Local Government Energy Audit:
Energy Audit Report

Saint Mary's Episcopal Church

33 Berlin Road

Clementon, NJ 08021

March 7, 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 saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Saint Mary's Episcopal Church. The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

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

1.1 Facility Summary

Saint Mary's Episcopal Church consists of a sanctuary, a meeting hall, an office, utility room, a small non-commercial kitchen, and an attic floor mechanical space totaling 4,870 square foot. The building was constructed in 1954. It is a one (1) story structure of stucco over concrete with fiberglass cavity insulation. Exterior walls are accented with vinyl siding. The front façade concrete is finished with drywall texture.

The building has a pitched roof covered with asphalt composite that is in good condition. It has double pane windows that are in good condition and show no signs of excessive infiltration. Exterior doors are constructed of wood and are in good condition except that the door seals have worn out which increases the level of outside air infiltration. The building envelope was found to be in overall age-appropriate condition. Interior lighting is provided by linear fluorescent light fixtures containing four (4) foot T8-T12 lamps with electronic and magnetic ballasts as well as incandescent and halogen incandescent light bulbs. Lighting control is provided by manual wall switches. The cooling system consists of four (4) Rheem air-conditioner split systems with condenser units located rear the building. Heating is provided by two (2) Rheem furnaces located at the attic floor and one (1) Trane furnace located in the utility room.

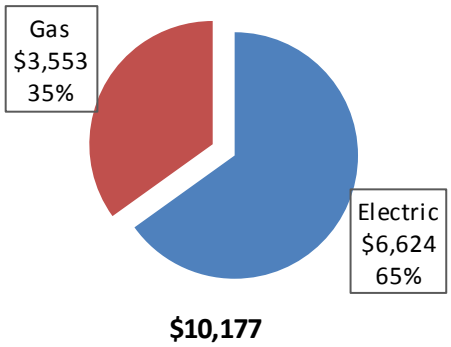
A thorough description of the facility and our observations are located in Section 2

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated six (6) projects which represent an opportunity for Saint Mary's Episcopal Church to reduce annual energy costs by $3,841.64 and annual greenhouse gas emissions by 17,431 lbs CO_2e. The measures would pay for themselves in 3.69 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 Saint Mary's Episcopal Church's annual energy use by 24%.

Figure 1 – Previous 12 Month Utility Costs



$10,177

Figure 2 – Potential Post-Implementation Costs

$6,336

A detailed description of Saint Mary's Episcopal Church'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 Natural Gas Savings (MMBtu)*	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**10,564**	**7.6**	**0.0**	**0.0**	**$2,999.73**	**$9,790.43**	**$455.00**	**$9,335.43**	**3.11**	**10,638**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	3,414	3.4	0.0	0.0	$969.32	$4,625.75	$20.00	$4,605.75	4.75	3,438
ECM 2	Retrofit Fixtures with LED Lamps	Yes	6,596	4.2	0.0	0.0	$1,873.01	$4,411.80	$435.00	$3,976.80	2.12	6,642
ECM 3	Install LED Exit Signs	Yes	554	0.0	0.0	0.0	$157.41	$752.89	$0.00	$752.89	4.78	558
Lighting Control Measures			**258**	**0.3**	**0.0**	**0.0**	**$73.24**	**$696.00**	**$120.00**	**$576.00**	**7.86**	**260**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	258	0.3	0.0	0.0	$73.24	$696.00	$120.00	$576.00	7.86	260
Electric Unitary HVAC Measures			**538**	**0.5**	**0.0**	**0.0**	**$152.90**	**$4,488.66**	**$276.00**	**$4,212.66**	**27.55**	**542**
ECM 5	Install High Efficiency Electric AC	Yes	538	0.5	0.0	0.0	$152.90	$4,488.66	$276.00	$4,212.66	27.55	542
Domestic Water Heating Upgrade			**0**	**0.0**	**51.2**	**51.2**	**$615.77**	**$64.53**	**$0.00**	**$64.53**	**0.10**	**5,991**
ECM 6	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	51.2	51.2	$615.77	$64.53	$0.00	$64.53	0.10	5,991
TOTALS			**11,360**	**8.4**	**51.2**	**51.2**	**$3,841.64**	**$15,039.62**	**$851.00**	**$14,188.62**	**3.69**	**17,431**

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

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

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

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when conditions allow. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

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

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 also identified seven (7) no (or 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 Saint Mary's Episcopal Church include:

- Reduce Air Leakage
- Ensure Lighting Controls Are Operating Properly
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Check for and Seal Duct Leakage
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

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

Self-Generation Measures

TRC evaluated the potential for installing self-generation sources for Saint Mary's Episcopal Church. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install

For facilities with capital available for implementation of selected individual measures or phasing implementation of selected measures over multiple years, incentives are available through the SmartStart program. To participate in this program you may utilize internal resources, or an outside firm or contractor, to design the ECM(s), select the equipment and apply for the incentive(s). Program pre-approval is required for some SmartStart incentives, so only after receiving approval may the ECM(s) be installed. The incentive values listed above in Figure 3 represent the SmartStart program and will be explained further in Section 8, as well as the other programs as mentioned below.

