Local Government Energy Audit:
Energy Audit Report

Mary McLeod Bethune Community Center

City of Jersey City

134-142 MLK Drive

Jersey City, NJ 07305

February 19, 2018

Final Report by:

TRC Energy Services

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The intent of this energy analysis report is to identify energy savings opportunities and recommend upgrades to the facility's energy using equipment and systems. Approximate saving are included in this report to help make decisions about reducing energy use at the facility. This report, however, is not intended to serve as a detailed engineering design document. Further design and analysis may be necessary in order to implement some of the measures recommended in this report.

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Mary McLeod Bethune Community Center.

The goal of a LGEA is to provide you with information on how your facility uses energy, identify energy conservation measures (ECMs) that can reduce your energy use, and put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

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

1.1 Facility Summary

Mary McLeod Bethune Community Center is a 26,350 square foot facility. The Community Center's key function is to provide Jersey City residents with a place to gather for group activities, social support, public information, boot camp, dance classes, and other purposes. The building was constructed in 2002 and has two floors which are comprised of offices, classrooms, community rooms and mechanical spaces. Typically 75-100 people occupy the facility during normal operating hours.

The foundation consists of a conventional, reinforced concrete. The building has structural steel columns supporting the upper floors and roof. The upper floor has concrete-topped metal decks that are supported by steel beams. Exterior walls are finished with brick masonry. Portions of the exterior wall are accented with concrete block. The primary roof is flat and finished with a single-ply membrane that is in good condition. The building's base and its perimeter were inspected for signs of uncontrolled moisture or water presence and other energy-compromising issues. Overall, the base was found to be in good condition with no signs of leakage or other energy-related issues.

The windows are wood-framed double-pane glazed double-hung units. The main entrance doors are fully glazed, aluminum framed entry doors set in metal frames. The glazing is double paned. Windows, shading devices, sills, related flashing and caulking were inspected for signs of moisture, air-leakage and other energy compromising issues. Overall, the windows were found to be in good condition with no signs of leakage or other energy-related issues.

Interior lighting in the facility is provided by linear T8 fluorescent lamps and fixtures, and recessed ceiling mounted compact fluorescent lamp (CFL) fixtures. The lighting in the building is controlled predominantly by light switches located on the walls near entry doors to rooms.

The facility's HVAC system consists of individual direct expansion constant volume gas-fired packaged roof top units (RTUs) and energy recovery units (ERUs). There is a total of three (3) Trane package RTUs, seven (7) ERUs, and two (2) Mitsubishi split system air conditioning serving the Telecom Room and the Computer Room.

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

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated nine (9) projects which represent an opportunity for Mary McLeod Bethune Community Center to reduce annual energy costs by roughly $31,676 and annual greenhouse gas emissions by 224,115 lbs CO_2e. The measures would pay for themselves in roughly 8.69 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce Mary McLeod Bethune Community Center's annual energy use by 15.5%.

Figure 1 – Previous 12 Month Utility Costs

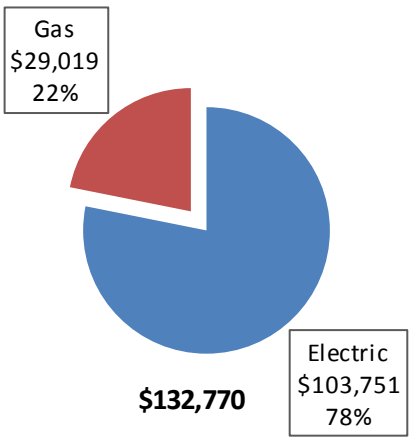
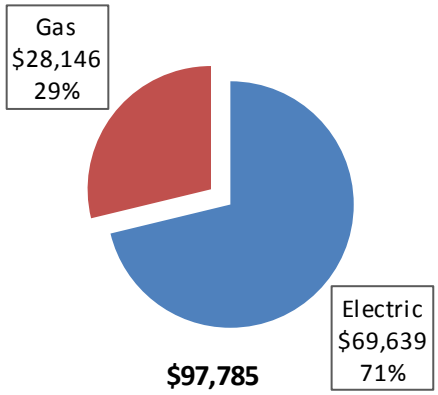


Figure 2 – Potential Post-Implementation Costs



A detailed description of Mary McLeod Bethune Community Center's existing energy use can be found in Section 3 .

The evaluated measures have been listed and grouped into major categories as shown in Figure 3. Brief descriptions of the categories can be found below and descriptions of the individual opportunities can be found in Section 4.

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**113,365**	**16.5**	**0.0**	**$16,430.28**	**$49,907.22**	**$3,045.00**	**$46,862.22**	**2.85**	**114,157**
ECM 1	Install LED Fixtures	Yes	63,928	9.5	0.0	$9,265.31	$31,436.29	$1,050.00	$30,386.29	3.28	64,375
ECM 2	Retrofit Fixtures with LED Lamps	Yes	46,427	6.8	0.0	$6,728.83	$14,383.83	$1,995.00	$12,388.83	1.84	46,752
ECM 3	Install LED Exit Signs	Yes	3,009	0.2	0.0	$436.14	$4,087.09	$0.00	$4,087.09	9.37	3,030
Lighting Control Measures			**8,755**	**1.3**	**0.0**	**$1,268.88**	**$4,640.00**	**$800.00**	**$3,840.00**	**3.03**	**8,816**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	8,755	1.3	0.0	$1,268.88	$4,640.00	$800.00	$3,840.00	3.03	8,816
Motor Upgrades			**741**	**0.3**	**0.0**	**$107.39**	**$1,547.10**	**$0.00**	**$1,547.10**	**14.41**	**746**
ECM 5	Premium Efficiency Motors	Yes	741	0.3	0.0	$107.39	$1,547.10	$0.00	$1,547.10	14.41	746
Electric Unitary HVAC Measures			**57,002**	**33.8**	**0.0**	**$8,261.40**	**$199,122.12**	**$8,477.25**	**$190,644.87**	**23.08**	**57,400**
ECM 6	Install High Efficiency Electric AC	Yes	57,002	33.8	0.0	$8,261.40	$199,122.12	$8,477.25	$190,644.87	23.08	57,400
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**72.5**	**$734.67**	**$31,323.76**	**$4,400.00**	**$26,923.76**	**36.65**	**8,494**
ECM 7	Install High Efficiency Furnaces	Yes	0	0.0	72.5	$734.67	$31,323.76	$4,400.00	$26,923.76	36.65	8,494
HVAC System Improvements			**32,675**	**7.4**	**0.0**	**$4,735.69**	**$7,800.00**	**$2,500.00**	**$5,300.00**	**1.12**	**32,904**
ECM 8	Install Dual Enthalpy Outside Economizer Control	Yes	32,675	7.4	0.0	$4,735.69	$7,800.00	$2,500.00	$5,300.00	1.12	32,904
Domestic Water Heating Upgrade			**0**	**0.0**	**13.6**	**$138.18**	**$71.70**	**$0.00**	**$71.70**	**0.52**	**1,598**
ECM 9	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	13.6	$138.18	$71.70	$0.00	$71.70	0.52	1,598
TOTALS			**212,537**	**59.2**	**86.2**	**$31,676.48**	**$294,411.90**	**$19,222.25**	**$275,189.65**	**8.69**	**224,115**

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

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

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

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

Motor Upgrades generally involve replacing old standard efficiency motors with motors of the current efficiency standard (EISA 2007). Motors will be replaced with the same size motors. This measure saves energy by reducing the power used by the motors due to improved electrical efficiency.

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

Gas Heating (HVAC/Process) measures generally involve replacing old inefficient hydronic heating systems with modern energy efficient systems. Gas heating systems can provide heating equivalent to older systems, but use less energy. These measures save energy by reducing the fuel used by the heating due to improved combustion and heat transfer efficiency.

HVAC System Improvements generally involve the installation of automated controls to reduce heating and cooling demand when conditions allow. These measures could encompass changing temperature setpoints, using outside air for free cooling, or limiting excessive outside air during extreme outdoor air temperatures. These measures save energy by reducing the demand on the systems and the amount of time systems operate.

