Local Government Energy Audit:
Energy Audit Report

Mildred B. Moss Elementary School

16 Simpson Place

Metuchen, NJ 08840

Metuchen Board of Education

February 8, 2019

Final Report by:

TRC Energy Services

Disclaimer

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

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

TRC bases estimated installation costs on our experience at similar facilities, pricing from local contractors and vendors, and/or cost estimates from RS Means. We encourage the owner of the facility is encouraged to independently confirm these cost estimates and to obtain multiple estimates when considering measure installations. Actual installation costs can vary widely based on individual measures and conditions. TRC and NJBPU do not guarantee installed cost estimates and shall in no event be held liable should actual installed costs vary from estimates.

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

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

Table of Contents

Table of Figures

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Mildred B. Moss Elementary School.

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

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

1.1 Facility Summary

Mildred B. Moss Elementary School is a 29,111 square foot building comprised of various space types including classrooms, offices, and various storage and mechanical spaces. There is also a multi-purpose room used as a gymnasium, auditorium, and dining hall. Part of the building is used as the Board Offices while the rest of the building is an elementary school.

Lighting at Mildred B. Moss Elementary School consists mostly of linear and U-bend fluorescent fixtures. Heating is supplied by two hot water boilers, while cooling for the building is provided by two rooftop packaged units, and window air conditioners. Domestic hot water is produced by an electric storage water heater. 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 13 measures and recommends 11 measures which together represent an opportunity for Mildred B. Moss Elementary School to reduce annual energy costs by $12,142 and annual greenhouse gas emissions by 81,712 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4 years. The breakdown of existing and potential utility costs after project implementation are illustrated in Figure 1 and Figure 2, respectively. Together these measures represent an opportunity to reduce Mildred B. Moss Elementary School's annual energy use by 6%.

Figure 1 – Previous 12 Month Utility Costs

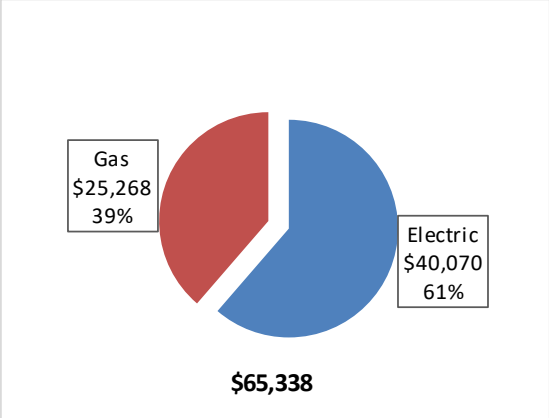
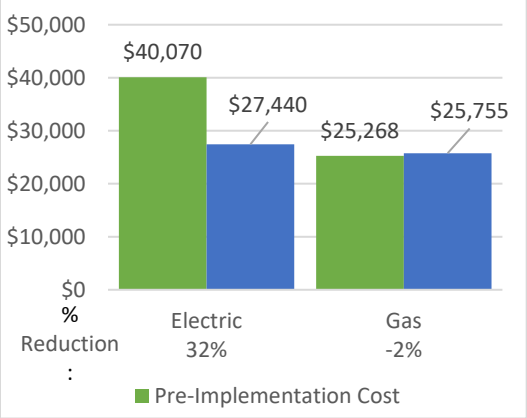


Figure 2 – Potential Post-Implementation Costs



A detailed description of Mildred B. Moss Elementary School's existing energy use can be found in Section 3.

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		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			**44,490**	**11.1**	**0.0**	**$6,402.42**	**$21,791.35**	**$5,200.00**	**$16,591.35**	**2.6**	**44,801**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	262	0.2	0.0	$37.72	$257.39	$0.00	$257.39	6.8	264
ECM 2	Retrofit Fixtures with LED Lamps	Yes	44,175	10.9	0.0	$6,357.15	$21,461.55	$5,200.00	$16,261.55	2.6	44,484
ECM 3	Install LED Exit Signs	Yes	53	0.0	0.0	$7.56	$72.42	$0.00	$72.42	9.6	53
Lighting Control Measures			**10,626**	**2.4**	**0.0**	**$1,529.19**	**$16,988.00**	**$2,165.00**	**$14,823.00**	**9.7**	**10,700**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	7,940	2.0	0.0	$1,142.59	$8,988.00	$1,085.00	$7,903.00	6.9	7,995
	Install Daylight Dimming Controls	No	425	0.1	0.0	$61.20	$6,000.00	$1,080.00	$4,920.00	80.4	428
ECM 5	Install High/Low Lighitng Controls	Yes	2,261	0.3	0.0	$325.40	$2,000.00	$0.00	$2,000.00	6.1	2,277
Motor Upgrades			**706**	**0.2**	**0.0**	**$101.60**	**$3,684.24**	**$0.00**	**$3,684.24**	**36.3**	**711**
ECM 6	Premium Efficiency Motors	Yes	706	0.2	0.0	$101.60	$3,684.24	$0.00	$3,684.24	36.3	711
Variable Frequency Drive (VFD) Measures			**14,071**	**2.6**	**0.0**	**$2,024.97**	**$13,103.40**	**$800.00**	**$12,303.40**	**6.1**	**14,170**
ECM 7	Install VFDs on Constant Volume (CV) HVAC	Yes	4,118	1.4	0.0	$592.67	$6,551.70	$800.00	$5,751.70	9.7	4,147
ECM 8	Install VFDs on Hot Water Pumps	Yes	9,953	1.3	0.0	$1,432.29	$6,551.70	$0.00	$6,551.70	4.6	10,022
Electric Unitary HVAC Measures			**9,043**	**5.0**	**0.0**	**$1,301.43**	**$36,240.10**	**$2,054.00**	**$34,186.10**	**26.3**	**9,107**
	Install High Efficiency Electric AC	No	9,043	5.0	0.0	$1,301.43	$36,240.10	$2,054.00	$34,186.10	26.3	9,107
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**398.6**	**$3,410.12**	**$98,106.19**	**$10,544.00**	**$87,562.19**	**25.7**	**46,667**
	Install High Efficiency Hot Water Boilers	No	0	0.0	398.6	$3,410.12	$98,106.19	$10,544.00	$87,562.19	25.7	46,667
Domestic Water Heating Upgrade			**16,685**	**1.4**	**-56.9**	**$1,913.96**	**$5,779.00**	**$200.00**	**$5,579.00**	**2.9**	**10,136**
ECM 9	Install High Efficiency Gas Water Heater	Yes	16,685	1.4	-56.9	$1,913.96	$5,779.00	$200.00	$5,579.00	2.9	10,136
Plug Load Equipment Control - Vending Machine			**1,612**	**0.0**	**0.0**	**$231.96**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 10	Vending Machine Control	Yes	1,612	0.0	0.0	$231.96	$230.00	$0.00	$230.00	1.0	1,623
TOTALS FOR HIGH PRIORITY MEASURES			**87,764**	**17.6**	**-56.9**	**$12,142.90**	**$55,575.99**	**$7,285.00**	**$48,290.99**	**4.0**	**81,712**
TOTALS FOR ALL EVALUATED MEASURES			**97,233**	**22.7**	**341.6**	**$16,915.65**	**$195,922.28**	**$20,963.00**	**$174,959.28**	**10.3**	**137,914**

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

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

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

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

Motor Upgrades generally involve replacing older standard efficiency motors with high efficiency standard (NEMA Premium®). Motors replacements generally assume the same size motors, just higher efficiency. Although occasionally additional savings can be achieved by downsizing motors to better meet current load requirements. This measure saves energy by reducing the power used by the motors, due to improved electrical efficiency.

