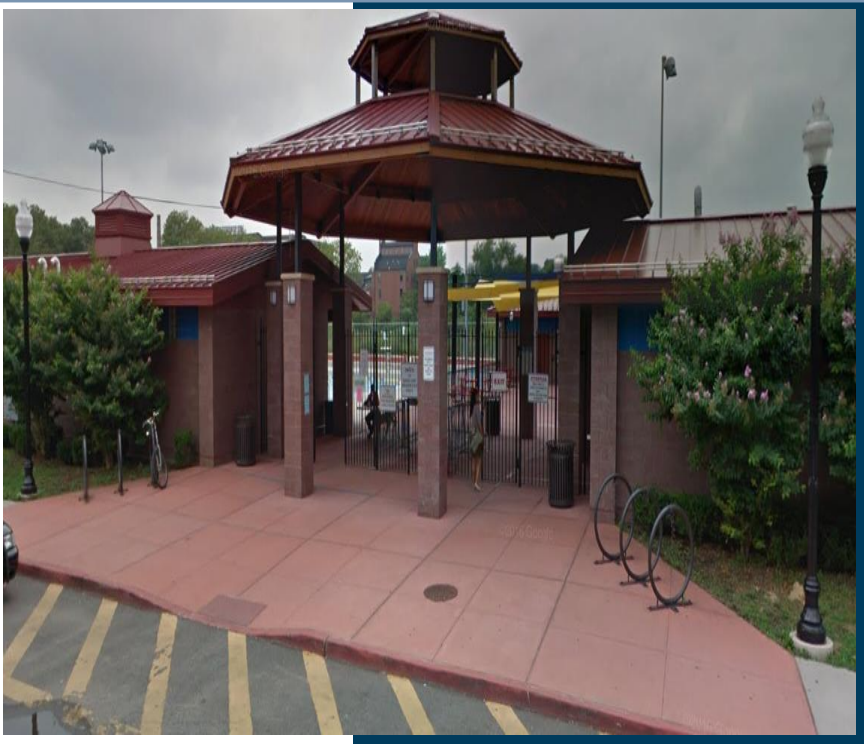
Local Government Energy Audit:
Energy Audit Report



Lafayette Pool

City of Jersey City
395 Johnston Ave.
Jersey City, NJ 07304

February 19, 2018

Final Report by:
TRC Energy Services

Disclaimer

The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate 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 Lafayette Pool. The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

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

1.1 Facility Summary

Lafayette Pool is a 7,450 square foot facility constructed in 2011. This is an outdoor pool which is open to the public during the summer months. The facility consists of a front office (with rooms for registration, first aid and an onsite police officer), pump rooms, restrooms and showers, locker rooms and a commercial kitchen space. Equipment at the facility is fairly new and mostly efficient. 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 seven (7) projects which represent an opportunity for Lafayette Pool to reduce annual energy costs by $2,223 and annual greenhouse gas emissions by 16,485 lbs CO_2e. The measures would pay for themselves in 13.8 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce Lafayette Pool's annual energy use by 9.9%.

Figure 1 – Previous 12 Month Utility Costs

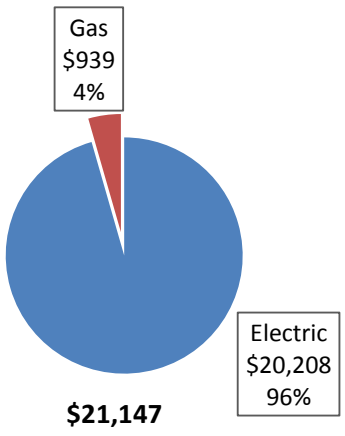
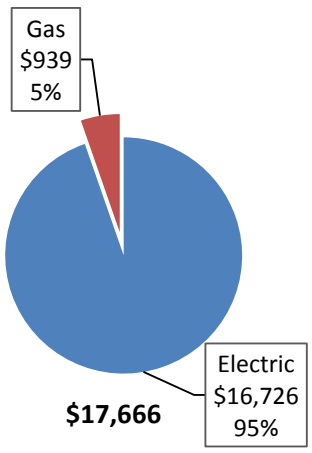


Figure 2 – Potential Post-Implementation Costs



A detailed description of Lafayette Pool's existing energy use can be found in Section 3. The evaluated measures have been listed and grouped into major categories as shown in Figure 3. Brief descriptions of

the categories can be found below and descriptions of the individual opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**12,936**	**6.0**	**0.0**	**$1,756.60**	**$32,149.18**	**$2,670.00**	**$29,479.18**	**16.78**	**13,027**
ECM 1	Install LED Fixtures	Yes	1,810	1.2	0.0	$245.75	$19,529.93	$1,000.00	$18,529.93	75.40	1,822
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	1,481	0.8	0.0	$201.07	$2,808.00	$0.00	$2,808.00	13.97	1,491
ECM 3	Retrofit Fixtures with LED Lamps	Yes	7,329	3.9	0.0	$995.25	$9,165.92	$1,670.00	$7,495.92	7.53	7,381
ECM 4	Install LED Exit Signs	Yes	2,316	0.2	0.0	$314.53	$645.33	$0.00	$645.33	2.05	2,333
Lighting Control Measures			**629**	**0.4**	**0.0**	**$85.39**	**$482.00**	**$290.00**	**$192.00**	**2.25**	**633**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	344	0.2	0.0	$46.72	$232.00	$40.00	$192.00	4.11	346
ECM 6	Install Daylight Dimming Controls	Yes	285	0.2	0.0	$38.67	$250.00	$250.00	$0.00	0.00	287
Domestic Water Heating Upgrade			**2,805**	**0.0**	**0.0**	**$380.95**	**$1,128.96**	**$0.00**	**$1,128.96**	**2.96**	**2,825**
ECM 7	Install Low-Flow Domestic Hot Water Devices	Yes	2,805	0.0	0.0	$380.95	$1,128.96	$0.00	$1,128.96	2.96	2,825
TOTALS			**16,371**	**6.4**	**0.0**	**$2,222.94**	**$33,760.14**	**$2,960.00**	**$30,800.14**	**13.86**	**16,485**