Domestic Water Heating upgrade measures generally involve replacing old inefficient domestic water heating systems with modern energy efficient systems. New domestic water heating systems can provide equivalent or greater capacity as older systems, but use less energy. These measures save energy by reducing the fuel used by the domestic water heating systems due to improved efficiency or the removal of standby losses.

Energy Efficient Practices

TRC also identified 15 no (or low) cost energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral and operational adjustments as well as performing routine maintenance on building systems. Through these practices equipment lifetime can be extended; occupant comfort, health and safety can be improved; and annual energy, operation, and maintenance costs can be reduced. Opportunities identified at Mary McLeod Bethune Community Center include:

- Reduce Air Leakage
- Close Doors and Windows
- Perform Proper Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Fans to Reduce Cooling Load
- Practice Proper Use of Thermostat Schedules and Temperature Resets
- Ensure Economizers are Functioning Properly
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

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

Self-Generation Measures

TRC evaluated the potential for installing self-generation sources for Mary McLeod Bethune Community Center. Based on the configuration of the site and its loads there is a low potential for installing any PV and combined heat and power self-generation measures.

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

1.3 Implementation Planning

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

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

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

- SmartStart
- Direct Install

- Energy Savings Improvement Program (ESIP)

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

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

For facilities without capital available to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.4 for additional information on the ESIP Program.

The Demand Response Energy Aggregator is a program (non-NJCEP) designed to reduce consumer electric load when wholesale electricity prices are high or when the reliability of the electric grid is threatened due to peak 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 locally. By enabling grid operators to call upon Curtailment Service Providers and energy consumers to reduce electric usage during times of peak demand, the grid is made more reliable and overall transmission costs are reduced for all ratepayers. Curtailment Service Providers provide regular payments to medium and large consumers of electric power for their participation in DR programs. Program participation is voluntary and participants will receive payments whether or not their facility is called upon to curtail their load. Refer to Section 7 for additional information on this program.

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

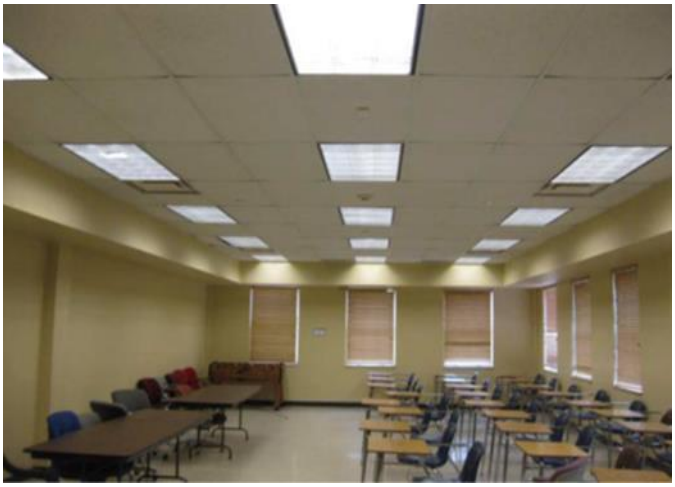
2.1 Project Contacts

Figure 4 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
John Mercer	Assistant Business Administrator	jmercer@jcnj.org	201-547-4417
Designated Representative			
Alvin Pettit	Assistant Manager		201-951-8960
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	732-855-2879

2.2 General Site Information

On July 15, 2016, TRC performed an energy audit at Mary McLeod Bethune Community Center located in Jersey City, New Jersey. TRC Energy Services' Auditor met with Alvin Pettit to review the facility operations and focus the investigation on specific energy-using systems.



Mary McLeod Bethune Community Center is a 26,350 square foot facility. The Community Center's key function is to provide residents of Jersey City with a place to gather for group activities, social support, public information, boot camp, dance classes, and other purposes. The building was constructed in 2002 and has two floors which are comprised of offices, classrooms, community rooms and mechanical spaces. Typically 75-100 people occupy the facility during normal operating hours.

2.3 Building Occupancy

Typically, 75-100 people occupy the facility during normal operating hours. Special events occur frequently, which vary the hours of operation and occupancy greatly. The typical schedule is presented in the table below.

Figure 5 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Mary Mcleod Bethune Center	Weekday	7:00 AM - 9:00 PM
Mary Mcleod Bethune Center	Weekend	9:00 AM - 9:00 PM

2.4 Building Envelope

The foundation consists of a conventional, reinforced concrete. The building has structural steel columns supporting the upper floors and roof. The upper floor has concrete-topped metal decks that are supported by steel beams. Exterior walls are finished with brick masonry. Portions of the exterior wall are accented with concrete block. The primary roof is flat and finished with a single-ply membrane that is in good condition. The building's base and its perimeter were inspected for signs of uncontrolled moisture or water presence and other energy-compromising issues. Overall, the base was found to be in good condition with no signs of leakage or other energy-related issues.

The windows are wood-framed double-pane glazed double-hung units. The main entrance doors are fully glazed, aluminum framed entry doors set in metal frames. The glazing is double paned. Windows, shading devices, sills, related flashing and caulking were inspected, as far as accessibility allowed, for signs of moisture, air-leakage and other energy compromising issues. Overall, the windows were found to be in good condition with no signs of uncontrolled moisture, air-leakage and other energy-compromising issues.

2.5 On-site Generation

Mary McLeod Bethune Community Center does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

Lighting System

Interior lighting in the facility is provided by linear T8 fluorescent lamps and fixtures and recessed ceiling mounted compact fluorescent lamp (CFL) fixtures. The fixtures are currently equipped with electronic ballasts. Additional fixtures contain standard CFL lamps and halogen flood lights. The main lobby and the hallways are lit with recessed CFLs (2 lamp, 26 Watts each). The classrooms are lit with linear T8 fluorescent lamps. The community rooms (theater rooms) are lit with a combination of linear T8 fixture lamps and recessed CFLs lamps. The community rooms also have halogen flood light fixtures. The lighting in the building is controlled predominantly by light switches located on the walls near entry doors to rooms.

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

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

Cooling and Heating System

The facility's HVAC system consists of individual direct expansion constant volume gas-fired packaged roof top units (RTU) and energy recovery units. There are a total of three (3) Trane package RTUs (ranging from 10 to 17.5 tons), seven (7) energy recovery units (ERUs), and two (2) Mitsubishi split system air conditioning units serving the Telecom Room and the Computer Room. Air distribution is provided by ductwork to supply air registers concealed above the ceilings. Return air grilles are located in each space. Heated and/or cooled air is distributed through ducts to variable air volume (VAV) terminals concealed above the ceilings in each common area and tenant space. The community rooms (theater rooms) have supplemental cooling systems provided by Friedrich window AC units. There are a total of ten (10) window AC units two (2) for each community room. The units have reached their useful service life and were observed running with a minimum efficiency, as a result they should be replaced with a more efficient unit.

Domestic Hot Water

The domestic hot water system for the facility consists of two (2) A. O. Smith gas-fired condensing hot water heaters with an input rating of 125 kBtu/hr each and a nominal efficiency of 92%. They are located in the mechanical closet on the second floor. The water heaters have a capacity of 60 gallons each and are in good condition. There is one (1) supplemental electric (50 gallon, 9 KW) water heater located in the custodian's closet.

Food Service and Refrigeration

The facility has a small non-commercial kitchen that is used to prepare food during special events. The kitchen contains two (2) gas-fired ovens and one (1) Traulsen full-size ENERGY STAR® refrigerator. The kitchen is well maintained.

Plug load & Vending Machines

There are five (5) computer work stations in the facility, and 99% of the computers are desktop units with LCD monitors. There are two (2) multi-function printers in the facility.

