Local Government Energy Audit:
Energy Audit Report

Results you can rely on

Martin Luther King (MLK) Center

207 E Main Street

Whitesboro, New Jersey 08252

Middle Township

March 28, 2019

Final Report by:

TRC Energy Services

Disclaimer

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information about financial incentives that may be available. Most energy conservation measures have received preliminary analysis of feasibility that identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to establish a basis for further discussion and to help prioritize energy measures.

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual 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.

The New Jersey 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. Please review all available program incentives and eligibility requirements prior to selecting and installing any energy conservation measures.

The customer and their respective contractor(s) are responsible to implement energy conservation measures in complete conformance with all applicable local, state and federal requirements.

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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 the Martin Luther King (MLK) Center.

The goal of a 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 MLK Center is a 16,384 square foot recreational and community facility comprised of various space types including a gymnasium, offices, a large community room, a commercial kitchen and various mechanical rooms and storage spaces. This is a slab on grade building built in two stages. The older part of the building had concrete masonry unit walls will asphalt shingle, pitched roof. The newer section houses the gymnasium in a steel framed and sided shell.

Lighting at the MLK Center consists mostly of linear fluorescent T8 fixtures and 6-lamp LED high-bay fixture in the gymnasium. 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 eight measures and recommends six measures which together represent an opportunity for the MLK Center to reduce annual energy costs by roughly $4,106 and annual greenhouse gas emissions by 23,660 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 3.0 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 MLK Center's annual energy use by 6%.

Figure 1 – Previous 12 Month Utility Costs

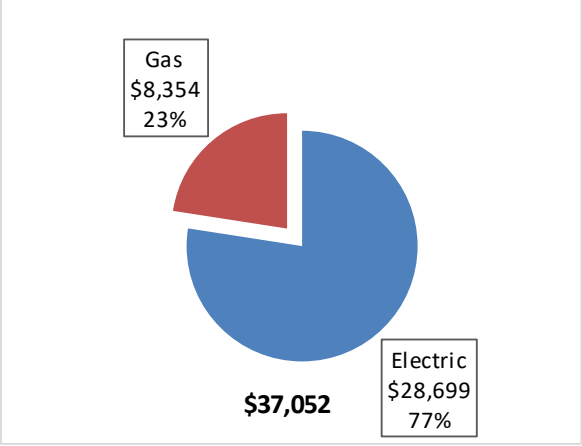
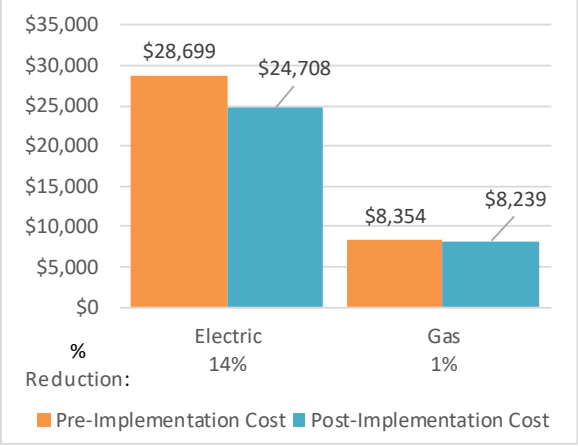


Figure 2 – Potential Post-Implementation Costs



A detailed description of MLK Center's existing energy use 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		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**17,265**	**5.3**	**0.0**	**0.0**	**$3,089.00**	**$10,318.08**	**$1,560.00**	**$8,758.08**	**2.8**	**17,386**
ECM 1	Install LED Fixtures	3,348	0.5	0.0	0.0	$599.08	$5,250.00	$700.00	$4,550.00	7.6	3,372
ECM 2	Retrofit Fixtures with LED Lamps	13,917	4.7	0.0	0.0	$2,489.92	$5,068.08	$860.00	$4,208.08	1.7	14,014
Lighting Control Measures		**3,490**	**1.2**	**0.0**	**0.0**	**$624.38**	**$3,288.00**	**$265.00**	**$3,023.00**	**4.8**	**3,514**
ECM 3	Install Occupancy Sensor Lighting Controls	3,416	1.2	0.0	0.0	$611.12	$3,088.00	$265.00	$2,823.00	4.6	3,440
ECM 4	Install High/Low Lighitng Controls	74	0.0	0.0	0.0	$13.26	$200.00	$0.00	$200.00	15.1	75
Electric Unitary HVAC Measures		**783**	**0.6**	**0.0**	**0.0**	**$140.09**	**$7,481.10**	**$460.00**	**$7,021.10**	**50.1**	**788**
	Install High Efficiency Electric AC	783	0.6	0.0	0.0	$140.09	$7,481.10	$460.00	$7,021.10	50.1	788
Domestic Water Heating Upgrade		**0**	**0.0**	**13.1**	**13.1**	**$146.96**	**$2,715.18**	**$50.00**	**$2,665.18**	**18.1**	**1,533**
	Install High Efficiency Gas Water Heater	0	0.0	2.9	2.9	$32.11	$2,672.16	$50.00	$2,622.16	81.7	335
ECM 5	Install Low-Flow Domestic Hot Water Devices	0	0.0	10.2	10.2	$114.85	$43.02	$0.00	$43.02	0.4	1,198
Food Service Equipment & Refrigeration Measures		**1,253**	**0.1**	**0.0**	**0.0**	**$224.26**	**$5,728.00**	**$325.00**	**$5,403.00**	**24.1**	**1,262**
	Replace Refrigeration Equipment	1,253	0.1	0.0	0.0	$224.26	$5,728.00	$325.00	$5,403.00	24.1	1,262
Plug Load Equipment Control - Vending Machine		**1,551**	**0.0**	**0.0**	**0.0**	**$277.57**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,562**
ECM 6	Vending Machine Control	1,551	0.0	0.0	0.0	$277.57	$460.00	$0.00	$460.00	1.7	1,562
TOTALS FOR HIGH PRIORITY MEASURES		**22,306**	**6.5**	**10.2**	**10.2**	**$4,105.81**	**$14,109.10**	**$1,825.00**	**$12,284.10**	**3.0**	**23,660**
TOTALS FOR ALL EVALUATED MEASURES		**24,343**	**7.2**	**13.1**	**13.1**	**$4,502.26**	**$29,990.36**	**$2,660.00**	**$27,330.36**	**6.1**	**26,046**

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

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

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

Lighting Controls measures generally involve the installation of automated controls to turn off lights or reduce light output when not needed. Automated control reduces reliance on occupant behavior for adjusting lights. These measures save energy by reducing the amount of time lights are on.