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

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

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

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

Domestic 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 four (4) no/low cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at Lafayette Pool include:

- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Use Fans to Reduce Cooling Load
- 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 Lafayette Pool. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install
- Energy Savings Improvement Program (ESIP)

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

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

For facilities without capital available to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.3 for additional information on the ESIP Program.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

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

2.2 General Site Information

On July 15, 2015, TRC performed an energy audit at Lafayette Pool located in Jersey City, New Jersey. TRC's team met with Ashley Salazar to review the facility operations and focus the investigation on specific energy-using systems.

Lafayette Pool is a 7,450 square foot facility comprised of a front office (with rooms for registration, first aid and an onsite police officer), pump rooms, restrooms and showers, locker rooms and a commercial kitchen space.

The facility was constructed in 2011. This is an open pool which is accessible to the public during the summer months. The facility predominantly consists of a front office (with rooms for registration, first aid and an onsite police officer), pump rooms, restrooms and showers, locker rooms and a commercial kitchen space.

2.3 Building Occupancy

The Lafayette pool is open for 20 weeks a year during the summer months. The water is drained and the pool is closed during the winter. The typical schedule is presented in the table below. The facility is occupied by about 7-10 full time staff.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Lafayette Pool	Weekday	9:30AM 6:00PM
Lafayette Pool	Weekend	9:30 AM - 6:00PM

2.4 Building Envelope

The building has (2) two swimming pools (kid's and an adult pool) both of which have concrete foundations. The office and kitchen has a brick façade and pitched roof. There are very few windows at the facility. The site is surrounded by a metal fence with entrance gates.

2.5 On-site Generation

Lafayette Pool does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Lighting System

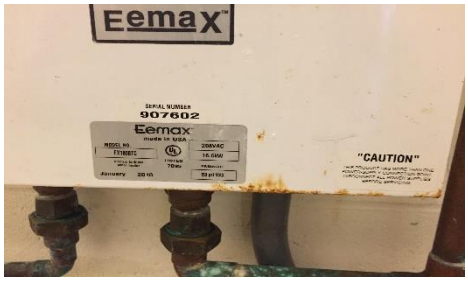
Lighting at the facility is provided predominately by 32-Watt, linear fluorescent T8 lamps with electronic ballasts, incandescent lamp fixtures as well as compact fluorescent lamps (CFL). Most of the building space uses 4-foot fixtures. The locker rooms are lit using 2-foot U-bent fluorescents which are T12 tubes. Lighting control in most spaces is provided by wall switches.

There is a significant amount of exterior lighting, which primarily consists of efficient high pressure sodium fixtures, recessed CFL fixtures and wall mount incandescent fixtures; it was mentioned by the site contact that these are manually controlled. The exit signs throughout the building are also incandescent.

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

Heating, Ventilation and Air Conditioning System

Office spaces are cooled by a 2-ton Trane heat pump system. This unit has a SEER rating of 10 and is six (6) years old. There is no space heating system in place.



Domestic Hot Water

The kitchen has two (2) tankless electric water heaters with an input capacity 16.6kW and over 95% efficiency.

Food Service, Refrigeration & Laundry Equipment

The food service area is the only source of natural gas usage in the building. The facility has commercial kitchen equipment including a stove with six (6) burners, 2 foot griddles, a full size oven, glass door refrigerators and a stand up freezer. There is also an ice making machine. It was observed that these were not ENERGY STAR®/high efficiency equipment. There is no laundry equipment.

Plug load & Vending Machines

There is one (1) computer and one (1) printer in the front office - police officer room. There are also two (2) microwaves at the first – aid room. There is no centralized PC power management software installed. The facility has no vending machines onsite.

2.7 Water-Using Systems

The facility has men's and women's locker rooms. These have sinks and shower heads with multi directional sprinklers. A sampling of restrooms found that the faucets are rated for 2 gpm or higher, the toilets are rated at 2.5 gallons per flush and the urinals are rated at 2 gallons per flush. The showerheads were rated at 2.5 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/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: Rec./Entertainment/Parks. 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 0 for additional information.