Also, the facility has no refrigerated beverage vending machines.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of common area restrooms found that the faucets are rated for 2.5 gallons per minute (gpm), the toilets are rated at 1.6 gallons per flush and the urinals are rated at 2 gpf. The kitchen has faucets rated for 3.5 gpm. The restrooms have commercial grade fixtures and accessories including water closets and lavatories.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for Electricity and Natural Gas was evaluated to determine the annual energy performance metrics for the building in energy cost/ft^2 and energy use/ft^2. These energy use indices are indicative of the relative energy effectiveness of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy use for other facilities identified as: Center/Meeting Hall. Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

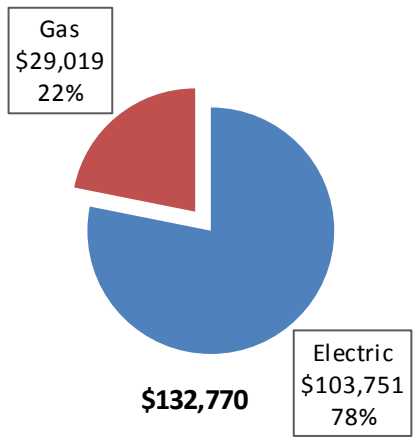
The following energy consumption and cost data is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 6 - Utility Summary

Utility Summary for Mary McLeod Bethune Community Center		
Fuel	**Usage**	**Cost**
Electricity	691,673 kWh	$103,751
Natural Gas	28,655 Therms	$29,019
Total		**$132,770**

The current utility cost for this site is $132,770 as shown in the chart below.

Figure 7 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.145/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below.

Figure 8 - Electric Usage & Demand

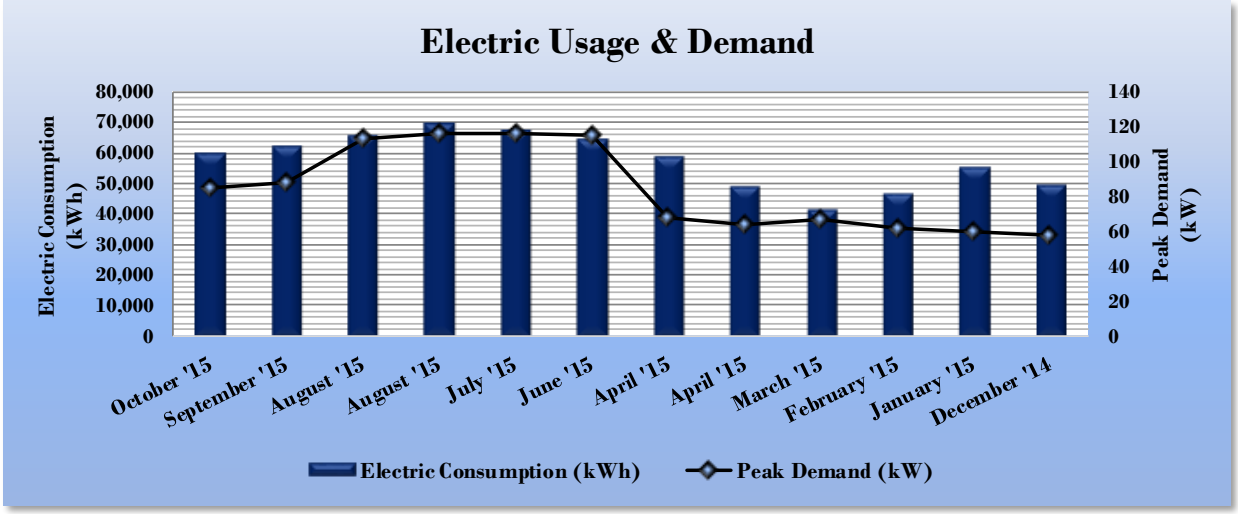


Figure 9 - Electric Usage & Demand

Electric Billing Data for Mary McLeod Bethune Community Center					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
11/13/15	31	60,040	85	$327	$9,006
10/14/15	30	62,086	88	$338	$9,313
9/15/15	31	65,475	113	$373	$9,821
8/17/15	31	69,746	116	$395	$10,462
7/16/15	30	67,526	116	$383	$10,129
6/17/15	32	64,880	115	$271	$9,732
5/15/15	29	58,760	68	$260	$8,814
4/16/15	30	49,160	64	$234	$7,374
3/17/15	30	41,760	67	$237	$6,264
2/20/15	28	46,960	62	$224	$7,044
1/22/15	32	55,680	60	$233	$8,352
12/19/14	31	49,600	58	$230	$7,440
Totals	**365**	**691,673**	**116**	**$3,505**	**$103,751**
Annual	**365**	**691,673**	**116**	**$3,505**	**$103,751**

3.3 Natural Gas Usage

Natural Gas is provided by PSE&G. The average gas cost for the past 12 months is $1.013/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below.

Figure 10 - Natural Gas Usage

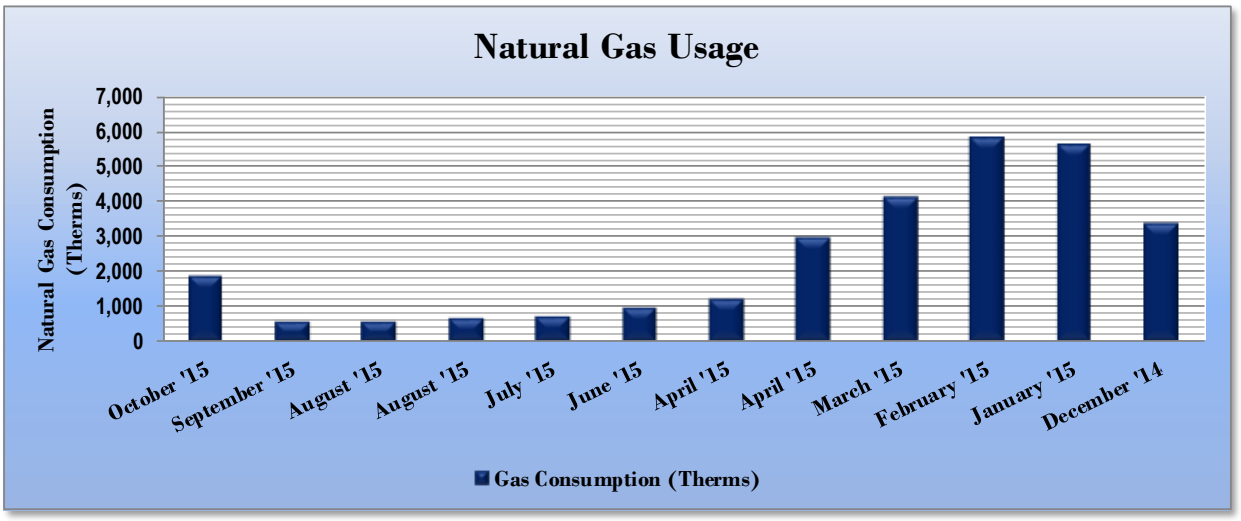


Figure 11 - Natural Gas Usage

Gas Billing Data for Mary McLeod Bethune Community Center			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
11/13/15	32	1,875	$1,908
10/14/15	30	546	$575
9/15/15	29	571	$600
8/17/15	31	677	$709
7/16/15	30	702	$731
6/17/15	31	970	$1,003
5/15/15	31	1,225	$1,254
4/16/15	30	3,002	$3,032
3/17/15	29	4,146	$4,171
2/20/15	29	5,873	$5,902
1/22/15	32	5,663	$5,697
12/19/14	31	3,406	$3,437
Totals	**365**	**28,655**	**$29,019**
Annual	**365**	**28,655**	**$29,019**

3.4 Benchmarking

This facility was benchmarked through Portfolio Manager, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager analyzes your building's consumption data, cost information, and operational use details and

compares its performance against a yearly baseline, national medians, or similar buildings in your portfolio. Metrics used in this comparison are the energy use intensity (EUI) and ENERGY STAR® Score.

