Local Government Energy Audit:
Energy Audit Report

Margaret Mace School Building

1201 Atlantic Avenue

North Wildwood, NJ 08260

North Wildwood BOE

October 24, 2018

Final Report by:

TRC Energy Services

Disclaimer

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

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

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

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

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1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Margaret Mace School Building.

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

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

1.1 Facility Summary

Margaret Mace School Building is a 65,687 square foot elementary and middle school. The school building has three floors and includes classrooms, offices, gym, locker rooms, a sub-basement mechanical space, and a roof mechanical space. The original building construction was in 1925 with the right wing added in 1957, the left wing added in 1967 and the annex added in 1987.

Lighting at Margaret Mace School Building consists of aging T8 lighting with no lighting controls except in the annex, where the T8 lighting has been replaced with LED tubes and occupancy sensors. Heating is supplied by three system types throughout the facility. The older area is heated by steam boilers, with the newer areas heated by hot water boilers and rooftop units.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated 11 measures which together represent an opportunity to reduce annual energy costs by $38,828 and annual greenhouse gas emissions by 256,248 lbs CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in 4.8 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 Margaret Mace School Building's annual energy use by 22%.

Figure 1 – Previous 12 Month Utility Costs

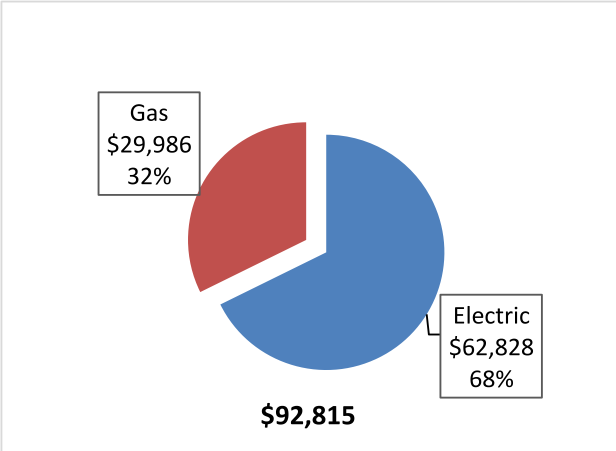
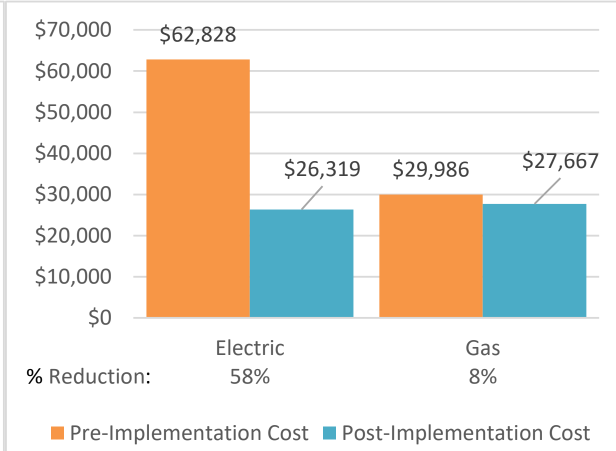


