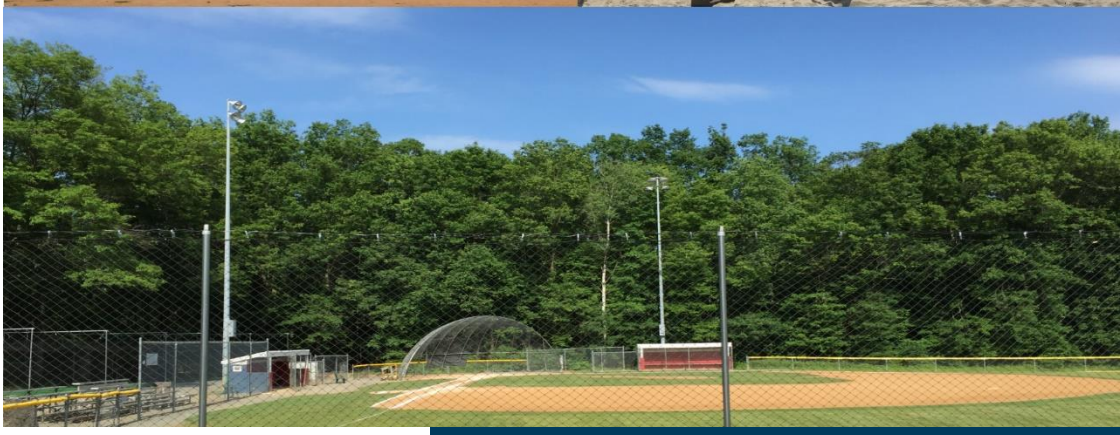
Local Government Energy Audit:
Energy Audit Report



Park & Recreation Areas

Various Locations

Long Hill, New Jersey 07933

Long Hill Township

October 31, 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 Longhill Township's park & recreation areas.

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.

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

1.1 Facility Summary

The park & recreation areas comprise three locations: Meyersville Ballfield, Stirling Lake, and the Little League Field with five buildings covering a total area of 4,800 square feet. All the buildings are single story facilities having various space types including a guard house, kitchen, restroom, and storage areas.

Interior lighting consists of 32-Watt T8 fluorescent fixtures with some 40-Watt and 75-Watt T12 fluorescent fixtures; all of which are inefficient in performance when compared to the latest lighting technology available in the market. Exterior lighting is primarily provided by 150-Watt and 400-Watt metal halide fixtures. Interior and exterior lighting systems are controlled manually.

Cooling and ventilation is provided by split system AC systems.

A thorough description of the facility and our observations is in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated and recommends three measures which together represent an opportunity for the park & recreation areas to reduce annual energy costs by roughly $4,817 and annual greenhouse gas emissions by 28,054 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in roughly 21.3 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 annual energy use at the park and recreation areas by 57%.

Figure 1 – Previous 12 Month Utility Costs

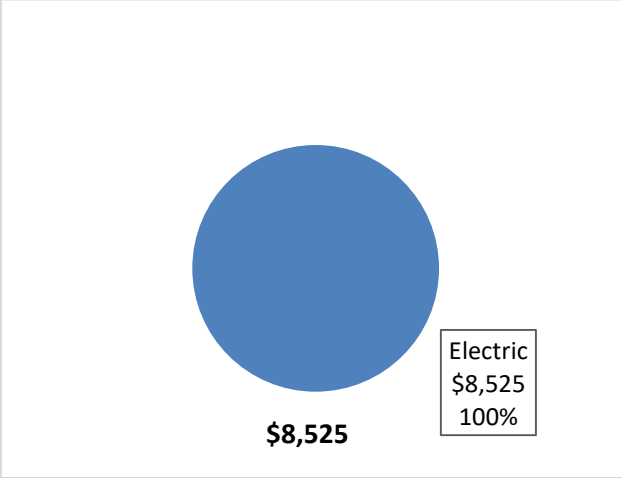
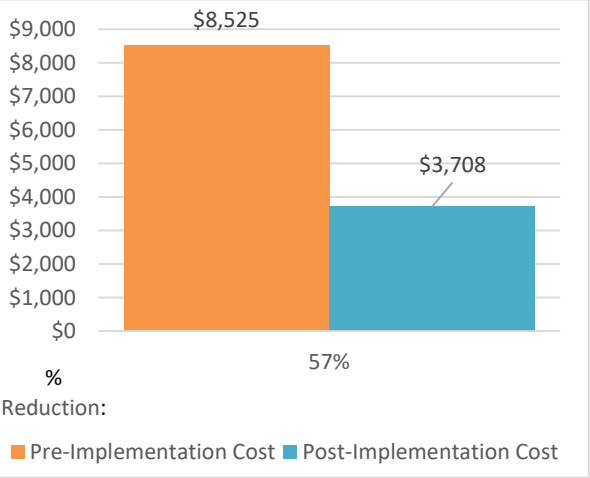


Figure 2 – Potential Post-Implementation Costs



A detailed description of existing energy use at the park and recreation areas can be found in Section 3.