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

Figure 12 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Mary McLeod Bethune Community Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	395.4	69.8
Site Energy Use Intensity (kBtu/ft^2)	198.3	45.3

By implementing all recommended measures covered in this reporting, the Project's estimated post-implementation EUI improves as shown in the table below:

Figure 13 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Mary McLeod Bethune Community Center	National Median Building Type: Center/Meeting Hall
Source Energy Use Intensity (kBtu/ft^2)	305.6	69.8
Site Energy Use Intensity (kBtu/ft^2)	167.5	45.3

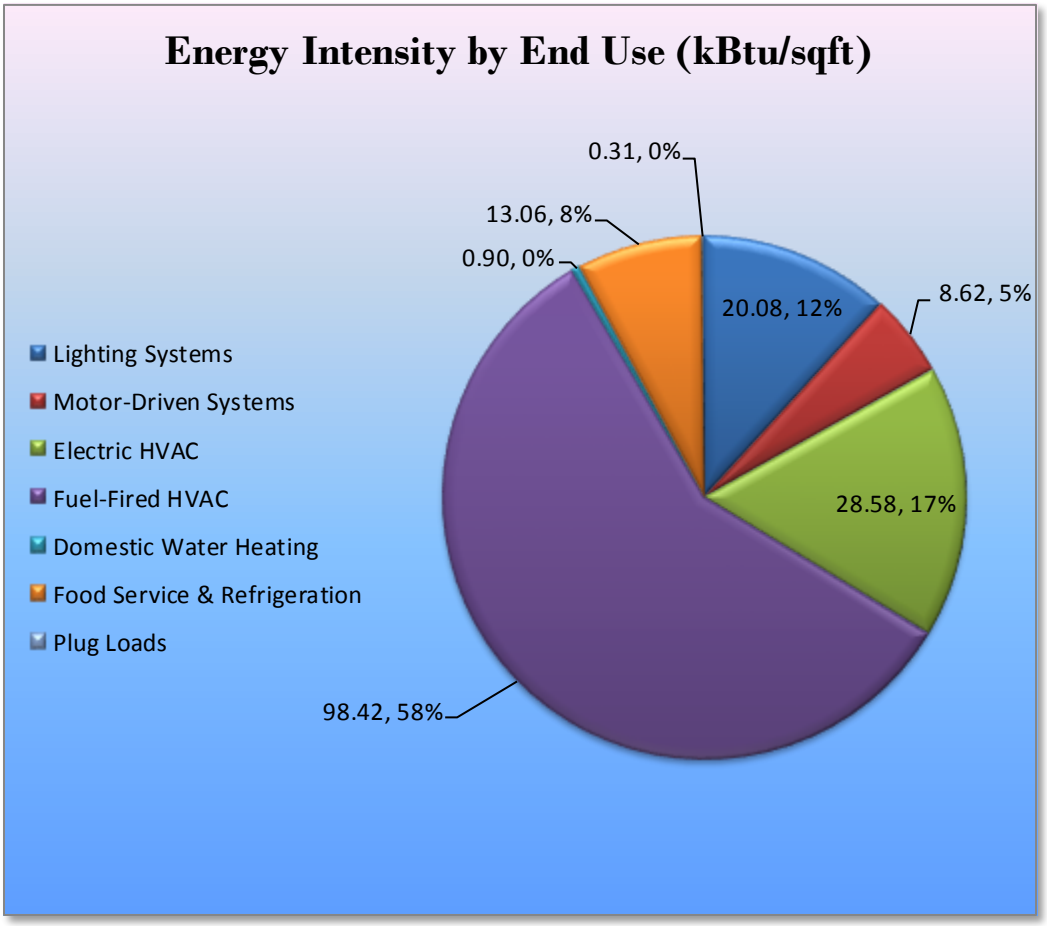
Many buildings can also receive a 1 – 100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide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

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

3.5 Energy End-Use Breakdown

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

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy projects, help prioritize specific measures for implementation, and set Mary McLeod Bethune Community Center on the path to receive financial incentives. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is considered sufficient to make decisions and to prioritize energy projects. Savings are based on the New Jersey Board of Public Utilities New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016. Further analysis or investigation may be required to calculate more accurate savings to support any custom SmartStart, Pay for Performance, or Large Energy Users incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJ prescriptive SmartStart program. Depending on your implementation strategy, the project may be eligible for more lucrative incentives through other programs as identified in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 15 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**113,365**	**16.5**	**0.0**	**$16,430.28**	**$49,907.22**	**$3,045.00**	**$46,862.22**	**2.85**	**114,157**
ECM 1	Install LED Fixtures	63,928	9.5	0.0	$9,265.31	$31,436.29	$1,050.00	$30,386.29	3.28	64,375
ECM 2	Retrofit Fixtures with LED Lamps	46,427	6.8	0.0	$6,728.83	$14,383.83	$1,995.00	$12,388.83	1.84	46,752
ECM 3	Install LED Exit Signs	3,009	0.2	0.0	$436.14	$4,087.09	$0.00	$4,087.09	9.37	3,030
Lighting Control Measures		**8,755**	**1.3**	**0.0**	**$1,268.88**	**$4,640.00**	**$800.00**	**$3,840.00**	**3.03**	**8,816**
ECM 4	Install Occupancy Sensor Lighting Controls	8,755	1.3	0.0	$1,268.88	$4,640.00	$800.00	$3,840.00	3.03	8,816
Motor Upgrades		**741**	**0.3**	**0.0**	**$107.39**	**$1,547.10**	**$0.00**	**$1,547.10**	**14.41**	**746**
ECM 5	Premium Efficiency Motors	741	0.3	0.0	$107.39	$1,547.10	$0.00	$1,547.10	14.41	746
Electric Unitary HVAC Measures		**57,002**	**33.8**	**0.0**	**$8,261.40**	**$199,122.12**	**$8,477.25**	**$190,644.87**	**23.08**	**57,400**
ECM 6	Install High Efficiency Electric AC	57,002	33.8	0.0	$8,261.40	$199,122.12	$8,477.25	$190,644.87	23.08	57,400
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**72.5**	**$734.67**	**$31,323.76**	**$4,400.00**	**$26,923.76**	**36.65**	**8,494**
ECM 7	Install High Efficiency Furnaces	0	0.0	72.5	$734.67	$31,323.76	$4,400.00	$26,923.76	36.65	8,494
HVAC System Improvements		**32,675**	**7.4**	**0.0**	**$4,735.69**	**$7,800.00**	**$2,500.00**	**$5,300.00**	**1.12**	**32,904**
ECM 8	Install Dual Enthalpy Outside Economizer Control	32,675	7.4	0.0	$4,735.69	$7,800.00	$2,500.00	$5,300.00	1.12	32,904
Domestic Water Heating Upgrade		**0**	**0.0**	**13.6**	**$138.18**	**$71.70**	**$0.00**	**$71.70**	**0.52**	**1,598**
ECM 9	Install Low-Flow Domestic Hot Water Devices	0	0.0	13.6	$138.18	$71.70	$0.00	$71.70	0.52	1,598
TOTALS		**212,537**	**59.2**	**86.2**	**$31,676.48**	**$294,411.90**	**$19,222.25**	**$275,189.65**	**8.69**	**224,115**

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

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

4.1.1 Lighting Upgrades

Lighting Upgrades include several "submeasures" as outlined in Figure 16 below.

Figure 16 – Summary of Lighting Upgrade ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**113,365**	**16.5**	**0.0**	**$16,430.28**	**$49,907.22**	**$3,045.00**	**$46,862.22**	**2.85**	**114,157**
ECM 1	Install LED Fixtures	63,928	9.5	0.0	$9,265.31	$31,436.29	$1,050.00	$30,386.29	3.28	64,375
ECM 2	Retrofit Fixtures with LED Lamps	46,427	6.8	0.0	$6,728.83	$14,383.83	$1,995.00	$12,388.83	1.84	46,752
ECM 3	Install LED Exit Signs	3,009	0.2	0.0	$436.14	$4,087.09	$0.00	$4,087.09	9.37	3,030

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	63,647	9.4	0.0	$9,224.48	$30,654.94	$850.00	$29,804.94	3.23	64,092
Exterior	282	0.1	0.0	$40.83	$781.35	$200.00	$581.35	14.24	284

Measure Description

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

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

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

Please refer to Appendix A: Equipment Inventory & Recommendations for a detailed list of the locations and light fixtures affected by this measure.

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	46,427	6.8	0.0	$6,728.83	$14,383.83	$1,995.00	$12,388.83	1.84	46,752
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing linear fluorescent T8 lamps with LED tube lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

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

Please refer to Appendix A: Equipment Inventory & Recommendations for a detailed list of the locations and light fixtures affected by this measure.

