	$10.41	$180.00	$20.00	15.36
womens	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,500	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	1,500	0.04	75	0.0	$10.41	$180.00	$20.00	15.36
court room	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,500	Relamp	No	16	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	40	1,500	0.29	597	0.0	$83.31	$1,440.00	$160.00	15.36
hallway	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,760	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	40	8,760	0.07	871	0.0	$121.64	$360.00	$40.00	2.63
judges office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	520	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	520	0.02	13	0.0	$1.81	$90.00	$10.00	44.32
copy room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.02	57	0.0	$7.90	$90.00	$10.00	10.13
municipal clerk	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.04	113	0.0	$15.79	$180.00	$20.00	10.13
CFA Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	520	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	520	0.02	13	0.0	$1.81	$90.00	$10.00	44.32
Construction Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.07	226	0.0	$31.59	$360.00	$40.00	10.13
Mayors Office	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	800	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	800	0.02	20	0.0	$2.78	$90.00	$10.00	28.81
Records	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.04	113	0.0	$15.79	$180.00	$20.00	10.13
Utility Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.02	57	0.0	$7.90	$90.00	$10.00	10.13
Tax Collector	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.04	113	0.0	$15.79	$180.00	$20.00	10.13
Front Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,275	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	40	2,275	0.05	170	0.0	$23.69	$270.00	$30.00	10.13
Building Walls	7	Metal Halide: (1) 175W Lamp	None	215	3,250	Fixture Replacement	No	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	None	75	3,250	0.80	3,599	0.0	$502.55	$2,734.74	$700.00	4.05
Front Building	6	LED - Fixtures: Ambient - 6' - Direct Fixture	None	12	3,250	None	No	6	LED - Fixtures: Ambient - 6' - Direct Fixture	None	12	3,250	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 NJCEP Incentives	Simple Payback w/ Incentives in Years
bathroom 1	bathroom1	1	Exhaust Fan	0.2	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
bathroom 2	bathroom2	1	Exhaust Fan	0.2	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Bathroom 3	bathroom3	1	Exhaust Fan	0.2	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
exhaust fan 1	left side	1	Exhaust Fan	0.5	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
exhaust fan 2	right side	1	Exhaust Fan	0.5	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
furnace fans	whole building	2	Supply Fan	0.3	85.0%	Yes	2,745	No	85.0%	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 NJCEP Incentives	Simple Payback w/ Incentives in Years
outside	front and offices	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		18.00		No	1.80	2,145	0.0	$299.53	$4,488.66	$276.00	14.06
outside	perimeter	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		18.00		No	2.99	3,575	0.0	$499.22	$7,481.10	$460.00	14.06
outside	perimeter	1	Split-System AC	5.00		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 NJCEP Incentives	Simple Payback w/ Incentives in Years
Drop Ceiling	whole building	2	Furnace	140.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Programmable Thermostat Recommendations

		Recommendation Inputs				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	Thermostat Quantity	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total NJCEP Incentives	Simple Payback w/ Incentives in Years
hallway	offices	1	10.00		280.00	0.00	471	18.2	$304.11	$329.87	$0.00	1.08

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 NJCEP Incentives	Simple Payback w/ Incentives in Years
Maintenance	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 NJCEP Incentives	Simple Payback w/ Incentives in Years
mens	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	80	0.0	$11.19	$14.34	$0.00	1.28
womens	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	80	0.0	$11.19	$14.34	$0.00	1.28
employee	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	40	0.0	$5.60	$7.17	$0.00	1.28

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
conference	1	32 Inch CRT	250.0	No
conference	1	philips DVD	20.0	No
conference	1	Keurig	1,500.0	No
conference	1	microwave	1,200.0	No
conference	1	minifridge	250.0	No
Conference	1	Water Cooler/heater`	429.0	NO
Offices	3	Portable Electric Heaters	1,500.0	No
Offices	7	Computers	200.0	No
offices	3	Printers	200.0	No

Appendix B: EPA Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Municipal Building

Primary Property Type: Courthouse
Gross Floor Area (ft²): 5,046
Built: 1995

For Year Ending: February 29, 2016
Date Generated: May 23, 2016

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
Municipal Building 1700 12th Street Folsom, New Jersey 08037	_____ . (____)____-_____	____ _____ . (____)____-_____ _____

Property ID: 4991974

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
77.8 kBtu/ft²

Source EUI
138.7 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	255,000 (65%)
Electric - Grid (kBtu)	137,694 (35%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	94.2
National Median Source EUI (kBtu/ft²)	168
% Diff from National Median Source EUI	-17%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	32

Signature & Stamp of Verifying Professional

_____ (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)