3.1 Total Cost of Energy

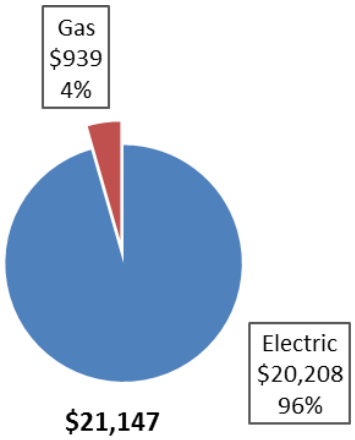
The following energy consumption and cost data is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Lafayette Pool		
Fuel	**Usage**	**Cost**
Electricity	137,911 kWh	$20,208
Natural Gas	929 Therms	$939
Total		**$21,147**

The current utility cost for this site is $21,147 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.136/kWh, which is the blended rate used throughout the analyses in this report. The third party supply is provided by Constellation Energy. The monthly electricity consumption and peak demand is represented graphically in the chart below.

Figure 8 - Electric Usage & Demand

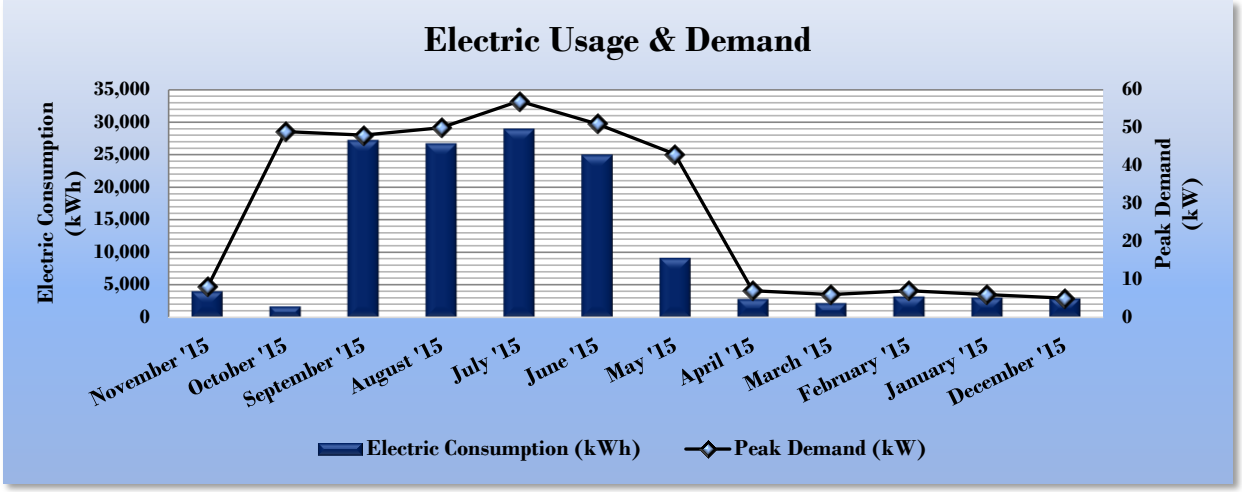


Figure 9 - Electric Usage & Demand

Electric Billing Data for Lafayette Pool					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
11/16/15	31	4,000	8	$35	$505
10/16/15	29	1,680	49	$213	$215
9/17/15	30	27,120	48	$209	$3,993
8/18/15	29	26,640	50	$219	$3,984
7/20/15	32	28,880	57	$247	$4,405
6/18/15	30	24,880	51	$222	$3,824
5/19/15	28	9,120	43	$188	$1,197
4/21/15	33	2,800	7	$31	$371
3/19/15	23	2,160	6	$21	$286
2/24/15	31	3,200	7	$31	$424
1/24/15	32	3,040	6	$28	$401
12/23/15	33	2,880	5	$21	$380
Totals	**361**	**136,400**	**57**	**$1,465**	**$19,987**
Annual	**365**	**137,911**	**57**	**$1,481**	**$20,208**

3.3 Natural Gas Usage

Natural gas is provided by PSE&G. The average gas cost for the past 12 months is $1.011/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