ECM 3: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	3,009	0.2	0.0	$436.14	$4,087.09	$0.00	$4,087.09	9.37	3,030
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

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

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

4.1.2 Lighting Control Measures

Lighting control measures include several "submeasures" as outlined in Figure 17 below.

Figure 17 – Summary of Lighting Control ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Lighting Control Measures		**8,755**	**1.3**	**0.0**	**$1,268.88**	**$4,640.00**	**$800.00**	**$3,840.00**	**3.03**	**8,816**
ECM 4	Install Occupancy Sensor Lighting Controls	8,755	1.3	0.0	$1,268.88	$4,640.00	$800.00	$3,840.00	3.03	8,816

ECM 4: Install Occupancy Sensor Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
8,755	1.3	0.0	$1,268.88	$4,640.00	$800.00	$3,840.00	3.03	8,816

Measure Description

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

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

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

4.1.3 Motor Upgrades

ECM 5: Premium Efficiency Motors

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)
741	0.3	0.0	$107.39	$1,547.10	$0.00	$1,547.10	14.41	746

Measure Description

This measure evaluates replacing the building water supply standard efficiency pump motor with EISA 2007 efficiency motor. The evaluation assumes existing motor will be replaced with the same size motor. It is important that the speed of each new motor match the speed of the motor it replaces as closely as

possible. The base case motor efficiencies are obtained from nameplate information. Proposed case premium motor efficiencies are obtained from the New Jersey's Clean Energy Program Protocols to Measure Resource Savings (2016). Savings are based on the difference between baseline and proposed efficiencies and the annual operating hours.

4.1.4 Electric Unitary HVAC Measures

Unitary HVAC measures include several "submeasures" as outlined in Figure 18 below.

Figure 18 - Summary of Unitary HVAC ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**57,002**	**33.8**	**0.0**	**$8,261.40**	**$199,122.12**	**$8,477.25**	**$190,644.87**	**23.08**	**57,400**
ECM 6	Install High Efficiency Electric AC	57,002	33.8	0.0	$8,261.40	$199,122.12	$8,477.25	$190,644.87	23.08	57,400

ECM 6: Install High Efficiency Electric AC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
57,002	33.8	0.0	$8,261.40	$199,122.12	$8,477.25	$190,644.87	23.08	57,400

Measure Description

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

4.1.5 Gas Heating (HVAC/Process) Replacement

Gas heating replacement measures include several "submeasures" as outlined in Figure 19 below.

Figure 19 - Summary of Gas Heating Replacement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**72.5**	**$734.67**	**$31,323.76**	**$4,400.00**	**$26,923.76**	**36.65**	**8,494**
ECM 7	Install High Efficiency Furnaces	0	0.0	72.5	$734.67	$31,323.76	$4,400.00	$26,923.76	36.65	8,494

ECM 7: Install High Efficiency Furnaces

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	72.5	$734.67	$31,323.76	$4,400.00	$26,923.76	36.65	8,494

Measure Description

This measure evaluates replacing existing standard furnaces section of the rooftop package units with condensing furnaces. Improved combustion technology and heat exchanger design optimize the heat recovery from the combustion gases which significantly improves the furnace efficiency. Savings result from improved system efficiency.

Condensing furnaces do have acidic condensate that needs to be drained.

4.1.6 HVAC System Improvements

HVAC system improvement measures include several "submeasures" as outlined in Figure 20 below.

Figure 20 - Summary of HVAC System Improvement 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)
HVAC System Improvements		**32,675**	**7.4**	**0.0**	**$4,735.69**	**$7,800.00**	**$2,500.00**	**$5,300.00**	**1.12**	**32,904**
ECM 8	Install Dual Enthalpy Outside Economizer Control	32,675	7.4	0.0	$4,735.69	$7,800.00	$2,500.00	$5,300.00	1.12	32,904

ECM 8: Install Dual Enthalpy Outside Economizer 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)
32,675	7.4	0.0	$4,735.69	$7,800.00	$2,500.00	$5,300.00	1.12	32,904

Measure Description

Dual enthalpy economizers are used to control a ventilation system's outside air intake in order to reduce a facility's total cooling load. A dual enthalpy economizer monitors the air temperature and humidity of both the outside and return air. The control supplies the lowest energy (temperature and humidity) air to the air handling system. When outside air conditions allow, outside air can be used for cooling in place of the air handling system's compressor. This reduces the demand on the cooling system, lowering its usage hours, saving energy.

Savings result from using outside air instead of mechanical cooling whenever possible.

4.1.7 Domestic Water Heating Upgrade

Domestic water heating measures include several "submeasures" as outlined in Figure 21 below.

Figure 21 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**13.6**	**$138.18**	**$71.70**	**$0.00**	**$71.70**	**0.52**	**1,598**
ECM 9	Install Low-Flow Domestic Hot Water Devices	0	0.0	13.6	$138.18	$71.70	$0.00	$71.70	0.52	1,598

ECM 9: 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	13.6	$138.18	$71.70	$0.00	$71.70	0.52	1,598

Measure Description

This measure evaluates the savings from installing low flow domestic water devices to reduce overall water flow in general and hot water flow in particular. Low flow showerheads and faucet aerators reduce the water flow, relative to standard showerheads and aerators, from the fixture. Pre-rinse spray valves—often used in commercial and institutional kitchens—are designed to remove food waste from dishes prior to dishwashing. Replacing standard pre-rinse spray valves with low flow valves will reduce water use.

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

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

Ensure doors and windows are closed in conditioned spaces. Leaving doors and windows open leads to a significant increase in heat transfer between conditioned spaces and the outside air. Reducing a facility's air changes per hour (ACH) can lead to increased occupant comfort as well as significant heating and cooling savings, especially when combined with proper HVAC controls and adequate ventilation.

Perform Proper Lighting Maintenance

In order to sustain optimal lighting levels, lighting fixtures should undergo routine maintenance. Light levels decrease over time due to lamp aging, lamp and ballast failure, and buildup of dirt and dust on lamps, fixtures and reflective surfaces. Together, these factors can reduce total illumination by 20% - 60% or more, while operating fixtures continue drawing full power. To limit this reduction, lamps, reflectors and diffusers should be thoroughly cleaned of dirt, dust, oil, and smoke film buildup approximately every 6 – 12 months.

Develop a Lighting Maintenance Schedule

In addition to routine fixture cleaning, development of a maintenance schedule can both ensure maintenance is performed regularly and can reduce the overall cost of fixture re-lamping and re-ballasting. By re-lamping and re-ballasting fixtures in groups, lighting levels are better maintained and the number of site visits by a lighting technician or contractor can be minimized, decreasing the overall cost of maintenance.

Ensure Lighting Controls Are Operating Properly

Lighting controls are very cost effective energy efficient devices, when installed and operating correctly. As part of a lighting maintenance schedule, lighting controls should be tested annually to ensure proper functioning. For occupancy sensors, this requires triggering the sensor and verifying that the sensor's timer settings are correct. For daylight sensors, maintenance involves cleaning of sensor lenses and confirming setpoints and sensitivity are appropriately configured.

Perform Routine Motor Maintenance

Motors consist of many moving parts whose collective degradation can contribute to a significant loss of motor efficiency. In order to prevent damage to motor components, routine maintenance should be performed. This maintenance consists of cleaning surfaces and ventilation openings on motors to prevent overheating, lubricating moving parts to reduce friction, inspecting belts and pulleys for wear and to ensure they are at proper alignment and tension, and cleaning and lubricating bearings. Consult a licensed technician to assess these and other motor maintenance strategies.

Use Fans to Reduce Cooling Load

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

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.

Check for and Seal Duct Leakage

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

Perform Proper Water Heater Maintenance

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

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 gallons per flush (gpf) and toilets that use as little as 1.28 gpf (this is lower than the current 1.6 gpf federal standard).

Refer to Section 4.1.7 for any low-flow ECM recommendations.