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

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

Food Service Equipment & Refrigeration measures generally involve improvements in the efficiency of cooking, food service, dishwashing, and food storage equipment. These measures may include more efficient convection ovens, steamers, ice machines, or refrigeration. These measures save energy by reducing the energy usage with more energy efficient equipment.

Plug Load Equipment control measures generally involve installing automated devices that limit the power usage or operation of equipment that is plugged into electric outlets when not in use.

Energy Efficient Practices

TRC also identified seven 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 MLK Center include:

- Ensure Economizers are Functioning Properly
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Furnace Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- 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 MLK Center. Based on the configuration of the site and its loads there is a moderate potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	50	kW DC STC
Electric Generation	37,622	kWh/yr
Displaced Cost	$3,270	/yr
Installed Cost	$130,000	

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
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)
- Demand Response Energy Aggregator

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 than 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 8.4 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. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Elizabeth Terenik	Township Administrato	eterenik@middletownship.com	(609) 465 8732
Robert Flynn	Township Public Works Supervisor	rflynn@middletownship.cm	609 602 1245
Designated Representative			
Robert Flynn	Township Public Works Supervisor	rflynn@middletownship.cm	609 602 1245
TRC Energy Services			
Robert Grindrod	Auditor	rgrindrod@trcsolutions.cm	(518) 416 7202

2.2 General Site Information

On July 19, 2018, TRC performed an energy audit at the MLK Center located in Whitesboro, New Jersey. TRC 's team met with Robert Flynn to review the facility operations and help focus our investigation on specific energy-using systems.

The MLK Center is a 16,384 square foot recreational and community facility comprised of various space types including a gymnasium, offices, a large community room, a commercial kitchen and various mechanical rooms and storage spaces. This is a slab on grade building built in two stages. The original building was constructed in 1963 with concrete masonry unit walls and an asphalt shingle pitched roof and the gym. The newer section was added in 2003 and houses the gymnasium in a steel framed and sided shell.

2.3 Building Occupancy

The school building is open all week; a typical schedule is presented in the table below. The entire facility is used year-round by the community and programs are run throughout the year. During a typical day, the facility is occupied by approximately two to four staff and varying numbers of community members depending on the day's programming.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
MLK Center	Weekday	8:00 AM - 6:00 PM
MLK Center	Weekend	8:00 AM - 6:00 PM

2.4 Building Envelope

The original building was constructed with concrete block with bare (painted) block as the finished surface on the inside. The windows are double glazed units and are in good condition. The newer addition is a steel building finished with steel panel inside and out. There are commercial grade steel and aluminum framed glass doors as well as an overhead door installed in the building. The roofs are all finished with standing seam metal panels.

Figure 7 - MLK Center

Figure 8 - Rear of Building

2.5 On-Site Generation

MLK Center does 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 the facility is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some compact fluorescent lamps (CFL). Most of the fixtures are 2-lamp or 4-lamp, 4-foot long troffers with diffusers. The gymnasium is served by 2 foot by 4 foot 6-lamp LED high-bay fixtures.

Exterior lighting includes 150-Watt high pressure sodium (HPS) parking lot pole lights and 1500-Watt metal halide (MH) high capacity sport lights. The sport lights are maintained under a service contract with MUSCO. They are rarely used and according to MUSCO in 2017 they were on for 25 hours total. There are various HPS fixtures mounted on the roof edges and on the walls.

Interior lighting control is provided by occupancy sensors and wall switches. The building's exterior security lighting is controlled with a timer. The sport lights are manually controlled.

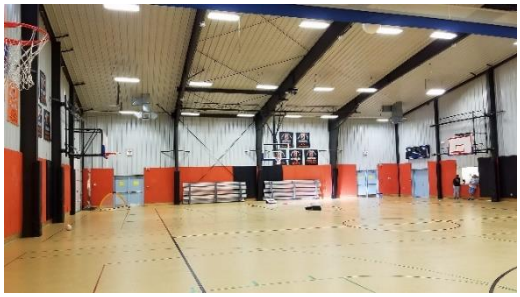


Figure 9 - High Bay LED Fixtures

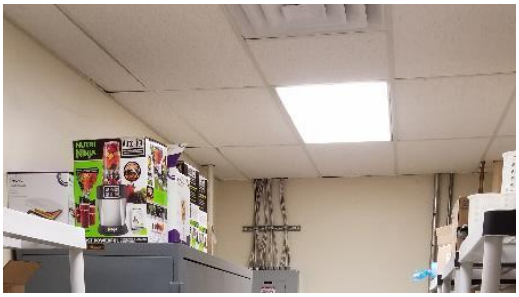


Figure 10 - Typical 2X4 Troffer

Hot Water Heating System

The hot water system consists of one Buderus 234 kBtu/hr. output, wall hung condensing (90+% efficient) boiler. The boilers are configured in primary /secondary distribution with hp 1/25 pump circulating the primary loop and a 1/6 hp pump serving the secondary loop.

The boiler is in good condition and well maintained.

Figure 11 - Buderus GB16280 Boiler

Fuel Heating Inventory

There is a 95% AFUE, 38 kBtu/hr. output furnace located in the rear storage area serving offices and two 80% AFUE, 80 kBtu/hr. furnaces in a mechanical room off the community room. The furnaces are 15 years old and in fair condition. They are controlled with programmable room thermostats.

Figure 12 - Carrier 58MXA040 Furnace

Direct Expansion Air Conditioning System (DX)

There are three split-system air conditioning (AC) units with ground mounted condensers serving the community room and offices. Two or these units have a 5-ton capacity and one is a 3-ton unit. All are over nine years old but are in good condition. All units are 13 SEER units.

The gym is served by four 8-year old, 10-ton, 12 SEER roof top packaged air conditioning units.

All systems are controlled by programmable thermostats.

Figure 13 -Ingersoll Rand (L) and Aircoaire (R) Condensers

Figure 14 - Roof Top Unit Supply Terminus with duct to Front Hallway (Alley)

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of a single natural draft 37 kBtu/h., 40-gallon storage hot water heater.

Figure 15 - GE 40-Gallon Hot Water Heater

Food Service & Laundry Equipment

The facility has a commercial grade kitchen that get used fairly frequently. The cooking equipment inventory includes a full size gas oven, a gas rack oven, gas griddle and an electric fryer. There is also a single tank conveyor dishwasher.