Variable Frequency Drives (VFDs) are motor control devices. These measures control the speed of a motor so that the motor spins at peak efficiency during partial load conditions. Sensors adapt the speed to flow, temperature, or pressure settings which is much more efficient that usage a valve or damper to control flow rates, or running the motor at full speed when only partial power is needed. These measures save energy by controlling motor usage more efficiently.

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

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

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

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

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

Energy Efficient Practices

TRC also identified 14 low cost (or no cost) energy efficient practices. A facility's energy performance can be significantly improved by employing certain behavioral or operational adjustments and by performing better routine maintenance on building systems. These practices can extend equipment lifetime, improve occupant comfort, provide better health and safety, as well as reduce annual energy and O&M costs. Potential opportunities identified at Mildred B. Moss Elementary School include:

- Reduce Air Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- 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
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Boiler Maintenance
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Mildred B. Moss Elementary School. Based on the configuration of the site and its loads there is a moderate potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	Medium	
System Potential	80	kW DC STC
Electric Generation	60,196	kWh/yr
Displaced Cost	$5,240	/yr
Installed Cost	$312,000	

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

1.3 Implementation Planning

To realize the energy savings from the ECMs listed in this report, a project implementation plan must be developed. Available capital must be considered and decisions need to be made whether it is best to pursue individual ECMs separately, groups of ECMs, or a comprehensive approach where all ECMs are implemented together, possibly in conjunction with other facility upgrades or improvements.

Rebates, incentives, and financing are available from NJCEP, as well as other sources, to help reduce the costs associated with the implementation of energy efficiency projects. Prior to implementing any measure, please review the relevant incentive program guidelines before proceeding. This is important because in most cases you will need to submit applications for the incentives prior to purchasing materials or commencing with installation.

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

- SmartStart
- Direct Install
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)

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

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

For larger facilities with limited capital availability to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with project development, design, and implementation support services, as well as, attractive financing for implementing ECMs. An LGEA report (or other approved energy audit) is required for participation in ESIP. Please refer to Section 8.4 for additional information on the ESIP Program.

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

Additional information on relevant incentive programs is located in Section 8. You may also check the following website for more details: www.njcleanenergy.com/ci.

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Michael Harvier	Business Administrator	maharvier@metboe.k12.nj.us	732-321-8700 ext. 1011
Designated Representative			
Gerard Redmond	Maintenance Supervisor	gredmond@metboe.k12.nj.us	N/A
TRC Energy Services			
Alexander Klieverik	Auditor	aklieverik@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On August 16, 2018, TRC performed an energy audit at Mildred B. Moss Elementary School located in Metuchen, New Jersey. TRC's team met with Gerard Redmond, Maintenance Supervisor to review the facility operations and help focus our investigation on specific energy-using systems.

Mildred B. Moss Elementary School is a 29,111 square foot building comprised of various space types including classrooms, offices, and storage and mechanical spaces. There is also a multi-purpose room used as a gymnasium, auditorium, and dining hall. Part of the building is used as the Board Offices while the rest of the building is an elementary school. The building was constructed in 1927.

2.3 Building Occupancy

The Board Office section of the building is open Monday through Friday, and the school section is open to Monday through Friday, and Saturdays for activities. The typical schedule is presented in the table below. The building is open during the school-year, and there is limited use throughout the summer. During a typical day, the facility is occupied by 42 staff and 170 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Mildred B. Moss Elementary School	Weekday	6:00 AM to 11:00 PM
Mildred B. Moss Elementary School	Weekend	Saturday: 9:00 AM to 4:00 PM Sunday: Closed

2.4 Building Envelope

The building is constructed of concrete block and structural steel with a brick facade. The building has a flat roof covered with sections of black membrane and light-colored membrane that is in good condition. The building has double-pane windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum and glass and are in good condition except that the door seals have worn out on some doors which increases the level of outside air infiltration.

2.5 On-Site Generation

Mildred B. Moss Elementary School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting at the facility is provided mostly by 32-Watt linear and U-bend fluorescent T8 lamps with electronic ballasts. There is a mixture of fixtures types with 2-lamp or 3-lamp, 4-foot long recessed troffers, ceiling-mounted fixtures, and indirect hanging fixtures.

Lighting control in most spaces is provided by wall switches. The gymnasium is the only area with occupancy sensors; these are fixture mounted. Stairwells, lobbies and corridor areas do not contain occupancy sensors and operate approximately 12 hours per day while the building is open.

The building's exterior lighting consists primarily of fixtures with compact fluorescent lamps that are controlled by wall switches.

Hot Water Heating System

The hot water heating system consists of two H.B. Smith 2,636 kBtu/hr output, hot water boilers. The boilers have a nominal combustion efficiency of 78%. The hot water system is configured in a constant flow primary distribution with two 5 HP supply pumps and two 1 HP return pumps. Hot water is supplied at 180°F when the outside air temperature is below 68°F. The boilers are controlled by an integrated control with outdoor sensor. The high natural gas usage during the summer months indicates that the control unit is not operating as intended. The boilers provide hot water to unit ventilators and radiant baseboard piping throughout the building. There are approximately 15 unit ventilators throughout the building, each with a ¼ HP supply fan.

The boilers operate in a lead/lag configuration. Both boilers may be required during cold weather, but according to site staff, it happens rarely. The lead boiler is rotated weekly.

The boilers are in good condition and well maintained.

Direct Expansion Air Conditioning System (DX)

There are two 13-ton AAON direct-expansion (DX) package units with outside air economizers used to condition the board office section of the building. The units are located on the roof of the west half of the building. Each unit provides constant air volume with a 5 hp supply fan. The unit utilizes hot water coils and a scroll compressor and a DX coil. The units have outside air economizers to utilize free cooling when the outside air temperature is lower than the return air temperature.

The units are controlled by a programmable thermostat located in the space. The thermostat is set to maintain a setpoint of 72°F.

The school section of the building is cooled by window air conditioners (AC). The window units have an average capacity of 18,000 Btu/hr with a rated efficiency of 11 SEER.

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of a Rheem electric storage water heater with an input rating of 4,500-Watts and a capacity of 75 gallons. One 500-Watt recirculation pump distributes 110°F water to the entire building. The recirculation pumps operate based on an aquastat.

Building Plug Load

There are 55 computer work stations throughout the facility. Ninety percent of the computers are desktop units with LCD monitors. There is no centralized PC power management software installed.

There are 24 desk printers, five projectors, seven smartboards, three photocopiers, and four LCD televisions throughout the building. The students have access to 40 tablets which are kept at the school. The faculty room and various offices have a total of five top freezer refrigerators and four compact refrigerators.

The facility has one refrigerated beverage vending machine located in the faculty room.

2.7 Water-Using Systems

There are 18 restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.2 gallons per minute (gpm) or lower, the toilets are rated at 2.0 gallons per flush (gpf) and the urinals are rated at 1.6 gpf.