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 can be found below and a description of savings 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			**27,859**	**13.7**	**0.0**	**$4,817.14**	**$109,206.42**	**$6,435.00**	**$102,771.42**	**21.3**	**28,054**
ECM 1	Install LED Fixtures	Yes	24,318	12.7	0.0	$4,204.92	$107,822.67	$6,350.00	$101,472.67	24.1	24,488
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	279	0.3	0.0	$48.28	$755.00	$20.00	$735.00	15.2	281
ECM 3	Retrofit Fixtures with LED Lamps	Yes	3,261	0.7	0.0	$563.94	$628.75	$65.00	$563.75	1.0	3,284
TOTALS			**27,859**	**13.7**	**0.0**	**$4,817.14**	**$109,206.42**	**$6,435.00**	**$102,771.42**	**21.3**	**28,054**

* - 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.

Energy Efficient Practices

TRC also identified four 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 the park & recreation areas include:

- Ensure Lighting Controls Are Operating Properly
- Turn Off Unneeded Motors
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for the park & recreation areas. 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 following program(s):

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

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

This facility may also qualify for the Direct Install program which can provide turnkey installation of multiple measures, through an authorized network of participating contractors. This program can provide substantially higher incentives that SmartStart, up to 70% of the cost of selected measures, although measure eligibility will have to be assessed and be verified by the designated Direct Install contractor and, in most cases, they will perform the installation work.

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

The Demand Response Energy Aggregator is a (non-NJCEP) program designed to reduce electric loads at commercial facilities, when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak power demand. Demand Response (DR) service providers (a.k.a. Curtailment Service Providers) are registered with PJM, the independent system operator (ISO) for mid-Atlantic state region that is charged with maintaining electric grid reliability. By enabling grid operators to call upon commercial facilities to reduce their 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 facilities receive payments whether or not they are called upon to curtail their load during times of peak demand. Refer to Section 7 for additional information on this program.

Additional information on relevant incentive programs is located in Section 8 or: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Guy Piserchia	Township Committee	guyp@longhillnj.gov	908-578-7010
Lisa Scanlon	Parks & Recreation Director	recreation@longhillnj.gov	908-647-8000 Ext. 219
Nancy Malool	Town Administrator	Administrator@longhillnj.gov	908-578-7010
TRC Energy Services			
Tom Page	Auditor	TPage@TRCsolutions.com	732-855-0033

2.2 General Site Information

On June 15, 2017, TRC performed an energy audit at the park & recreation areas located in Long Hill, New Jersey. TRC's team met with Lisa Scanlon to review the facility operations and help focus our investigation on specific energy-using systems.

The park & recreation areas are comprised of three parks: Meyersville Ballfield, Stirling Lake, and the Little League Field, with five buildings covering a total area of 4,800 square feet. All the buildings are single story facilities which include space types such as a guard house, kitchen, and storage areas.

Lighting at the facilities consists of 32-Watt T8 fluorescent fixtures with some 40-Watt and 75-Watt T12 fluorescent fixtures; all of which are inefficient in performance when compared to the latest lighting technology available in the market. Exterior lighting is primarily provided by 150-Watt and 400-Watt metal halide fixtures. Fixtures are controlled by manual switches.

Cooling and ventilation is provided by split system AC systems.

2.3 Building Occupancy

The typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Meyersville Ballfield	Weekday	seasonal - varies
Meyersville Ballfield	Weekend	seasonal - varies
Little League Field	Weekday	seasonal - varies
Little League Field	Weekend	seasonal - varies
Stirling Lake	Weekday	11 am - 5 pm (seasonal)
Stirling Lake	Weekend	11 am - 5 pm (seasonal)

2.4 Building Envelope

All the buildings at Meyersville Ballfield, Stirling Lake, and the Little League Field are single story facilities. The construction is of concrete masonry block with a combination of finished and brick exterior. Sloped roof sections are constructed of tile roofing material.

Figure 6 – Building Façade

2.5 On-Site Generation

The park & recreation areas do not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at Meyersville Ballfield consists mainly exterior fixtures. All the fixtures are 400-Watt metal halide lamps. The fixtures are operated by manual switch.

Figure 7 - Meyersville Ballfield Lighting Systems

Lighting at the Stirling Lake guardhouse consists of 40-Watt and 75-Watt T12 linear fluorescent fixtures, and the restrooms by 32-Watt T8 fluorescent fixtures. These lighting sources are inefficient in performance when compared to the latest lighting technology available in the market. The concession stand is lit by 100-Watt incandescent fixtures, which are also inefficient. Exterior lighting is provided by 70-Watt and 150-Watt metal halide exterior fixtures while walkway lighting consists of 150-Watt and 400-Watt metal halide and high pressure sodium fixtures.