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

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

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Richard Picini	Property Warden	rc.pichini@gmail.com	856-261-4059
Designated Representative			
Richard Picini	Property Warden	rc.pichini@gmail.com	856-261-4059
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-2879

2.2 General Site Information

On September 7, 2016, TRC performed an energy audit at Saint Mary's Episcopal Church located in Clementon, New Jersey. TRC's auditor met with Richard Pichini, Property Warden to review the facility operations and focus the investigation on specific energy-using systems.

Saint Mary's Episcopal Church consists of a sanctuary, a meeting hall, an office, utility room, a small non-commercial kitchen, and an attic floor mechanical space totaling 4,870 square feet. The building was constructed in 1954.

2.3 Building Occupancy

The church is open to the community every day. The typical schedule is presented in the table below. The entire facility is used year-round by the community.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Saint Mary's Episcopal Church	Weekday	9:00 AM - 11:00 AM
Saint Mary's Episcopal Church	Weekend	8:00 AM - 10:30 PM

2.4 Building Envelope

The building is constructed of stucco over concrete with fiberglass cavity insulation. Interior walls are mostly painted gypsum wallboard. Exterior walls are accented with vinyl siding. The front façade concrete is finished with drywall texture. The building has a gable roof covered with asphalt composite that is in good condition.

The building has double pane windows that are in good condition and show no sign of excessive infiltration. Exterior doors are constructed of wood and in good condition except that the door seals have worn out which increases the level of outside air infiltration. We recommend the congregation maintenance staff seal the doors. The Church has numerous stained glass windows that are single pane. The building envelope was found to be in overall age-appropriate condition.

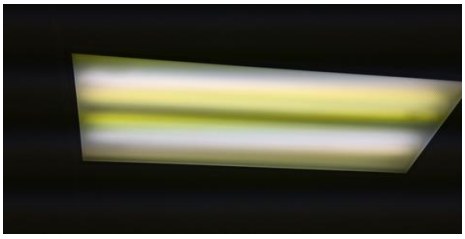
2.5 On-site Generation

Saint Mary's Episcopal Church does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System



Lighting is provided predominately by 32-Watt T8 and 40-Watt T12 linear fluorescent lamps with electronic and magnetic ballasts as well as incandescent and halogen incandescent bulbs. Most of the building spaces use 1 or 4 lamp, 4-foot long recessed and surfaced mounted fixtures.

The sanctuary is lit with a mix of fluorescent T12 lamps fixtures, incandescent and halogen incandescent bulbs. The meeting room, the kitchen and the restrooms are lit with linear fluorescent T8 and T12 lamps fixtures. The closets, utility room, and hallway are lit with incandescent light bulbs. Lighting control is provided by manual wall switches. The facility has minimal exterior lighting, which primarily consists of wall sconce incandescent and halogen incandescent flood light fixtures.

Air Conditioning (DX)

Cooling is provided by three (3) 5-ton and one (1) 3-ton Rheem split systems. The 3 ton-split system was installed more than 26 years ago. It has reached the end of its useful life service and we recommend replacing it with a new efficient system. The remaining three (3) 5-ton units were observed running in good condition. Each unit is controlled by its own seven day a week programmable thermostats located in the sanctuary and meeting hall.

Heating System

Heating is provided by two (2) 125,000 Btu/hr Rheem furnace units located in the attic, and one (1) 140,000 Btu/hr Trane furnace located in the utility room. All three units appear to be in good condition.

It should be noted that the air circulation ducts, which consist of simple plastic material, were inspected and found to be in poor condition. The attic floor houses two (2) Rheem furnaces has limited accessibility with no light fixtures. We strongly recommend the congregation maintenance staff review the facility air circulation system. Facility staff noted that in winter the sanctuary does not receive enough heat from the 140,000 Btu/hr Trane furnace. This maybe the result of a poor air circulation system.

Domestic Hot Water

The domestic hot water system consists of one (1) Bradford White, gas-fired, non-condensing hot water heater with an input rating of 40 kBtu/hr and a nominal efficiency of 80% located in the utility room. The water heater has a 50 gallon storage tank and is in good condition.

Food Service & Refrigeration.

The facility has a small kitchen that includes one (1) electric range and one (1) solid door standup refrigerator.

Plug load & Vending Machines

There are no computer work stations in the facility. Plug load consists of one (1) microwave, and one (1) coffee maker located in the kitchen. There is also one (1) copy machine located in the storage room. There is no refrigerated beverage vending machines in the facility

2.7 Water-Using Systems

There are three (3) restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.5 gallons per minute (gpm) or higher, the toilets are rated at 2.2 gallons per flush (gpf) and the urinals are rated at 2gpf. The kitchen has a faucet that is rated 2.5 gpm. There are no showers in the facility.