3 SITE ENERGY USE AND COSTS

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

3.1 Total Cost of Energy

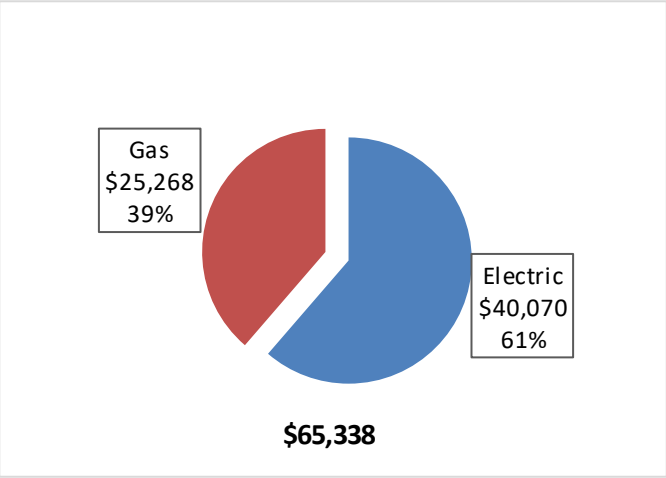
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Mildred B. Moss Elementary School		
Fuel	**Usage**	**Cost**
Electricity	278,440 kWh	$40,070
Natural Gas	29,532 Therms	$25,268
Total		**$65,338**

The current annual energy cost for this facility is $65,338 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost over the past 12 months was $0.144/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

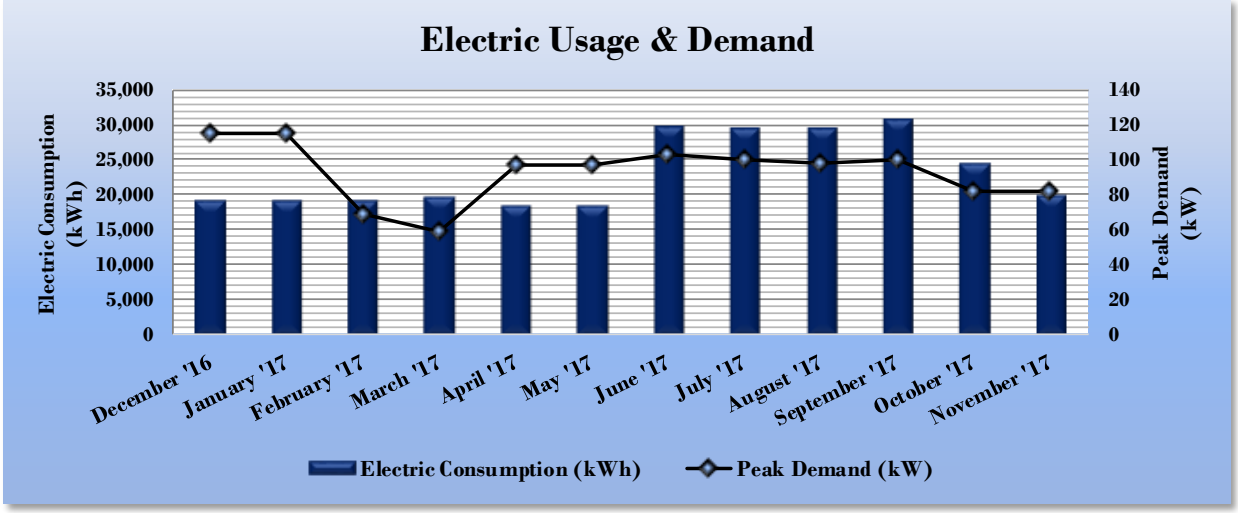


Figure 10 - Electric Usage & Demand

Electric Billing Data for Mildred B. Moss Elementary School						
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost	TRC Estimated Usage?
12/19/16	32	19,280	115		$2,446	No
1/19/17	31	19,280	115		$2,446	No
2/19/17	31	19,200	69		$2,449	No
3/18/17	27	19,760	58		$2,469	No
4/19/17	32	18,400	97		$2,356	No
5/18/17	29	18,400	97		$2,356	No
6/19/17	32	29,840	103		$4,947	No
7/19/17	30	29,640	100		$4,891	Yes
8/21/17	33	29,440	98		$4,836	No
9/20/17	30	30,720	100		$5,114	No
10/19/17	29	24,560	82		$3,218	No
11/17/17	29	19,920	82		$2,540	No
Totals	**365**	**278,440**	**115**	**$0**	**$40,070**	
Annual	**365**	**278,440**	**115**	**$0**	**$40,070**	

3.3 Natural Gas Usage

Natural gas is provided by Elizabethtown Gas. The average gas cost for the past 12 months is $0.856/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is shown in the chart below.

Figure 11 - Natural Gas Usage

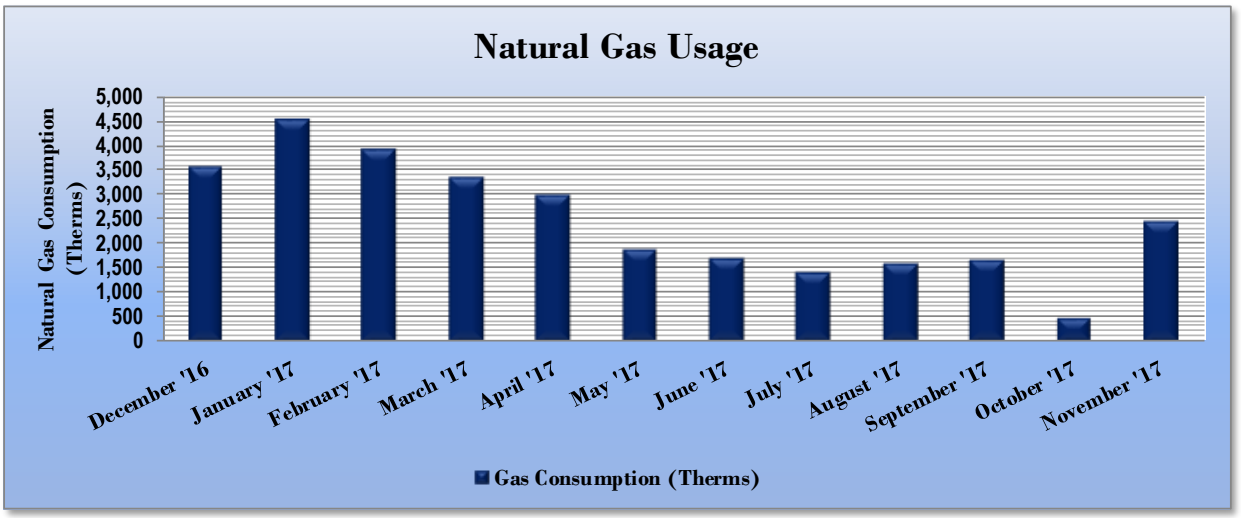


Figure 12 - Natural Gas Usage

Gas Billing Data for Mildred B. Moss Elementary School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/19/16	32	3,557	$2,972
1/19/17	31	4,540	$3,710
2/19/17	31	3,933	$3,244
3/18/17	27	3,370	$2,814
4/19/17	32	3,001	$2,502
5/18/17	29	1,873	$1,638
6/19/17	32	1,686	$1,498
7/19/17	30	1,416	$1,296
8/21/17	33	1,588	$1,421
9/20/17	30	1,649	$1,468
10/19/17	29	476	$605
11/17/17	29	2,443	$2,100
Totals	**365**	**29,532**	**$25,268**
Annual	**365**	**29,532**	**$25,268**

3.4 Benchmarking

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

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Mildred B. Moss Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	209.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	134.1	58.2

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

Figure 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures

Energy Use Intensity Comparison - Following Installation of Recommended Measures		
	Mildred B. Moss Elementary School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	176.0	141.4
Site Energy Use Intensity (kBtu/ft^2)	124.9	58.2

Many types of commercial buildings are also eligible to receive an ENERGY STAR® score. This score is a percentile ranking from 1 to 100. It compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75% of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. Your building is one of the building categories that are eligible to receive a score. This facility has a current score of **13**.