Refrigeration

Refrigeration equipment includes five residential grade refrigerators and one commercial grade double door refrigerator. One of the refrigerators in the rear storage area was empty of goods and in need of defrosting.

There is also a commercial grade ice making machine in the kitchen and two water coolers in the hall way.

Figure 16 - Maytag Energy Star Refrigerator (L) and GE Refrigerator (R)

Figure 17 - McCall Commercial Grade Refrigerator

Figure 18 - Ice-o-Matic Ice Making Machine

Building Plug Load

There are five computer work stations and seven LCD monitors in the building. There is also a larger stand-alone copier/printer and a desktop printer. There is no centralized PC power management software installed.

There is a variety IT equipment installed including a server, network hubs and switches, security video recording equipment, a modem and a router.

The facility has one refrigerated beverage vending machine and a snack machine with no energy saving controls.

2.7 Water-Using Systems

There are two restrooms at this facility. The faucets are rated for 2.0 gallons per minute (gpm) or higher, the toilets are rated at 1.6 gallons per flush (gpf) and the urinals are rated at 1 gpf.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

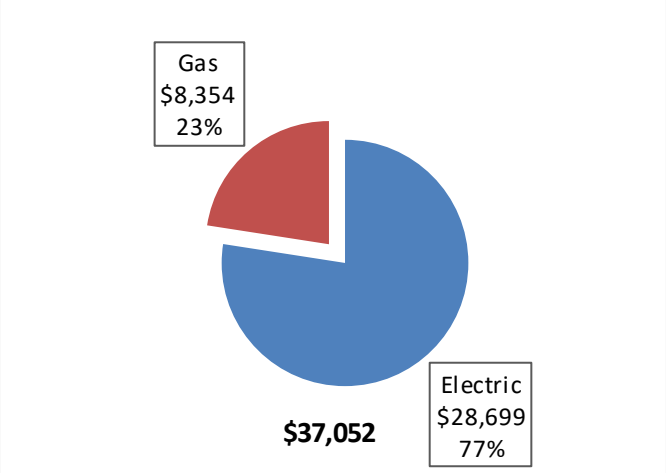
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 19 - Utility Summary

Utility Summary for MLK Center		
Fuel	**Usage**	**Cost**
Electricity	160,402 kWh	$28,699
Natural Gas	7,443 Therms	$8,354
Total		**$37,052**

The current annual energy cost for this facility is $37,052 as shown in the chart below.

Figure 20 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.179/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. Electric consumption follows a normal pattern for a building with an air conditioning load. The demand curve indicates that perhaps a short lived load was applied to the system during the non-cooling months such as turning on the outdoor sports lamps or the air conditioning system.

Figure 21 - Electric Usage & Demand

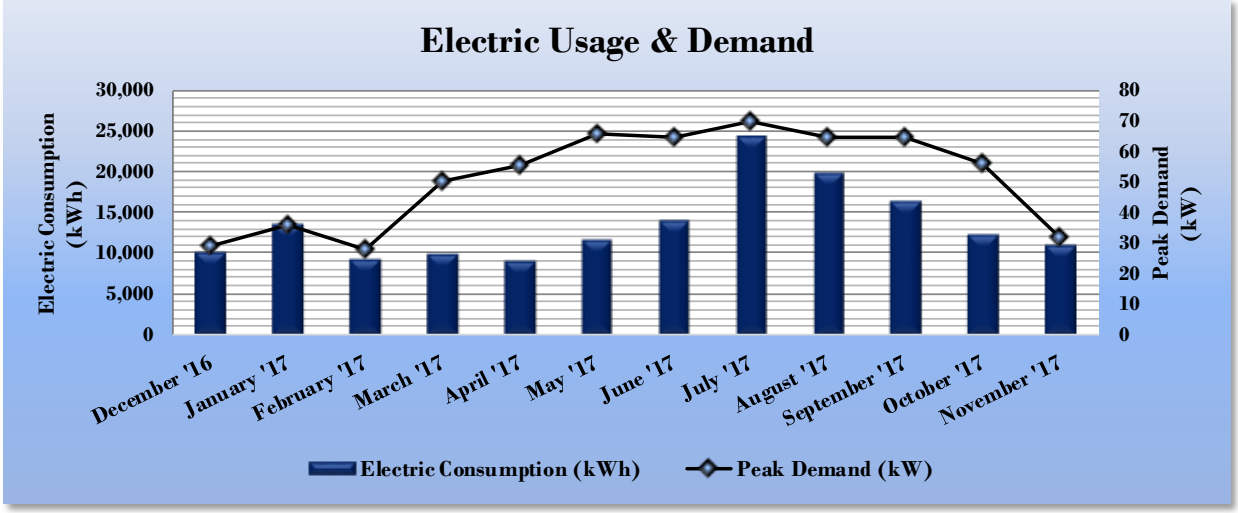


Figure 22 - Electric Usage & Demand

Electric Billing Data for MLK Center					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
12/20/16	32	10,240	29	$48	$1,820
1/24/17	35	13,600	36	$65	$2,416
2/21/17	28	9,440	28	$40	$1,665
3/23/17	30	9,920	50	$79	$1,835
4/21/17	29	9,120	55	$83	$1,712
5/23/17	32	11,680	66	$109	$2,199
6/22/17	30	14,000	65	$117	$2,541
7/24/17	32	24,440	70	$142	$4,251
8/22/17	29	19,840	65	$119	$3,460
9/22/17	31	16,440	65	$127	$3,041
10/23/17	31	12,320	56	$104	$2,209
11/22/17	30	11,120	32	$56	$1,864
Totals	**369**	**162,160**	**70**	**$1,090**	**$29,013**
Annual	**365**	**160,402**	**70**	**$1,078**	**$28,699**

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $1.122/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below. The natural gas usage pattern is normal for a gas heated building with a limited domestic hot water load