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: Religious. Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

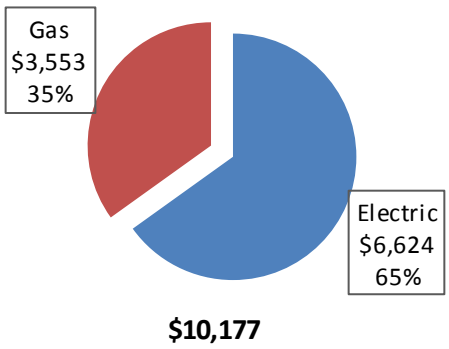
The following energy consumption and cost data is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Saint Mary's Episcopal Church		
Fuel	**Usage**	**Cost**
Electricity	23,329 kWh	$6,624
Natural Gas	2,952 Therms	$3,553
Total		**$10,177**

The current utility cost for this site is $10,177 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 the past 12 months is $0.184/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below.

Figure 8 - Electric Usage & Demand

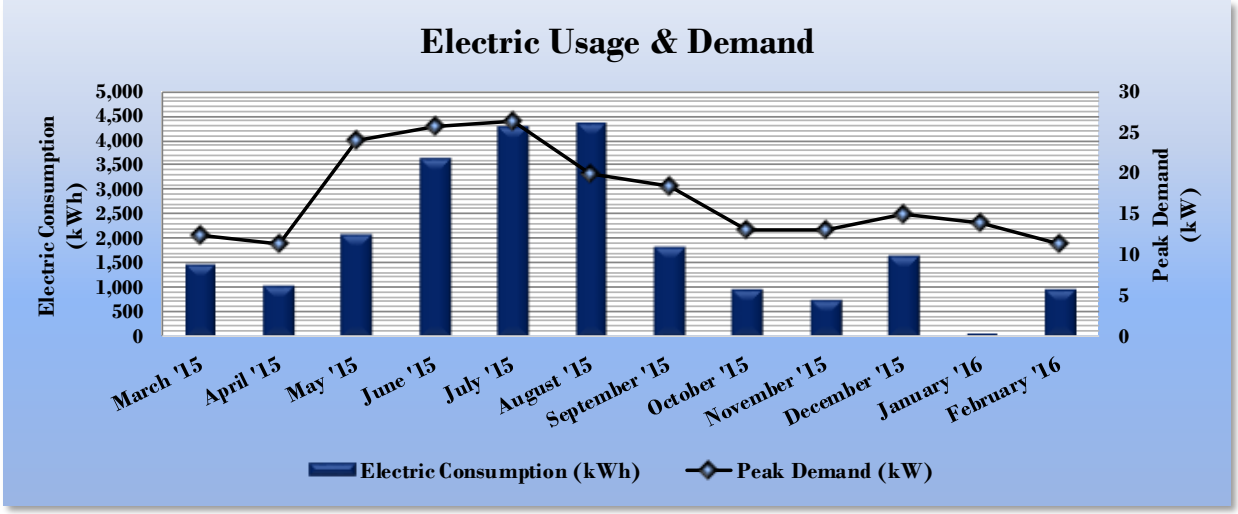


Figure 9 - Electric Usage & Demand

Electric Billing Data for Saint Mary's Episcopal Church					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/9/15	30	1,485	12	$382	No
5/8/15	31	1,061	11	$272	No
6/9/15	30	2,107	24	$620	No
7/10/15	32	3,657	26	$1,077	No
8/11/15	31	4,296	26	$1,252	No
9/10/15	30	4,378	20	$1,223	No
10/9/15	30	1,827	18	$534	No
11/10/15	30	981	13	$280	No
12/8/15	31	782	13	$225	No
1/9/16	30	1,679	15	$430	No
2/8/16	29	82	14	$57	No
3/7/16	31	994	11	$271	No
Totals	**365**	**23,329**	**26.34**	**$6,624**	0
Annual	**365**	**23,329**	**26.34**	**$6,624**	

3.3 Natural Gas Usage

Natural Gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.203/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below.