Figure 8 - Stirling Lake Lighting Systems

Fluorescent Fixture	*Exterior Fixtures*
	

Exterior lighting at Little League Field is provided by 150-Watt and 400-Watt metal halide exterior fixtures. Parking lots lights are 150-Watt high pressure sodium fixtures. In addition to linear fluorescent and HID lamps, the facility also has 150-Watt incandescent lamps. Lighting control is provided by manual switches.

Figure 9 – Little League Field Lighting Systems

Halogen Incandescent Fixture	*Field Lighting Fixtures*
	

During the audit areas such as storage sheds and snack shacks were locked, therefore, lighting in such spaces is not represented in the report. The Township should provide access to all areas when contracting for lighting retrofit work. This will ensure that all lighting systems are evaluated for upgrade.

Direct Expansion Air Conditioning System (DX)

Cooling at the Little League Field building that TRC accessed is provided by a 2-ton direct expansion split system. The indoor unit is an evaporator unit and the condenser unit is installed on the outside of the building.

Figure 10 - Building AC Systems

Split System Condensing Unit	*Nameplate*
	

Refrigeration

The Stirling Lake facility has two solid door stand-up refrigerators.

Figure 11 - Refrigerator

Building Plug Load

The Stirling Lake facility consist of several plug load systems such as microwave, toaster, and defibrillator.

Figure 12 – Plug Load Equipment

2.7 Water-Using Systems

Stirling Lake facility restrooms have two showerheads with a 3.5 gallons per minute (gpm) rating.

3 SITE ENERGY USE AND COSTS

Utility data for electricity was analyzed to identify opportunities for savings. In addition, data for electricity 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 3.3 for additional information.

3.1 Total Cost of Energy

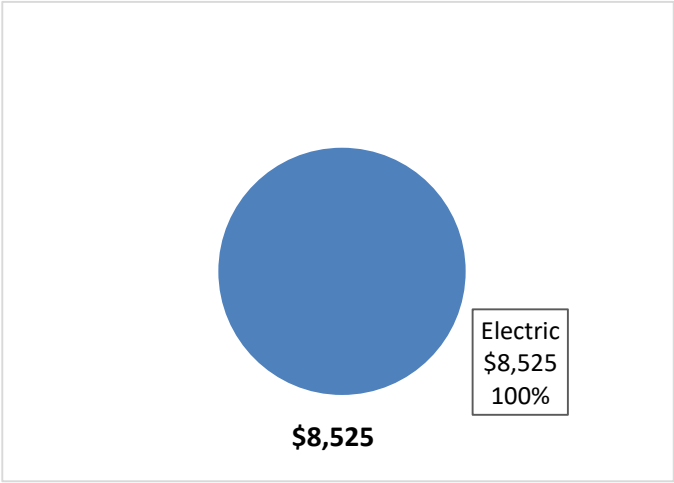
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 13 - Utility Summary

Utility Summary for Park & Recreation Areas		
Fuel	**Usage**	**Cost**
Electricity	49,300 kWh	$8,525
Total		**$8,525**

The current annual energy cost for this facility is $8,525 as shown in the chart below.

Figure 14 - Energy Cost Breakdown



3.2 Electricity Usage - Overall

Electricity is provided by JCP&L. The average electric cost for the three parks combined over the past 12 months was $0.173/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 15 Electric Usage & Demand – Overall