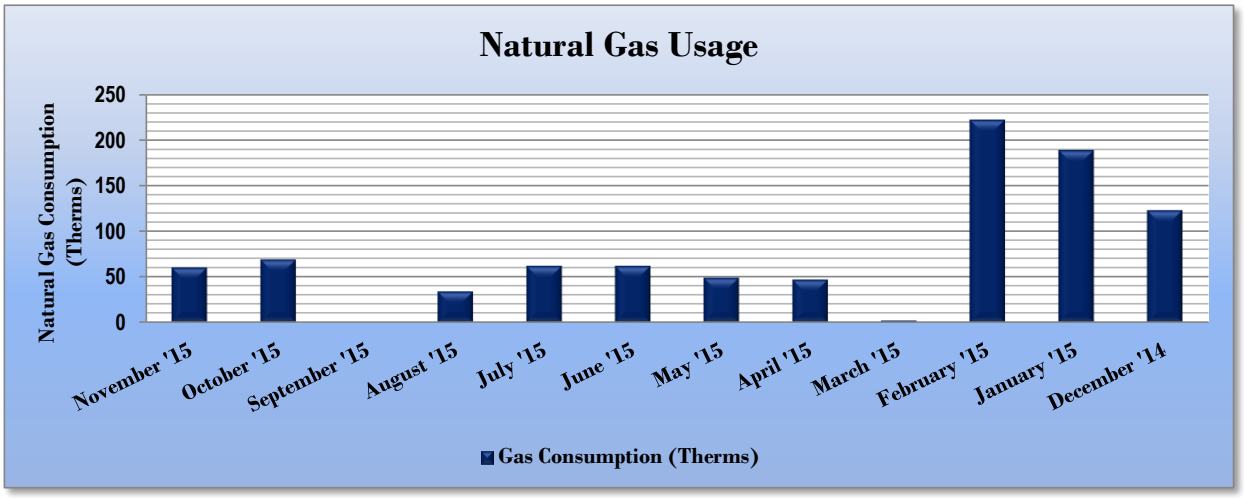


Figure 11 - Natural Gas Usage

Gas Billing Data for Lafayette Pool			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
11/20/15	31	60	$57
10/22/15	29	69	$63
9/22/15	30	0	$11
8/19/15	29	34	$38
7/21/15	32	62	$60
6/19/15	30	62	$59
5/20/15	28	49	$48
4/22/15	33	47	$48
3/20/15	23	2	$10
2/25/15	31	222	$210
1/26/15	32	189	$191
12/24/14	33	123	$135
Totals	**361**	**919**	**$929**
Annual	**365**	**929**	**$939**

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		
	Lafayette Pool	National Median Building Type: Rec./Entertainment/Parks
Source Energy Use Intensity (kBtu/ft^2)	211.4	96.8
Site Energy Use Intensity (kBtu/ft^2)	75.6	41.2

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

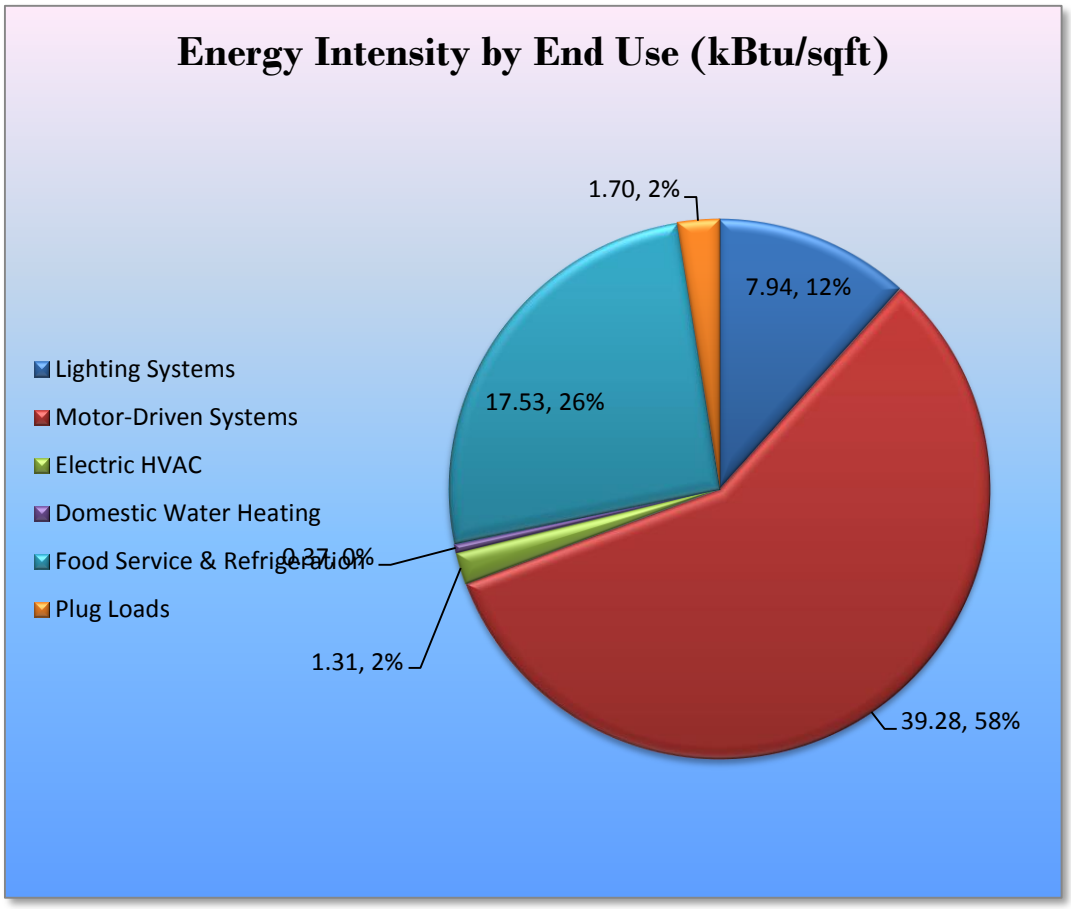
Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Lafayette Pool	National Median Building Type: Rec./Entertainment/Parks
Source Energy Use Intensity (kBtu/ft^2)	187.9	96.8
Site Energy Use Intensity (kBtu/ft^2)	68.1	41.2

Many buildings can also receive a 1 – 100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide — and may be eligible for ENERGY STAR® certification. This building type does not currently qualify to receive a score. The Portfolio Manager, Statement of Energy Performance can be found in Appendix B: ENERGY STAR® Statement of Energy Performance.

