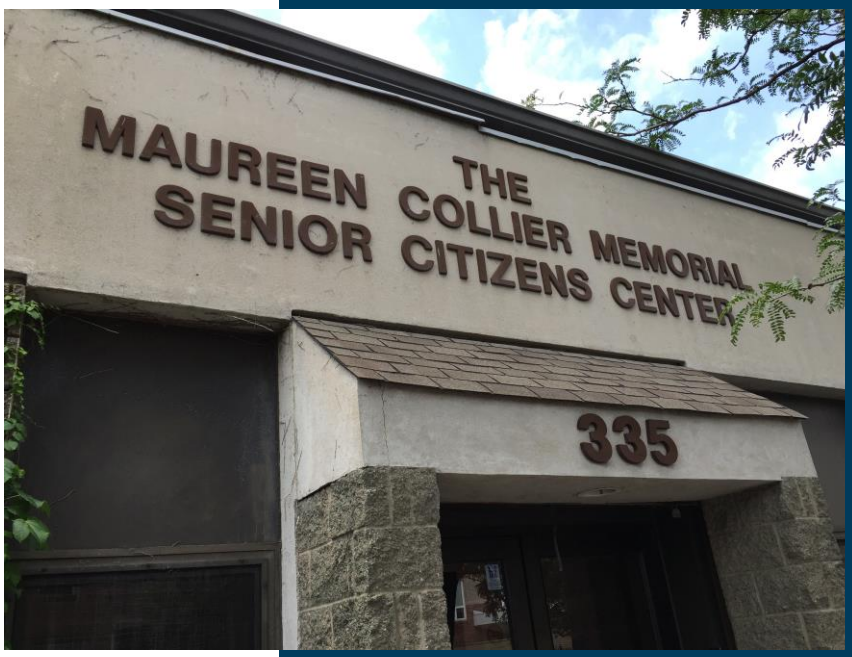
Local Government Energy Audit:
Energy Audit Report



Maureen Collier Senior Center

City of Jersey City
335 Bergen Avenue
Jersey City, NJ 07304

February 19, 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.

Table of Contents

Table of Figures

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Pershing Field Athletic Complex. The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can help to reduce your energy usage, and put you in a position to implement the recommended ECMs. The LGEA program also helps you 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 governments in reducing their energy usage, to help them control costs, reduce demand on energy systems, and help protect our environment.

1.1 Facility Summary

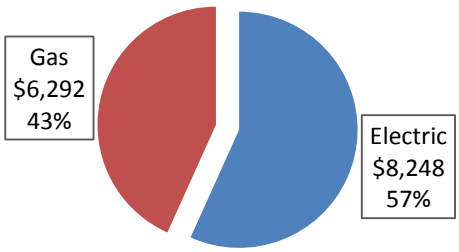
Maureen Collier Senior Center is a single story 6,500 square foot facility. The building is used for public gatherings and other recreational purposes. The building has an office, kitchen, a large hall, and two (2) entertainment rooms. The building is occupied throughout the year and is open to the public. Typically 20–30 people occupy the building at all times, including the staff. The HVAC equipment is original to the facility and it's lit with mostly aging and inefficient lighting. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

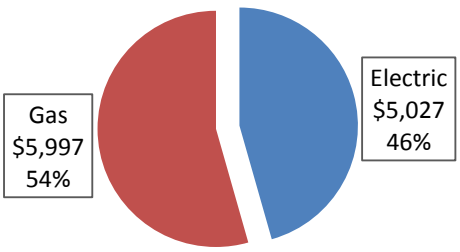
TRC evaluated six (6) measures which together represent an opportunity to reduce energy costs by roughly $2,377 per year and annual greenhouse gas emissions by 19,656 lbs CO_2e per year. We estimate that the measures would likely pay for themselves in energy savings in roughly 5.57 years. The breakdown of existing utility costs and potential utility costs following the proposed upgrades is shown in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce Maureen Collier Senior Center's annual energy usage by about 13.1%.

Figure 1 – Previous 12 Month Utility Costs



$14,541

Figure 2 – Potential Post-Implementation Costs



$11,024

A detailed description of the facility'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.