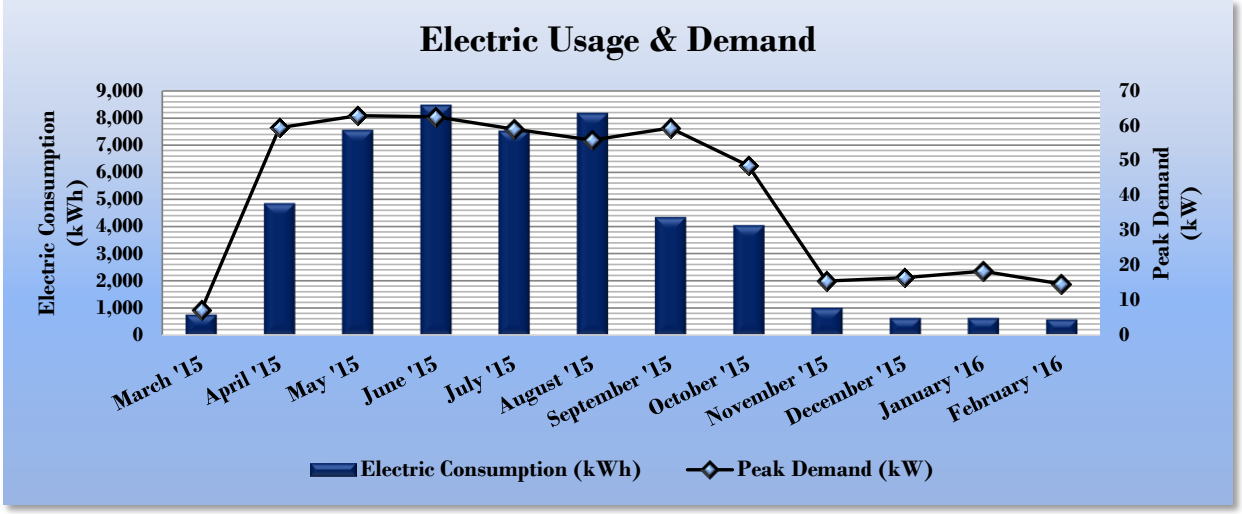


Figure 16 - Electric Usage & Demand – Overall

Electric Billing Data for Park & Recreation Areas					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
4/13/15	23	766	7.2	$0	$240
5/13/15	30	4,854	59.5	$0	$828
6/12/15	30	7,549	62.9	$0	$1,143
7/15/15	33	8,468	62.6	$0	$1,272
8/13/15	29	7,524	59.1	$0	$1,228
9/14/15	32	8,177	55.9	$0	$1,196
10/14/15	30	4,351	59.4	$0	$782
11/12/15	29	4,053	48.6	$0	$748
12/12/15	30	1,012	15.5	$0	$328
1/13/16	32	642	16.5	$0	$216
2/12/16	30	643	18.3	$0	$218
3/15/16	32	586	14.6	$0	$209
Totals	**360**	**48,625**	**62.9**	**$0**	**$8,408**
Annual	**365**	**49,300**	**62.9**	**$0**	**$8,525**

3.2.1 Electric Usage -Meyersville Ball Field

Electricity is provided by JCP&L to Meyersville Ball Field. The average electric cost over the past 12 months was $0.182/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 17 - Electric Usage & Demand – Meyersville Ballfield

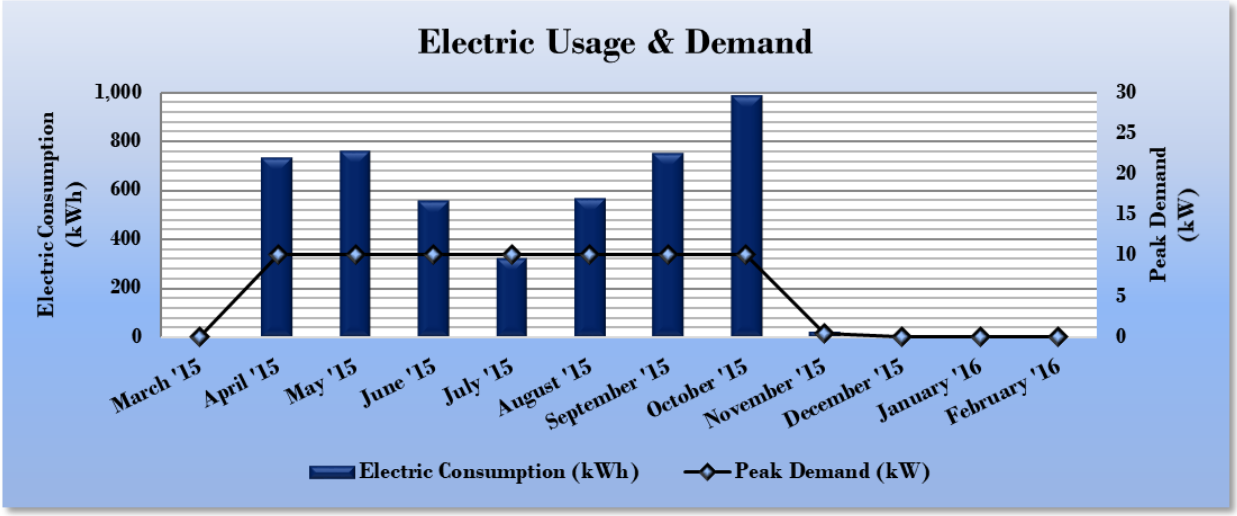


Figure 18 - Electric Usage & Demand – Meyersville Ballfield

Electric Billing Data for Park & Recreation Areas					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/13/15	31	0	0	$3.07	No
5/13/15	30	731	10	$112.85	Yes
6/12/15	30	761	10	$120.43	Yes
7/15/15	33	559	10	$91.36	Yes
8/13/15	29	324	10	$145.57	Yes
9/14/15	32	565	10	$92.32	Yes
10/14/15	30	749	10	$118.44	Yes
11/12/15	29	983	10	$154.60	Yes
12/12/15	30	25	0	$6.90	No
1/13/16	32	1	0	$3.23	No
2/12/16	30	0	0	$3.14	No
3/15/16	32	0	0	$3.17	No
Totals	**368**	**4,698**	**10**	**$855**	
Annual	**365**	**4,698**	**10**	**$855**	

3.2.2 Electric Usage -Stirling Lake

Electricity is provided by JCP&L to Stirling Lake. The average electric cost over the past 12 months was $0.129/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 19 - Electric Usage & Demand – Stirling Lake