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

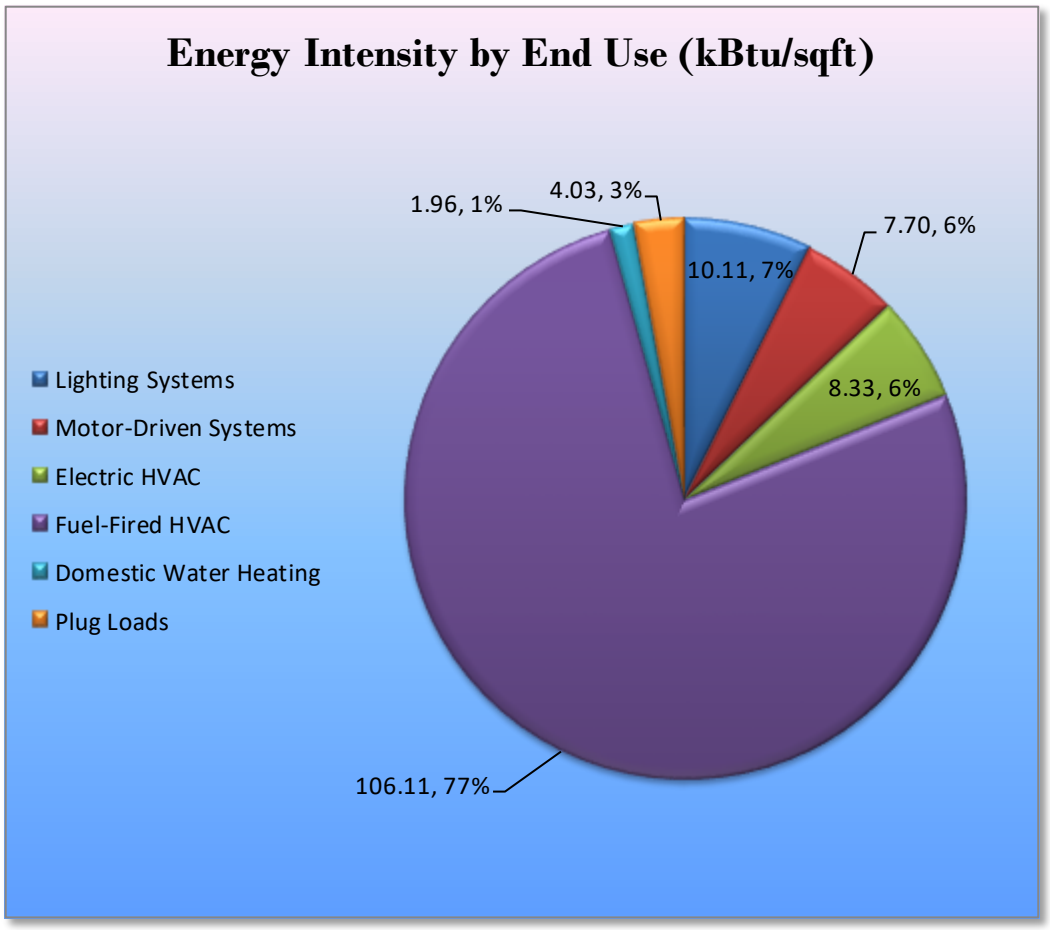
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

3.5 Energy End-Use Breakdown

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

Figure 15 - Energy Balance (% and kBtu/SF)



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy efficiency opportunities, help prioritize specific measures for implementation, and provide information to Mildred B. Moss Elementary School regarding financial incentives for which they may qualify to implement the recommended measures. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is usually considered sufficient to demonstrate project cost-effectiveness and help prioritize energy measures. Savings are based on the New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016, approved by the New Jersey Board of Public Utilities. Further analysis or investigation may be required to calculate more precise savings based on specific circumstances. A higher level of investigation may be necessary to support any custom SmartStart or Pay for Performance, or Direct Install incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJCEP prescriptive SmartStart program. Some measures and proposed upgrade projects may be eligible for higher incentives than those shown below through other NJCEP programs as described in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 16 – 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		**44,490**	**11.1**	**0.0**	**$6,402.42**	**$21,791.35**	**$5,200.00**	**$16,591.35**	**2.6**	**44,801**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	262	0.2	0.0	$37.72	$257.39	$0.00	$257.39	6.8	264
ECM 2	Retrofit Fixtures with LED Lamps	44,175	10.9	0.0	$6,357.15	$21,461.55	$5,200.00	$16,261.55	2.6	44,484
ECM 3	Install LED Exit Signs	53	0.0	0.0	$7.56	$72.42	$0.00	$72.42	9.6	53
Lighting Control Measures		**10,626**	**2.4**	**0.0**	**$1,529.19**	**$16,988.00**	**$2,165.00**	**$14,823.00**	**9.7**	**10,700**
ECM 4	Install Occupancy Sensor Lighting Controls	7,940	2.0	0.0	$1,142.59	$8,988.00	$1,085.00	$7,903.00	6.9	7,995
ECM 5	Install High/Low Lighitng Controls	2,261	0.3	0.0	$325.40	$2,000.00	$0.00	$2,000.00	6.1	2,277
Motor Upgrades		**706**	**0.2**	**0.0**	**$101.60**	**$3,684.24**	**$0.00**	**$3,684.24**	**36.3**	**711**
ECM 6	Premium Efficiency Motors	706	0.2	0.0	$101.60	$3,684.24	$0.00	$3,684.24	36.3	711
Variable Frequency Drive (VFD) Measures		**14,071**	**2.6**	**0.0**	**$2,024.97**	**$13,103.40**	**$800.00**	**$12,303.40**	**6.1**	**14,170**
ECM 7	Install VFDs on Constant Volume (CV) HVAC	4,118	1.4	0.0	$592.67	$6,551.70	$800.00	$5,751.70	9.7	4,147
ECM 8	Install VFDs on Hot Water Pumps	9,953	1.3	0.0	$1,432.29	$6,551.70	$0.00	$6,551.70	4.6	10,022
Domestic Water Heating Upgrade		**16,685**	**1.4**	**-56.9**	**$1,913.96**	**$5,779.00**	**$200.00**	**$5,579.00**	**2.9**	**10,136**
ECM 9	Install High Efficiency Gas Water Heater	16,685	1.4	-56.9	$1,913.96	$5,779.00	$200.00	$5,579.00	2.9	10,136
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$231.96**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 10	Vending Machine Control	1,612	0.0	0.0	$231.96	$230.00	$0.00	$230.00	1.0	1,623
TOTALS FOR HIGH PRIORITY MEASURES		**87,764**	**17.6**	**-56.9**	**$12,142.90**	**$55,575.99**	**$7,285.00**	**$48,290.99**	**4.0**	**81,712**

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

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

4.1.1 Lighting Upgrades

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 17 below.