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			**14,139**	**4.9**	**0.0**	**$1,858.97**	**$13,265.68**	**$1,020.00**	**$12,245.68**	**6.59**	**14,238**
ECM 1	Install LED Fixtures	Yes	1,443	0.5	0.0	$189.72	$3,906.77	$1,000.00	$2,906.77	15.32	1,453
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	9,552	4.1	0.0	$1,255.83	$8,444.97	$0.00	$8,444.97	6.72	9,619
ECM 3	Retrofit Fixtures with LED Lamps	Yes	17	0.0	0.0	$2.26	$53.50	$20.00	$33.50	14.85	17
ECM 4	Install LED Exit Signs	Yes	3,127	0.3	0.0	$411.16	$860.44	$0.00	$860.44	2.09	3,149
Lighting Control Measures			**1,697**	**0.7**	**0.0**	**$223.17**	**$1,050.00**	**$95.00**	**$955.00**	**4.28**	**1,709**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	1,508	0.6	0.0	$198.25	$850.00	$95.00	$755.00	3.81	1,518
ECM 6	Install High/Low Lighitng Controls	Yes	190	0.1	0.0	$24.92	$200.00	$0.00	$200.00	8.03	191
Electric Unitary HVAC Measures			**2,163**	**2.2**	**0.0**	**$284.44**	**$11,969.76**	**$736.00**	**$11,233.76**	**39.49**	**2,179**
	Install High Efficiency Electric AC	No	2,163	2.2	0.0	$284.44	$11,969.76	$736.00	$11,233.76	39.49	2,179
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**19.2**	**$179.25**	**$6,457.34**	**$1,200.00**	**$5,257.34**	**29.33**	**2,254**
	Install High Efficiency Furnaces	No	0	0.0	19.2	$179.25	$6,457.34	$1,200.00	$5,257.34	29.33	2,254
Domestic Water Heating Upgrade			**0**	**0.0**	**31.7**	**$294.99**	**$43.02**	**$0.00**	**$43.02**	**0.15**	**3,709**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	31.7	$294.99	$43.02	$0.00	$43.02	0.15	3,709
TOTAL OF ALL EVALUATED ECMS			**18,000**	**7.8**	**50.9**	**$2,840.83**	**$32,785.80**	**$3,051.00**	**$29,734.80**	**10.47**	**24,088**
TOTAL OF ALL RECOMMENDED ECMS			**15,837**	**6**	**32**	**$ 2,377.13**	**$ 14,358.70**	**$ 1,115.00**	**$ 13,243.70**	**5.57**	**19,656**

* - 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.

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.

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

Energy Efficient Practices

TRC also identified five (5) low (or no) cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at Maureen Collier Senior Center include:

- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly

- Practice Proper Use of Thermostat Schedules and Temperature Resets
- 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 measures at Maureen Collier Senior Center. Based on the configuration of the site and its electric load and thermal demand, there appears to be a low potential for installing solar PV systems or combined heat and power 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, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

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

1. SmartStart
2. Direct Install
3. Energy Savings Improvement Program (ESIP)

For facilities wanting to pursue only selected individual measures (or planning to phase implementation of selected measures over multiple years), incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to do the final design of the ECM(s) and do the installation. Program pre-approval is required for some SmartStart incentives, so only after receiving pre-approval should you proceed with ECM installation. The incentive estimates listed above in Figure 3 represent the SmartStart program. More details on this program and others are available in Section 8.

This facility may also qualifies for the Direct Install program. Direct Install uses an authorized network of participating contractors to assist customers with the implementation of multiple measures at once, rather than installing individual measures separately, or dividing the project into multiple phases over time. This program is designed to be turnkey and can provide an incentive up to 70% of the total cost of the project, as identified by the designated Direct Install contractor.

For facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.3 for additional information on the ESIP Program.

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
John Mercer	Assistant Business Administrator	jmercer@jcnj.org	201-547-4417
TRC Energy Services			
Smruti Srinivasan	Auditor	ssrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On July 13, 2015, TRC performed an energy audit at Maureen Collier Senior Center located in Jersey City, New Jersey. TRC's team met with Inez Frye to review the facility operations and focus the investigation on specific energy-using systems.

Maureen Collier Senior Center is a 6,500 square foot facility comprised of a single floor. This building is used for public gatherings and other recreational purposes. It includes an office, kitchen, a large hall, and two entertainment rooms.

The building was constructed in 1992. Since construction, the facility has not had any lighting upgrades and has mostly outdated and inefficient T12 fluorescent fixtures.

2.3 Building Occupancy

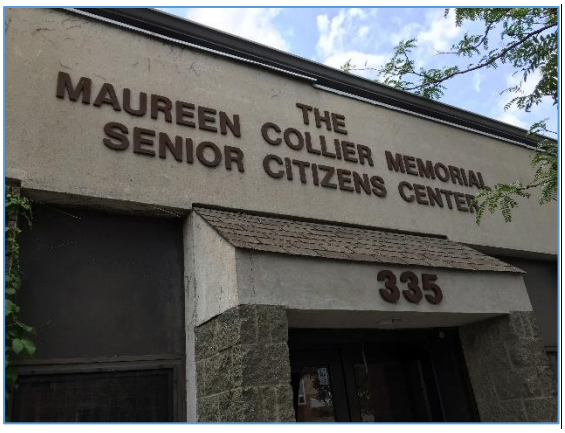
The typical schedule is presented in the table below. Building occupancy varies between 20-30 depending on events and activities The entire facility is used year-round.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Collier Senior Center	Weekday	9AM - 4:30PM
Collier Senior Center	Weekend	No operation

2.4 Building Envelope

The building is comprised of concrete masonry exterior walls with interior steel columns. The roof is steeply sloped and finished with asphalt-paper shingles. The windows are aluminum-framed double-pane glazed units. No excessive air-infiltration or leakage was observed. The glass doors are aluminum framed and fully glazed. The doors and windows are in good condition.



2.5 On-site Generation

Maureen Collier Senior Center does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Lighting System

Lighting at the facility is provided predominately by linear 40-Watt fluorescent T12 lamps, 2-foot U-bend T12 lamps, incandescent lamps, and compact fluorescent lamps (CFL).