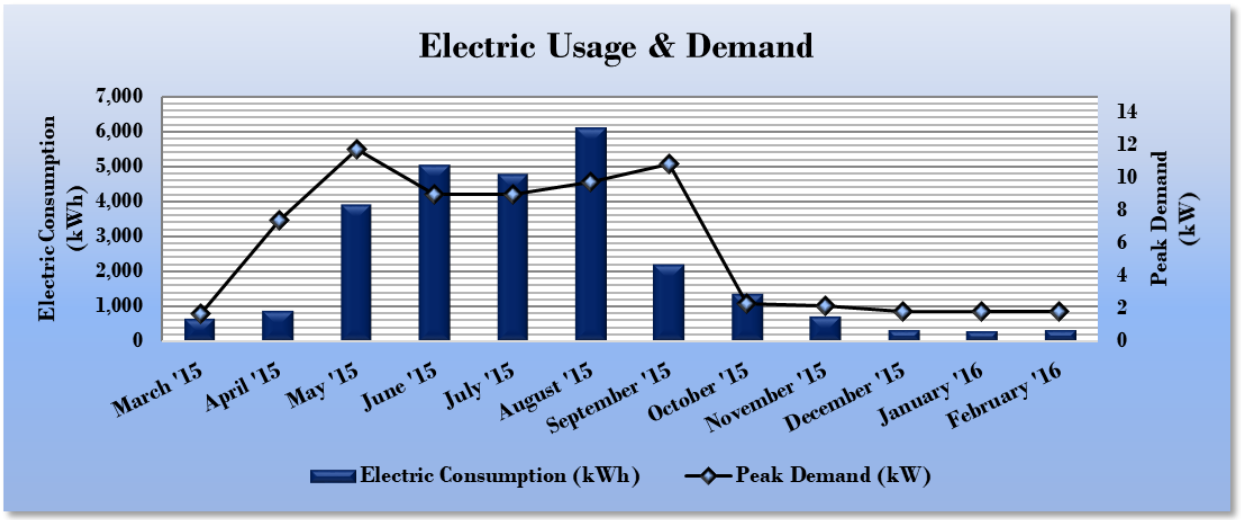


Figure 20 - Electric Usage & Demand – Stirling Lake

Electric Billing Data for Park & Recreation Areas					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/13/15	31	646	1.7	$105.91	No
5/13/15	30	883	7.4	$139.04	No
6/12/15	30	3,908	11.8	$473.84	No
7/13/15	31	5,029	9.0	$605.76	No
8/12/15	30	4,760	9.0	$576.35	No
9/14/15	33	6,092	9.8	$721.41	No
10/14/15	30	2,202	10.9	$295.20	No
11/13/15	30	1,350	2.3	$202.73	No
12/14/15	31	707	2.2	$119.64	No
1/12/16	29	321	1.8	$60.14	No
2/11/16	30	283	1.8	$55.24	No
3/14/16	32	306	1.8	$59.18	No
Totals	**367**	**26,487**	**11.8**	**$3,414**	0
Annual	**365**	**26,343**	**11.8**	**$3,396**	

3.2.3 Electric Usage – Little League Field

Electricity is provided by JCP&L to the Little League Field. The average electric cost over the past 12 months was $0.237/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 21 - Electric Usage & Demand – Little League Field