Figure 10 - Natural Gas Usage

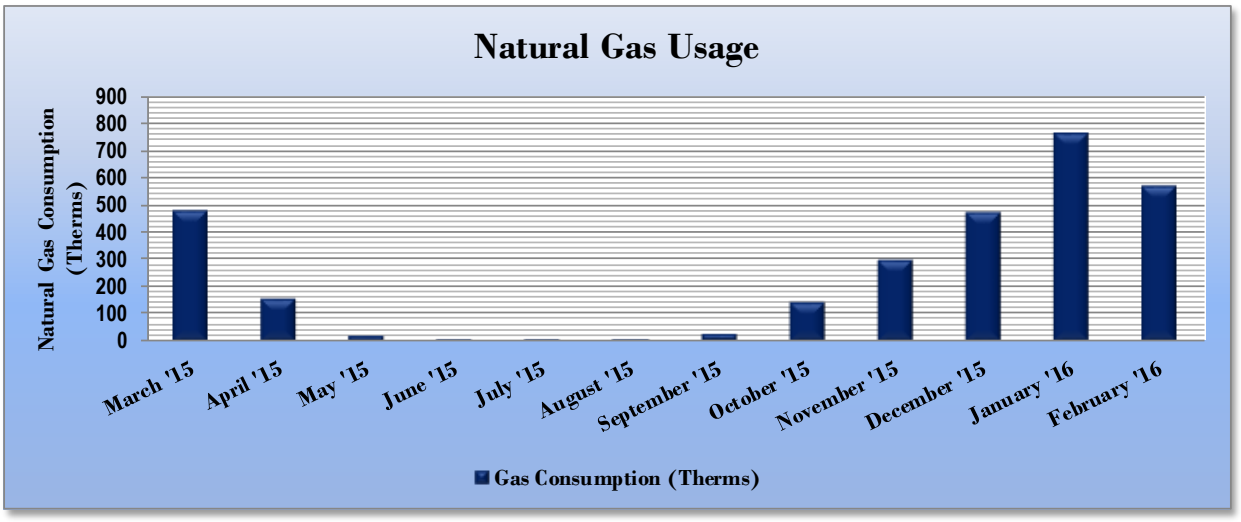


Figure 11 - Natural Gas Usage

Gas Billing Data for Saint Mary's Episcopal Church			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
4/9/15	30	479	$613
5/8/15	31	159	$222
6/9/15	30	21	$56
7/10/15	32	3	$34
8/11/15	31	4	$36
9/10/15	30	4	$34
10/9/15	30	27	$59
11/10/15	30	146	$183
12/8/15	31	303	$343
1/9/16	30	472	$524
2/8/16	29	766	$828
3/7/16	31	569	$621
Totals	**365**	**2,952**	**$3,553**
Annual	**365**	**2,952**	**$3,553**

3.4 Benchmarking

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

The EUI is a measure of a facility's energy consumption per square foot, and it is the standard metric for comparing buildings' energy performance. Comparing the EUI of a building with the national median EUI for that building type illustrates whether that building uses more energy than similar buildings on a square foot basis or if that building performs better than the median. EUI is presented in both site energy and source energy. Site energy is the amount of fuel and electricity consumed by a building as reflected in utility bills. Source energy is the raw fuel consumed to generate the energy consumed at the site, factoring in energy production and distribution losses.

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Saint Mary's Episcopal Church	National Median Building Type: Religious
Source Energy Use Intensity (kBtu/ft^2)	115.0	70.7
Site Energy Use Intensity (kBtu/ft^2)	77.0	36.8

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		
	Saint Mary's Episcopal Church	National Median Building Type: Religious
Source Energy Use Intensity (kBtu/ft^2)	79.0	70.7
Site Energy Use Intensity (kBtu/ft^2)	58.5	36.8

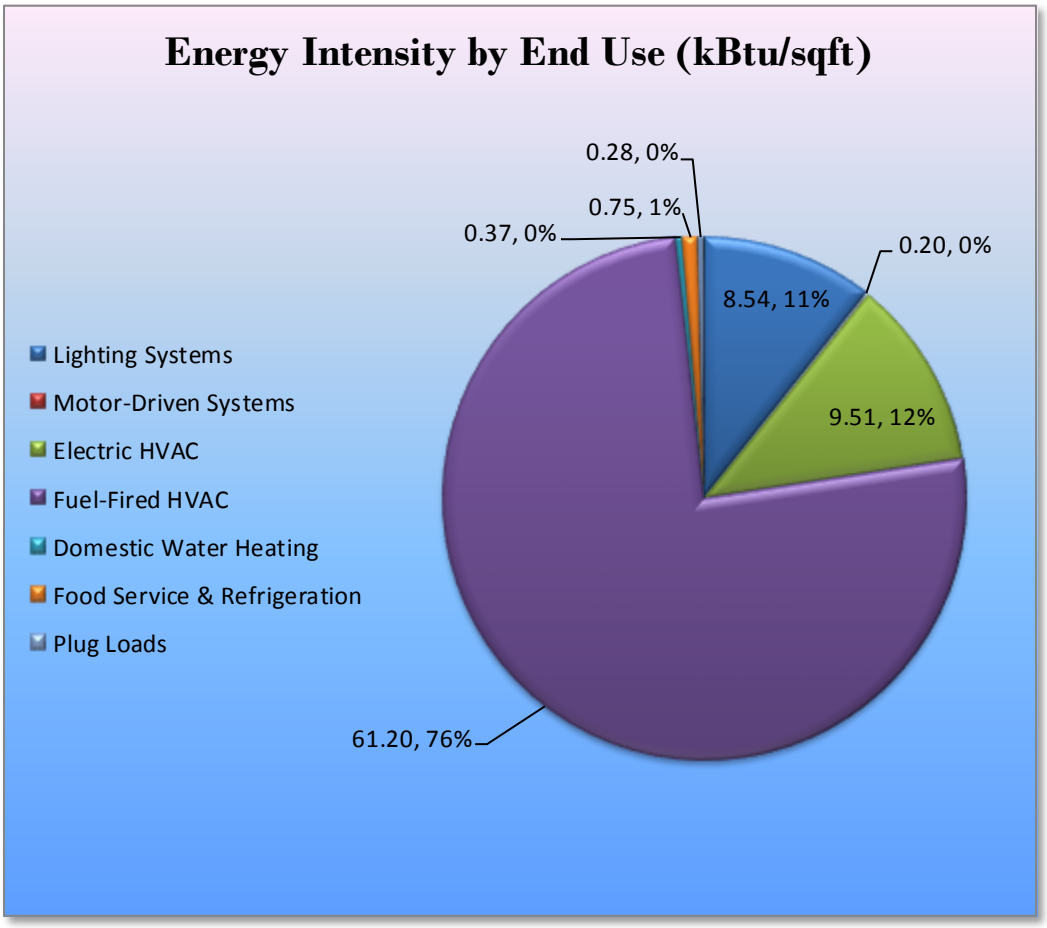
Many buildings can also receive a 1 – 100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide — and may be eligible for ENERGY STAR® certification. This facility has a current score of 67.