Lighting control in most spaces is provided by manual wall switches. The exit light fixtures in the building use 45-Watt incandescent bulbs.

The exterior lighting primarily consists of 70-watt and 150-watt metal halide wall mounted fixtures.

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

Air Conditioning Systems (DX)

Cooling is provided by remote air conditioning condensing units located on the outside of the building. There are six (6) units ranging from 2 to 5 tons each; they use R-22 refrigerant. Two (2) 3 ton units and one (1) 2 ton unit were installed in the late 1991 and early 1992. These units are in poor condition and have been evaluated for replacements. Other three units (one (1) 3 ton and two (2) 5 ton units) were installed in 2010 and 2012 respectively. These units are in good condition. The space temperature in the building are controlled using programmable thermostats.

Gas-Fired Heating Equipment

The facility is being heated using has three (2) forced air gas fired YORK furnaces. Two (2) of these furnaces have an output capacity of 80 MBH and the other furnace has an output capacity of 125 MBh. The furnaces have a combustion efficiency of 80% and 78% respectively. The furnaces are about 20 years old, and have been evaluated for replacement.

Domestic Hot Water

The domestic hot water system for the facility consists of two (2) small electric heaters manufactured by RHEEM; they are located in the kitchen and the bathroom. They have storage capacities of 19.9 and 6 gallons respectively.

Food Service & Laundry Equipment

The building has a small scale commercial kitchen where food is prepared regularly. This is equipped with a gas-fired stove/oven with four (4) burners. There is also a milk steamer and a fryer. These are not high efficiency equipment but appear to be in good condition.



Plug load and Vending Machines

The plug load at the facility consists primarily of electric kitchen equipment, such as: a refrigerator, coffee machines, dishwashers, microwave ovens, etc. Other plug load equipment includes: televisions, space heaters and office equipment, such as computers and printers.

The facility does not have any vending machines.

2.7 Water-Using Systems

There are two (2) restrooms at this facility. The restroom fixtures are rated for 2.5 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush, and the urinals are rated at 2 (gpf).

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

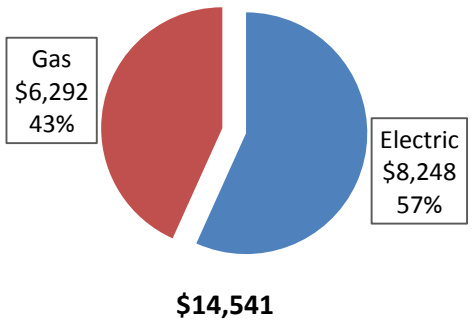
The following energy consumption and cost data is based on the most recent 12-month period of utility billing data that was available. A profile of the annual energy consumption and costs for the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Maureen Collier Senior Center		
Fuel	**Usage**	**Cost**
Electricity	53,169 kWh	$8,248
Natural Gas	6,756 Therms	$6,292
Total		**$14,541**

The current annual utility cost for this site is $14,541 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



$14,541

3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.131/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 8 - Electric Usage & Demand

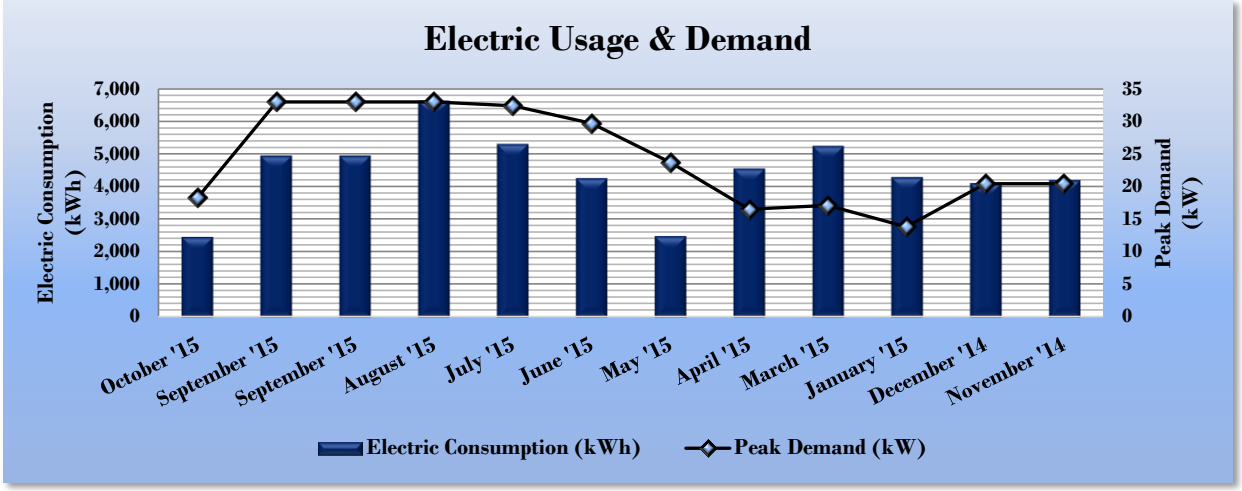


Figure 9 - Electric Usage & Demand

Electric Billing Data for Maureen Collier Senior Center					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
11/13/15	29	2,460	18	$80	$312
10/15/15	29	4,950	33	$144	$922
9/16/15	30	4,950	33	$143	$922
8/17/15	31	6,630	33	$143	$1,162
7/17/15	30	5,310	32	$141	$991
6/17/15	30	4,260	30	$129	$828
5/18/15	31	2,490	24	$103	$331
4/17/15	30	4,560	17	$72	$602
3/18/15	34	5,250	17	$74	$692
2/12/15	29	4,290	14	$60	$566
1/14/15	33	4,110	20	$88	$543
12/12/14	31	4,200	20	$88	$423
Totals	**367**	**53,460**	**33**	**$1,265**	**$8,294**
Annual	**365**	**53,169**	**33**	**$1,258**	**$8,248**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $0.931/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 10 - Natural Gas Usage

