Local Government Energy Audit:
Energy Audit Report

Abundant Life Original Glorious Church

305-307 Ellis Avenue

Irvington, NJ 07111

August 31, 2017

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 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 Abundant Life Original Glorious Church.

The goal of an LGEA report is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and provide information and assistance to help facilities implement ECMs. The LGEA report also contains valuable information on financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing ECMs.

TRC Energy Services (TRC) conducted this study as part of a comprehensive effort to assist New Jersey nonprofits in controlling energy costs and protecting our environment by offering a wide range of energy management options and advice.

1.1 Facility Summary

The Abundant Life Original Glorious Church is a 5,000 square foot facility located in Irvington. The windows throughout the facility are double paned and the exterior doors are constructed of wood. Interior lighting consists of linear fluorescent, incandescent, and compact fluorescent lamps with lighting control provided by manual wall switches. Heating is provided by one hot water gas fired boiler. The cooling system consists of window air conditioning units.

A thorough description of the facility and our observations are located in Section 2, "Facility Information and Existing Conditions."

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated eight measures which together represent an opportunity for Abundant Life Original Glorious Church to reduce annual energy costs by roughly $671 and annual greenhouse gas emissions by 6,125 lbs CO_2e. We estimate that if all measures are implemented as recommended, the project would pay for itself in roughly 27 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce the church's annual energy use by 13%.

Figure 1 – Previous 12 Month Utility Costs

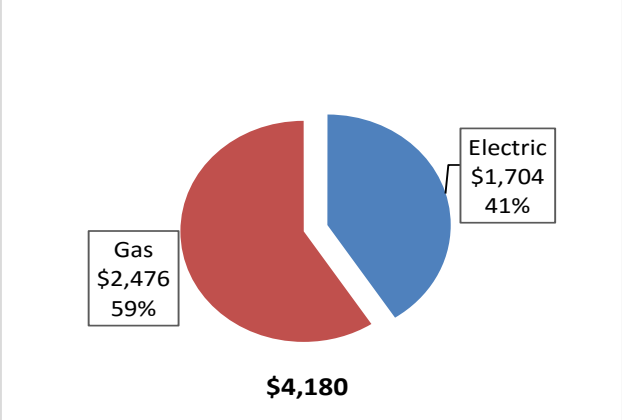
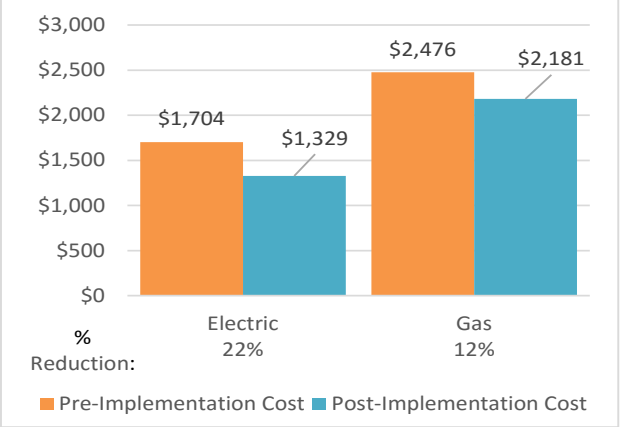


Figure 2 – Potential Post-Implementation Costs



A detailed description of existing energy use is in Section 3 "Site Energy Use and Costs."

Estimates of the total cost, energy savings, and financial incentives for the proposed energy efficient upgrades are summarized below in Figure 3. A brief description of each category is below and a description of savings opportunities can be found in Section 4, "Energy Conservation Measures."

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			1,277	1.9	0.0	$242.09	$4,697.08	$215.00	$4,482.08	18.5	1,286
ECM 1	Install LED Fixtures	Yes	233	0.4	0.0	$44.10	$1,035.96	$200.00	$835.96	19.0	234
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	188	0.4	0.0	$35.72	$939.50	$15.00	$924.50	25.9	190
ECM 3	Retrofit Fixtures with LED Lamps	Yes	539	1.1	0.0	$102.24	$2,291.40	$0.00	$2,291.40	22.4	543
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Lighting Control Measures			48	0.1	0.0	$9.07	$464.00	$80.00	$384.00	42.3	48
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	48	0.1	0.0	$9.07	$464.00	$80.00	$384.00	42.3	48
Electric Unitary HVAC Measures			654	0.7	0.0	$124.01	$3,571.13	$0.00	$3,571.13	28.8	659
ECM 6	Install High Efficiency Electric AC	Yes	654	0.7	0.0	$124.01	$3,571.13	$0.00	$3,571.13	28.8	659
Gas Heating (HVAC/Process) Replacement			0	0.0	34.1	$285.38	$10,170.05	$400.00	$9,770.05	34.2	3,991
ECM 7	Install High Efficiency Hot Water Boilers	Yes	0	0.0	34.1	$285.38	$10,170.05	$400.00	$9,770.05	34.2	3,991
Domestic Water Heating Upgrade			0	0.0	1.2	$9.99	$14.34	$0.00	$14.34	1.4	140
ECM 8	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	1.2	$9.99	$14.34	$0.00	$14.34	1.4	140
TOTALS			1,980	2.7	35.3	$670.55	$18,916.60	$695.00	$18,221.60	27.2	6,125

* - 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 not needed. 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 older inefficient air conditioning systems with modern energy efficient systems. New air conditioning systems can provide equivalent cooling to older air condition systems at a reduced energy cost. These measures save energy by reducing the power used by the air conditioning systems, due to improved electrical efficiency.