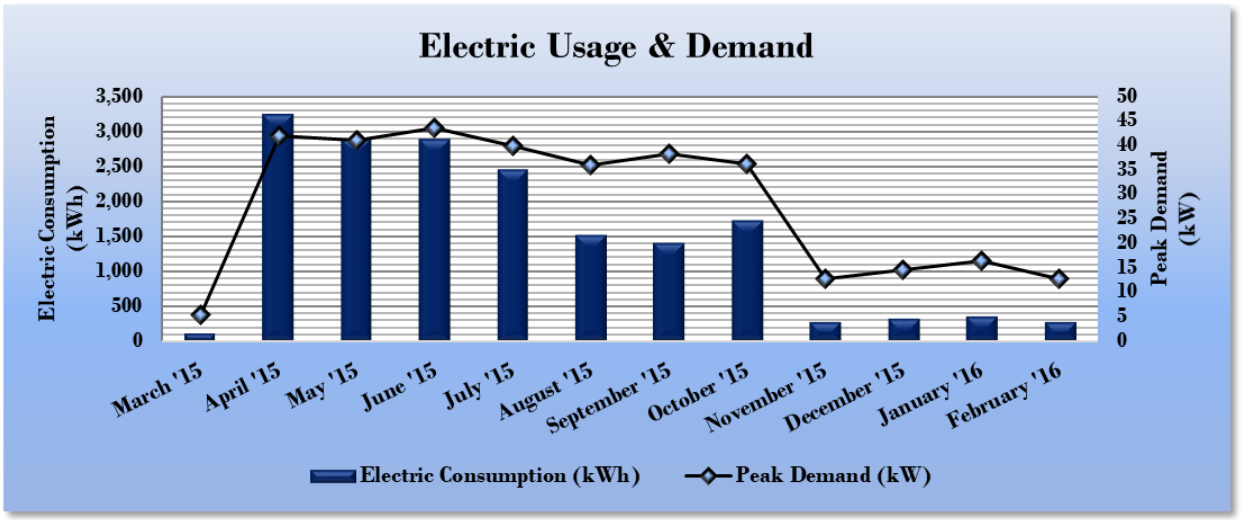


Figure 22 - Electric Usage & Demand – Little League Field

Electric Billing Data for Park & Recreation Areas					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Total Electric Cost	TRC Estimated Usage?
4/13/15	31	120	5.5	$130.57	No
5/13/15	30	3,240	42.0	$575.61	No
6/12/15	30	2,880	41.0	$548.58	No
7/13/15	31	2,880	43.5	$574.94	No
8/12/15	30	2,440	40.0	$506.09	No
9/14/15	33	1,520	36.0	$382.43	No
10/14/15	30	1,400	38.4	$368.45	No
11/12/15	29	1,720	36.2	$391.01	No
12/14/15	32	280	12.8	$201.90	No
1/13/16	30	320	14.7	$152.58	No
2/11/16	29	360	16.5	$159.20	No
3/14/16	32	280	12.8	$147.00	No
Totals	**367**	**17,440**	**43.5**	**$4,138**	0
Annual	**365**	**17,345**	**43.5**	**$4,116**	

3.3 Benchmarking

The park and recreation areas were not benchmarked as these areas are not covered in the ENERGY STAR® program. Facilities are typically 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 a 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.

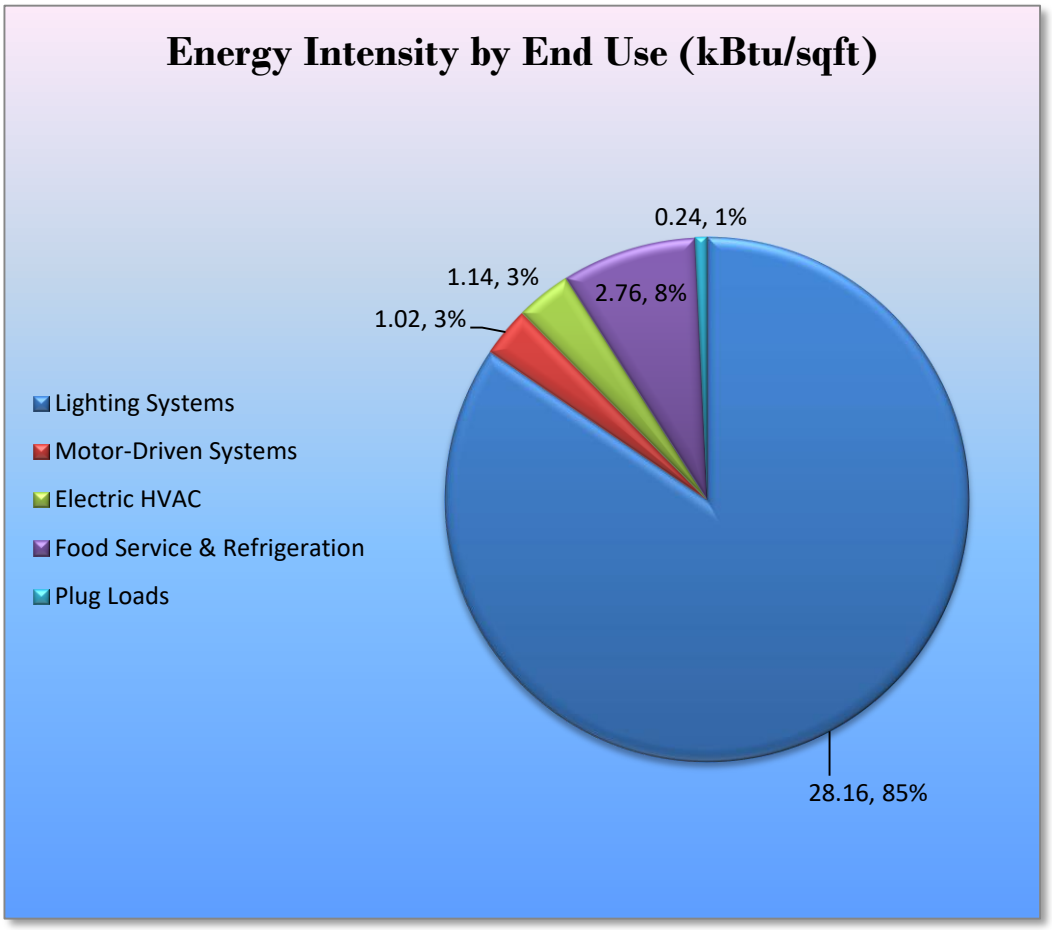
Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares a building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. The park and recreation areas not in a category that is eligible to receive a score.