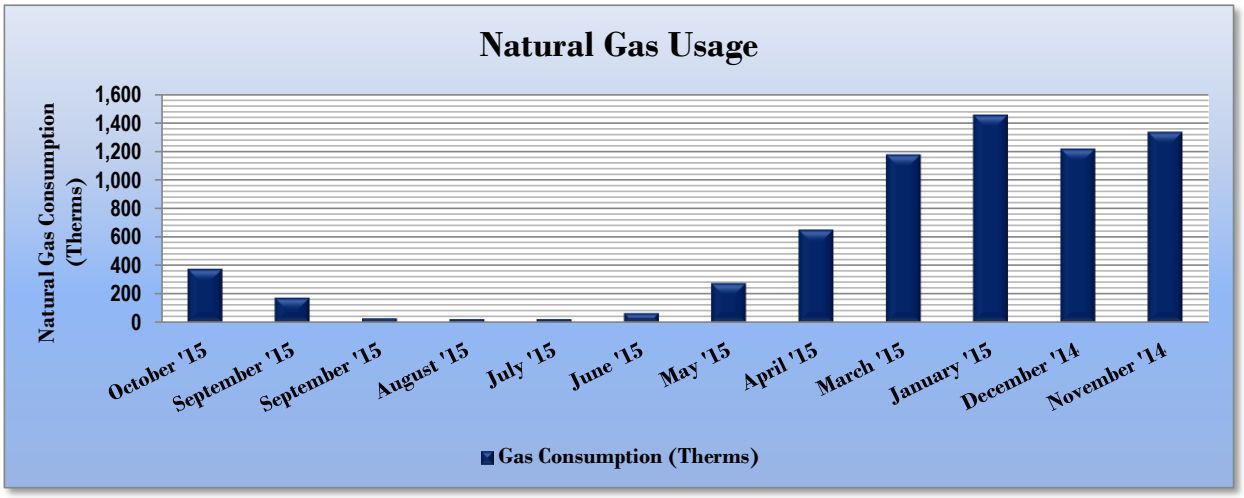


Figure 11 - Natural Gas Usage

Gas Billing Data for Maureen Collier Senior Center			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
11/13/15	29	376	$311
10/15/15	29	173	$153
9/16/15	30	28	$34
8/17/15	31	22	$29
7/17/15	30	22	$28
6/17/15	30	64	$61
5/18/15	31	275	$222
4/17/15	30	650	$530
3/18/15	34	1,177	$1,054
2/12/15	29	1,454	$1,342
1/14/15	33	1,217	$1,204
12/12/14	31	1,334	$1,359
Totals	**367**	**6,793**	**$6,327**
Annual	**365**	**6,756**	**$6,292**

3.4 Benchmarking

This facility was benchmarked using 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 then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® score for select building types.

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 or less energy than similar buildings of its type on a square foot basis. EUI is presented in terms of "site energy" and "source energy." Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy includes fuel consumed to generate electricity consumed at the site, factoring in electric production and distribution losses for the region.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Maureen Collier Senior Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	196.8	69.8
Site Energy Use Intensity (kBtu/ft^2)	131.9	45.3

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		
	Maureen Collier Senior Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	165.6	69.8
Site Energy Use Intensity (kBtu/ft^2)	118.7	45.3