Gas Heating (HVAC/Process) measures generally involve replacing older inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide equivalent heating compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel demands for heating, due to improved combustion and heat transfer efficiency.

Domestic Hot Water upgrade measures generally involve replacing older inefficient domestic water heating systems with modern energy efficient systems. New domestic hot water heating systems can provide equivalent, or greater, water heating capacity compared to older systems at a reduced energy cost. These measures save energy by reducing the fuel used for domestic hot water heating due to improved heating efficiency or reducing standby losses.

Energy Efficient Practices

TRC Energy Services also identified 11 low cost or no cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend

equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Abundant Life Original Glorious Church include:

- Reduce Air Leakage
- Use Window Treatments/Coverings
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Water Conservation

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

On-Site Generation Measures

TRC Energy Services evaluated the potential for installing on-site generation for Abundant Life Original Glorious 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 on-site generation potential, please refer to section 6.

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, 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 NJBPU SmartStart program. Facilities pursuing individual measures (or planning to phase implementation of selected measures over multiple years) can access incentives through SmartStart. To participate in this program you can use internal resources, or an outside firm or contractor for the final design and installation of the ECM(s). To participate in SmartStart, pre-approval is required when pursuing specific incentives for ECM installation. For more information on incentive estimates for each ECM, please refer to Figure 3. For more information on this programs and other programs offered please refer to Section 6 of this report or www.njcleanenergy.com

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Gloria F. Green	Pastor	getyourlife@yahoo.com	(570) 801-1430
Designated Representative			
Gloria F. Green	Pastor	getyourlife@yahoo.com	(570) 801-1430
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On February 5, 2017, TRC Energy Services performed an energy audit at Abundant Life Original Glorious Church located in Irvington, New Jersey. TRC Energy Services' team met with Pastor Gloria F. Green to review the facility operations and help focus our investigation on specific energy-using systems.

Abundant Life Church consists of a sacristy room, a fellowship hall, offices, a small kitchen and a small mechanical space. It is a two-story structure of stucco over fiberglass cavity insulation.

2.3 Building Occupancy

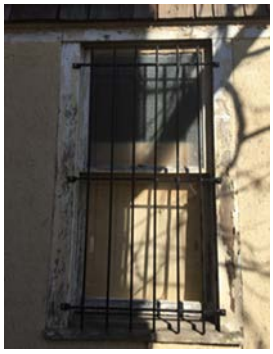
The church is open to the community and used year round. During the week, Monday through Friday, the church is open to the public for one hour. On the weekends, the church has extended hours as listed in Figure 5 below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Abundant Life Church	Weekday	10:00 AM - 11:00 AM
Abundant Life Church	Weekend	9:00 AM - 8:00 PM

2.4 Building Envelope

The foundation consists of cast-in-place concrete perimeter wall footings with masonry foundation walls. The building has a gable roof that was replaced by the congregation as part of renovation project. The exterior walls are constructed of stucco, and the upper walls are accented with vinyl siding. The walls were found to be in poor condition and are in need of a complete renovation. The front façade is finished with concrete wall and vinyl siding wall.



There are cracks on the building's exterior walls. The stucco and vinyl siding are aging and are no longer capable of weatherizing the building. The windows throughout the facility are double paned and were observed to be in poor condition and showing signs of outside air infiltration. The exteriors doors are constructed of wood and are also in poor condition. Overall the building's envelope was reported to be in poor condition with signs of excessive outside air infiltration. We recommend the congregation plan for a renovation of the building's envelope so it can provide a tight weather barrier.

2.5 On-Site Generation

Abundant Life Original Glorious Church does not have on-site electric generation capacity.

2.6 Energy-Using Systems

Please see **Appendix A: Equipment Inventory & Recommendations** for an inventory of the facility's lighting equipment.

Lighting

The facility interior lighting system consists of a mixture of 40-watt, T12 fluorescent lamps and fixtures with both electronic and magnetic ballasts, incandescent, and compact fluorescent lamps. The fellowship hall and the kitchen are lit with T12 linear fluorescent lamps. The restrooms are lit with incandescent lamps, the offices, corridor, and sacristy room are lit with a combination of incandescent and compact

fluorescent lamps. Lighting control is provided by manual wall switches. The building's electric panel should be upgraded since the current circuit breaker cannot support the building's actual load.

Energy savings could be achieved by replacing the existing lighting system with LED linear tubes and LED screw-in lamps. Installing occupancy sensors in select areas will yield additional energy savings.

Hot Water (or Steam) Heating

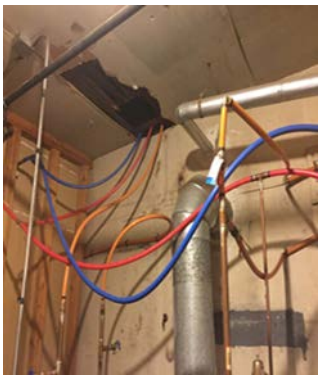
Hot water for heating the space is supplied by a single gas-fired hot water boiler controlled by a manual thermostat. The boiler has a nameplate output capacity of 278 KBtu/hr. The boiler is 27 years old and has two (2) 1/2 hp pumps that supply heating hot water to the radiator units. The heating hot water supply piping system needs to be replaced. There was no heat on the first floor because the hot water circulation pipe is leaking, and has been cut-off from the boiler, as mentioned by the site contact.