3.5 Energy End-Use Breakdown

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

Figure 14 - Energy Balance (% 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 Lafayette Pool 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 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		**12,936**	**6.0**	**0.0**	**$1,756.60**	**$32,149.18**	**$2,670.00**	**$29,479.18**	**16.78**	**13,027**
ECM 1	Install LED Fixtures	1,810	1.2	0.0	$245.75	$19,529.93	$1,000.00	$18,529.93	75.40	1,822
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	1,481	0.8	0.0	$201.07	$2,808.00	$0.00	$2,808.00	13.97	1,491
ECM 3	Retrofit Fixtures with LED Lamps	7,329	3.9	0.0	$995.25	$9,165.92	$1,670.00	$7,495.92	7.53	7,381
ECM 4	Install LED Exit Signs	2,316	0.2	0.0	$314.53	$645.33	$0.00	$645.33	2.05	2,333
Lighting Control Measures		**629**	**0.4**	**0.0**	**$85.39**	**$482.00**	**$290.00**	**$192.00**	**2.25**	**633**
ECM 5	Install Occupancy Sensor Lighting Controls	344	0.2	0.0	$46.72	$232.00	$40.00	$192.00	4.11	346
ECM 6	Install Daylight Dimming Controls	285	0.2	0.0	$38.67	$250.00	$250.00	$0.00	0.00	287
Domestic Water Heating Upgrade		**2,805**	**0.0**	**0.0**	**$380.95**	**$1,128.96**	**$0.00**	**$1,128.96**	**2.96**	**2,825**
ECM 7	Install Low-Flow Domestic Hot Water Devices	2,805	0.0	0.0	$380.95	$1,128.96	$0.00	$1,128.96	2.96	2,825
TOTALS		**16,371**	**6.4**	**0.0**	**$2,222.94**	**$33,760.14**	**$2,960.00**	**$30,800.14**	**13.86**	**16,485**

* - 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 "submeasures" 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		**12,936**	**6.0**	**0.0**	**$1,756.60**	**$32,149.18**	**$2,670.00**	**$29,479.18**	**16.78**	**13,027**
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ECM 3	Retrofit Fixtures with LED Lamps	7,329	3.9	0.0	$995.25	$9,165.92	$1,670.00	$7,495.92	7.53	7,381
ECM 4	Install LED Exit Signs	2,316	0.2	0.0	$314.53	$645.33	$0.00	$645.33	2.05	2,333

ECM 1: Install LED Fixtures

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0
Exterior	1,810	1.2	0.0	$245.75	$19,529.93	$1,000.00	$18,529.93	75.40	1,822

Measure Description

This measure evaluates replacing existing fixtures containing fluorescent tubes, CFL, HID, and incandescent lamps with new high performance LED light fixtures. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are generally more than twice that of a fluorescent source and more than ten (10) times incandescent sources. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

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

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

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	1,481	0.8	0.0	$201.07	$2,808.00	$0.00	$2,808.00	13.97	1,491

Measure Description

This measure evaluates replacing linear fluorescent lamps, ballasts, and reflectors with LED tube lamps, reflectors, and drivers specifically designed for existing linear fluorescent fixtures. The retrofit uses the existing fixture housing but replaces the rest of the components with an efficient source and reflectors

designed for LEDs. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output and efficiently projects the light into the space.

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

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

ECM 3: Retrofit Fixtures with LED Lamps

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	5,548	2.9	0.0	$753.36	$5,080.69	$910.00	$4,170.69	5.54	5,587
Exterior	1,781	1.0	0.0	$241.88	$4,085.23	$760.00	$3,325.23	13.75	1,794

Measure Description

This measure evaluates replacing linear fluorescent lamps with LED tube lamps and replacing incandescent and halogen screw-in/plug-in based lamps with LED lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

ECM 4: Install LED Exit Signs

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	2,316	0.2	0.0	$314.53	$645.33	$0.00	$645.33	2.05	2,333
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 several "submeasures" 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		**629**	**0.4**	**0.0**	**$85.39**	**$482.00**	**$290.00**	**$192.00**	**2.25**	**633**
ECM 5	Install Occupancy Sensor Lighting Controls	344	0.2	0.0	$46.72	$232.00	$40.00	$192.00	4.11	346
ECM 6	Install Daylight Dimming Controls	285	0.2	0.0	$38.67	$250.00	$250.00	$0.00	0.00	287

ECM 5: Install Occupancy Sensor Lighting Controls

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
344	0.2	0.0	$46.72	$232.00	$40.00	$192.00	4.11	346

Measure Description

This measure evaluates installing occupancy sensors to control light fixtures that are currently manually controlled in the office space of the facility. 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.

ECM 6: Install Daylight Dimming Controls

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
285	0.2	0.0	$38.67	$250.00	$250.00	$0.00	0.00	287

Measure Description

This measure evaluates installing ceiling-mounted, adjustable, indoor photosensor controls that serve the day lit areas. Photosensor control is recommended for fixtures that are located adjacent to window spaces with ample daylight. Light fixtures must be capable of continuous or at least four steps of dimming. This measure would reduce energy use by fixtures in spaces when appropriate light levels are met via daylight.

Optimum light levels and the method of dimming should be determined during the design phase of this project. We recommend a holistic design approach that considers both the technology of the lighting sources and how they are controlled.

4.1.3 Domestic Water Heating Upgrade

Domestic water heating measures include several "submeasures" as outlined in Figure 18 below.