Figure 17 – 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		**44,490**	**11.1**	**0.0**	**$6,402.42**	**$21,791.35**	**$5,200.00**	**$16,591.35**	**2.6**	**44,801**
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	262	0.2	0.0	$37.72	$257.39	$0.00	$257.39	6.8	264
ECM 2	Retrofit Fixtures with LED Lamps	44,175	10.9	0.0	$6,357.15	$21,461.55	$5,200.00	$16,261.55	2.6	44,484
ECM 3	Install LED Exit Signs	53	0.0	0.0	$7.56	$72.42	$0.00	$72.42	9.6	53

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

ECM 1: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	262	0.2	0.0	$37.72	$257.39	$0.00	$257.39	6.8	264
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

We recommend retrofitting existing high output fluorescent T12 fixtures by removing fluorescent tubes and ballasts and replacing them with LEDs and LED drivers (if necessary), which are designed to be used retrofitted fluorescent fixtures. The measure uses the existing fixture housing but replaces the rest of the components with more efficient lighting technology. This measure saves energy by installing LEDs which use less power than other lighting technologies yet provide equivalent lighting output for the space.

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

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	43,324	10.7	0.0	$6,234.74	$20,856.27	$5,200.00	$15,656.27	2.5	43,627
Exterior	851	0.1	0.0	$122.41	$605.28	$0.00	$605.28	4.9	857

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes and more than ten times longer than many incandescent lamps.

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	53	0.0	0.0	$7.56	$72.42	$0.00	$72.42	9.6	53
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

4.1.2 Lighting Control Measures

Our recommendations for upgrades to existing lighting fixtures are summarized in Figure 18 below.

Figure 18 – 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		**10,201**	**2.4**	**0.0**	**$1,467.99**	**$10,988.00**	**$1,085.00**	**$9,903.00**	**6.7**	**10,272**
ECM 4	Install Occupancy Sensor Lighting Controls	7,940	2.0	0.0	$1,142.59	$8,988.00	$1,085.00	$7,903.00	6.9	7,995
ECM 5	Install High/Low Lighitng Controls	2,261	0.3	0.0	$325.40	$2,000.00	$0.00	$2,000.00	6.1	2,277

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

ECM 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)
7,940	2.0	0.0	$1,142.59	$8,988.00	$1,085.00	$7,903.00	6.9	7,995

Measure Description

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

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

ECM 5: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
2,261	0.3	0.0	$325.40	$2,000.00	$0.00	$2,000.00	6.1	2,277

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in spaces that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Areas identified for such lighting control are stairwells and interior corridors throughout the building.

Lighting fixtures with these controls operate at default low levels when the area is not occupied to provide minimal lighting to meet security or safety requirements. Sensors detect occupancy using ultrasonic and/or infrared sensors. The lighting systems are switched to full lighting levels whenever an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period of time. Energy savings results from only providing full lighting levels when it is required.

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

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

4.1.3 Motor Upgrades

Our recommendations for upgrades to premium efficiency motors are summarized in Figure 19 below.

Figure 19 – Summary of Premium Efficiency Motor 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)
Motor Upgrades		**706**	**0.2**	**0.0**	**$101.60**	**$3,684.24**	**$0.00**	**$3,684.24**	**36.3**	**711**
ECM 6	Premium Efficiency Motors	706	0.2	0.0	$101.60	$3,684.24	$0.00	$3,684.24	36.3	711

ECM 6: 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)
706	0.2	0.0	$101.60	$3,684.24	$0.00	$3,684.24	36.3	711

Measure Description

We recommend replacing standard efficiency motors with NEMA Premium® efficiency motors. Our evaluation assumes that existing motors will be replaced with motors of equivalent size and type. Although occasionally additional savings can be achieved by downsizing motors to better meet the motor's current load requirements. The base case motor efficiencies are estimated from nameplate information and our best estimates of motor run hours. Efficiencies of proposed motor upgrades 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 assumed annual operating hours.

4.1.4 Variable Frequency Drive (VFD) Measures

For equipment with proposed VFDs, we have included replacing the controlled motor with a new motor —unless the existing motor meets or exceeds IHP 2014 standards—to conservatively account for the cost of an inverter duty rated motor. The savings and cost associated with the new motor are presented with the Premium Efficiency Motor measures. If the proposed VFD measure is not selected for implementation, the motor replacement should be reevaluated.

Our recommendations for variable frequency drive measures are summarized in Figure 20 below.

Figure 20 – Summary of Variable Frequency Drive 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)
Variable Frequency Drive (VFD) Measures		**14,071**	**2.6**	**0.0**	**$2,024.97**	**$13,103.40**	**$800.00**	**$12,303.40**	**6.1**	**14,170**
ECM 7	Install VFDs on Constant Volume (CV) HVAC	4,118	1.4	0.0	$592.67	$6,551.70	$800.00	$5,751.70	9.7	4,147
ECM 8	Install VFDs on Hot Water Pumps	9,953	1.3	0.0	$1,432.29	$6,551.70	$0.00	$6,551.70	4.6	10,022

ECM 7: Install VFDs on Constant Volume (CV) HVAC

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)
4,118	1.4	0.0	$592.67	$6,551.70	$800.00	$5,751.70	9.7	4,147

Measure Description

We recommend installing variable frequency drives (VFDs) to control supply fan motor speeds to convert constant-volume, single-zone air handling systems into variable-air-volume (VAV) systems. A separate VFD is usually required to control the return fan motor or dedicated exhaust fan motor, if the air handler has one. Zone thermostats will cause the VFD to modulate fan speed to maintain the appropriate temperature in the zone, while maintaining a constant supply air temperature. Energy savings results from reducing fan speed (and power) when there is a reduced load required for the zone. The magnitude of energy savings is based on the estimated amount of time that fan motors operate at partial load.

For air handlers with direct expansion (DX) cooling systems, the minimum air flow across the cooling coil required to prevent the coil from freezing will have to be determined during the final project design. The control system should be programmed to maintain the minimum air flow whenever the compressor is operating.

ECM 8: Install VFDs on Hot Water Pumps

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)
9,953	1.3	0.0	$1,432.29	$6,551.70	$0.00	$6,551.70	4.6	10,022

Measure Description

We recommend installing variable frequency drives (VFD) to control the hot water pumps. This measure requires that a majority of the hot water coils be served by two-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure setpoint. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.5 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized 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		**16,685**	**1.4**	**-56.9**	**$1,913.96**	**$5,779.00**	**$200.00**	**$5,579.00**	**2.9**	**10,136**
ECM 9	Install High Efficiency Gas Water Heater	16,685	1.4	-56.9	$1,913.96	$5,779.00	$200.00	$5,579.00	2.9	10,136

ECM 9: Install High Efficiency Gas-Fired Water Heater

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
16,685	1.4	-56.9	$1,913.96	$5,779.00	$200.00	$5,579.00	2.9	10,136

Measure Description

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

4.1.6 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment controls are summarized in Figure 22 below.