Air Conditioning

There are a total of eight (8) manually controlled 5,350 BTU/hr window AC units made by Daewoo. The window AC units are in poor condition and have been proposed for replacement with a new energy efficient units.

Domestic Hot Water

The domestic hot water system for the facility consists of one (1) A. O. Smith gas-fired atmospheric hot water heater with an input rating of 40 kBtu/hr and a nominal efficiency of 80%. The water heater is in good condition, however the domestic hot water distribution system needs to be upgraded. The current system consists of visible non-sized plastic pipes.



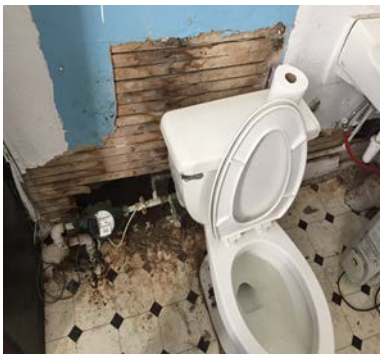
Food Service

The facility has a small kitchen with a four (4) pans gas convection oven and is seldom used throughout the year. The kitchen has three (3) stand-up refrigerators for beverage and food storage.

There is no laundry equipment in the facility.

2.7 Water-Using Systems

There are two (2) restrooms at this facility. Faucets are rated at 1.9 gpm or higher; toilets are rated at 2.5 gallons per flush and the urinals are rated at 2 gallons per flush. The kitchen faucet is rated at 2.0 gpm.



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

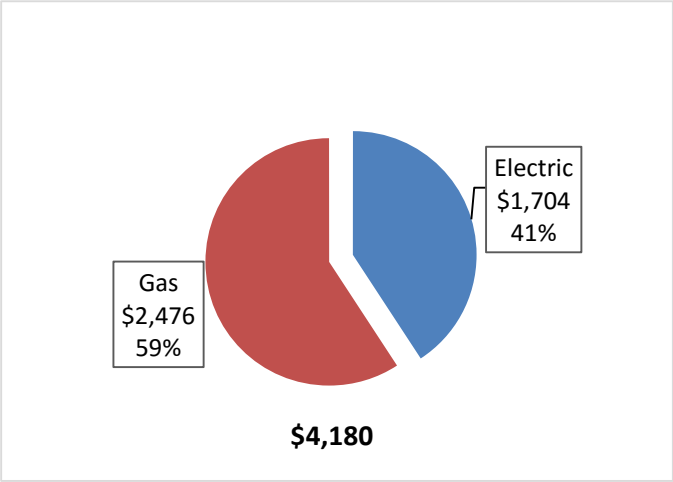
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Abundant Life Original Glorious Church		
Fuel	Usage	Cost
Electricity	8,993 kWh	$1,704
Natural Gas	2,958 Therms	$2,476
Total		$4,180

The current annual energy cost for this facility is $4,180 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.190/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

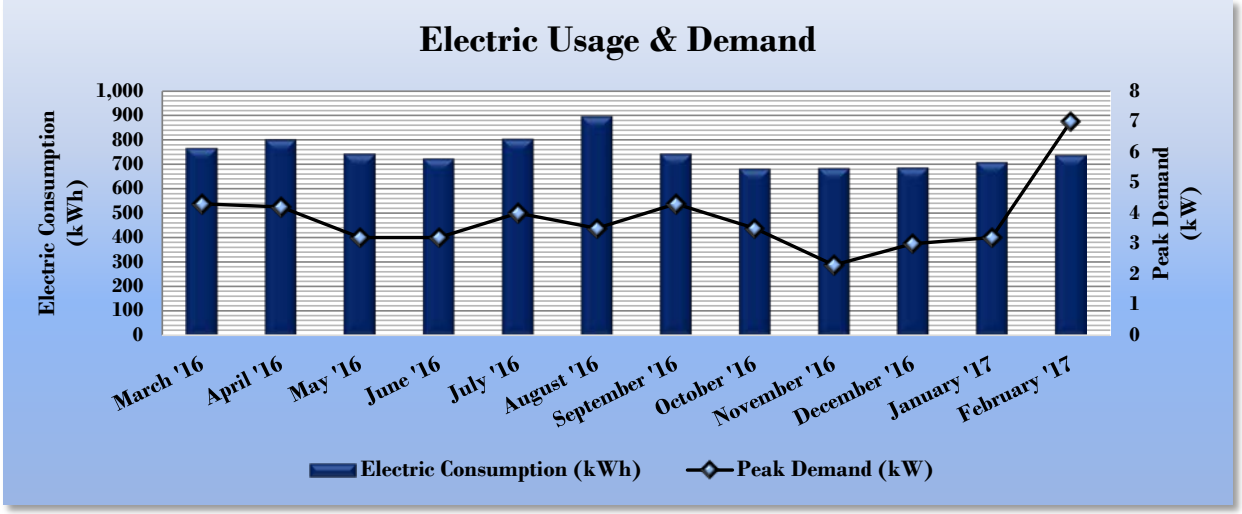


Figure 9 - Electric Usage & Demand

Electric Billing Data for Abundant Life Original Glorious Church						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
3/31/16	31	768	4	$18	$194	Yes
4/30/16	30	803	4	$18	$201	Yes
5/31/16	31	744	3	$16	$190	Yes
6/30/16	30	724	3	$16	$188	Yes
7/31/16	31	805	4	$18	$198	Yes
8/31/16	31	898	4	$15	$176	Yes
9/30/16	30	744	4	$19	$122	Yes
10/31/16	31	683	4	$16	$80	Yes
11/30/16	30	686	2	$10	$71	Yes
12/31/16	31	688	3	$13	$77	Yes
1/31/17	31	711	3	$14	$84	Yes
2/28/17	28	739	7	$31	$124	Yes
Totals	365	8,993	7	$205	$1,704	12
Annual	365	8,993	7	$205	$1,704	