Figure 18 - 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		**2,805**	**0.0**	**0.0**	**$380.95**	**$1,128.96**	**$0.00**	**$1,128.96**	**2.96**	**2,825**
ECM 7	Install Low-Flow Domestic Hot Water Devices	2,805	0.0	0.0	$380.95	$1,128.96	$0.00	$1,128.96	2.96	2,825

ECM 7: Install Low-Flow DHW Devices

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)
2,805	0.0	0.0	$380.95	$1,128.96	$0.00	$1,128.96	2.96	2,825

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 showerheads and faucet aerators reduce the water flow, relative to standard showerheads and aerators, from the fixture. Pre-rinse spray valves—often used in commercial and institutional kitchens—are designed to remove food waste from dishes prior to dishwashing. Replacing standard pre-rinse spray valves with low flow valves will reduce water use.

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.

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.

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.

Water Conservation

Installing dual flush or low flow toilets and low flow or waterless urinals are additional ways to reduce the sites water use, however, these devices do not provide energy savings at the site level. Any reduction in water use does however ultimately reduce grid level electricity use since a significant amount of electricity is used to deliver water from reservoirs to end users. The EPA WaterSense™ ratings for urinals is 0.5 (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard). Refer to Section 4.1.3 for any low-flow ECM recommendations.

6 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.

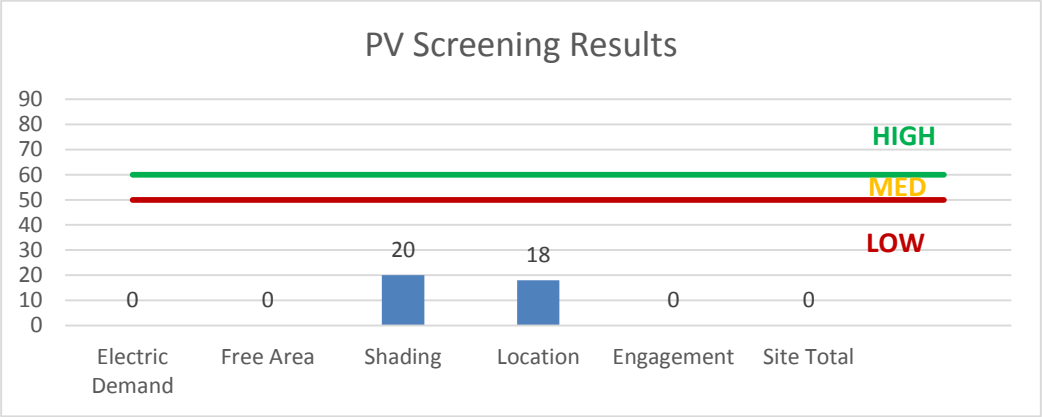
Preliminary screenings were performed to determine the potential that a generation project could provide a cost-effective solution for your facility. Before making a decision to implement, a feasibility study should be conducted that would take a detailed look at existing energy profiles, siting, interconnection, 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.

Figure 19 - Photovoltaic Screening



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

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

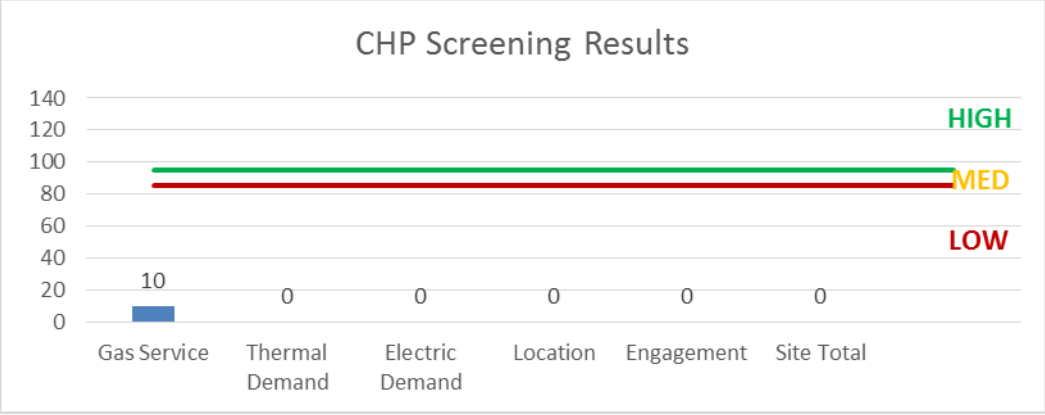
6.2 Combined Heat and Power

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.

Figure 20 – CHP Screening



7 DEMAND RESPONSE

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

By enabling grid operators to call upon Curtailment Service Providers and commercial facilities to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants receive payments whether or not their facility is called upon to curtail their electric usage.

Typically an electric customer needs to be capable of reducing their electric demand, within minutes, by at least 100 kW or more in order to participate in a DR program. Customers with a greater capability to quickly curtail their demand during peak hours will receive higher payments. Customers with back-up generators onsite may also receive additional DR payments for their generating capacity if they agree to run the generators for grid support when called upon. Eligible customers who have chosen to participate in a DR programs often find it to be a valuable source of revenue for their facility because the payments can significantly offset annual electric costs.