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.

3.4 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 23 - 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 Longhill Township 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 or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described 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 24 – 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		**27,859**	**13.7**	**0.0**	**$4,817.14**	**$109,206.42**	**$6,435.00**	**$102,771.42**	**21.3**	**28,054**
ECM 1	Install LED Fixtures	24,318	12.7	0.0	$4,204.92	$107,822.67	$6,350.00	$101,472.67	24.1	24,488
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	279	0.3	0.0	$48.28	$755.00	$20.00	$735.00	15.2	281
ECM 3	Retrofit Fixtures with LED Lamps	3,261	0.7	0.0	$563.94	$628.75	$65.00	$563.75	1.0	3,284
TOTALS		**27,859**	**13.7**	**0.0**	**$4,817.14**	**$109,206.42**	**$6,435.00**	**$102,771.42**	**21.3**	**28,054**

* - 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

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 25 below.

Figure 25 – 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		**27,859**	**13.7**	**0.0**	**$4,817.14**	**$109,206.42**	**$6,435.00**	**$102,771.42**	**21.3**	**28,054**
ECM 1	Install LED Fixtures	24,318	12.7	0.0	$4,204.92	$107,822.67	$6,350.00	$101,472.67	24.1	24,488
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	279	0.3	0.0	$48.28	$755.00	$20.00	$735.00	15.2	281
ECM 3	Retrofit Fixtures with LED Lamps	3,261	0.7	0.0	$563.94	$628.75	$65.00	$563.75	1.0	3,284

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	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0
Exterior	24,318	12.7	0.0	$4,204.92	$107,822.67	$6,350.00	$101,472.67	24.1	24,488

Measure Description

We recommend replacing existing fixtures containing metal halide and high pressure sodium lamps with new high performance LED light fixtures. Fixtures are located in the parking lots, field lighting, and on the building exterior. This measure saves energy by installing LEDs which use less power than other technologies with a comparable light output.

While the payback for this measure is lengthy, we note that additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a metal halide/high pressure sodium lamp.

Also, a conservative approach has been taken for fixture replacement. In some cases, direct replacement of lamps may be possible depending on the configuration of the existing lamps and fixtures. Finally, competitive pricing for LED sources may contribute to a reduction in overall cost.

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	232	0.2	0.0	$40.12	$638.00	$20.00	$618.00	15.4	234
Exterior	47	0.0	0.0	$8.16	$117.00	$0.00	$117.00	14.3	48

Measure Description

We recommend retrofitting existing T12 fluorescent fixtures 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 tube and more than 10 times longer than many incandescent lamps.

Some building/areas were inaccessible during the site walk, therefore we recommend these retrofits for similar fixture types in other buildings as well.

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	140	0.2	0.0	$24.14	$260.75	$45.00	$215.75	8.9	141
Exterior	3,122	0.5	0.0	$539.80	$368.00	$20.00	$348.00	0.6	3,144

Measure Description

We recommend retrofitting existing incandescent and T8 linear fluorescent 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 tube and more than 10 times longer than many incandescent lamps.

Some building/areas were inaccessible during the site walk, therefore we recommend these retrofits for similar fixture types in other buildings as well.

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.

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.

Turn Off Unneeded Motors

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Reducing run hours for these motors can result in significant energy savings. Whenever possible, use automatic devices such as twist timers or occupancy sensors to ensure that motors are turned off when not needed.

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 gallons per minute (gpm) for bathroom faucets, 2.0 gpm for showerheads, and 1.28 gpm for pre-rinse spray valves.

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

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.

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

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

6.2 Combined Heat and Power

Combined heat and power (CHP) is the on-site generation of electricity 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, lack of gas service, and interconnection shows that the facilities have a **Low** potential for installing a cost-effective CHP system.

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

Curtailment Service Providers typically offer free assessments to determine a facility's eligibility to participate in a DR program. They will provide details regarding 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.

In our opinion this building is not a good candidate for DR.

8 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 26 for a list of the eligible programs identified for each recommended ECM.

Figure 26 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings
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	

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

Generally, the incentive values provided throughout the report assume the SmartStart program is utilized 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.

Brief descriptions of all relevant financing and incentive programs are located in the sections below. Further information, including most current program availability, requirements, and incentive levels can be found at: www.njcleanenergy.com/ci

8.1 SmartStart

Overview

The SmartStart program 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.

8.2 Direct Install

Overview

Direct Install is a turnkey program available to existing small to medium-sized facilities with a peak electric demand that does not exceed 200 kW for any recent 12-month period. You will work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected 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 who the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program 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 and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

Since Direct Install offers a free assessment of eligible measures, Direct Install is also available to small businesses and other commercial facilities too that may not be eligible for the more detailed facility audits provided by LGEA.