3.3 Natural Gas Usage

Natural Gas is provided by PSE&G. The average gas cost for the past 12 months is $0.837/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

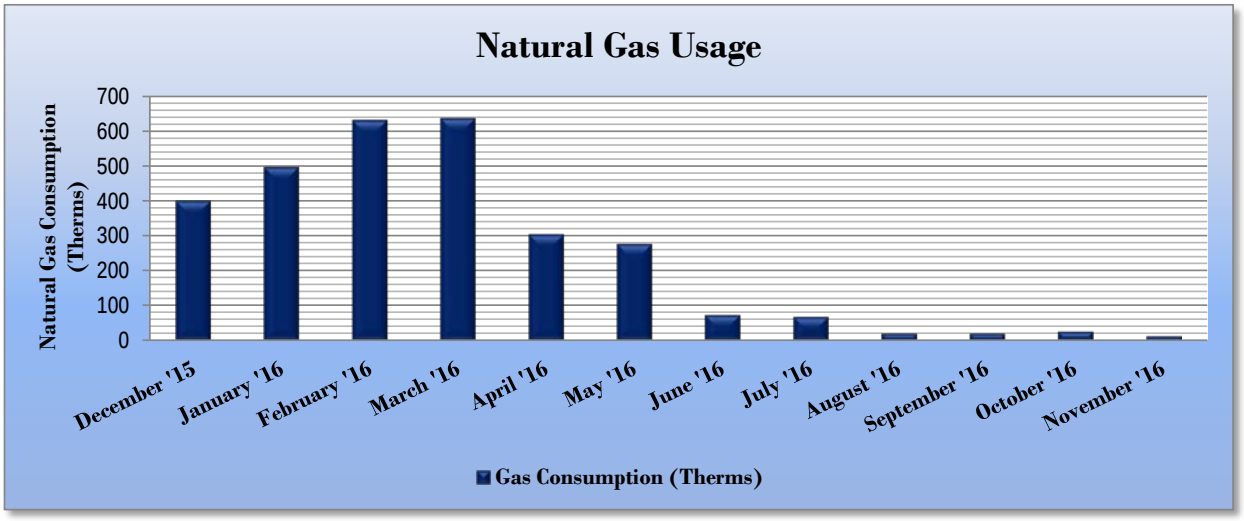


Figure 11 - Natural Gas Usage

Gas Billing Data for Abundant Life Original Glorious Church			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/31/15	31	400	$331
1/31/16	31	496	$423
2/29/16	29	630	$531
3/31/16	31	636	$517
4/30/16	30	304	$227
5/31/16	31	277	$212
6/30/16	30	74	$65
7/31/16	31	68	$63
8/31/16	31	21	$29
9/30/16	30	21	$29
10/31/16	31	26	$34
11/30/16	30	13	$23
Totals	366	2,966	$2,483
Annual	365	2,958	$2,476

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 measures a building's energy consumption per square foot, and it is the standard metric for comparing building 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		
	Abundant Life Original Glorious Church	National Median Building Type: Religious
Source Energy Use Intensity (kBtu/ft^2)	81.4	70.7
Site Energy Use Intensity (kBtu/ft^2)	65.3	36.8

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, 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		
	Abundant Life Original Glorious Church	National Median Building Type: Religious
Source Energy Use Intensity (kBtu/ft^2)	69.7	70.7
Site Energy Use Intensity (kBtu/ft^2)	56.9	36.8

Many types of commercial buildings are also eligible to receive 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. The church building could not receive an ENERGY STAR® score because the auditor needed to estimate some energy usage due to billing issues. Data can always be updated in this account if the PSE&G eventually provides corrected invoices, which would most likely be at your request.