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

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

Figure 14 - Energy Balance (% and kBtu/SF)



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 Saint Mary's Episcopal Church 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 evaluated measures.

4.1 Recommended ECMs

The measures below have been evaluated by the auditor and are recommended for implementation at the facility.

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**10,564**	**7.6**	**0.0**	**0.0**	**$2,999.73**	**$9,790.43**	**$455.00**	**$9,335.43**	**3.11**	**10,638**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	3,414	3.4	0.0	0.0	$969.32	$4,625.75	$20.00	$4,605.75	4.75	3,438
ECM 2	Retrofit Fixtures with LED Lamps	6,596	4.2	0.0	0.0	$1,873.01	$4,411.80	$435.00	$3,976.80	2.12	6,642
ECM 3	Install LED Exit Signs	554	0.0	0.0	0.0	$157.41	$752.89	$0.00	$752.89	4.78	558
Lighting Control Measures		**258**	**0.3**	**0.0**	**0.0**	**$73.24**	**$696.00**	**$120.00**	**$576.00**	**7.86**	**260**
ECM 4	Install Occupancy Sensor Lighting Controls	258	0.3	0.0	0.0	$73.24	$696.00	$120.00	$576.00	7.86	260
Electric Unitary HVAC Measures		**538**	**0.5**	**0.0**	**0.0**	**$152.90**	**$4,488.66**	**$276.00**	**$4,212.66**	**27.55**	**542**
ECM 5	Install High Efficiency Electric AC	538	0.5	0.0	0.0	$152.90	$4,488.66	$276.00	$4,212.66	27.55	542
Domestic Water Heating Upgrade		**0**	**0.0**	**51.2**	**51.2**	**$615.77**	**$64.53**	**$0.00**	**$64.53**	**0.10**	**5,991**
ECM 6	Install Low-Flow Domestic Hot Water Devices	0	0.0	51.2	51.2	$615.77	$64.53	$0.00	$64.53	0.10	5,991
TOTALS		**11,360**	**8.4**	**51.2**	**51.2**	**$3,841.64**	**$15,039.62**	**$851.00**	**$14,188.62**	**3.69**	**17,431**

* - 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

Lighting Upgrades include several measures as outlined 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		**10,564**	**7.6**	**0.0**	**$2,999.73**	**$9,790.43**	**$455.00**	**$9,335.43**	**3.11**	**10,638**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	3,414	3.4	0.0	$969.32	$4,625.75	$20.00	$4,605.75	4.75	3,438
ECM 2	Retrofit Fixtures with LED Lamps	6,596	4.2	0.0	$1,873.01	$4,411.80	$435.00	$3,976.80	2.12	6,642
ECM 3	Install LED Exit Signs	554	0.0	0.0	$157.41	$752.89	$0.00	$752.89	4.78	558

ECM 1: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	3,414	3.4	0.0	$969.32	$4,625.75	$20.00	$4,605.75	4.75	3,438
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing linear fluorescent T12 lamps, ballasts, and reflectors with LED tube lamps, reflectors, and drivers specifically designed for existing linear fluorescent fixtures. The retrofit uses the existing fixture housing but replaces the rest of the components with an efficient source and reflectors designed for LEDs. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output and efficiently projects the light into the space.

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

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

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	4,424	3.9	0.0	$1,256.18	$4,089.28	$405.00	$3,684.28	2.93	4,455
Exterior	2,172	0.3	0.0	$616.82	$322.52	$30.00	$292.52	0.47	2,187

Measure Description

This measure evaluates replacing linear fluorescent lamps with LED tube lamps and replacing incandescent and halogen screw-in based 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. Screw-in LED lamps can be used as a direct replacement for most other screw-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 ten (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.

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

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	554	0.0	0.0	$157.41	$752.89	$0.00	$752.89	4.78	558
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing incandescent lighting in exit signs with LEDs. LED sources require virtually no maintenance and LED exit signs have a life expectancy of at least 20 years. Many manufacturers can provide retrofit kits that meet fire and safety code requirements. Retrofit kits are less expensive and simpler to install than replacement signs, however, new fixtures would have a longer useful life and are therefore recommended.