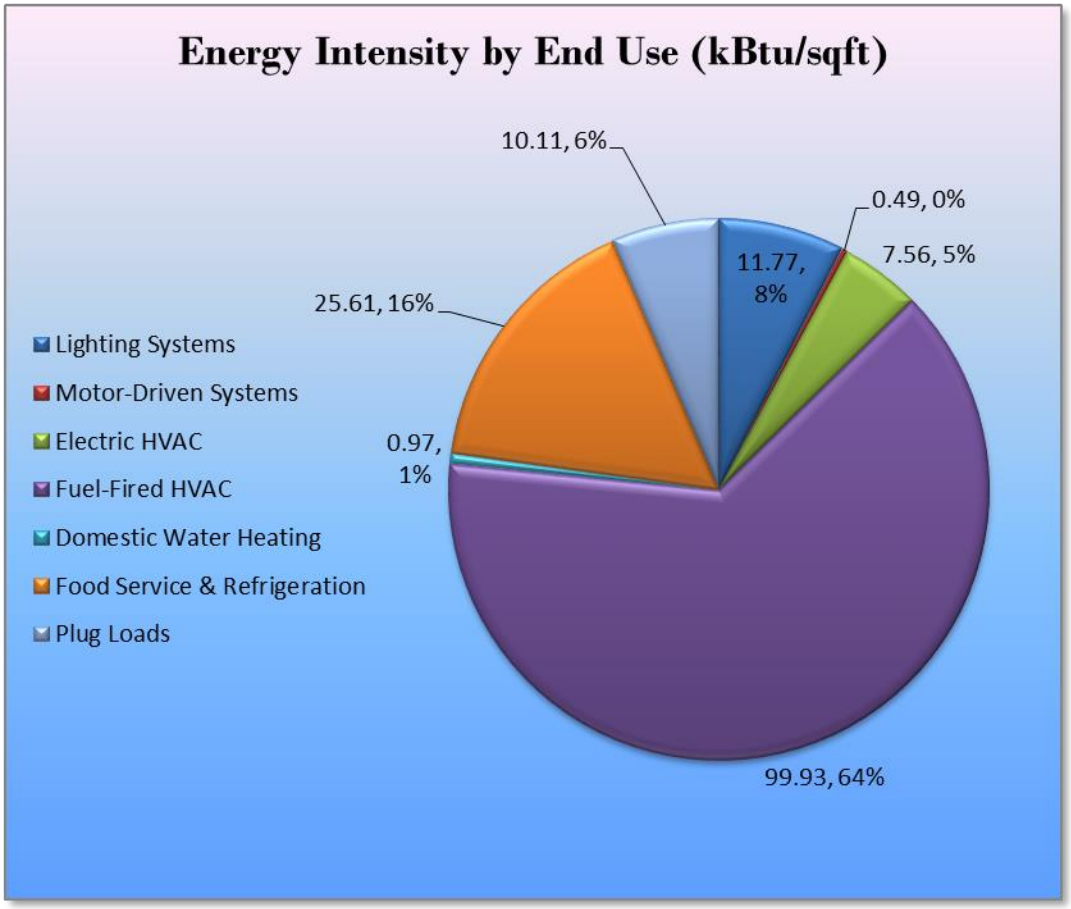
Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification.

This building is not is one of the building categories that are currently eligible to receive an ENERGY STAR® score. However, a Portfolio Manager "Statement of Energy Performance" was developed for this site and 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 graphical representation of energy end-uses highlights where the most benefit might be achieved from energy efficiency upgrades and measures.

Figure 14 - Energy Balance (Percentage and kBtu/ ft^2)



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 Pershing Field Athletic Complex 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 decisions and to prioritize energy projects. Savings are based on the New Jersey Board of Public Utilities New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016. 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 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.

The following sections describe the recommended 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		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			**14,139**	**4.9**	**0.0**	**$1,858.97**	**$13,265.68**	**$1,020.00**	**$12,245.68**	**6.59**	**14,238**
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TOTAL OF ALL RECOMMENDED ECMS			**15,837**	**6**	**32**	**$ 2,377.13**	**$ 14,358.70**	**$ 1,115.00**	**$ 13,243.70**	**5.57**	**19,656**

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

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

4.1.1 Lighting Upgrades

Recommended lighting upgrades 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		**14,139**	**4.9**	**0.0**	**$1,858.97**	**$13,265.68**	**$1,020.00**	**$12,245.68**	**6.59**	**14,238**
ECM 1	Install LED Fixtures	1,443	0.5	0.0	$189.72	$3,906.77	$1,000.00	$2,906.77	15.32	1,453
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	9,552	4.1	0.0	$1,255.83	$8,444.97	$0.00	$8,444.97	6.72	9,619
ECM 3	Retrofit Fixtures with LED Lamps	17	0.0	0.0	$2.26	$53.50	$20.00	$33.50	14.85	17
ECM 4	Install LED Exit Signs	3,127	0.3	0.0	$411.16	$860.44	$0.00	$860.44	2.09	3,149

ECM 1: Install LED Fixtures

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0
Exterior	1,443	0.5	0.0	$189.72	$3,906.77	$1,000.00	$2,906.77	15.32	1,453

Measure Description

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

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

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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	9,552	4.1	0.0	$1,255.83	$8,444.97	$0.00	$8,444.97	6.72	9,619
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

We recommend replacing linear fluorescent lamps and ballasts with LED tube lamps and drivers specifically designed to be used in existing linear fluorescent fixtures. The proposed retrofits would use the existing fixture housings but replace the rest of the components with efficient LED technology. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output and efficiently projects the light into the space.

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

ECM 3: Retrofit Fixtures with LED Lamps

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	17	0.0	0.0	$2.26	$53.50	$20.00	$33.50	14.85	17
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

We recommend replacing linear fluorescent lamps with LED tube lamps and replacing incandescent and halogen lamps with LED 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. LED lamps can be used as a direct replacement for most types of screw-in or plug-in lamps. This measure saves energy by installing LEDs which use less power than other lighting technologies with a comparable light output.