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

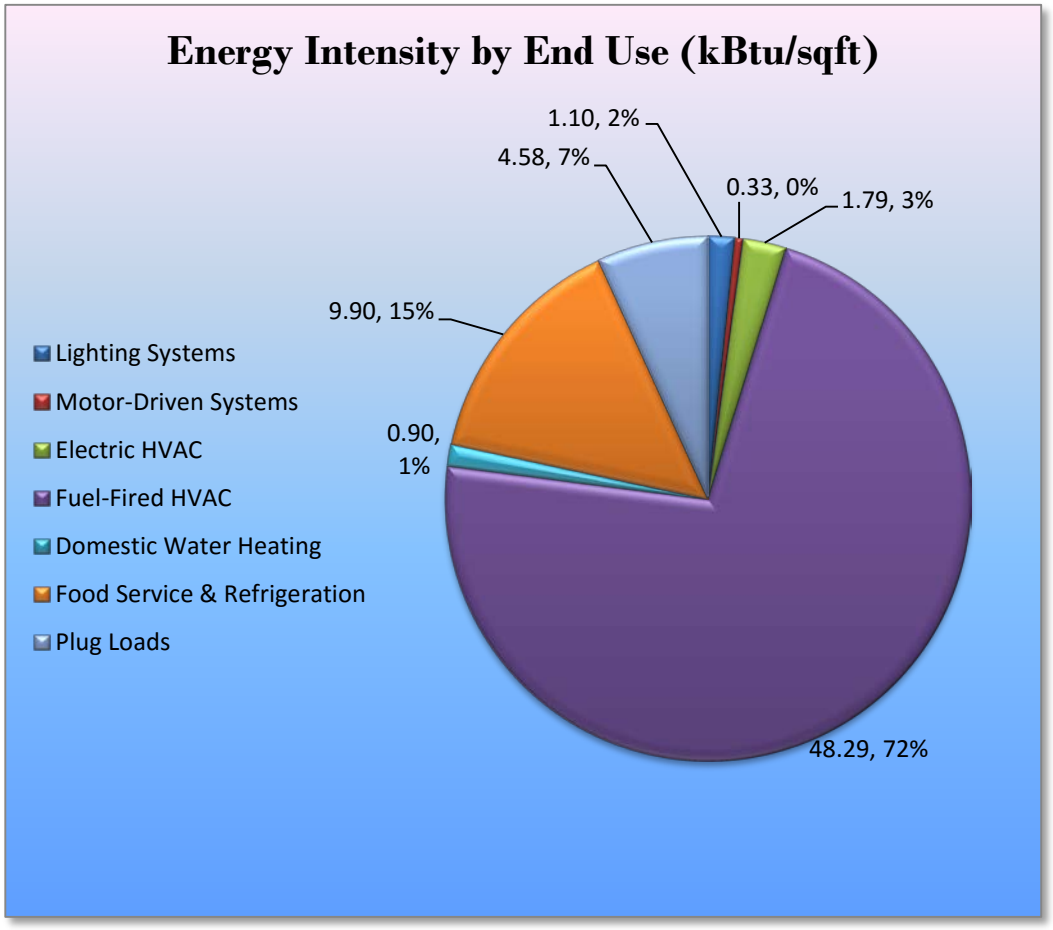
For more information on Energy Star certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

A Portfolio Manager account has been created online for your facility and you will be provided with the login information for the account under separate cover. We encourage you to update your utility information in Portfolio Manager regularly, so that you can keep track of your building's performance. Free online training is available to help you use ENERGY STAR® Portfolio Manager to track your building's performance at: https://www.energystar.gov/buildings/training.

3.5 Energy End-Use Breakdown

In order to provide a complete overview of energy consumption across building systems, an energy balance was performed at this facility. An energy balance utilizes standard practice engineering methods to evaluate all components of the various electric and fuel-fired systems found in a building to determine their proportional contribution to overall building energy usage. This chart of energy end uses highlights the relative contribution of each equipment category to total energy usage. This can help determine where the greatest benefits might be found from energy efficiency measures.

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 efficiency opportunities, help prioritize specific measures for implementation, and provide information to the Abundant Life Original Glorious Church regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016 approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
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ECM 8	Install Low-Flow Domestic Hot Water Devices	0	0.0	1.2	$9.99	$14.34	$0.00	$14.34	1.4	140
TOTALS		1,980	2.7	35.3	$670.55	$18,916.60	$695.00	$18,221.60	27.2	6,125

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

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

4.1.1 Lighting Upgrades

Recommended upgrades to existing lighting fixtures are summarized in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		1,277	1.9	0.0	$242.09	$4,697.08	$215.00	$4,482.08	18.5	1,286
ECM 1	Install LED Fixtures	233	0.4	0.0	$44.10	$1,035.96	$200.00	$835.96	19.0	234
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	188	0.4	0.0	$35.72	$939.50	$15.00	$924.50	25.9	190
ECM 3	Retrofit Fixtures with LED Lamps	539	1.1	0.0	$102.24	$2,291.40	$0.00	$2,291.40	22.4	543
ECM 4	Install LED Exit Signs	317	0.0	0.0	$60.04	$430.22	$0.00	$430.22	7.2	319

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	8	0.0	0.0	$1.50	$254.60	$0.00	$254.60	169.8	8
Exterior	225	0.4	0.0	$42.60	$781.35	$200.00	$581.35	13.6	226

Measure Description

We recommend replacing existing fixtures containing compact fluorescent lamps with new high performance LED light 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 10 times longer than many incandescent lamps.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	188	0.4	0.0	$35.72	$939.50	$15.00	$924.50	25.9	190
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent fixtures in the fellowship and the kitchen by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for 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 10 times longer than many incandescent lamps.

ECM 3: 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	539	1.1	0.0	$102.24	$2,291.40	$0.00	$2,291.40	22.4	543
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing incandescent, halogen, HID or other lighting technologies with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed while leaving the fluorescent fixture ballast in place. LED bulbs can be used in existing fixtures as a direct replacement for most other lighting technologies. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for 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 10 times longer than many incandescent lamps.

ECM 4: 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	317	0.0	0.0	$60.04	$430.22	$0.00	$430.22	7.2	319
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend replacing all incandescent EXIT signs with LED EXIT signs. LED EXIT signs require virtually no maintenance and have a life expectancy of at least 20 years. This measure saves energy by installing LED fixtures, which use less power than other technologies with an equivalent lighting output.