Figure 23 - Natural Gas Usage

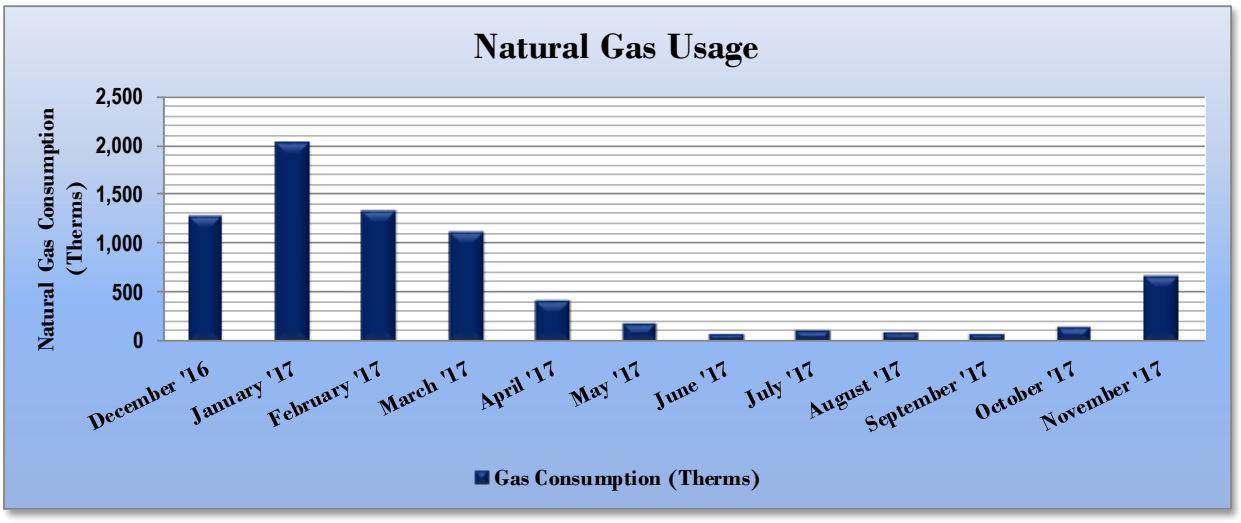


Figure 24 - Natural Gas Usage

Gas Billing Data for MLK Center			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/20/16	33	1,279	$1,427
1/24/17	35	2,031	$2,410
2/21/17	28	1,334	$1,434
3/23/17	30	1,112	$1,111
4/21/17	29	424	$441
5/23/17	32	178	$207
6/22/17	30	74	$102
7/24/17	32	105	$136
8/22/17	29	90	$125
9/22/17	31	84	$115
10/23/17	31	158	$186
11/22/17	30	677	$774
Totals	**370**	**7,545**	**$8,468**
Annual	**365**	**7,443**	**$8,354**

3.4 Benchmarking

This facility was benchmarked using Portfolio Manager®, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager® analyzes your building's consumption data, cost information, and operational use details and then compares its performance against a national median for similar buildings of its type. Metrics provided by this analysis are Energy Use Intensity (EUI) and an ENERGY STAR® score for select building types.

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

Figure 25 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	MLK Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	152.6	69.8
Site Energy Use Intensity (kBtu/ft^2)	78.8	45.3

Implementation of all recommended measures in this report would improve the building's estimated EUI significantly, as shown in the table below:

Figure 26 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	MLK Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	139.5	69.8
Site Energy Use Intensity (kBtu/ft^2)	74.3	45.3

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

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

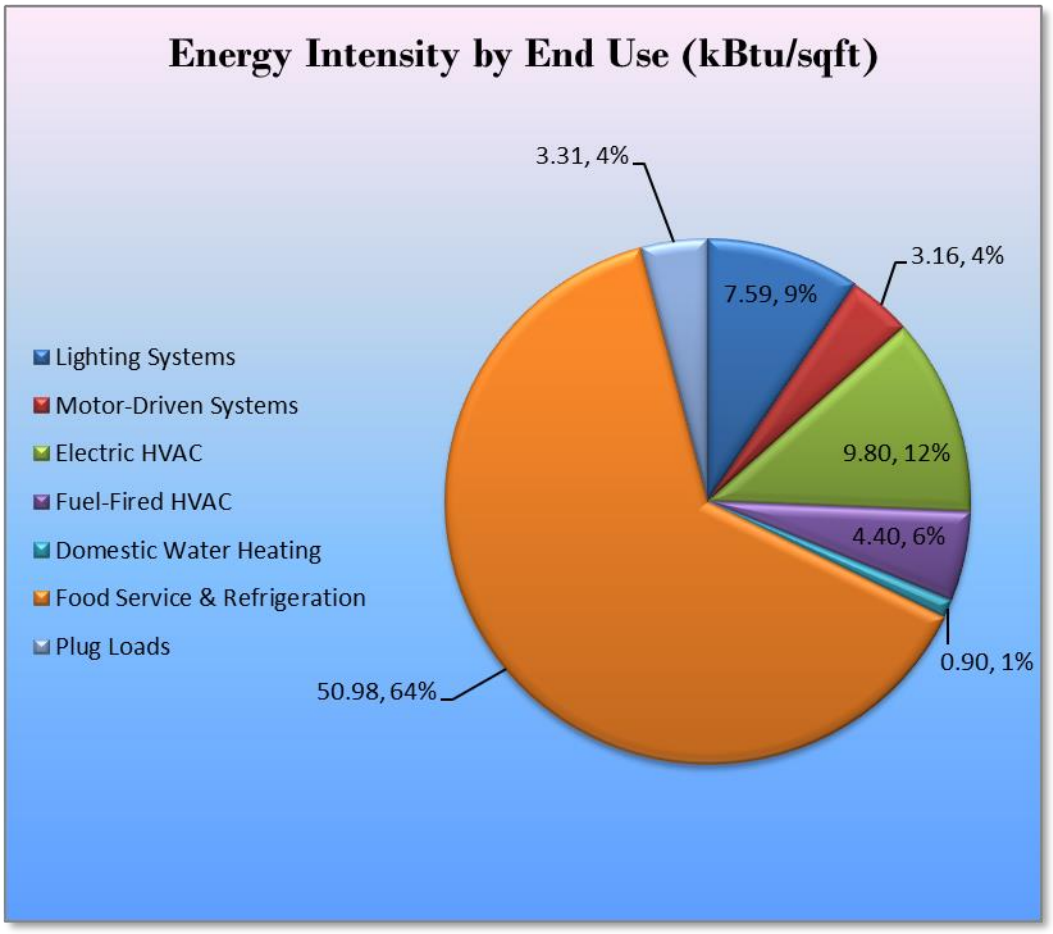
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