Figure 22 - Summary of Plug Load Equipment Controls 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)
Plug Load Equipment Control - Vending Machine		**1,612**	**0.0**	**0.0**	**$231.96**	**$230.00**	**$0.00**	**$230.00**	**1.0**	**1,623**
ECM 10	Vending Machine Control	1,612	0.0	0.0	$231.96	$230.00	$0.00	$230.00	1.0	1,623

ECM 10: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
1,612	0.0	0.0	$231.96	$230.00	$0.00	$230.00	1.0	1,623

Measure Description

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

4.2 ECMs Evaluated But Not Recommended

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

Figure 23 – Summary of Measures Evaluated, But Not Recommended

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	**425**	**0.1**	**0.0**	**$61.20**	**$6,000.00**	**$1,080.00**	**$4,920.00**	**80.4**	**428**
Install Daylight Dimming Controls	425	0.1	0.0	$61.20	$6,000.00	$1,080.00	$4,920.00	80.4	428
Electric Unitary HVAC Measures	**9,043**	**5.0**	**0.0**	**$1,301.43**	**$36,240.10**	**$2,054.00**	**$34,186.10**	**26.3**	**9,107**
Install High Efficiency Electric AC	9,043	5.0	0.0	$1,301.43	$36,240.10	$2,054.00	$34,186.10	26.3	9,107
Gas Heating (HVAC/Process) Replacement	**0**	**0.0**	**398.6**	**$3,410.12**	**$98,106.19**	**$10,544.00**	**$87,562.19**	**25.7**	**46,667**
Install High Efficiency Hot Water Boilers	0	0.0	398.6	$3,410.12	$98,106.19	$10,544.00	$87,562.19	25.7	46,667
TOTALS	**9,469**	**5.1**	**398.6**	**$4,772.75**	**$140,346.29**	**$13,678.00**	**$126,668.29**	**26.5**	**56,202**

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

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

Install Photocell 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)
425	0.1	0.0	$61.20	$6,000.00	$1,080.00	$4,920.00	80.4	428

Measure Description

We evaluated installing photocell controls to eliminate electric lighting in areas when ample daylight lighting is present. Photocell controls were evaluated for the exterior compact fluorescent fixtures.

Reasons for not Recommending

The measure is not cost effective because of the relatively low load associated with the proposed replacement LED fixtures, and further because of the limited hours of use associated with these fixtures.

Install High Efficiency Air Conditioning Units

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
9,043	5.0	0.0	$1,301.43	$36,240.10	$2,054.00	$34,186.10	26.3	9,107

Measure Description

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

Reasons for not Recommending

The payback period for the measure exceeds the expected life of the replacement equipment.

Install High Efficiency Hot Water Boilers

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	398.6	$3,410.12	$98,106.19	$10,544.00	$87,562.19	25.7	46,667

Measure Description

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

The most notable efficiency improvement is condensing hydronic boilers that can achieve over 90% efficiency under the proper conditions. Condensing hydronic boilers typically operate at efficiencies between 85% and 87% (comparable to other high efficiency boilers) when the return water temperature is above 130°F. The boiler efficiency increases as the return water temperature drops below 130°F. Therefore, condensing hydronic boilers were only evaluated when the return water temperature is less than 130°F during most of the operating hours.

Reasons for not Recommending

The payback period of the measure exceeds the expected life of the replacement equipment. As discussed elsewhere, short term operational savings may be realized through review of the boiler controls, including lockout and reset functions.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

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.

Use Window Treatments/Coverings

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

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.

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

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

Plug Load Controls

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

Water Conservation

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

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

6 On-Site Generation Measures

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

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

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

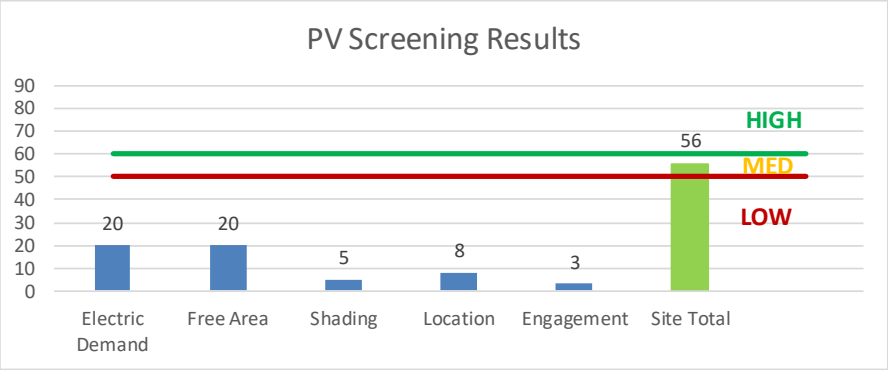
6.1 Photovoltaic

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

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

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

Figure 24 - Photovoltaic Screening



Potential	Medium	
System Potential	80	kW DC STC
Electric Generation	60,196	kWh/yr
Displaced Cost	$5,240	/yr
Installed Cost	$312,000	

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

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

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

6.2 Combined Heat and Power

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

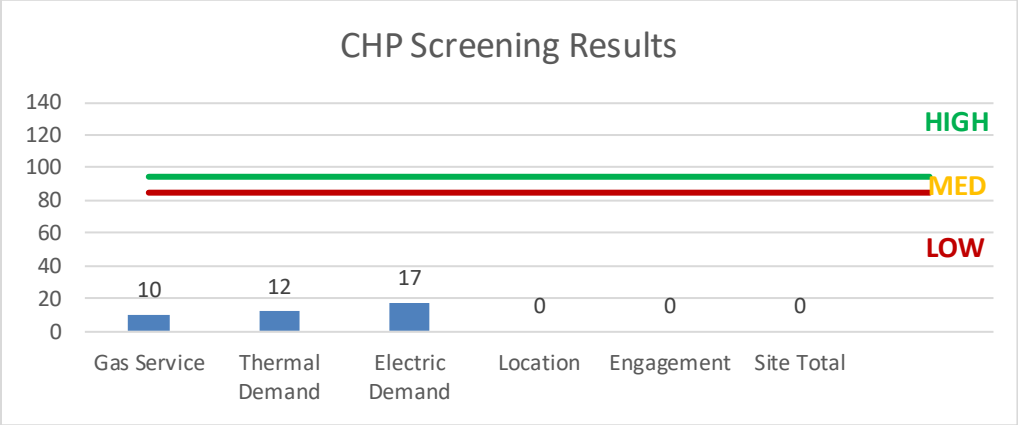
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

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

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

Figure 25 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

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

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

It is the opinion of TRC that this building is not a good candidate for Demand Response (DR).

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund, your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 26 for a list of the eligible programs identified for each recommended ECM.

Figure 26 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Retrofit Fluorescent Fixtures with LED Lamps and Drivers						
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	Install High/Low Lighitng Controls			X			
ECM 6	Premium Efficiency Motors			X			
ECM 7	Install VFDs on Constant Volume (CV) HVAC	X					
ECM 8	Install VFDs on Hot Water Pumps						
ECM 9	Install High Efficiency Gas Water Heater	X		X			
ECM 10	Vending Machine Control			X			

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

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

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

8.1 SmartStart

Overview

The SmartStart program offers incentives for installing prescriptive and custom energy efficiency measures at your facility. Routinely the program adds, removes or modifies incentives from year to year for various energy efficiency equipment based on market trends and new technologies.

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

Direct Install is a turnkey program available to existing small to medium-sized facilities with an average peak electric demand that does not exceed 200 kW over the recent 12-month period. You work directly with a pre-approved contractor who will perform a free energy assessment at your facility, identify specific eligible measures, and provide a clear scope of work for installation of selected measures. Energy efficiency measures may include lighting and lighting controls, refrigeration, HVAC, motors, variable speed drives and controls.

Incentives

The program pays up to 70% of the total installed cost of eligible measures, up to $125,000 per project. Each entity is limited to incentives up to $250,000 per fiscal year.

How to Participate

To participate in Direct Install, you will need to contact the participating contractor assigned to the region of the state where your facility is located. A complete list of Direct Install program partners is provided on the Direct Install website linked below. The contractor will be paid the measure incentives directly by the program which will pass on to you in the form of reduced material and implementation costs. This means up to 70% of eligible costs are covered by the program, subject to program caps and eligibility, while the remaining 30% of the cost is paid to the contractor by the customer.