Participating customers can often quickly reduce their peak load through simple measures, such as temporarily raising temperature set points on thermostats, so that air conditioning units run less frequently, or agreeing to dim or shut off less critical lighting. This usually requires some level of building automation and controls capability to ensure rapid load reduction during a DR curtailment event. DR program participants may need to install smart meters or may need to also sub-meter larger energy-using equipment, such as chillers, in order to demonstrate compliance with DR program requirements.

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

The first step toward participation in a DR program is to contact a Curtailment Service Provider. Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding program rules and requirements for metering and controls, assess a facility's ability to temporarily reduce electric load, and provide details on payments to be expected for participation in the program. Providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment of their own to help ensure compliance with all terms and conditions of a DR contract.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and others, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay this charge on their monthly energy bills. As a contributor to the fund you were able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 21 for a list of the eligible programs identified for each recommended ECM.

Figure 21 - ECM Incentive Program Eligibility

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

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

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized because it provides a consistent comparison of available incentives.

Brief descriptions of all relevant alternative financing and incentive programs are located in the sections below or: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

The SmartStart program is comprised of new construction and retrofit components that offer incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives for various energy efficiency equipment based on national/market trends, new technologies or changes in efficiency baselines.

Prescriptive Equipment Incentives Available:

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

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

Incentives

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

Since your facility is an existing building, only the retrofit incentives have been applied in this report. Custom Measure incentives are calculated at $0.16/kWh and $1.60/therm based on estimated annual savings, capped at the lesser of 50% of the total installed incremental project cost, or a buy down to a one year payback. Program incentives are capped at $500,000 per electric account and $500,000 per natural gas account, per fiscal year.

How to Participate

To participate in the SmartStart program you will need to submit an application for the specific equipment to be installed. Many applications are designed as rebates, although others require application approval prior to installation. Applicants may work with a contractor of their choosing and can also utilize internal personnel, which provides added flexibility to the program. Using internal personnel also helps improve the economics of the ECM by reducing the labor cost that is included in the tables in this report.

Detailed program descriptions, instructions for applying and applications can be found at: www.njcleanenergy.com/SSB.

8.2 Direct Install

Overview

Direct Install 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.

8.3 Energy Savings Improvement Program

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

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

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

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

The ESIP approach may not be appropriate for all energy conservation and energy efficiency improvements. Entities should carefully consider all alternatives to develop an approach that best meets their needs. A detailed program descriptions and application can be found at: www.njcleanenergy.com/ESIP.

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

In 1999, New Jersey State Legislature passed the Electric Discount & Energy Competition Act (EDECA) to restructure the electric power industry in New Jersey. This law deregulated the retail electric markets, allowing all consumers to shop for service from competitive electric suppliers. The intent was to create a more competitive market for electric power supply in New Jersey. As a result, utilities were allowed to charge Cost of Service and customers were given the ability to choose a third party (i.e. non-utility) energy supplier.

Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. So, though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.

If your facility is not purchasing electricity from a third party supplier, consider shopping for a reduced rate from third party electric suppliers. If your facility is purchasing electricity from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party electric suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

9.2 Retail Natural Gas Supply Options

The natural gas market in New Jersey has also been deregulated. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. The utility provides basic gas supply service (BGSS) to customers who choose not to buy from a third party supplier for natural gas commodity.

A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process.

If your facility is not purchasing natural gas from a third party supplier, consider shopping for a reduced rate from third party natural gas suppliers. If your facility is purchasing natural gas from a third party supplier, review and compare prices at the end of the current contract or every couple years.

A list of third party natural gas suppliers, who are licensed by the state to provide service in New Jersey, can be found online at: www.state.nj.us/bpu/commercial/shopping.html.