Figure 27 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to the MLK Center 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 28 – 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		**17,265**	**5.3**	**0.0**	**$3,089.00**	**$10,318.08**	**$1,560.00**	**$8,758.08**	**2.8**	**17,386**
ECM 1	Install LED Fixtures	3,348	0.5	0.0	$599.08	$5,250.00	$700.00	$4,550.00	7.6	3,372
ECM 2	Retrofit Fixtures with LED Lamps	13,917	4.7	0.0	$2,489.92	$5,068.08	$860.00	$4,208.08	1.7	14,014
Lighting Control Measures		**3,490**	**1.2**	**0.0**	**$624.38**	**$3,288.00**	**$265.00**	**$3,023.00**	**4.8**	**3,514**
ECM 3	Install Occupancy Sensor Lighting Controls	3,416	1.2	0.0	$611.12	$3,088.00	$265.00	$2,823.00	4.6	3,440
ECM 4	Install High/Low Lighitng Controls	74	0.0	0.0	$13.26	$200.00	$0.00	$200.00	15.1	75
Domestic Water Heating Upgrade		**0**	**0.0**	**10.2**	**$114.85**	**$43.02**	**$0.00**	**$43.02**	**0.4**	**1,198**
ECM 5	Install Low-Flow Domestic Hot Water Devices	0	0.0	10.2	$114.85	$43.02	$0.00	$43.02	0.4	1,198
Plug Load Equipment Control - Vending Machine		**1,551**	**0.0**	**0.0**	**$277.57**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,562**
ECM 6	Vending Machine Control	1,551	0.0	0.0	$277.57	$460.00	$0.00	$460.00	1.7	1,562
TOTALS		**22,306**	**6.5**	**10.2**	**$4,105.81**	**$14,109.10**	**$1,825.00**	**$12,284.10**	**3.0**	**23,660**

* - 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 29 below.

Figure 29 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	*Annual Natural Gas Savings (MMBtu)*	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**17,265**	**5.3**	**0.0**	**0.0**	**$3,089.00**	**$10,318.08**	**$1,560.00**	**$8,758.08**	**2.8**	**17,386**
ECM 1	Install LED Fixtures	3,348	0.5	0.0	0.0	$599.08	$5,250.00	$700.00	$4,550.00	7.6	3,372
ECM 2	Retrofit Fixtures with LED Lamps	13,917	4.7	0.0	0.0	$2,489.92	$5,068.08	$860.00	$4,208.08	1.7	14,014

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	3,348	0.5	0.0	$599.08	$5,250.00	$700.00	$4,550.00	7.6	3,372

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of HID lamps.

ECM 2: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	13,917	4.7	0.0	$2,489.92	$5,068.08	$860.00	$4,208.08	1.7	14,014
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing fluorescent tubes in the offices, hallways storage areas, kitchens and community room, with LED lamps. This includes all 4-foot linear and 2-foot “u-bend” troffers. 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 fluorescent tubes.

4.1.2 Lighting Control Measures

Our recommendations for upgrades to existing lighting control measures are summarized in Figure 30 below.

Figure 30 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**3,490**	**1.2**	**0.0**	**0.0**	**$624.38**	**$3,288.00**	**$265.00**	**$3,023.00**	**4.8**	**3,514**
ECM 3	Install Occupancy Sensor Lighting Controls	3,416	1.2	0.0	0.0	$611.12	$3,088.00	$265.00	$2,823.00	4.6	3,440
ECM 4	Install High/Low Lighitng Controls	74	0.0	0.0	0.0	$13.26	$200.00	$0.00	$200.00	15.1	75

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 3: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
3,416	1.2	0.0	$611.12	$3,088.00	$265.00	$2,823.00	4.6	3,440

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in all restrooms, storage rooms, offices areas. Lighting sensors detect occupancy using ultrasonic and/or infrared sensors. For most spaces, we recommend lighting controls use dual technology sensors, which can eliminate the possibility of any lights turning off unexpectedly. Lighting systems are enabled when an occupant is detected. Fixtures are automatically turned off after an area has been vacant for a preset period. Some controls also provide dimming options and all modern occupancy controls can be easily over-ridden by room occupants to allow them to manually turn fixtures on or off, as desired. Energy savings results from only operating lighting systems when they are required.

Occupancy sensors may be mounted on the wall at existing switch locations, mounted on the ceiling, or in remote locations. In general, wall switch replacement sensors are recommended for single occupant offices and other small rooms. Ceiling-mounted or remote mounted sensors are used in locations without local switching or where wall switches are not in the line-of-sight of the main work area and in large spaces. We recommend a comprehensive approach to lighting design that upgrades both the lighting fixtures and the controls together for maximum energy savings and improved lighting for occupants.

ECM 4: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
74	0.0	0.0	$13.26	$200.00	$0.00	$200.00	15.1	75

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages. In the MLK Center, this measure would be applied to the alley, or hallway at the street side of the gym.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. In the ally, there is significant ambient lighting (daylight) so this control can sometimes be combined with photocell controls to turn the lights off when there is sufficient daylighting. Energy savings results from only providing full lighting levels when it is required.

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

Additional savings from reduced lighting maintenance may also result from this measure, due to reduced lamp operation.

4.1.3 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 31 below.

Figure 31 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**13.1**	**13.1**	**$146.96**	**$2,715.18**	**$50.00**	**$2,665.18**	**18.1**	**1,533**
ECM 5	Install Low-Flow Domestic Hot Water Devices	0	0.0	10.2	10.2	$114.85	$43.02	$0.00	$43.02	0.4	1,198

ECM 5: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	10.2	$114.85	$43.02	$0.00	$43.02	0.4	1,198

Measure Description

We recommend installing low-flow domestic hot water devices to reduce overall hot water demand. Energy demand from domestic hot water heating systems can be reduced by reducing water usage in general. Faucet aerators can reduce hot water usage, relative to standard aerators, which saves energy.

Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

Low-flow devices reduce the overall water flow from the fixture, while still adequate pressure for washing. This reduces the amount of water used per day resulting in energy and water savings.

4.1.4 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment control measures are summarized in Figure 32 below.

Figure 32 - Summary of Plug Load Equipment Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Plug Load Equipment Control - Vending Machine		**1,551**	**0.0**	**0.0**	**0.0**	**$277.57**	**$460.00**	**$0.00**	**$460.00**	**1.7**	**1,562**
ECM 6	Vending Machine Control	1,551	0.0	0.0	0.0	$277.57	$460.00	$0.00	$460.00	1.7	1,562

ECM 6: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,551	0.0	0.0	$277.57	$460.00	$0.00	$460.00	1.7	1,562

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor controls to reduce the energy use. These controls power down vending machines when the vending machine area has been vacant for some time, then power up at regular intervals, as needed, to turn machine lights on or keep the product cool. Energy savings are a dependent on vending machine and activity level in the area surrounding the machines.