6 SELF-GENERATION MEASURES

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

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

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

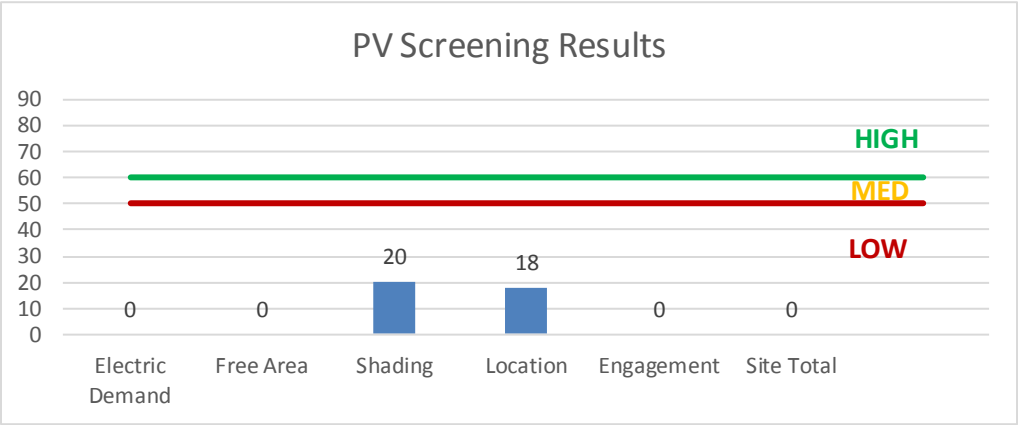
6.1 Photovoltaic

Sunlight can be converted into electricity using photovoltaics (PV) modules. Modules are racked together into an array that produces direct current (DC) electricity. The DC current is converted to alternating current (AC) through an inverter. The inverter is interconnected to the facility's electrical distribution system. The amount of unobstructed area available determines how large of a solar array can be installed. The size of the array combined with the orientation, tilt, and shading elements determines the energy produced.

A preliminary screening based on the facility's electric demand, size and location of free area, and shading elements shows that the facility has a Low potential for installing a PV array.

In order to be cost-effective, a solar PV array generally needs a minimum of 4,000 sq ft of flat or south-facing rooftop, or other unshaded space, on which to place the PV panels. In our opinion, the facility does appear not meet these minimum criteria for cost-effective PV installation.

Figure 22 - Photovoltaic Screening



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

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

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

6.2 Combined Heat and Power

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

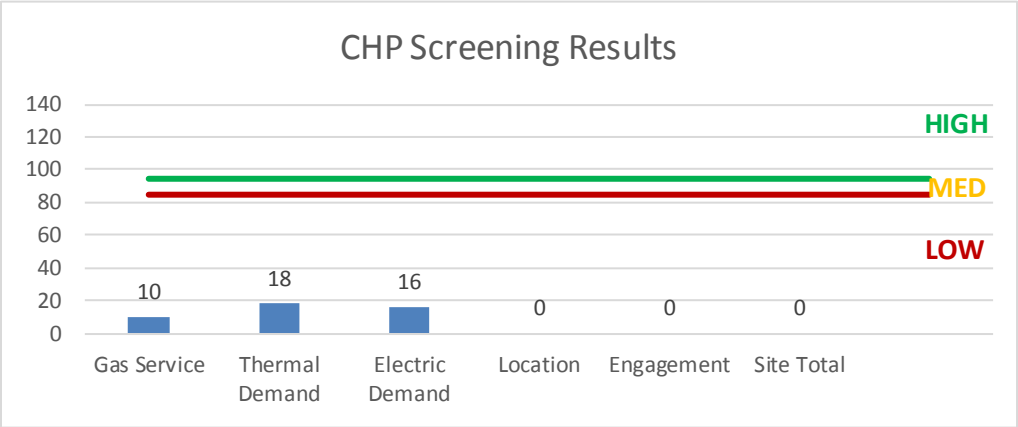
CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

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

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

Figure 23 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

The first step toward participation in a DR program is to contact a Curtailment Service Provider. 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.

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and others, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's 1999 Electricity Restructuring Law which requires all customers of investor-owned electric and gas utilities to pay this charge on their monthly energy bills. As a contributor to the fund you were able to participate in the LGEA program and are also eligible to utilize the equipment incentive programs. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 24 for a list of the eligible programs identified for each recommended ECM.

Figure 24 - 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	Install LED Fixtures	X		X			
ECM 2	Retrofit Fixtures with LED Lamps	X		X			
ECM 3	Install LED Exit Signs			X			
ECM 4	Install Occupancy Sensor Lighting Controls	X		X			
ECM 5	Premium Efficiency Motors			X			
ECM 6	Install High Efficiency Electric AC	X		X			
ECM 7	Install High Efficiency Furnaces	X		X			
ECM 8	Install Dual Enthalpy Outside Economizer Control	X		X			
ECM 9	Install Low-Flow Domestic Hot Water Devices			X			

SmartStart is generally well suited for implementation of individual or small sets of measures, with the flexibility to install projects at your own pace using in-house staff or a preferred contractor. Direct Install caters to small to mid-size facilities to bundle measures and simplify participation, but requires the use of pre-approved contractors. The Pay for Performance (P4P) program is a "whole-building" energy improvement program designed for larger facilities and requires implementation of multiple measures meeting minimum savings thresholds, as well as use of pre-approved consultants. The Large Energy Users Program (LEUP) is available to New Jersey's largest energy users giving them flexibility to install as little or as many measures, in a single facility or several facilities, with incentives capped based on the entity's annual energy consumption; applicants can use in-house staff or preferred contractor.

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

Brief descriptions of all relevant alternative financing and incentive programs are located in the sections below. You may also check the following website for further information, including most current program availability, requirements, and incentive levels: www.njcleanenergy.com/ci.

8.1 SmartStart

Overview

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

Prescriptive Equipment Incentives Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

Direct Install is a turnkey program available to existing small to mid-sized facilities with a peak electric demand that did not exceed 200 kW in the preceding 12 months. You will work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and install those measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

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

How to Participate

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

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

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

8.3 Combined Heat and Power and Fuel Cell

Overview

The Combined Heat & Power and Fuel Cell (CHP-FC) program can be a significant source of funding if this facility was identified as a good candidate for this type of on-site generation. Please note that the program experienced higher than anticipated participation levels since the beginning of the Fiscal Year 2016 (FY16). On December 11, 2015 the Board issued a notice that the NJCEP will temporarily cease accepting applications for the CHP-FC program. The program is expected to re-open in the coming months.

Incentives

Please check the NJCEP website for details on program availability, incentive levels, and requirements.

How to Participate

Once the program reopens, you will need to work with a qualified developer or consulting firm to complete the CHP-FC Application and have it approved prior to installing any equipment. Once the application is approved the project can be installed.

Information about the CHP-FC program can be found at: www.njcleanenergy.com/CHP.

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 the incentive programs to help further reduce costs when compiling the ESP. You should refer to the ESIP guidelines at the link above for further information and guidance on next steps.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Front Entrance	2	Metal Halide: (1) 70W Lamp	Daylight Dimming	72	2,444	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	21	2,444	0.08	282	0.0	$40.83	$781.35	$200.00	14.24
Reception Area	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	158	0.0	$22.95	$215.11	$0.00	9.37
Reception Area	6	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	6	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.21	1,425	0.0	$206.54	$381.91	$0.00	1.85
Reception Area	19	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	19	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.66	4,513	0.0	$654.03	$1,209.37	$0.00	1.85
1st Floor Hallway	7	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	7	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.26	1,790	0.0	$259.45	$561.56	$20.00	2.09
1st Floor Hallway	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Back Building Hallway	37	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	37	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	1.39	9,462	0.0	$1,371.38	$2,819.09	$80.00	2.00
Back Building Hallway	5	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	5	LED Exit Signs: 2 W Lamp	None	6	8,760	0.03	396	0.0	$57.39	$537.78	$0.00	9.37
Room 111 Mech Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,888	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,888	0.09	619	0.0	$89.66	$190.27	$40.00	1.68
Room112 Electrical Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,888	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	4,888	0.18	1,237	0.0	$179.32	$380.53	$80.00	1.68
Room 107	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,422	0.76	5,182	0.0	$751.09	$1,360.00	$265.00	1.46
Room 107A Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room 107	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room 107	4	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.14	950	0.0	$137.69	$254.60	$0.00	1.85
Room 107B Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Emergency Exit hallway	1	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.03	238	0.0	$34.42	$63.65	$0.00	1.85
Emergency Exit hallway	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room 106	4	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	4	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.15	1,023	0.0	$148.26	$370.60	$20.00	2.36
Room 106	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.48	3,281	0.0	$475.51	$902.40	$180.00	1.52
Room 106	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.07	481	0.0	$69.65	$189.60	$0.00	2.72
Room 106A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room 106B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room 105	4	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	4	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.15	1,023	0.0	$148.26	$486.60	$40.00	3.01
Room 105	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.48	3,281	0.0	$475.51	$902.40	$180.00	1.52
Room 10A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52