A reduction in maintenance costs will be realized with the proposed retrofit because lamps will not have to be replaced as frequently.

4.1.2 Lighting Control Measures

Lighting control measures include one measure as outlined in Figure 17 below.

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**258**	**0.3**	**0.0**	**$73.24**	**$696.00**	**$120.00**	**$576.00**	**7.86**	**260**
ECM 4	Install Occupancy Sensor Lighting Controls	258	0.3	0.0	$73.24	$696.00	$120.00	$576.00	7.86	260

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
258	0.3	0.0	$73.24	$696.00	$120.00	$576.00	7.86	260

Measure Description

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

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

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

4.1.3 Electric Unitary HVAC Measures

Unitary HVAC measures include one measures as outlined in Figure 18 below.

Figure 18 - Summary of Unitary HVAC ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**538**	**0.5**	**0.0**	**$152.90**	**$4,488.66**	**$276.00**	**$4,212.66**	**27.55**	**542**
ECM 5	Install High Efficiency Electric AC	538	0.5	0.0	$152.90	$4,488.66	$276.00	$4,212.66	27.55	542

ECM 5: Install High Efficiency Electric AC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
538	0.5	0.0	$152.90	$4,488.66	$276.00	$4,212.66	27.55	542

Measure Description

This measure evaluates replacing the 26 year old Rheem split air conditioner with high efficiency split air conditioner. There have been significant improvements in both compressor and fan motor efficiencies in the past several years. Therefore, electricity savings can be achieved by replacing old units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the old and new unit, the cooling load, and the annual operating hours.

4.1.4 Domestic Water Heating Upgrade

Domestic water heating measures include measure as outlined in Figure 19 below.

Figure 19 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**51.2**	**$615.77**	**$64.53**	**$0.00**	**$64.53**	**0.10**	**5,991**
ECM 7	Install Low-Flow Domestic Hot Water Devices	0	0.0	51.2	$615.77	$64.53	$0.00	$64.53	0.10	5,991

ECM 6: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	51.2	$615.77	$64.53	$0.00	$64.53	0.10	5,991

Measure Description

This measure evaluates the savings from installing low flow domestic water devices to reduce overall water flow in general and hot water flow in particular. Low flow faucet aerators reduce the water flow, relative to standard aerators, from the fixture.

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

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.

Reduce Air Leakage

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

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.

Check for and Seal Duct Leakage

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

Perform Proper 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 sacrificial anode annually.

Water Conservation

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

Installing dual flush or low flow toilets and low flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense ratings for urinals is 0.5 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 4.1.4 for any low-flow ECM recommendations.

6 SELF-GENERATION MEASURES

Self-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 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.

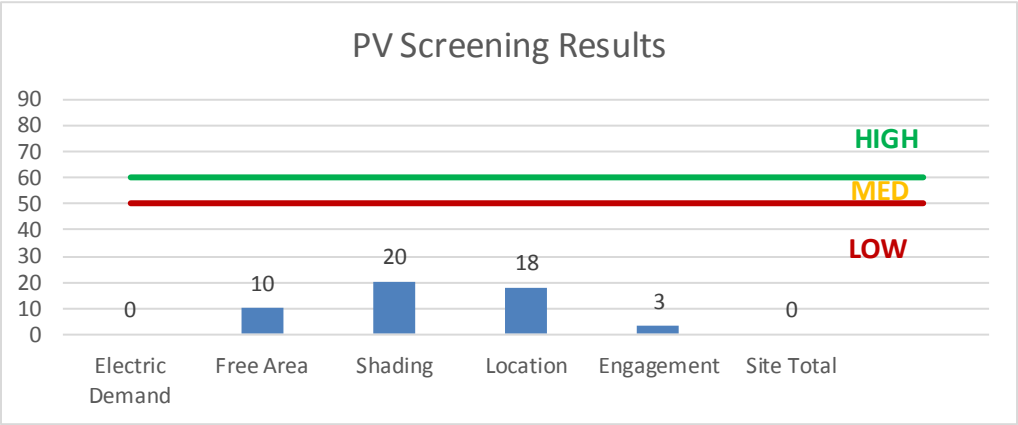
6.1 Photovoltaic

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 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, or other unshaded space, on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.

Figure 20 - 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.