4.1.2 Lighting Control Measures

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		48	0.1	0.0	$9.07	$464.00	$80.00	$384.00	42.3	48
ECM 5	Install Occupancy Sensor Lighting Controls	48	0.1	0.0	$9.07	$464.00	$80.00	$384.00	42.3	48

During lighting upgrade planning and design, we recommend a comprehensive approach that considers both the efficiency of the lighting fixtures and how they are controlled.

ECM 5: 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)
48	0.1	0.0	$9.07	$464.00	$80.00	$384.00	42.3	48

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in the offices, fellowship and restroom. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy

controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results 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. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

4.1.3 Electric Unitary HVAC Measures

Our recommendations for unitary HVAC measures are summarized in Figure 18 below.

Figure 18 - Summary of Unitary HVAC ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		654	0.7	0.0	$124.01	$3,571.13	$0.00	$3,571.13	28.8	659
ECM 6	Install High Efficiency Electric AC	654	0.7	0.0	$124.01	$3,571.13	$0.00	$3,571.13	28.8	659

Please see **Appendix A: Equipment Inventory & Recommendations** for more information about existing HVAC equipment and proposed upgrades.

ECM 6: Install High Efficiency Air Conditioning Units

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)
654	0.7	0.0	$124.01	$3,571.13	$0.00	$3,571.13	28.8	659

Measure Description

We recommend 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.

4.1.4 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 19 below.

Figure 19 - Summary of Gas-Fired Heating Replacement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		0	0.0	34.1	$285.38	$10,170.05	$400.00	$9,770.05	34.2	3,991
ECM 7	Install High Efficiency Hot Water Boilers	0	0.0	34.1	$285.38	$10,170.05	$400.00	$9,770.05	34.2	3,991

ECM 7: Install High Efficiency Hot Water Boilers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	34.1	$285.38	$10,170.05	$400.00	$9,770.05	34.2	3,991

Measure Description

We recommend replacing older inefficient hot water boilers with high efficiency hot water boilers. Significant improvements have been made in combustion technology resulting in increased overall boiler efficiency. Energy savings results from improved combustion efficiency and reduced standby losses at low loads.

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers were only evaluated when the return water temperature is less than 130°F during most of the operating hours. As a result condensing hydronic boilers is not recommended for this site.

4.1.5 Domestic Hot Water System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 20 below.

Figure 20 - 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	1.2	$9.99	$14.34	$0.00	$14.34	1.4	140
ECM 8	Install Low-Flow Domestic Hot Water Devices	0	0.0	1.2	$9.99	$14.34	$0.00	$14.34	1.4	140

ECM 8: 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	1.2	$9.99	$14.34	$0.00	$14.34	1.4	140

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy. Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day 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 many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M 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.

Use Window Treatments/Coverings

A substantial amount of heat gain can occur through uncovered or untreated windows, especially older single pane windows and east or west-facing windows. Treatments such as high-reflectivity films or covering windows with shades or shutters can reduce solar heat gain and, consequently, cooling load and can reduce internal heat loss and the associated heating load.

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.

Use Fans to Reduce Cooling Load

Utilizing ceiling fans to supplement cooling is a low cost strategy to reduce cooling load considerably. Thermostat settings can be increased by 4°F with no change in overall occupant comfort when the wind chill effect of moving air is employed for cooling.

Practice Proper Use of Thermostat Schedules and Temperature Resets

Ensure thermostats are correctly set back. By employing proper set back temperatures and schedules, facility heating and cooling costs can be reduced dramatically during periods of low or no occupancy. As such, thermostats should be programmed for a setback of 5-10 °F during low occupancy hours (reduce heating setpoints and increase cooling setpoints). Cooling load can be reduced further by increasing the facility's occupied setpoint temperature. In general, during the cooling season, thermostats should be set as high as possible without sacrificing occupant comfort.

Clean and/or Replace HVAC Filters

Air filters work to reduce the amount of indoor air pollution and increase occupant comfort. Over time, filters become less and less effective as particulate buildup increases. In addition to health concerns related to clogged filters, filters that have reached saturation also restrict air flow through the facility's air conditioning or heat pump system, increasing the load on the distribution fans and decreasing occupant comfort levels. Filters should be checked monthly and cleaned or replaced when appropriate.

Perform Proper Boiler Maintenance

Many boiler problems develop slowly over time, so regular inspection and maintenance is essential to retain proper functionality and efficiency of the heating system. Fuel burning equipment should undergo yearly tune-ups to ensure they are operating as safely and efficiently as possible from a combustion standpoint. A tune-up should include a combustion analysis to analyze the exhaust from the boilers and to ensure the boiler is operating safely. Buildup of dirt, dust, or deposits on the internal surfaces of a boiler can greatly affect its heat transfer efficiency. These deposits can accumulate on the water side or fire side of the boiler. Boilers should be cleaned regularly according to the manufacturer's instructions to remove this build up in order to sustain efficiency and equipment life.

Perform Proper Water Heater Maintenance

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

Water Conservation

Installing low-flow faucets or faucet aerators, low-flow showerheads, and kitchen sink pre-rinse spray valves saves both energy and water. These devices save energy by reducing the overall amount of hot water used hence reducing the energy used to heat the water. The flow ratings for EPA WaterSense™

(http://www3.epa.gov/watersense/products) labeled devices are 1.5 gpm for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

Installing dual flush or low-flow toilets and low-flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 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 4.1.5 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.