	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
Room 10B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room104	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,422	0.61	4,146	0.0	$600.88	$1,134.40	$220.00	1.52
Room104	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.07	481	0.0	$69.65	$189.60	$0.00	2.72
Room104	4	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.14	950	0.0	$137.69	$254.60	$0.00	1.85
Room10A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room10B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room103	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,422	0.61	4,146	0.0	$600.88	$1,134.40	$220.00	1.52
Room103	4	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.14	950	0.0	$137.69	$254.60	$0.00	1.85
Room103	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.07	481	0.0	$69.65	$189.60	$0.00	2.72
Room103A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room103B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room102	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,422	0.61	4,146	0.0	$600.88	$1,134.40	$220.00	1.52
Room102	4	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.14	950	0.0	$137.69	$254.60	$0.00	1.85
Room102	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,888	0.08	547	0.0	$79.25	$175.50	$30.00	1.84
Room102	1	Exit Signs: Incandescent	Wall Switch	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room102	14	Halogen Incandescent: Theater Room Trac Light	Wall Switch	90	4,888	Fixture Replacement	No	14	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	15	4,888	0.85	5,800	0.0	$840.55	$8,421.34	$420.00	9.52
Room103	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room104	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room105	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room106	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room102A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room102B	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room101	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Room101	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,422	0.41	2,764	0.0	$400.58	$934.00	$160.00	1.93
Room101	4	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.14	950	0.0	$137.69	$254.60	$0.00	1.85

	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
Room101	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,888	0.08	547	0.0	$79.25	$175.50	$30.00	1.84
Room101	14	Halogen Incandescent: Theater Room Trac Light	Wall Switch	90	4,888	Fixture Replacement	No	14	LED - Fixtures: Track or Mono-Point Directional Lighting Fixtures	Wall Switch	15	4,888	0.85	5,800	0.0	$840.55	$8,421.34	$420.00	9.52
Room101A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room102A	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room108 - Kitchen	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	4,888	Relamp	Yes	8	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	3,422	0.14	965	0.0	$139.93	$403.20	$60.00	2.45
Room108 - Kitchen	2	Incandescent: 100W A Lamp	Wall Switch	100	4,888	Fixture Replacement	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.14	983	0.0	$142.49	$127.30	$10.00	0.82
Room100A	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,888	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	3,422	0.24	1,622	0.0	$235.03	$496.53	$100.00	1.69
Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Admin Office Hallway	2	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	2	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.08	511	0.0	$74.13	$243.30	$20.00	3.01
Admin Office Hallway	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	79	0.0	$11.48	$107.56	$0.00	9.37
Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,888	0.04	273	0.0	$39.63	$75.20	$15.00	1.52
Room100B	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,422	0.10	691	0.0	$100.15	$266.40	$50.00	2.16
Room100C	6	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	Yes	6	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,422	0.31	2,073	0.0	$300.44	$567.20	$110.00	1.52
Room100C	1	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.03	238	0.0	$34.42	$63.65	$0.00	1.85
Room201-202	16	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	16	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.60	4,092	0.0	$593.03	$1,250.42	$40.00	2.04
Room201-202	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.28	1,922	0.0	$278.58	$758.40	$0.00	2.72
Room201-202	4	Exit Signs: Incandescent	Wall Switch	14	8,760	Fixture Replacement	No	4	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.03	317	0.0	$45.91	$430.22	$0.00	9.37
Room201A-202A	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,888	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	3,422	0.20	1,382	0.0	$200.29	$532.80	$100.00	2.16
Custodial	1	CFL Screw-In Lamps: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.03	238	0.0	$34.42	$63.65	$0.00	1.85
2nd Floor Hallway Bath	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	3,422	0.10	691	0.0	$100.15	$291.50	$50.00	2.41
Hallway	38	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	38	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	1.43	9,718	0.0	$1,408.45	$2,882.74	$80.00	1.99
Hallway	8	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	8	LED Exit Signs: 2 W Lamp	None	6	8,760	0.05	634	0.0	$91.82	$860.44	$0.00	9.37
Hallway	4	Compact Fluorescent: Hanging Pendant 2X26W	Wall Switch	54	4,888	Fixture Replacement	No	4	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.14	950	0.0	$137.69	$254.60	$0.00	1.85
Room208-209	16	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	16	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.60	4,092	0.0	$593.03	$1,250.42	$40.00	2.04
Room208-209	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.28	1,922	0.0	$278.58	$758.40	$0.00	2.72

	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
Room208-209	3	Exit Signs: Incandescent	Wall Switch	14	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.02	238	0.0	$34.43	$322.67	$0.00	9.37
Women's bathroom	2	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	2	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.08	511	0.0	$74.13	$243.30	$20.00	3.01
Women's bathroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.07	481	0.0	$69.65	$189.60	$0.00	2.72
Storage Room	1	CFL Screw-In Lamps: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.03	238	0.0	$34.42	$63.65	$0.00	1.85
Room206-207	16	CFL Screw-In Lamps: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	16	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.60	4,092	0.0	$593.03	$1,250.42	$40.00	2.04
Room206-207	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.28	1,922	0.0	$278.58	$758.40	$0.00	2.72
Room206-207	3	Exit Signs: Incandescent	Wall Switch	14	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.02	238	0.0	$34.43	$322.67	$0.00	9.37
Bathroom	2	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	2	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.08	511	0.0	$74.13	$243.30	$20.00	3.01
Bathroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.07	481	0.0	$69.65	$189.60	$0.00	2.72
Room204-205	16	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	Yes	16	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	11	3,422	0.60	4,092	0.0	$593.03	$1,250.42	$40.00	2.04
Room204-205	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	12	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.28	1,922	0.0	$278.58	$758.40	$0.00	2.72
Room204-205	3	Exit Signs: Incandescent	Wall Switch	14	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.02	238	0.0	$34.43	$322.67	$0.00	9.37
Bathroom	2	Compact Fluorescent: Recessed 2x26W CFL	Wall Switch	54	4,888	Fixture Replacement	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	11	4,888	0.07	475	0.0	$68.85	$127.30	$0.00	1.85
Bathroom	3	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	4,888	Relamp	No	3	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	4,888	0.07	481	0.0	$69.65	$189.60	$0.00	2.72