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

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

6.2 Combined Heat and Power

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

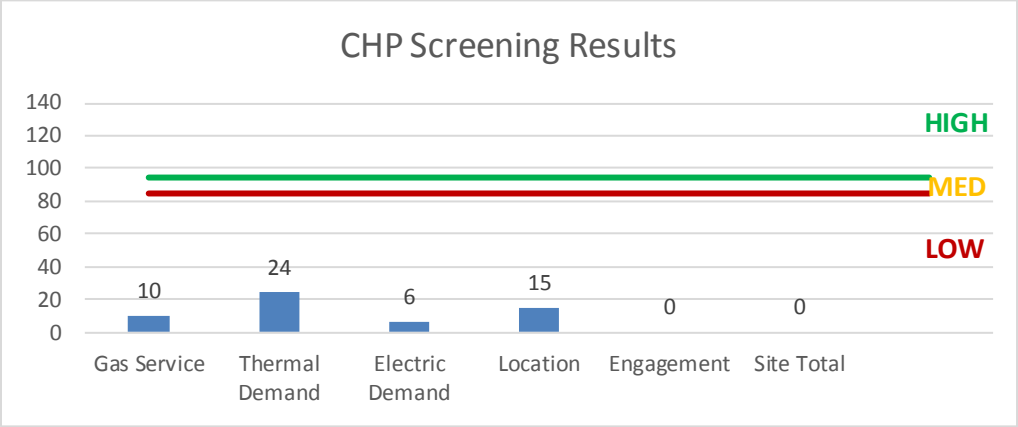
CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has a Low potential for installing a cost-effective CHP system.

Low or infrequent thermal load, and lack of space near the existing thermal generation are the most significant factors contributing to the low potential for CHP at the site. In our opinion, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation.

For a list of qualified firms in NJ specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/.

Figure 21 - Combined Heat and Power Screening



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.

By enabling grid operators to call upon Curtailment Service Providers and energy consumers 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 will receive payments whether or not their facility is called upon to curtail their load.

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 program often find it to be a valuable source of revenue for their facility(ies) because the payments can significantly offset annual utility 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 event cycle. DR program participants often have to install smart meters and may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

DR does not include the reduction of electricity consumption based on normal operating practice or behavior. For example, if a company's normal schedule is to close for a holiday, the reduction of electricity due to this closure or scaled-back operation is not considered a demand response activity in most situations.

The first step toward participation in a DR program is to contact a Curtailment Service Provider. A list of these providers is available on PJM's website and it includes contact information for each company, as well as the states where they have active business (http://www.pjm.com/markets-and-operations/demand-response/csps.aspx). PJM also posts training materials that are developed for program members interested in specific rules and requirements regarding DR activity (http://www.pjm.com/training/training%20material.aspx), along with a variety of other DR program information.

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

In our opinion, this facility has is not a good candidate for DR curtailment. There is no load to be shed.

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 22 for a list of the eligible programs identified for each recommended ECM.

Figure 22 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	X		X
ECM 2	Retrofit Fixtures with LED Lamps	X		X
ECM 3	Install LED Exit Signs			X
ECM 4	Install Occupancy Sensor Lighting Controls	X		X
ECM 5	Install High Efficiency Electric AC			X
ECM 6	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. 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 offers 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 is a turnkey program available to existing small to mid-sized facilities with a peak electric demand that did not exceed 200 kW in the preceding 12 months. You will work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and install those measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

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

How to Participate

To participate in the Direct Install program you will need to contact the participating contractor assigned to the county where your facility is located; a complete list is provided on the Direct Install website identified below. The contractor will be paid the program incentive directly which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps mentioned above, and the remaining 30% of the cost is your responsibility to the contractor.