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

ECM 4: Install LED Exit Signs

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	3,127	0.3	0.0	$411.16	$860.44	$0.00	$860.44	2.09	3,149
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

We recommend replacing incandescent or compact fluorescent exit signs with LED exit signs. LEDs require virtually no maintenance and LED exit signs have a life expectancy of at least 20 years. Exit signs are on 24 hours per day, so even the low wattage bulbs in them consume significant power over time. Upgrading them all to LED exit signs improves energy efficiency and fire safety. A reduction in maintenance costs may also result from the proposed retrofit because lamps will not have to be replaced as frequently.

4.1.2 Lighting Control Measures

Recommended lighting control measures are summarized in Figure 17 below.

Figure 17 – Summary of Lighting Control ECMs

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 Control Measures			**1,697**	**0.7**	**0.0**	**$223.17**	**$1,050.00**	**$95.00**	**$955.00**	**4.28**	**1,709**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	1,508	0.6	0.0	$198.25	$850.00	$95.00	$755.00	3.81	1,518
ECM 6	Install High/Low Lighitng Controls	Yes	190	0.1	0.0	$24.92	$200.00	$0.00	$200.00	8.03	191

ECM 5: Install Occupancy Sensor Lighting Controls

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)
1,508	0.6	0.0	$198.25	$850.00	$95.00	$755.00	3.81	1,518

Measure Description

We recommend installing occupancy sensors to control light fixtures that are currently manually controlled in restrooms, storage rooms, 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.

ECM 6: Install High/Low Lighting Controls

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)
190	0.1	0.0	$24.92	$200.00	$0.00	$200.00	8.03	191

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is

detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

For this type of measure the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage needs to be provided to ensure that lights turn on in each area as an occupant approaches.

4.1.3 Domestic Water Heating Upgrade

Recommended domestic hot water heating system upgrades are summarized in Figure 18 below.

Figure 18 - Summary of Domestic Water Heating ECMs

	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)
	Domestic Water Heating Upgrade		**0**	**0.0**	**31.7**	**$294.99**	**$43.02**	**$0.00**	**$43.02**	**0.15**	**3,709**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	31.7	$294.99	$43.02	$0.00	$43.02	0.15	3,709

ECM 7: Install Low-Flow DHW Devices

Measure Description

We recommend installing low flow domestic water devices to reduce overall water flow rates to reduce hot water usage. Low flow faucet aerators reduce water flow rates. 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 gallons per minute (gpm) for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

4.2 ECMs Evaluated and Not Recommended

	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)
	Electric Unitary HVAC Measures		**2,163**	**2.2**	**0.0**	**$284.44**	**$11,969.76**	**$736.00**	**$11,233.76**	**39.49**	**2,179**
	Install High Efficiency Electric AC	No	2,163	2.2	0.0	$284.44	$11,969.76	$736.00	$11,233.76	39.49	2,179
	Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**19.2**	**$179.25**	**$6,457.34**	**$1,200.00**	**$5,257.34**	**29.33**	**2,254**
	Install High Efficiency Furnaces	No	0	0.0	19.2	$179.25	$6,457.34	$1,200.00	$5,257.34	29.33	2,254

Install High Efficiency Air Conditioning Units

Measure Description

We evaluated replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older 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 older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Install High Efficiency Furnaces

Measure Description

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

Reasons for not Recommending

Although these units are old enough to be evaluated for the replacement the payback period on these investments are greater than the useful life of the equipment itself. When they are due for replacement we recommend that these be replaced with higher efficiency units at the time.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of 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.

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.

Water Conservation

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). Refer to Section 4.1.3 for any low-flow ECM recommendations.

6 On-Site Generation Measures

On-site generation measure options include both renewable (e.g., solar, wind) and non-renewable (e.g., fuel cells) on-site technologies that generate power to meet all or a portion of the electric energy needs of a facility, often repurposing any waste heat where applicable. Also referred to as distributed generation, these systems contribute to Greenhouse Gas (GHG) emission reductions, demand reductions and reduced customer electricity purchases, resulting in the electric system reliability through improved transmission and distribution system utilization.

The State of New Jersey's Energy Master Plan (EMP) encourages new distributed generation of all forms and specifically focuses on expanding use of combined heat and power (CHP) by reducing financial, regulatory and technical barriers and identifying opportunities for new entries. The EMP also outlines a goal of 70% of the State's electrical needs to be met by renewable sources by 2050.

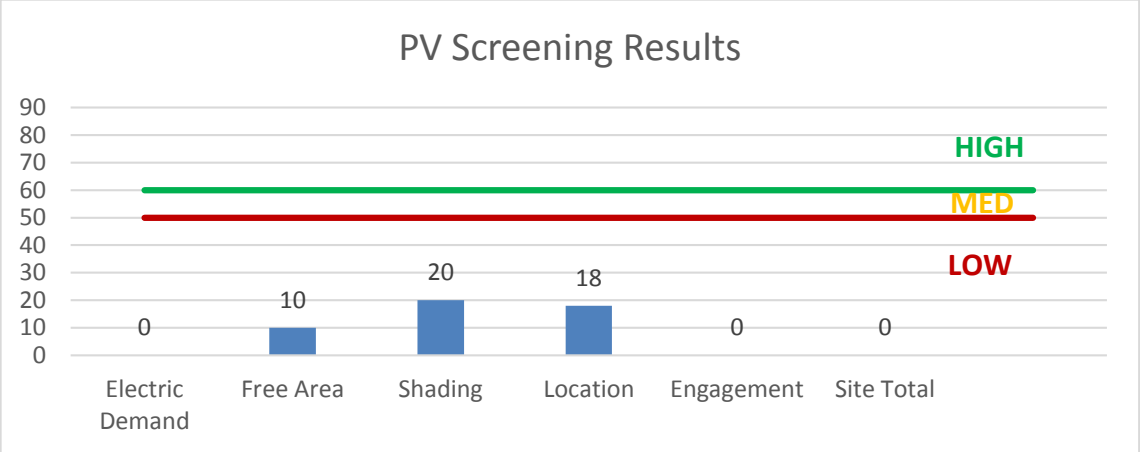
Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, and the costs associated with the generation project including interconnection costs, departing load charges, and any additional special facilities charges.