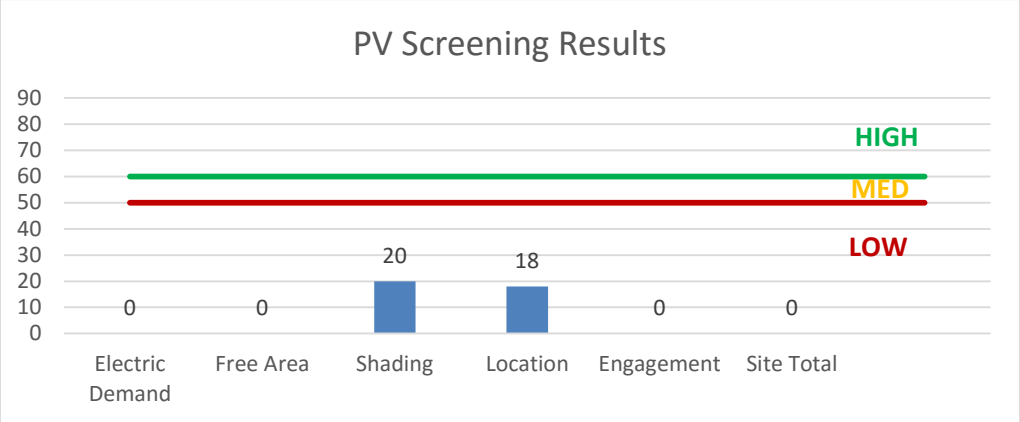
6.1 Photovoltaic

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 array.

In order to be cost-effective, a solar PV array needs certain minimum criteria, such as 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 21 - Photovoltaic Screening



6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity along with the recovery of heat energy, which is put to beneficial use. Common technologies for CHP include reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. Electric generation from a CHP system is typically interconnected to local power distribution systems. Heat is recovered from exhaust and ancillary cooling systems and interconnected to the existing hot water (or steam) distribution systems.

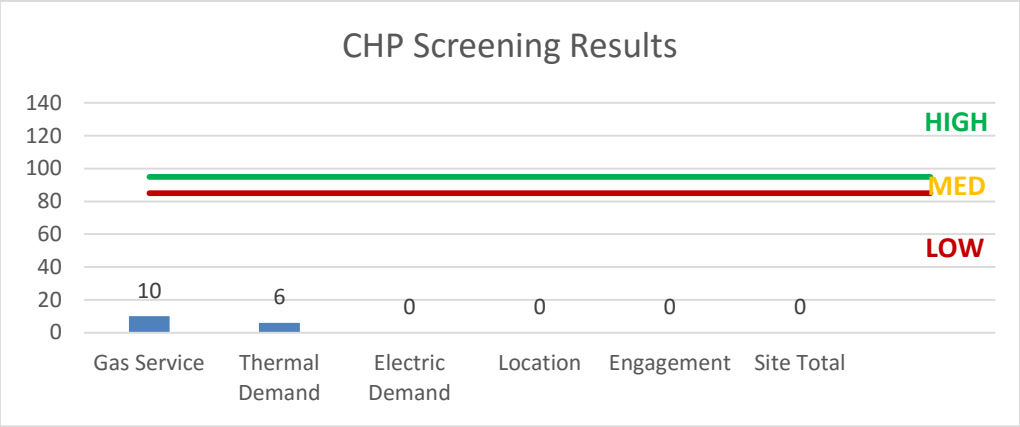
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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 boilers are the most significant factors contributing to 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 New Jersey specializing in commercial CHP cost assessment and installation, go to: http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/tools-and-resources/tradeally/approved_vendorsearch/

Figure 22 - Combined Heat and Power Screening



7 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, 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 a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 23 for a list of the eligible programs identified for each recommended ECM.

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom
ECM 1	Install LED Fixtures	x	
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x	
ECM 3	Retrofit Fixtures with LED Lamps		
ECM 4	Install LED Exit Signs		
ECM 5	Install Occupancy Sensor Lighting Controls	x	
ECM 6	Install High Efficiency Electric AC		
ECM 7	Install High Efficiency Hot Water Boilers	x	
ECM 8	Install Low-Flow Domestic Hot Water Devices		

Please note that the incentive values provided throughout the report assume SmartStart is used because it provides a consistent basis for comparison of available incentives for various measures, though in many cases incentive amounts may be higher through participation in other programs.

7.1 SmartStart

SmartStart is generally well-suited for implementation of individual measures or small group of measures. It provides flexibility to install measures at your own pace using in-house staff or a preferred contractor. SmartStart offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at 50% of the total installed incremental project cost, or a project cost buy down to a one year payback (whichever is less. 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 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

8.1 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.