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

8.3 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Meyersville Ballfield	22	Metal Halide: (1) 400W Lamp	Wall Switch	458	420	Fixture Replacement	No	22	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	140	420	5.04	2,936	0.0	$507.63	$42,965.85	$2,200.00	80.31
Little League Field - Field Lighting	20	Metal Halide: (1) 400W Lamp	Wall Switch	458	420	Fixture Replacement	No	20	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	140	420	5.17	3,016	0.0	$521.47	$39,059.86	$2,000.00	71.07
Little League Field - Restroom Exterior	2	Halogen Incandescent: 150W SpotLights	Wall Switch	150	4,300	Relamp	No	2	LED Screw-In Lamps: LED PAR-38 Floodlight Bulbs	Wall Switch	17	4,300	0.22	1,292	0.0	$223.49	$63.50	$10.00	0.24
Little League Field - Parking Lot 1	2	Metal Halide: (1) 150W Lamp	Wall Switch	190	4,300	Fixture Replacement	No	2	LED Screw-In Lamps: LED Retrofit Bulbs for 150W MH (on 10' Pole)	Wall Switch	45	4,300	0.24	1,409	0.0	$243.65	$251.00	$0.00	1.03
Little League Field - Parking Lot 2	5	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,300	Fixture Replacement	No	5	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	75	4,300	0.46	2,745	0.0	$474.70	$1,633.65	$500.00	2.39
Little League Field - Parking Lot 2	2	Metal Halide: (1) 400W Lamp	Wall Switch	458	4,300	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	146	4,300	0.51	3,032	0.0	$524.27	$1,135.10	$200.00	1.78
Stirling Lake - Guardhouse	2	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	800	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	800	0.14	155	0.0	$26.89	$404.00	$0.00	15.03
Stirling Lake - Guardhouse	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	800	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.05	53	0.0	$9.22	$117.00	$0.00	12.69
Stirling Lake - Guardhouse	1	Metal Halide: (1) 70W Lamp	Wall Switch	95	4,300	Fixture Replacement	No	1	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Wall Switch	20	4,300	0.06	364	0.0	$63.01	$239.19	$100.00	2.21
Stirling Lake - Walkway Lights	13	Metal Halide: (1) 150W Lamp	Wall Switch	190	4,300	Fixture Replacement	No	13	LED - Fixtures: Bollard Fixture	Wall Switch	45	4,300	1.53	9,159	0.0	$1,583.74	$20,020.27	$650.00	12.23
Stirling Lake - Walkway Lights	2	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,300	Fixture Replacement	No	2	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	75	4,300	0.18	1,098	0.0	$189.88	$653.46	$200.00	2.39
Stirling Lake - Walkway Lights	1	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	465	4,300	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	146	4,300	0.26	1,550	0.0	$268.02	$567.55	$100.00	1.74
Volleyball Court	3	High-Pressure Sodium: (1) 150W Lamp	Wall Switch	188	4,300	Fixture Replacement	No	3	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	75	4,300	0.28	1,647	0.0	$284.82	$980.19	$300.00	2.39
Women's Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	800	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.05	60	0.0	$10.32	$117.00	$20.00	9.40
Men's Rm	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	800	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.05	60	0.0	$10.32	$117.00	$20.00	9.40
Stirling Lake - Parking Lot	1	High-Pressure Sodium: (1) 400W Lamp	Wall Switch	465	4,300	Fixture Replacement	No	1	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	146	4,300	0.26	1,550	0.0	$268.02	$567.55	$100.00	1.74
Stirling Lake - Concession Stand Kitchen	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	800	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	800	0.10	107	0.0	$18.44	$234.00	$20.00	11.60
Stirling Lake - Concession Storage	1	Incandescent: 100W Bulbs	Wall Switch	100	400	Relamp	No	1	LED Screw-In Lamps: 15W LED Screw-In Bulbs	Wall Switch	15	400	0.07	38	0.0	$6.64	$26.75	$5.00	3.27
Concession Stand	2	Incandescent: 100W Bulbs	Wall Switch	100	4,300	Relamp	No	2	LED Screw-In Lamps: 15W LED Screw-In Bulbs	Wall Switch	15	4,300	0.14	826	0.0	$142.83	$53.50	$10.00	0.30

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Stirling Lake	Restrooms	2	Exhaust Fan	0.3	70.0%	No	400	No	70.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stirling Lake	Pond Fountain	1	Process Pump	1.0	70.0%	No	1,600	No	70.0%	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
Little League Field	Snack Shack	1	Split-System Air-Source HP	1.96	24.00	No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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
Stirling Lake - Guard House	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stirling Lake - Concession Stand	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	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?
Stirling Lake - Guard House	1	Microwave	1,200.0	No
Stirling Lake - Guard House	1	Toaster Oven	1,000.0	No
Stirling Lake - Guard House	1	Defibrilator	200.0	No