6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a low potential for installing a PV solar array.

Figure 19 - Photovoltaic Screening



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

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

6.2 Combined Heat and Power

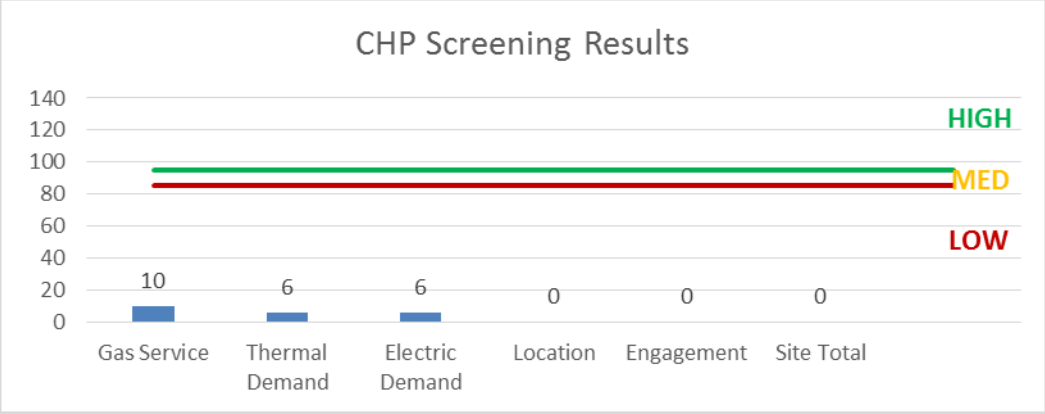
Combined heat and power (CHP) is the on-site generation of electricity and recovery of heat which is put to beneficial use. Common prime movers in CHP applications include reciprocating engines, microturbines, fuel cells, and (at large facilities) gas turbines. Electricity is typically interconnected 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 and/or infrequent hot water demand is the main reason the site has a low potential for CHP installation. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

Figure 20 - CHP Screening



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/.

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. 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 Electricity Restructuring Law (1999), 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 20 for a list of the eligible programs identified for each recommended ECM.

Figure 21 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install
ECM 1	Install LED Fixtures			x
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x
ECM 3	Retrofit Fixtures with LED Lamps	x		x
ECM 4	Install LED Exit Signs			x
ECM 5	Install Occupancy Sensor Lighting Controls	x		x
ECM 6	Install High/Low Lighitng Controls	x		x
ECM 7	Install Low-Flow Domestic Hot Water Devices			x

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

8.1 SmartStart

Overview

The SmartStart 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, which does not exceed 200 kW for 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 region where your facility is located. A complete list is provided on the DI website linked below. The contractor will be paid the incentive amount for each measure directly, which will result in greatly reduced material and labor costs for the customer. Up to 70% of eligible costs are covered by the program, subject to program caps. The remaining 30% of the cost is paid to the contractor by the customer.