4.2 ECMs Evaluated but Not Recommended

The measures below have been evaluated by the auditor but are not recommended for implementation at the facility. Reasons for exclusion can be found in each measure description section.

Figure 33 – Summary of Measures Evaluated, But Not Recommended

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Natural Gas Savings (MMBtu)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**783**	**0.6**	**0.0**	**0.0**	**$140.09**	**$7,481.10**	**$460.00**	**$7,021.10**	**50.1**	**788**
	Install High Efficiency Electric AC	783	0.6	0.0	0.0	$140.09	$7,481.10	$460.00	$7,021.10	50.1	788
Domestic Water Heating Upgrade		**0**	**0.0**	**13.1**	**13.1**	**$146.96**	**$2,715.18**	**$50.00**	**$2,665.18**	**18.1**	**1,533**
	Install High Efficiency Gas Water Heater	0	0.0	2.9	2.9	$32.11	$2,672.16	$50.00	$2,622.16	81.7	335
Food Service Equipment & Refrigeration Measures		**1,253**	**0.1**	**0.0**	**0.0**	**$224.26**	**$5,728.00**	**$325.00**	**$5,403.00**	**24.1**	**1,262**
	Replace Refrigeration Equipment	1,253	0.1	0.0	0.0	$224.26	$5,728.00	$325.00	$5,403.00	24.1	1,262

* - 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).

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
783	0.6	0.0	$140.09	$7,481.10	$460.00	$7,021.10	50.1	788

Measure Description

We evaluated replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. The units evaluated were the rooftop packaged unit serving the gymnasium. There have been significant improvements in both compressor and fan motor efficiencies over the past several years. Therefore, electricity savings can be achieved by replacing older units with new high efficiency units. A higher EER or SEER rating indicates a more efficient cooling system. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling load, and the estimated annual operating hours.

Reasons for not Recommending

Due to a longer simple payback for this measure the replacement would not be cost effective based on energy savings alone. The facility may choose to upgrade for other reasons such as a compressive facility-wide retrofit or additional O&M savings.

Install High Efficiency Gas Water Heater

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	2.9	$32.11	$2,672.16	$50.00	$2,622.16	81.7	335

Measure Description

We evaluated replacing the existing tank water heater with a high efficiency tank water heater. Improvements in combustion efficiency and reductions in heat losses have improved the overall efficiency of storage water heaters. Energy savings results from using less gas to heat water, due to higher unit efficiency, and fewer run hours to maintain the tank water temperature.

Reasons for not Recommending

Due to a longer simple payback for this measure the replacement would not be cost effective based on energy savings alone. The facility may choose to upgrade for other reasons such as a compressive facility-wide retrofit or additional O&M savings.

Replace Refrigeration Equipment

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,253	0.1	0.0	$224.26	$5,728.00	$325.00	$5,403.00	24.1	1,262

Measure Description

We evaluated replacing existing commercial refrigerators, and freezers, with new ENERGY STAR® high efficiency equipment. There have been many improvements in refrigeration system equipment, operation, and insulation. The energy savings associated with this measure come from reduced energy usage, due to more efficient technology, and reduced run times.

Reasons for not Recommending

Due to a longer simple payback for this measure the replacement would not be cost effective based on energy savings alone. The facility may choose to upgrade for other reasons such as a compressive facility-wide retrofit or additional O&M savings.

5 ENERGY EFFICIENT PRACTICES

In addition to the quantifiable savings estimated in Section 4, a facility's energy performance can also be improved through application of many low cost or no-cost energy efficiency strategies. By employing certain behavioral and operational changes and performing routine maintenance on building systems, equipment lifetime can be extended; occupant comfort, health and safety can be improved; and energy and O&M costs can be reduced. The recommendations below are provided as a framework for developing a whole building maintenance plan that is customized to your facility. Consult with qualified equipment specialists for details on proper maintenance and system operation.

Ensure Economizers are Functioning Properly

Economizers, when properly configured, can be used to significantly reduce mechanical cooling. However, if the outdoor thermostat or enthalpy control is malfunctioning or the damper is stuck or improperly adjusted, benefits from the economizer may not be fully realized. As such, periodic inspection and maintenance is required to ensure proper operation. This maintenance should be scheduled with maintenance of the facility's air conditioning system and should include proper setting of the outdoor thermostat/enthalpy control, inspection of control and damper operation, lubrication of damper connections, and adjustment of minimum damper position. A malfunctioning economizer can significantly increase the amount of heating and mechanical cooling required by introducing excess amounts of cold or hot outside air.

Clean Evaporator/Condenser Coils on AC Systems

Dirty evaporators and condensers coils cause a restriction to air flow and restrict heat transfer. This results in increased evaporator and condenser fan load and a decrease in cooling system performance. Keeping the coils clean allows the fans and cooling system to operate more efficiently.

Clean and/or Replace HVAC Filters

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

Perform Regular Furnace Maintenance

Preventative furnace maintenance can extend the life of the system, maintain energy efficiency, and ensure safe operation. Following the manufacturer's instructions, a yearly tune-up should include tasks such as checking for gas/carbon monoxide leaks; changing the air and fuel filters; checking components for cracks, corrosion, dirt, or debris build-up; ensuring the ignition system is working properly; testing and adjusting operation and safety controls; inspecting the electrical connections; and ensuring proper lubrication for motors and bearings.

Perform Regular Water Heater Maintenance

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

Plug Load Controls

There are a variety of ways to limit the energy use of plug loads including increasing occupant awareness, removing under-utilized equipment, installing hardware controls, and using software controls. Some control steps to take are to enable the most aggressive power settings on existing devices or install load sensing or occupancy sensing (advanced) power strips. For additional information refer to "Plug Load Best Practices Guide" http://www.advancedbuildings.net/plug-load-best-practices-guide-offices.