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

8.3 SREC Registration Program

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

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

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

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

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

8.4 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	7	Incandescent: Screw-In: (60W) - 1L	Wall Switch	60	728	Relamp	Yes	7	LED Screw-In Lamps: Screw-In: (9W) - 1L	Occupancy Sensor	9	510	0.25	315	0.0	$45.29	$352.58	$35.00	7.01
Gym	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,757	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,757	0.06	314	0.0	$45.16	$109.55	$30.00	1.76
Gym	20	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Occupancy Sensor	114	2,757	Relamp	No	20	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,757	0.73	3,551	0.0	$510.95	$1,460.60	$400.00	2.08
Gym	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stage	3	Incandescent: Screw-In: (300W) - 1L	Wall Switch	300	728	Relamp	No	3	LED Screw-In Lamps: Screw-In: (45W) - 1L	Wall Switch	45	728	0.50	640	0.0	$92.17	$51.68	$15.00	0.40
Stage	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Stage	2	Linear Fluorescent - T12HO: 8' T12HO (110W) - 2L	Wall Switch	252	728	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 8' Lamps	Wall Switch	72	728	0.24	301	0.0	$43.37	$257.39	$0.00	5.93
Stage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	728	0.02	28	0.0	$3.98	$36.52	$10.00	6.67
Gym Electrical Room	1	Incandescent: Screw-In: (60W) - 1L	Wall Switch	60	728	Relamp	No	1	LED Screw-In Lamps: Screw-In: (9W) - 1L	Wall Switch	9	728	0.03	43	0.0	$6.14	$17.23	$5.00	1.99
Hallway: Front Foyer	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,938	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,757	0.04	283	0.0	$40.76	$254.77	$15.00	5.88
Hallway: Front Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,938	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,757	0.16	1,133	0.0	$163.06	$419.09	$60.00	2.20
Hallway: Front Stairwell	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: 1st Floor School Section (S)	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,938	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,757	0.30	2,077	0.0	$298.94	$601.67	$110.00	1.64
Hallway: 1st Floor School Section (S)	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: 1st Floor Board Office Section (B.O.)	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,938	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,757	0.30	2,077	0.0	$298.94	$601.67	$110.00	1.64
Hallway: 1st Floor Board Office Section (B.O.)	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.O. Copy Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.05	239	0.0	$34.45	$343.03	$20.00	9.38
B.O. Conference Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.25	1,077	0.0	$155.03	$598.64	$125.00	3.06
B.O. Server Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	728	0.02	28	0.0	$3.98	$36.52	$10.00	6.67
B.O. Transportation Office	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	9	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.25	1,077	0.0	$155.03	$598.64	$125.00	3.06
B.O. Transportation Office	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.O. Transportation Office RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
B.O. Office Room 7	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.22	958	0.0	$137.80	$562.12	$115.00	3.24
B.O. Office Room 7	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	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
B.A. Office Room 6	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.27	1,197	0.0	$172.25	$635.15	$135.00	2.90
B.A. Office Room 6	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.A. Office Room 6 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
B.O. Janitor Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	728	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	728	0.03	41	0.0	$5.96	$54.77	$15.00	6.67
Superintendant Office	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.27	1,197	0.0	$172.25	$635.15	$135.00	2.90
Superintendant Office	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Superintendant Office Conf. Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.22	958	0.0	$137.80	$562.12	$115.00	3.24
Superintendant Office Conf. Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Superintendant Office RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
B.O. Office Room 3	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.60	2,633	0.0	$378.95	$1,073.33	$255.00	2.16
B.O. Office Room 3	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.O. Office Room 3 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
B.O. Office Room 4	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.33	1,436	0.0	$206.70	$708.18	$155.00	2.68
B.O. Office Room 4	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
B.O. Office Room 4 Side Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.16	718	0.0	$103.35	$489.09	$95.00	3.81
CR 101	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.52	1,804	0.0	$259.62	$963.79	$225.00	2.85
CR 101	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 101	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	1,980	0.02	66	0.0	$9.50	$72.46	$0.00	7.63
IT Office (103)	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.36	1,459	0.0	$209.93	$744.70	$165.00	2.76
IT Office (103)	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
IT Office (103) Storage	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	None	62	728	Relamp	Yes	1	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	510	0.03	33	0.0	$4.69	$188.46	$0.00	40.21
Boys RR	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,938	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,757	0.08	567	0.0	$81.53	$379.55	$65.00	3.86
Mechanical Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	728	0.02	28	0.0	$3.98	$36.52	$10.00	6.67
Storage Room 1	1	Incandescent: Screw-In: (60W) - 1L	Wall Switch	60	728	Relamp	No	1	LED Screw-In Lamps: Screw-In: (9W) - 1L	Wall Switch	9	728	0.03	43	0.0	$6.14	$17.23	$5.00	1.99
Storage Room 2	1	Incandescent: Screw-In: (60W) - 1L	Wall Switch	60	728	Relamp	No	1	LED Screw-In Lamps: Screw-In: (9W) - 1L	Wall Switch	9	728	0.03	43	0.0	$6.14	$17.23	$5.00	1.99

	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
Girls RR	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,938	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,757	0.08	567	0.0	$81.53	$379.55	$65.00	3.86
Faculty Room	10	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	10	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,747	0.25	1,117	0.0	$160.69	$994.60	$35.00	5.97
Faculty Room	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Faculty Room RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
Sprinkler Room	1	Incandescent: Screw-In: (60W) - 1L	Wall Switch	60	728	Relamp	No	1	LED Screw-In Lamps: Screw-In: (9W) - 1L	Wall Switch	9	728	0.03	43	0.0	$6.14	$17.23	$5.00	1.99
Special Services Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,340	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,638	0.16	673	0.0	$96.89	$489.09	$95.00	4.07
Special Services Office	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	2,340	0.02	78	0.0	$11.23	$72.46	$0.00	6.45
Special Services Office	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Special Services Office File Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.11	449	0.0	$64.59	$416.06	$75.00	5.28
Special Services Office Back Office	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.27	1,122	0.0	$161.49	$635.15	$135.00	3.10
Room 111	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,340	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,638	0.22	898	0.0	$129.19	$562.12	$115.00	3.46
Room 111	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Door 2 Stairwell	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,938	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,757	0.05	378	0.0	$54.35	$273.03	$20.00	4.66
Door 2 Stairwell	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,938	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,757	0.04	283	0.0	$40.76	$254.77	$15.00	5.88
Door 2 Stairwell	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 221	23	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	23	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.63	2,184	0.0	$314.28	$1,109.85	$265.00	2.69
CR 221	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 221 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
CR 223	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.38	1,329	0.0	$191.30	$781.21	$175.00	3.17
CR 223	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 223 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
Main Office	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.27	1,197	0.0	$172.25	$635.15	$135.00	2.90
Main Office	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Main Office RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	728	0.02	28	0.0	$3.98	$36.52	$10.00	6.67
Principal's Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.14	598	0.0	$86.13	$452.58	$85.00	4.27