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

8.3 Energy Savings Improvement Program

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

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

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

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets

their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities 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
Entrance	1	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	Fixture Replacement	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	54	1,950	0.06	161	0.0	$21.15	$104.35	$0.00	4.93
Entrance	1	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	386	0.0	$50.76	$107.56	$0.00	2.12
Hallway	6	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	LED Retrofit	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	54	1,365	0.44	1,179	0.0	$155.05	$742.10	$20.00	4.66
Hallway	1	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	386	0.0	$50.76	$107.56	$0.00	2.12
Director's office	3	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	Fixture Replacement	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	54	1,365	0.22	590	0.0	$77.53	$429.05	$20.00	5.28
Director's office	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	1,950	Fixture Replacement	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	18	1,950	0.02	62	0.0	$8.11	$104.35	$0.00	12.86
Women's Room	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	780	Fixture Replacement	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	36	546	0.10	111	0.0	$14.55	$392.52	$20.00	25.59
Women's Room	2	U-Bend Fluorescent - T12: U T12 (34W) - 1L	Wall Switch	43	780	Fixture Replacement	No	2	LED - Linear Tubes: (1) U-Lamp	Wall Switch	18	780	0.04	44	0.0	$5.79	$171.10	$0.00	29.53
Women's Room	2	CFL Screw-In Lamps: Recessed lamps	Wall Switch	26	780	Relamp	No	2	LED Screw-In Lamps: Recessed fixtures	Wall Switch	15	780	0.02	19	0.0	$2.55	$53.50	$20.00	13.14
Men's Room	8	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	780	Fixture Replacement	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	54	546	0.58	629	0.0	$82.69	$950.80	$20.00	11.26
Men's Room	2	U-Bend Fluorescent - T12: U T12 (34W) - 1L	Wall Switch	43	780	Fixture Replacement	No	2	LED - Linear Tubes: (1) U-Lamp	Wall Switch	18	780	0.04	44	0.0	$5.79	$171.10	$0.00	29.53
Meeting Room 1	8	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	Fixture Replacement	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	54	1,365	0.58	1,572	0.0	$206.73	$950.80	$20.00	4.50
Meeting Room 1	1	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	386	0.0	$50.76	$107.56	$0.00	2.12
Meeting Room 2	8	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	Fixture Replacement	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	54	1,365	0.58	1,572	0.0	$206.73	$950.80	$20.00	4.50
Meeting Room 2	2	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.07	831	0.0	$109.32	$107.56	$0.00	0.98
Multipurpose Room	25	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	Fixture Replacement	Yes	25	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	54	1,365	1.81	4,914	0.0	$646.04	$2,724.75	$20.00	4.19
Multipurpose Room	3	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.10	1,158	0.0	$152.27	$322.67	$0.00	2.12
Multipurpose Room	8	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	Fixture Replacement	No	8	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	54	1,950	0.48	1,287	0.0	$169.19	$834.80	$0.00	4.93
Multipurpose Room	1	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	386	0.0	$50.76	$107.56	$0.00	2.12
Kitchen	6	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	780	Fixture Replacement	No	6	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	54	780	0.36	386	0.0	$50.76	$626.10	$0.00	12.34
Mechanical Room	1	Linear Fluorescent - T12: 4' T12 (40W) - 3L	Wall Switch	127	1,950	Fixture Replacement	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	54	1,950	0.06	161	0.0	$21.15	$104.35	$0.00	4.93
Outside lights	8	Metal Halide: (1) 70W Lamp	Wall Switch	95	1,950	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	40	1,950	0.36	970	0.0	$127.47	$3,125.42	$800.00	18.24
Outside lights	2	Metal Halide: (1) 150W Lamp	Wall Switch	190	1,950	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	40	1,950	0.24	661	0.0	$86.91	$781.35	$200.00	6.69

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
Collier senior centre	Kitchen	1	Exhaust Fan	0.2	69.5%	No	2,745	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Milk steamer	Kitchen	1	Air Compressor	0.1	69.5%	No	4,957	No	69.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Outside	Collier Senior Center	2	Split-System AC	3.00		Yes	2	Split-System AC	3.00		14.00		No	1.69	1,638	0.0	$215.42	$8,977.32	$552.00	39.11
Outside	Collier Senior Center	1	Split-System AC	2.00		Yes	1	Split-System AC	2.00		14.00		No	0.54	525	0.0	$69.02	$2,992.44	$184.00	40.69
Outside	Collier Senior Center	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outside	Collier Senior Center	1	Split-System AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Outside	Collier Senior Center	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 Incentives	Simple Payback w/ Incentives in Years
Attic	Collier Senior Center	1	Furnace	125.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	Collier Senior Center	2	Furnace	80.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	Bathrooms and other areas	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	Kitchen	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Director's office	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	6.1	$56.73	$7.17	$0.00	0.13
Women's room	2	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	12.2	$113.46	$14.34	$0.00	0.13
Men's room	2	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	12.2	$113.46	$14.34	$0.00	0.13
Kitchen	1	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	1.2	$11.35	$7.17	$0.00	0.63

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	$0.00	$16,598.81	$750.00	0.00
Kitchen	1	Gas Fryer	No	No	0.00	0	0.0	$0.00	$5,620.63	$749.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	**Quantity**	**Equipment Description**	**Energy Rate (W)**	**ENERGY STAR Qualified?**
Entrance, recreation and meeting rooms	4	Electric space heaters	1,500.0	No
Kitchen	1	Food Warmer	1,500.0	No
Kitchen	1	Refrigerator Big	600.0	No
Kitchen	1	Dishwasher	1,500.0	No
Kitchen	1	Microwave	1,000.0	No
Kitchen	1	Coffee machine	400.0	No
Kitchen	1	Refrigerator Big	600.0	No
Multipurpose room	3	Television	150.0	No
Multipurpose room	3	Computers	75.0	No
Multipurpose room	2	Tape recorder	60.0	No
Director's office	1	Fax machine	600.0	No
Hallway	1	Water Dispenser	500.0	No

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]

Collier Senior Center

Primary Property Type: Social/Meeting Hall
Gross Floor Area (ft²): 6,500
Built: 1992

For Year Ending: October 31, 2015
Date Generated: February 03, 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
Collier Senior Center 335 Bergen Ave Jersey City, New Jersey 07304	_____ , (___)___-_____	____ _____ , (___)___-_____ _____

Property ID: 5082919

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
137.4 kBtu/ft²

Source EUI
216.3 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	669,464 (75%)
Electric - Grid (kBtu)	223,868 (25%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	44.4
National Median Source EUI (kBtu/ft²)	69.8
% Diff from National Median Source EUI	210%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	61

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)