Water Conservation

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

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

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

6 On-Site Generation Measures

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

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

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

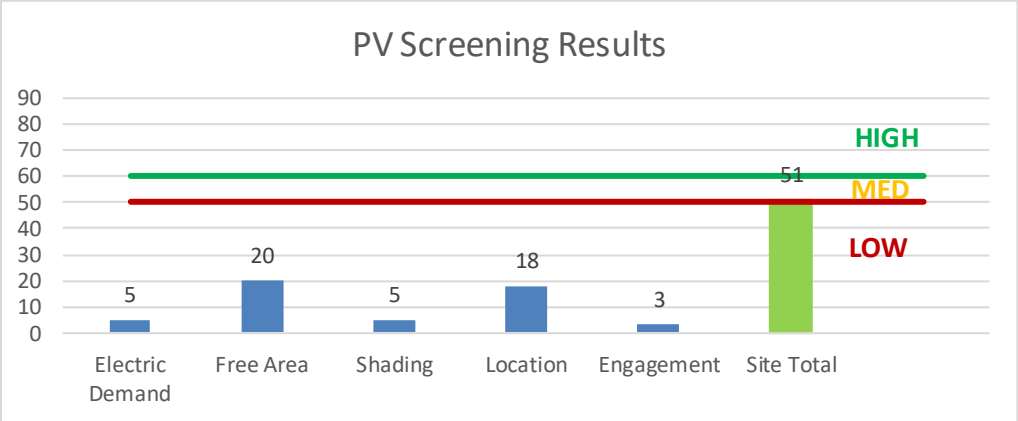
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC 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 **medium** potential for installing a PV array.

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the potential for PV at the site. A PV array located on the roof of the main building/ground next to the building/over the main parking lot may be feasible. If MLK Center is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 34 - Photovoltaic Screening



Potential	Medium	
System Potential	50	kW DC STC
Electric Generation	37,622	kWh/yr
Displaced Cost	$3,270	/yr
Installed Cost	$130,000	

Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.3 for additional information.

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.

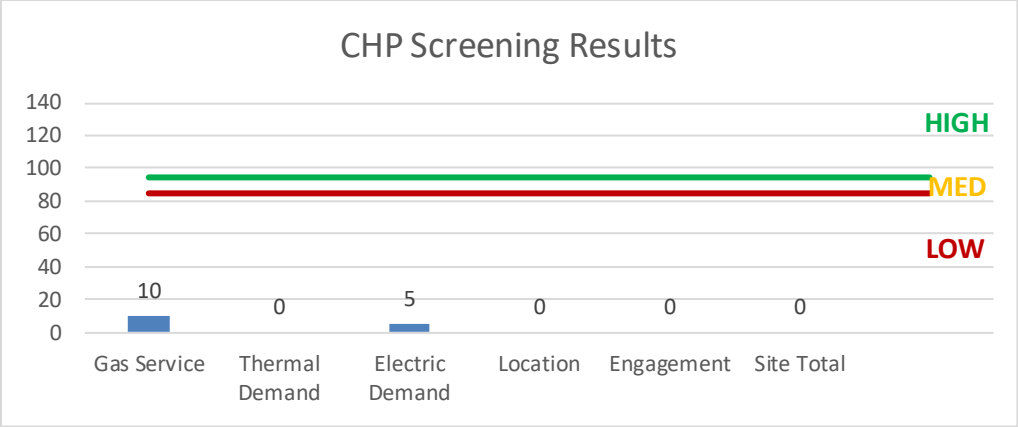
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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, and interconnection shows that the facility has a **low** potential for installing a cost-effective CHP system.

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

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

Figure 35 - Combined Heat and Power 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. 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.

High demand is the most significant factor contributing to the potential for a Demand Response application. In our opinion, the facility does not appear to have enough demand for a cost-effective DR measure.

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

Figure 36 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Retrofit Fixtures with LED Lamps	x		x			
ECM 2	Install Occupancy Sensor Lighting Controls	x		x			
ECM 3	Install High/Low Lighitng Controls	x		x			
ECM 4	Install Low-Flow Domestic Hot Water Devices			x			
ECM 5	Vending Machine Control	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 assigned to 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 SREC Registration Program

The SREC (Solar Renewable Energy Certificate) Registration Program (SRP) is used to register the intent to install solar projects in New Jersey. Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SRP prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing.

After the registration is accepted, construction is complete, and final paperwork has been submitted and is deemed complete, the project is issued a New Jersey certification number which enables it to generate New Jersey SRECs. SREC's are generated once the solar project has been authorized to be energized by the Electric Distribution Company (EDC).

Each time a solar installation generates 1,000 kilowatt-hours (kWh) of electricity, an SREC is earned. Solar project owners report the energy production to the SREC Tracking System. This reporting allows SREC's to be placed in the customer's electronic account. SRECs can then be sold on the SREC Tracking System, providing revenue for the first 15 years of the project's life.

Electricity suppliers, the primary purchasers of SRECs, are required to pay a Solar Alternative Compliance Payment (SACP) if they do not meet the requirements of New Jersey's Solar RPS. One way they can meet the RPS requirements is by purchasing SRECs. As SRECs are traded in a competitive market, the price may vary significantly. The actual price of an SREC during a trading period can and will fluctuate depending on supply and demand.

Information about the SRP can be found at: www.njcleanenergy.com/srec.

8.4 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.

8.5 Demand Response Energy Aggregator

The first step toward participation in a Demand Response (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 program information.

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

See Section 7 for additional information.