8.2 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
Boiler Room	1	Compact Fluorescent: 26 W CFL Screen-in	Wall Switch	26	350	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.01	7	0.0	$1.27	$63.65	$0.00	49.95
Fellowship Hall	4	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	350	Relamp & Reballast	Yes	4	LED - Linear Tubes: (2) 8' Lamps	Occupancy Sensor	72	245	0.35	170	0.0	$32.26	$924.00	$20.00	28.02
Fellowship Hall	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	$15.01	$107.56	$0.00	7.17
Kitchen	1	Linear Fluorescent - T12: 4' T12 (40W) - 4L	Wall Switch	176	350	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	245	0.12	58	0.0	$10.91	$247.50	$35.00	19.48
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	$15.01	$107.56	$0.00	7.17
Women Restroom	6	Incandescent: 100 W A Lamp	Wall Switch	100	350	Relamp	Yes	6	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	9	245	0.46	222	0.0	$42.14	$497.90	$20.00	11.34
Women Restroom	1	Incandescent: 60 W A Lamp	Wall Switch	60	350	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.04	20	0.0	$3.82	$63.65	$0.00	16.65
Men Bathroom	1	Compact Fluorescent: 14 W CFL Screen-in	Wall Switch	14	350	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.00	2	0.0	$0.37	$63.65	$0.00	169.83
Men Bathroom	1	Incandescent: 60 W A Lamp	Wall Switch	60	350	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.04	20	0.0	$3.82	$63.65	$0.00	16.65
Storage Room	1	Incandescent: 60 W A Lamp	Wall Switch	60	350	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.04	20	0.0	$3.82	$63.65	$0.00	16.65
Walkway	4	Compact Fluorescent: 14 W CFL Screen-in	Wall Switch	14	350	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.02	8	0.0	$1.50	$254.60	$0.00	169.83
Walkway	1	Incandescent: 60 W A Lamp	Wall Switch	60	350	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.04	20	0.0	$3.82	$63.65	$0.00	16.65
Walkway	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	$15.01	$107.56	$0.00	7.17
Stairwell	2	Compact Fluorescent: 14 W CFL Screen-in	Wall Switch	14	350	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.01	4	0.0	$0.75	$127.30	$0.00	169.83
2nd floor Office1	2	Incandescent: 100 W A Lamp	Wall Switch	100	350	Relamp	Yes	2	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	9	245	0.15	74	0.0	$14.05	$243.30	$20.00	15.90
2nd floor Office2	2	Compact Fluorescent: 14 W CFL Screen-in	Wall Switch	14	350	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.01	4	0.0	$0.75	$127.30	$0.00	169.83
Sacristy Room	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	$15.01	$107.56	$0.00	7.17
Sacristy Room	12	Compact Fluorescent: 26 W CFL Screen-in	Wall Switch	26	350	Relamp	No	12	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.17	81	0.0	$15.29	$763.80	$0.00	49.95
Sacristy Room	2	Compact Fluorescent: 23 W Screen-in (wall sconce)	Wall Switch	23	350	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.02	11	0.0	$2.10	$127.30	$0.00	60.65
Sacristy Room	3	Halogen Incandescent: PAR 38 Flood Light	Wall Switch	60	350	Relamp	No	3	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.12	61	0.0	$11.47	$190.95	$0.00	16.65
Front Entrance	1	Compact Fluorescent: 14 W CFL Screen-in	Wall Switch	14	350	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	9	350	0.00	2	0.0	$0.37	$63.65	$0.00	169.83
Back Building	2	Halogen Incandescent: 250 W Flood Light	Daylight Dimming	250	442	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	25	442	0.37	225	0.0	$42.60	$781.35	$200.00	13.65

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
Sacristy Room	Sacristy Room	3	Ventilation Fan	0.1	65.0%	No	400	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler	Heating hot water system	2	Heating Hot Water Pump	0.8	65.0%	No	400	No	65.0%	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
Sacristy Room	Sacristy Room	6	Window AC	0.44		Yes	6	Window AC	0.41		12.00		No	0.59	525	0.0	$99.47	$2,678.35	$0.00	26.93
Office2	Office2	1	Window AC	0.41		Yes	1	Window AC	0.41		12.00		No	0.07	65	0.0	$12.27	$446.39	$0.00	36.38
Office1	Office1	1	Window AC	0.41		Yes	1	Window AC	0.41		12.00		No	0.07	65	0.0	$12.27	$446.39	$0.00	36.38

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions					Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Church Building	1	Non-Condensing Hot Water Boiler	278.00	Yes	1	Non-Condensing Hot Water Boiler	278.00	85.00%	AFUE	0.00	0	34.1	$285.38	$10,170.05	$400.00	34.24

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	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
Restrooms	1	Faucet Aerator (Lavatory)	1.90	1.00	0.00	0	1.5	$12.85	$7.17	$0.00	0.56
Kitchen	1	Faucet Aerator (Kitchen)	2.00	2.20	0.00	0	-0.3	-$2.86	$7.17	$0.00	-2.51

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)	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	Refrigerator	250.0	Yes
Kitchen	1	Refrigerator	250.0	Yes
Kitchen	1	Refrigerator	250.0	Yes
Kitchen	1	Microwave	950.0	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]

Abundant Live Church

Primary Property Type: Worship Facility
Gross Floor Area (ft²): 5,000
Built: 1918

For Year Ending: November 30, 2016
Date Generated: July 24, 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
Abundant Live Church 305-307 Elis Avenue Irvington, New Jersey 07111	_____ , (___)___-_____	___ _____ , (___)___-_____ _____

Property ID: 5980422

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
63.5 kBtu/ft²

Source EUI
75.5 kBtu/ft²

Annual Energy by Fuel		National Median Comparison	
Electric - Grid (kBtu)	21,117 (7%)	National Median Site EUI (kBtu/ft²)	59.4
Natural Gas (kBtu)	296,600 (93%)	National Median Source EUI (kBtu/ft²)	70.7
		% Diff from National Median Source EUI	7%
		Annual Emissions	
		Greenhouse Gas Emissions (Metric Tons CO2e/year)	18

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)