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

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

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
Sanctuary	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	158	0.0	$44.97	$215.11	$0.00	4.78
Sanctuary	36	Incandescent: 60W A Lamp (Hanging Pendant)	Wall Switch	60	858	Relamp	No	36	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	858	1.38	1,640	0.0	$465.82	$1,935.11	$180.00	3.77
Sanctuary	6	Halogen Incandescent: 300W Reflector	Wall Switch	300	800	Relamp	No	6	LED Screw-In Lamps: LED A Lamp	Wall Switch	38	800	1.28	1,421	0.0	$403.53	$322.52	$30.00	0.72
Sanctuary	7	Incandescent: PAR38 90W Flood Light	Wall Switch	90	800	Relamp	No	7	LED Screw-In Lamps: LED A Lamp	Wall Switch	15	800	0.43	475	0.0	$134.77	$376.27	$35.00	2.53
Sanctuary	18	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	800	Relamp & Reballast	No	18	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	800	0.46	513	0.0	$145.55	$1,764.00	$0.00	12.12
Sanctuary	2	LED - Fixtures: Shelf-Mounted Display and Task Lights	Wall Switch	14	800	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	800	0.01	9	0.0	$2.57	$107.50	$0.00	41.88
Sacristy Room	1	Incandescent: 60W A Lamp (Hanging Pendant)	Wall Switch	60	800	Relamp	No	1	LED Screw-In Lamps: 13W LED A9 Bulb Replacement	Wall Switch	13	800	0.04	42	0.0	$12.06	$97.85	$5.00	7.70
Hallway	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	158	0.0	$44.97	$215.11	$0.00	4.78
Hallway	3	Incandescent: 40W Cadelabra	Wall Switch	40	800	Relamp	No	3	LED Screw-In Lamps: LED A Lamp	Wall Switch	4	800	0.09	98	0.0	$27.72	$161.26	$15.00	5.28
Hallway	2	Incandescent: 60W Ceiling Mounted	Wall Switch	60	800	Relamp	No	2	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	800	0.08	85	0.0	$24.13	$107.51	$10.00	4.04
Closet	1	Incandescent: 60W Ceiling Mounted	Wall Switch	60	800	Relamp	No	1	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	800	0.04	42	0.0	$12.06	$53.75	$5.00	4.04
Closet	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	800	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	800	0.02	26	0.0	$7.44	$63.20	$0.00	8.49
Meeting Hall	24	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	715	Relamp & Reballast	Yes	24	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	501	3.04	3,019	0.0	$857.30	$3,040.00	$40.00	3.50
Meeting Hall	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	158	0.0	$44.97	$215.11	$0.00	4.78
Men's Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	800	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	560	0.06	66	0.0	$18.84	$211.13	$40.00	9.08
Closet	1	Incandescent: 60W Ceiling Mounted	Wall Switch	60	800	Relamp	No	1	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	800	0.04	42	0.0	$12.06	$53.75	$5.00	4.04
Women's Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	800	LED Retrofit	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	560	0.06	66	0.0	$18.84	$169.75	$40.00	6.89
Utility Room	1	Incandescent: 60W Ceiling Mounted	Wall Switch	60	800	Relamp	No	1	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	800	0.04	42	0.0	$12.06	$53.75	$5.00	4.04
Kitchen	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	800	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	560	0.18	199	0.0	$56.52	$401.40	$80.00	5.69
Kitchen	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$22.49	$107.56	$0.00	4.78
Storage/Office	3	Incandescent: 60W A Lamp (Hanging Pendant)	Wall Switch	60	800	Relamp	Yes	3	LED Screw-In Lamps: LED A Lamp	Occupancy Sensor	13	560	0.12	138	0.0	$39.20	$277.26	$35.00	6.18
Closet1	2	Incandescent: 60W A Lamp (Hanging Pendant)	Wall Switch	60	800	Relamp	No	2	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	800	0.08	85	0.0	$24.13	$107.51	$10.00	4.04
Closet2	1	Incandescent: 60W A Lamp (Hanging Pendant)	Wall Switch	60	800	Relamp	No	1	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	800	0.04	42	0.0	$12.06	$53.75	$5.00	4.04
Attic Floor	1	Incandescent: 60W A Lamp (Hanging Pendant)	Wall Switch	60	800	Relamp	No	1	LED Screw-In Lamps: LED A Lamp	Wall Switch	13	800	0.04	42	0.0	$12.06	$53.75	$5.00	4.04
Exterior Perimeter	4	Incandescent: Wall Sconce 60W A Lamp	Daylight Dimming	60	4,830	Relamp	No	4	LED Screw-In Lamps: LED A Lamp	Daylight Dimming	13	4,830	0.15	1,026	0.0	$291.36	$215.01	$20.00	0.67

	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
Exterior Perimeter	2	Halogen Incandescent: PAR38 150W	Daylight Dimming	150	4,830	Relamp	No	2	LED Screw-In Lamps: LED A Lamp	Daylight Dimming	45	4,830	0.17	1,146	0.0	$325.46	$107.51	$10.00	0.30

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
Attic Floor	Attic Floor	1	Exhaust Fan	0.3	78.0%	No	1,300	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Exterior	Church Building	2	Split-System AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	Church Building	1	Split-System AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Exterior	Church Building	1	Split-System AC	3.00		Yes	1	Split-System AC	3.00		18.00		No	0.52	538	0.0	$152.90	$4,488.66	$276.00	27.55

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
Utility Room	Church Building	1	Furnace	140.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic Floor	Church Building	2	Furnace	125.00	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
Utility Room	Church Building	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Sacricy Room	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	6.8	$82.10	$7.17	$0.00	0.09
Men's bathroom	3	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	20.5	$246.31	$21.51	$0.00	0.09
Women's Bathroom	3	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	20.5	$246.31	$21.51	$0.00	0.09
Kitchen	2	Faucet Aerator (Kitchen)	2.50	2.20	0.00	0	3.4	$41.05	$14.34	$0.00	0.35

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR 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	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Kitchen	1	Microwave	1,000.0	No
Kitchen	1	Coffee Maker	680.0	No
Storage/Office	1	Printer	20.0	Yes
Kitchen	1	Electric Range	100.0	No

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Saint Mary's Episcopal Church

Primary Property Type: Worship Facility
Gross Floor Area (ft²): 4,870
Built: 1954

For Year Ending: April 30, 2016
Date Generated: October 01, 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
Saint Mary's Episcopal Church 33 Berlin Road Clementon, New Jersey 08021	_____ (___)___-_____	___ _____ (___)___-_____ _____

Property ID: 5145421

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
73.6 kBtu/ft²

Source EUI
110.6 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	77,671 (22%)
Natural Gas (kBtu)	280,600 (78%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	91.1
National Median Source EUI (kBtu/ft²)	137
% Diff from National Median Source EUI	-19%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	25

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)