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 of 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 of 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
Front Lobby	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,987	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	31	1,987	0.48	1,320	0.0	$236.11	$1,440.00	$0.00	6.10
Vestibule	2	Compact Fluorescent: Recessed 1L	Wall Switch	23	2,839	Relamp	Yes	2	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	16	1,987	0.02	75	0.0	$13.47	$150.45	$30.00	8.94
Directors Office	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,839	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,839	0.16	635	0.0	$113.66	$219.09	$60.00	1.40
Employees Office	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,839	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,839	0.08	318	0.0	$56.83	$109.55	$30.00	1.40
employees Office closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,987	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,987	0.03	74	0.0	$13.26	$36.52	$10.00	2.00
Mechanical Room	1	Incandescent: Utility screw in base 1L	Wall Switch	75	2,839	Relamp	Yes	1	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	23	1,987	0.05	190	0.0	$34.01	$133.23	$5.00	3.77
CHR office	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,839	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,839	0.11	423	0.0	$75.77	$146.06	$40.00	1.40
Janitor	1	Incandescent: Utility screw in base 1L	Occupancy Sensor	75	2,839	Relamp	Yes	1	LED Screw-In Lamps: LED Screw-In Lamps	Occupancy Sensor	23	1,987	0.05	190	0.0	$34.01	$133.23	$5.00	3.77
Girls Rest Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,987	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,391	0.07	187	0.0	$33.51	$189.03	$20.00	5.04
Boys Rest Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,839	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,987	0.07	268	0.0	$47.87	$189.03	$20.00	3.53
Ally	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Occupancy Sensor	62	2,839	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	1,987	0.05	202	0.0	$36.22	$309.55	$30.00	7.72
Locker Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,987	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,391	0.10	281	0.0	$50.27	$225.55	$30.00	3.89
Great Room	32	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,987	Relamp	No	32	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	1,987	2.21	6,109	0.0	$1,092.93	$1,168.48	$320.00	0.78
Rear Storage	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,987	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,391	0.31	843	0.0	$150.80	$598.64	$90.00	3.37
Center Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Occupancy Sensor	93	2,839	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,839	0.04	159	0.0	$28.41	$54.77	$15.00	1.40
Center Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,839	Relamp	Yes	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,987	0.08	301	0.0	$53.79	$152.52	$10.00	2.65
Kitchen	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,839	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,987	0.05	201	0.0	$35.90	$594.77	$85.00	14.20
Kitchen	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,839	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,987	0.38	1,503	0.0	$268.93	$452.58	$35.00	1.55
Exit	6	Exit Signs: LED - 2 W Lamp	Wall Switch	6	2,839	Relamp	No	1	LED Screw-In Lamps: (1) LED Screw Lamp	Wall Switch	2	2,839	0.03	110	0.0	$19.63	$17.23	$0.00	0.88
Gym	30	LED - Linear Tubes: (6) 4' T5HO (25W) Lamps	Wall Switch	153	1,987	None	Yes	30	LED - Linear Tubes: (6) 4' T5HO (25W) Lamps	Occupancy Sensor	153	1,391	1.12	3,092	0.0	$553.30	$1,080.00	$140.00	1.70
Gym Storage	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	1,820	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	25	1,274	0.61	1,553	0.0	$277.81	$663.73	$150.00	1.85
Gym Hall	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	1,820	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	25	1,820	0.58	1,464	0.0	$261.99	$292.12	$0.00	1.12
Roof edges	4	High-Pressure Sodium: (1) 50W Lamp	Daylight Dimming	66	8,760	Fixture Replacement	No	4	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	33	8,760	0.11	1,307	0.0	$233.78	$1,400.00	$0.00	5.99
Under eaves	3	High-Pressure Sodium: (1) 50W Lamp	Daylight Dimming	66	2,839	Fixture Replacement	No	3	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	33	2,839	0.08	318	0.0	$56.83	$1,050.00	$0.00	18.48
Parking Lot	7	High-Pressure Sodium: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	150	3,640	Fixture Replacement	No	7	LED - Fixtures: Outdoor Pole/Arm-Mounted Area/Roadway Fixture	Wall Switch	75	3,640	0.43	2,159	0.0	$386.36	$2,800.00	$700.00	5.44

	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
Sport Lights	6	Metal Halide: (1) 1500W Lamp	Wall Switch	1,610	25	None	No	6	Metal Halide: (1) 1500W Lamp	Wall Switch	1,610	25	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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
MER	Boiler Heating Hot Water Distribution	1	Heating Hot Water Pump	0.3	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
MER	Boiler Heating Hot Water Distribution	1	Heating Hot Water Pump	0.0	60.0%	No	2,745	No	60.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
MER	Roof Top Unit Fans	4	Supply Fan	2.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
North Side	Great Room	1	Split-System AC	5.00		Yes	1	Split-System AC	5.00		16.00		No	0.58	783	0.0	$140.09	$7,481.10	$460.00	50.12
North Side	Great Room	1	Split-System AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
West Side	Unknown	1	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Gym	4	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
MER	Perimeter radiation	1	Condensing Hot Water Boiler	60.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rear Gym Storage	Unknown	1	Furnace	38.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Great room and offices	2	Furnace	80.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
MER	Whole Building	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (≤ 50 Gal)	Natural Gas	67.00%	EF	0.00	0	2.9	$32.11	$2,672.16	$50.00	81.66

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
Bathrooms	6	Faucet Aerator (Lavatory)	2.00	1.00	0.00	0	10.2	$114.85	$43.02	$0.00	0.37

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
Storage Room	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage Room	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	Yes	0.02	138	0.0	$24.69	$1,088.00	$75.00	41.04
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	No	Yes	0.08	681	0.0	$121.92	$2,208.00	$125.00	17.08
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rear Gym Sorage	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	No	Yes	0.03	273	0.0	$48.91	$1,312.00	$75.00	25.29
Rear Gym Sorage	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	No	Yes	0.02	161	0.0	$28.73	$1,120.00	$50.00	37.24

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	No	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	$0.00	$0.00	0.00
Kitchen	1	Gas Rack Oven (Double)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Gas Griddle (3 Feet Width)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Electric Fryer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel 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	Payback w/ Incentives in Years
Kitchen	1	Single Tank Conveyor (High Temp)	Natural Gas	N/A	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?
Lobby	2	Water Cooler	164.0	No
Office	5	Desktop PCs	100.0	No
Office	7	LCD Monitors	50.0	No
Office	1	Printer	30.0	No
Office	1	Large Copier	147.0	No
Office	2	Servers	200.0	No
Office	1	Router	50.0	No
Office	1	Modem	50.0	No
Office	2	network switch	100.0	No
Office	1	Video Recorder	300.0	No
Storage	2	Sump Pump	567.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	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
Lobby	1	Glass Fronted Refrigerated	Yes	0.00	1,209	0.0	$216.29	$230.00	$0.00	1.06
Lobby	1	Non-Refrigerated	Yes	0.00	343	0.0	$61.28	$230.00	$0.00	3.75

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

MLK Recreation Center

Primary Property Type: Other - Recreation
Gross Floor Area (ft²): 16,384
Built: 1963

For Year Ending: October 31, 2017
Date Generated: October 08, 2018

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
MLK Recreation Center 207 E. Main Street Whitesboro, New Jersey 08252	Township of Middle 33 Mechanic Street Cape May Court House, NJ 08210 609-465-8732	Elizabeth Terenik 33 Mechanic Street Cape May Court House, NJ 08210 609-465-8732 eterenik@middletownship.com

Property ID: 6542599

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
79 kBtu/ft²

Source EUI
141.2 kBtu/ft²

Annual Energy by Fuel	
Natural Gas (kBtu)	749,162 (58%)
Electric - Grid (kBtu)	545,119 (42%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	62.7
National Median Source EUI (kBtu/ft²)	112
% Diff from National Median Source EUI	26%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	95

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)