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
Custodial Room	Bethune Community Center	2	Water Supply Pump	3.0	80.0%	No	2,745	Yes	85.5%	No		0.27	741	0.0	$107.39	$1,547.10	$0.00	14.41
Roof Top	Energy Recovery Unit 1 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 2 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 3 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 4 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 5 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 6 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 7 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 8 Supply Fan	1	Supply Fan	3.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Package AC Roof Top	Package AC Motor	1	Other	1.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Package AC Roof Top	Package AC Motor	1	Other	1.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Package AC Roof Top	Package AC Motor	1	Other	1.0	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 1 Exhaust fan	1	Exhaust Fan	1.5	182.0%	No	2,745	No	182.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 2 Exhaust fan	1	Exhaust Fan	1.5	282.0%	No	2,745	No	282.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 3 Exhaust fan	1	Exhaust Fan	1.5	382.0%	No	2,745	No	382.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 4 Exhaust fan	1	Exhaust Fan	1.5	482.0%	No	2,745	No	482.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 5 Exhaust fan	1	Exhaust Fan	1.5	582.0%	No	2,745	No	582.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 6 Exhaust fan	1	Exhaust Fan	1.5	682.0%	No	2,745	No	682.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 7 Exhaust fan	1	Exhaust Fan	1.5	782.0%	No	2,745	No	782.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Energy Recovery Unit 8 Exhaust fan	1	Exhaust Fan	1.5	882.0%	No	2,745	No	882.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room201-202	Theater Room201-202	2	Window AC	2.00		Yes	2	Window AC	1.00		12.00		No	2.12	3,575	0.0	$518.20	$2,177.52	$0.00	4.20
Room208-209	Theater Room208-209	2	Window AC	2.00		Yes	2	Window AC	1.00		12.00		No	2.19	3,704	0.0	$536.79	$2,177.52	$0.00	4.06
Room206-207	Theater Room206-207	2	Window AC	2.00		Yes	2	Window AC	1.00		12.00		No	1.98	3,335	0.0	$483.31	$2,177.52	$0.00	4.51
Room201-202	Theater Room206-208	2	Window AC	2.00		Yes	2	Window AC	1.00		12.00		No	2.19	3,704	0.0	$536.79	$2,177.52	$0.00	4.06
Room204-205	Theater Room206-209	2	Window AC	2.00		Yes	2	Window AC	1.00		12.00		No	2.16	3,639	0.0	$527.39	$2,177.52	$0.00	4.13
Roof Top	Community Center	1	Packaged Terminal AC	17.50		Yes	1	Packaged AC	17.50		11.50		Yes	4.71	11,083	0.0	$1,606.23	$25,292.38	$1,632.50	14.73
Roof Top	Community Center	1	Packaged Terminal AC	17.50		Yes	1	Packaged AC	17.50		11.50		Yes	4.71	11,083	0.0	$1,606.23	$25,292.38	$1,632.50	14.73
Roof Top	Community Center	1	Packaged Terminal AC	10.00		Yes	1	Packaged AC	10.00		11.50		Yes	2.69	6,333	0.0	$917.85	$18,571.06	$980.00	19.17
Roof Top	Community Center ERU1-DX	1	Packaged Terminal AC	9.75		Yes	1	Packaged AC	9.75		11.50		Yes	2.63	6,175	0.0	$894.90	$18,125.53	$961.75	19.18
Roof Top	Community Center ERU2-DX	1	Packaged Terminal AC	9.75		Yes	1	Packaged AC	9.75		11.50		Yes	2.63	6,175	0.0	$894.90	$18,125.53	$961.75	19.18
Roof Top	Community Center ERU3-DX	1	Packaged Terminal AC	9.75		Yes	1	Packaged AC	9.75		11.50		Yes	2.63	6,175	0.0	$894.90	$18,125.53	$961.75	19.18
Roof Top	Community Center ERU4-DX	1	Packaged Terminal AC	9.75		Yes	1	Packaged AC	9.75		11.50		Yes	2.63	6,175	0.0	$894.90	$18,125.53	$961.75	19.18
Roof Top	Community Center ERU5-DX	1	Packaged Terminal AC	9.75		Yes	1	Packaged AC	9.75		11.50		Yes	2.63	6,175	0.0	$894.90	$18,125.53	$961.75	19.18
Roof Top	Community Center ERU6-DX	1	Packaged Terminal AC	9.75		Yes	1	Packaged AC	9.75		11.50		Yes	2.63	6,175	0.0	$894.90	$18,125.53	$961.75	19.18
Roof Top	Community Center ERU7-DX	1	Packaged Terminal AC	9.75		Yes	1	Packaged AC	9.75		11.50		Yes	2.63	6,175	0.0	$894.90	$18,125.53	$961.75	19.18
Roof Top	Community Center ERU8-DX	1	Packaged Terminal AC	9.75		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Mounted	Computer	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Mounted	Telecommunication	1	Split-System AC	1.00		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
Roof Top	Community Center ERU1	1	Furnace	100.00	Yes	1	Furnace	100.00	95.00%	AFUE	0.00	0	5.2	$53.14	$2,265.73	$400.00	35.11
Roof Top	Community Center ERU2	1	Furnace	80.00	Yes	1	Furnace	80.00	95.00%	AFUE	0.00	0	4.2	$42.51	$1,812.59	$400.00	33.23
Roof Top	Community Center ERU3	1	Furnace	80.00	Yes	1	Furnace	80.00	95.00%	AFUE	0.00	0	4.2	$42.51	$1,812.59	$400.00	33.23
Roof Top	Community Center ERU4	1	Furnace	80.00	Yes	1	Furnace	80.00	95.00%	AFUE	0.00	0	4.2	$42.51	$1,812.59	$400.00	33.23
Roof Top	Community Center ERU5	1	Furnace	80.00	Yes	1	Furnace	80.00	95.00%	AFUE	0.00	0	4.2	$42.51	$1,812.59	$400.00	33.23
Roof Top	Community Center ERU6	1	Furnace	80.00	Yes	1	Furnace	80.00	95.00%	AFUE	0.00	0	4.2	$42.51	$1,812.59	$400.00	33.23
Roof Top	Community Center ERU7	1	Furnace	80.00	Yes	1	Furnace	80.00	95.00%	AFUE	0.00	0	4.2	$42.51	$1,812.59	$400.00	33.23
Roof Top	Community Center ERU8	1	Furnace	100.00	Yes	1	Furnace	100.00	95.00%	AFUE	0.00	0	5.2	$53.14	$2,265.73	$400.00	35.11
Roof Top	Community Center	2	Furnace	250.00	Yes	2	Furnace	250.00	95.00%	AFUE	0.00	0	26.2	$265.70	$11,328.67	$800.00	39.63
Roof Top	Community Center	1	Furnace	202.50	Yes	1	Furnace	202.50	95.00%	AFUE	0.00	0	10.6	$107.61	$4,588.11	$400.00	38.92

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
Custodial Room	Bethune Coomunity Center	1	Storage Tank Water Heater (≤ 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Closet	Bethune Coomunity Center	2	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room107B	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	1.4	$14.39	$7.17	$0.00	0.50
Room106B	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	1.4	$14.39	$7.17	$0.00	0.50
Room105B	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	1.4	$14.39	$7.17	$0.00	0.50
Room104B	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	1.4	$14.39	$7.17	$0.00	0.50
Room103B	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	1.4	$14.39	$7.17	$0.00	0.50
Room102B	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	1.4	$14.39	$7.17	$0.00	0.50
Room100A	1	Faucet Aerator (Lavatory)	2.50	1.00	0.00	0	1.4	$14.39	$7.17	$0.00	0.50
Kitchen	3	Faucet Aerator (Kitchen)	3.50	2.20	0.00	0	3.7	$37.42	$21.51	$0.00	0.57

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	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
Room108 Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	$0.00	$16,598.81	$750.00	0.00
Room108 Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	No	No	0.00	0	0.0	$0.00	$16,598.81	$750.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
100A	1	Desktop	191.0	Yes
100B	4	Desktop	191.0	Yes
100B	1	Office Multi Function Printer	760.0	Yes
100B	1	Office Multi Function Printer	1,440.0	Yes
100B	1	Fax Machine	45.0	Yes
100B	1	Microwave	1,000.0	No
100B	1	Office Coffee Machine	700.0	Yes

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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N/A

ENERGY STAR® Score[1]

Mary McLeod Bethune Center

Primary Property Type: Social/Meeting Hall
Gross Floor Area (ft²): 26,350
Built: 2002

For Year Ending: October 31, 2015
Date Generated: November 30, 2016

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information

Property Address	Property Owner	Primary Contact
Mary McLeod Bethune Center 140 MLK Drive Jersey City, New Jersey 07305	_____ , (___)___-_____	___ _____ , (___)___-_____ _____

Property ID: 5082921

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
186.3 kBtu/ft²

Source EUI
377.4 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	2,291,910 (47%)
Natural Gas (kBtu)	2,617,754 (53%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	34.5
National Median Source EUI (kBtu/ft²)	69.8
% Diff from National Median Source EUI	440%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	402

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)