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Women's locker Room	13	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	1,400	Relamp & Reballast	No	13	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,400	0.41	802	0.0	$108.91	$1,521.00	$0.00	13.97
Women's locker Room	14	Incandescent: Ceiling mount fixture	Wall Switch	60	1,400	Relamp	No	14	LED Screw-In Lamps: Ceiling Mount fixture	Wall Switch	11	1,400	0.56	1,085	0.0	$147.36	$752.54	$140.00	4.16
Women's locker Room	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.27	522	0.0	$70.89	$585.00	$100.00	6.84
Storage closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,400	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,400	0.08	157	0.0	$21.27	$150.40	$30.00	5.66
Men's Locker Room	11	U-Bend Fluorescent - T12: U T12 (34W) - 2L	Wall Switch	72	1,400	Relamp & Reballast	No	11	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,400	0.35	679	0.0	$92.16	$1,287.00	$0.00	13.97
Men's Locker Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,400	Relamp	No	4	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,400	0.16	313	0.0	$42.53	$300.80	$60.00	5.66
Men's Locker Room	14	Incandescent: Ceiling mount fixture	Wall Switch	60	1,400	Relamp	No	14	LED Screw-In Lamps: Ceiling Mount fixture	Wall Switch	11	1,400	0.56	1,085	0.0	$147.36	$752.54	$140.00	4.16
Storage closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,400	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	1,400	0.08	157	0.0	$21.27	$150.40	$30.00	5.66
Women's locker Room	2	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.06	772	0.0	$104.84	$215.11	$0.00	2.05
Men's Locker Room	2	Exit Signs: Incandescent	None	45	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.06	772	0.0	$104.84	$215.11	$0.00	2.05
Locker Room - Side Hallway	20	CFL Screw-In Lamps: Recessed Fixtures	Wall Switch	26	1,120	Relamp	No	20	LED Screw-In Lamps: Recessed fixture	Wall Switch	22	1,120	0.07	101	0.0	$13.75	$2,150.12	$400.00	127.30
Locker Room - Side Hallway	15	Incandescent: Wall mount fixture	Wall Switch	60	1,120	Relamp	No	15	LED Screw-In Lamps: Wall mount fixture	Wall Switch	22	1,120	0.46	721	0.0	$97.96	$1,612.59	$300.00	13.40
Pump Room	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	980	0.41	792	0.0	$107.49	$818.00	$140.00	6.31
Pump Room	1	Exit Signs: Incandescent	Wall Switch	45	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.03	386	0.0	$52.42	$107.56	$0.00	2.05
Pool Side Exterior lights	6	Incandescent: Wall mount fixture	Wall Switch	120	1,400	Relamp	No	6	LED Screw-In Lamps: Wall mount fixture	Wall Switch	19	1,400	0.49	959	0.0	$130.18	$322.52	$60.00	2.02
Storage closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.03	52	0.0	$7.09	$58.50	$10.00	6.84
Office	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	980	0.44	858	0.0	$116.45	$876.50	$150.00	6.24
Office	1	Exit Signs: Incandescent	Wall Switch	45	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.03	386	0.0	$52.42	$107.56	$0.00	2.05
AHU Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.03	52	0.0	$7.09	$58.50	$10.00	6.84
First AID Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.05	104	0.0	$14.18	$117.00	$20.00	6.84
Cop Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.05	104	0.0	$14.18	$117.00	$20.00	6.84
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.03	52	0.0	$7.09	$58.50	$10.00	6.84
Locker Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.05	104	0.0	$14.18	$117.00	$20.00	6.84
Handicap bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.05	104	0.0	$14.18	$117.00	$20.00	6.84
Storage closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.03	52	0.0	$7.09	$58.50	$10.00	6.84

	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
Handicap bathroom	2	CFL Screw-In Lamps: Wall mount fixture	Wall Switch	75	1,400	Relamp	No	2	LED Screw-In Lamps: Wall mount fixture	Wall Switch	14	1,400	0.10	193	0.0	$26.21	$107.51	$20.00	3.34
Storage closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,400	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,400	0.05	104	0.0	$14.18	$117.00	$20.00	6.84
Exterior	10	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	1,120	Fixture Replacement	Yes	10	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Daylight Dimming	45	560	1.35	2,095	0.0	$284.42	$19,779.93	$1,450.00	64.45

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
Lafayette Pool	Women's Locker Room	1	Other	0.5	78.2%	No	2,745	No	78.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump Room	Lafayette Pool	2	Water Supply Pump	15.0	90.2%	Yes	3,391	No	90.2%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Pump Room	Lafayette Pool	1	Water Supply Pump	10.0	91.7%	Yes	3,391	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men's Locker Room	Men's Locker room	1	Other	0.5	78.2%	No	2,745	No	78.2%	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
AHU Room	Lafayette Pool	1	Packaged AC	2.00		No							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
Water meter room	Pool	1	Tankless Water Heater	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	Sink	1	Tankless Water Heater	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
Women's locker room	4	Faucet Aerator (Lavatory)	1.00	1.00	0.00	0	0.0	$0.00	$28.68	$0.00	0.00
Women's locker room	6	Showerhead	2.50	2.00	0.00	1,079	0.0	$146.52	$535.80	$0.00	3.66
Men's locker Room	6	Showerhead	2.50	2.00	0.00	1,079	0.0	$146.52	$535.80	$0.00	3.66
Men's locker Room	2	Faucet Aerator (Lavatory)	1.00	1.00	0.00	0	0.0	$0.00	$14.34	$0.00	0.00
First Aid Room	1	Faucet Aerator (Lavatory)	1.00	1.00	0.00	0	0.0	$0.00	$7.17	$0.00	0.00
Restroom	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	647	0.0	$87.91	$7.17	$0.00	0.08

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	2	Stand-Up Refrigerator, Glass Door (>50 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Freezer, Solid Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker 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	Ice Making Head (<450 lbs/day), Batch	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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 Convection Oven (Full Size)	No	No	0.00	0	0.0	$0.00	$9,290.04	$500.00	0.00
Kitchen	1	Electric Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	$0.00	$15,789.30	$1,000.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
First Aid Room	2	Microwave	1,000.0	No
First Aid Room	1	Refrigerator - Big	400.0	No
Cop Room	1	Computer	75.0	Yes
Cop Room	1	Printer Small	20.0	yes

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

Lafayette Pool

Primary Property Type: Other - Recreation
Gross Floor Area (ft²): 7,450
Built: 2011

For Year Ending: October 31, 2015
Date Generated: December 13, 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
Lafayette Pool 395 Johnston Ave Jersey City, New Jersey 07304	_____ , (___)___-_____	____ _____ , (___)___-_____ _____

Property ID: 5082940

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
74.7 kBtu/ft²

Source EUI
208.7 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	92,246 (17%)
Electric - Grid (kBtu)	464,337 (83%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	34.7
National Median Source EUI (kBtu/ft²)	96.8
% Diff from National Median Source EUI	116%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	58

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)