	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
Nurse's Office	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.19	838	0.0	$120.58	$525.61	$105.00	3.49
Nurse's Office	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Nurse's Office RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
CR 203	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.77	2,659	0.0	$382.60	$1,292.42	$315.00	2.55
CR 203	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 203 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
Door 13 Stairwell	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,938	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,757	0.16	1,133	0.0	$163.06	$419.09	$60.00	2.20
Door 13 Stairwell	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 200	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.57	1,994	0.0	$286.95	$1,036.82	$245.00	2.76
CR 200	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 200 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
Inspector Closet	1	Incandescent: Screw-In: (60W) - 1L	Wall Switch	60	728	Relamp	No	1	LED Screw-In Lamps: Screw-In: (9W) - 1L	Wall Switch	9	728	0.03	43	0.0	$6.14	$17.23	$5.00	1.99
CR 202	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.57	1,994	0.0	$286.95	$1,036.82	$245.00	2.76
CR 202	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 202 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
Library	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,496	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,747	0.55	2,394	0.0	$344.50	$1,000.30	$235.00	2.22
Library	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 215	21	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	21	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.57	1,994	0.0	$286.95	$1,036.82	$245.00	2.76
CR 215	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 215 RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	728	0.02	28	0.0	$3.98	$36.52	$10.00	6.67
Door 15 Stairwell	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,938	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,757	0.05	332	0.0	$47.84	$273.03	$20.00	5.29
Door 15 Stairwell	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,938	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,757	0.08	567	0.0	$81.53	$309.55	$30.00	3.43
Door 15 Stairwell	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 217	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.55	1,899	0.0	$273.28	$1,000.30	$235.00	2.80
CR 217	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

	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
CR 217 RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	728	0.02	28	0.0	$3.98	$36.52	$10.00	6.67
CR 218	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.77	2,659	0.0	$382.60	$1,292.42	$315.00	2.55
CR 218	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 218 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
CR 220	16	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	1,980	Relamp	Yes	16	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,386	0.44	1,519	0.0	$218.63	$854.24	$195.00	3.02
CR 220	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
CR 220 RR	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	728	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	728	0.02	24	0.0	$3.49	$72.46	$0.00	20.74
Hallway: 2nd Floor	22	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,938	Relamp	Yes	22	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,757	0.60	4,155	0.0	$597.88	$1,003.33	$220.00	1.31
Hallway: 2nd Floor	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hallway: 2nd Floor	1	Exit Signs: Fluorescent	Wall Switch	12	8,760	LED Retrofit	No	1	LED Exit Signs: 2 W Lamp	Wall Switch	6	8,760	0.00	60	0.0	$8.70	$72.42	$0.00	8.33
Door Lights	24	Compact Fluorescent: PL: (18W) - 1L	Wall Switch	18	3,938	Relamp	Yes	24	LED Screw-In Lamps: PL: (9W) - 1L	Daylight Dimming	9	1,969	0.21	1,467	0.0	$211.16	$6,605.28	$1,080.00	26.17

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
Boiler Room	Heating HW Supply	1	Heating Hot Water Pump	5.0	87.5%	No	2,745	Yes	89.5%	Yes	1	0.68	5,153	0.0	$741.55	$4,196.91	$0.00	5.66
Boiler Room	Heating HW Supply	1	Heating Hot Water Pump	5.0	87.5%	No	2,745	Yes	89.5%	Yes	1	0.68	5,153	0.0	$741.55	$4,196.91	$0.00	5.66
Boiler Room	Heating HW Return	1	Heating Hot Water Pump	1.0	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Heating HW Return	1	Heating Hot Water Pump	1.0	85.5%	No	2,745	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Board Office Packaged AC	1	Supply Fan	5.0	87.5%	No	2,745	Yes	89.5%	Yes	1	0.72	2,236	0.0	$321.74	$4,196.91	$400.00	11.80
Roof	Board Office Packaged AC	1	Supply Fan	5.0	87.5%	No	2,745	Yes	89.5%	Yes	1	0.72	2,236	0.0	$321.74	$4,196.91	$400.00	11.80
Roof	Whole Building	16	Exhaust Fan	0.5	78.0%	No	2,745	No	78.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooms/Offices	Rooms/Offices Unit Ventilators	15	Supply Fan	0.3	73.4%	No	2,745	No	73.4%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Gym	Gym exhaust fan	1	Exhaust Fan	0.5	75.0%	No	2,745	No	75.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mechanical Room	Elevator Motor	1	Process Pump	20.0	93.0%	No	200	No	93.0%	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
Roof	Board Office	1	Packaged AC	13.00		Yes	1	Packaged AC	13.00		11.50		Yes	3.37	8,273	0.0	$1,190.48	$19,020.05	$1,277.00	14.90
Roof	Board Office	1	Packaged AC	13.00		Yes	1	Packaged AC	13.00		11.50		Yes	3.37	8,273	0.0	$1,190.48	$19,020.05	$1,277.00	14.90
Building Windows	Classrooms/Offices	15	Window AC	1.50		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
Boiler Room	Whole Building	1	Non-Condensing Hot Water Boiler	2,636.00	Yes	1	Condensing Hot Water Boiler	2,636.00	93.00%	Ec	0.00	0	221.1	$1,891.61	$49,053.09	$5,272.00	23.14
Boiler Room	Whole Building	1	Non-Condensing Hot Water Boiler	2,636.00	Yes	1	Condensing Hot Water Boiler	2,636.00	93.00%	Ec	0.00	0	177.5	$1,518.51	$49,053.09	$5,272.00	28.83

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Whole Building	1	Storage Tank Water Heater (> 50 Gal)	Yes	1	Storage Tank Water Heater (> 50 Gal)	Natural Gas	90.00%	Et	1.35	16,685	-56.9	$1,913.96	$5,779.00	$200.00	2.91

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Whole Building	50	Desktop Computers	150.0	Yes
Whole Building	40	Tablets	45.0	Yes
Whole Building	24	Desk Printers	40.0	Yes
Whole Building	5	Projectors	150.0	Yes
Whole Building	6	Microwaves	900.0	No
Whole Building	5	Refrigerators	172.0	Yes
Whole Building	3	Photocopier	600.0	Yes
Whole Building	3	Paper Shredder	150.0	Yes
Whole Building	4	LCD TVs	71.0	Yes
Whole Building	4	Minifridge	153.0	Yes
Whole Building	5	Smartboard w/ Projector	190.0	Yes
Whole Building	2	Smartboard	40.0	Yes
Main Office	1	Laminator	1,500.0	Yes
Whole Building	3	Wall/Ceiling fans	100.0	No
Whole Building	2	Coffee Maker	900.0	No
Whole Building	5	Laptops	45.0	Yes
Classroom	1	CRT TV	120.0	No
Whole Building	4	Water Fountain	153.0	No
Whole Building Restrooms	6	Electric hand dryers	500.0	No
Whole Building	2	Dehumidifier	180.0	Yes

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Faculty Room	1	Refrigerated	Yes	0.00	1,612	0.0	$231.96	$230.00	$0.00	0.99

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

LEARN MORE AT energystar.gov

13

ENERGY STAR® Score[1]

Moss School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 29,111
Built: 1927

For Year Ending: July 31, 2017
Date Generated: October 30, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Moss School 16 Simpson Place Metuchen, New Jersey 08840	Metuchen Board of Education 16 Simpson Place Metuchen, NJ 08840 (____)____-_____	Michael Harvier 16 Simpson Place Metuchen, NJ 08840 732-321-8700 ext. 1011 maharvier@metboe.k12.nj.us

Property ID: 6399368

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
135.9 kBtu/ft²

Source EUI
201.8 kBtu/ft²

Annual Energy by Fuel	
Electric - Grid (kBtu)	984,116 (25%)
Natural Gas (kBtu)	2,971,807 (75%)

National Median Comparison	
National Median Site EUI (kBtu/ft²)	90
National Median Source EUI (kBtu/ft²)	133.6
% Diff from National Median Source EUI	51%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	258

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)