Figure 2 – Potential Post-Implementation Costs



A detailed description of Margaret Mace School Building'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			**188,142**	**27.0**	**0.0**	**$30,587.72**	**$133,768.84**	**$10,230.00**	**$123,538.84**	**4.0**	**189,457**
ECM 1	Install LED Fixtures	Yes	43,212	6.1	0.0	$7,025.33	$75,185.60	$4,200.00	$70,985.60	10.1	43,514
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	143,080	20.0	0.0	$23,261.59	$57,083.17	$5,880.00	$51,203.17	2.2	144,080
ECM 3	Retrofit Fixtures with LED Lamps	Yes	1,850	0.9	0.0	$300.80	$1,500.07	$150.00	$1,350.07	4.5	1,863
Lighting Control Measures			**19,394**	**2.7**	**0.0**	**$3,153.03**	**$20,520.00**	**$2,660.00**	**$17,860.00**	**5.7**	**19,530**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	19,394	2.7	0.0	$3,153.03	$20,520.00	$2,660.00	$17,860.00	5.7	19,530
Motor Upgrades			**12,052**	**3.2**	**0.0**	**$1,959.36**	**$14,611.69**	**$0.00**	**$14,611.69**	**7.5**	**12,136**
ECM 5	Premium Efficiency Motors	Yes	12,052	3.2	0.0	$1,959.36	$14,611.69	$0.00	$14,611.69	7.5	12,136
Variable Frequency Drive (VFD) Measures			**2,059**	**0.4**	**0.0**	**$334.75**	**$3,007.65**	**$0.00**	**$3,007.65**	**9.0**	**2,073**
ECM 6	Install Air Compressors with VFDs	Yes	2,059	0.4	0.0	$334.75	$3,007.65	$0.00	$3,007.65	9.0	2,073
Gas Heating (HVAC/Process) Replacement			**0**	**0.0**	**215.7**	**$1,944.95**	**$24,450.00**	**$3,000.00**	**$21,450.00**	**11.0**	**25,255**
ECM 7	Install High Efficiency Hot Water Boilers	Yes	0	0.0	215.7	$1,944.95	$24,450.00	$3,000.00	$21,450.00	11.0	25,255
HVAC System Improvements			**1,096**	**0.0**	**18.4**	**$343.70**	**$4,618.18**	**$0.00**	**$4,618.18**	**13.4**	**3,253**
ECM 8	Install Programmable Thermostats	Yes	1,096	0.0	18.4	$343.70	$4,618.18	$0.00	$4,618.18	13.4	3,253
Domestic Water Heating Upgrade			**0**	**0.0**	**23.1**	**$208.72**	**$136.23**	**$0.00**	**$136.23**	**0.7**	**2,710**
ECM 9	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	23.1	$208.72	$136.23	$0.00	$136.23	0.7	2,710
Food Service Equipment & Refrigeration Measures			**1,820**	**0.1**	**0.0**	**$295.87**	**$1,977.30**	**$75.00**	**$1,902.30**	**6.4**	**1,833**
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	Yes	873	0.1	0.0	$141.90	$303.30	$0.00	$303.30	2.1	879
ECM 11	Refrigeration Controls	Yes	947	0.0	0.0	$153.97	$1,674.00	$75.00	$1,599.00	10.4	954
TOTALS			**224,562**	**33.5**	**257.2**	**$38,828.10**	**$203,089.89**	**$15,965.00**	**$187,124.89**	**4.8**	**256,248**

* - 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.

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.

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

Energy Efficient Practices

TRC also identified 13 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 Margaret Mace School Building include:

- Reduce Air Leakage
- Perform Lighting Maintenance
- Develop a Lighting Maintenance Schedule
- Ensure Lighting Controls Are Operating Properly
- Perform Routine Motor Maintenance
- Use Thermostat Schedules and Temperature Resets
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Check for and Seal Duct Leakage
- Perform Boiler Maintenance
- Perform Furnace Maintenance
- Perform Maintenance on Compressed Air Systems
- 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 Margaret Mace School Building. Based on the configuration of the site and its loads there is a high potential for installing a photovoltaic (PV) array.

Figure 4 – Photovoltaic Potential

Potential	High	
System Potential	54	kW DC STC
Electric Generation	64,334	kWh/yr
Displaced Cost	$5,600	/yr
Installed Cost	$154,400	

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
- Pay for Performance - Existing Building (P4P)
- SREC (Solar Renewable Energy Certificate) Registration Program (SRP)
- Energy Savings Improvement Program (ESIP)
- Demand Response Energy Aggregator

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

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

Larger facilities with an interest in a more comprehensive whole building approach to energy conservation should consider participating in the Pay for Performance (P4P) program. Projects eligible for this project program must meet minimum savings requirements. Final incentives are calculated based on actual measured performance achieved at the end of the project. The application process is more involved, and it requires working with a qualified P4P contractor, but the process may result in greater energy savings overall and more lucrative incentives, up to 50% of project's total cost.

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 8.5 for additional information on the ESIP Program.

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

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

2 Facility Information and Existing Conditions

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Rose Miller	Business Administrator	rmillar@mmace.capemayschools.com	609-729-4649
TRC Energy Services			
Ignacio Badilla	Auditor	ibadilla@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On February 16, 2017, TRC performed an energy audit at Margaret Mace School Building located in North Wildwood, New Jersey. TRC's team met with Rose Miller to review the facility operations and help focus our investigation on specific energy-using systems.

Margaret Mace School Building is a 65,687 square foot K-8th grade school facility. The facility houses approximately 350 students with a teaching staff of approximately 40. Original construction was in 1925 with various subsequent additions.

Only the annex section has received lighting upgrades, however, the remainder of the facility is lit by T8 fluorescent fixtures. The original building is heated by steam boilers while the additions are heated by a hot water boiler system and rooftop units.

2.3 Building Occupancy

The school building is open Monday through Friday with some sporadic use on the weekends. The typical schedule is presented in the table below. Summer school operates during the summer months, however, does not utilize the entire facility.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Margaret Mace School	Weekday	6AM -9:30PM
Margaret Mace School	Weekend	No Schedule

2.4 Building Envelope

The facility is constructed of concrete block and structural steel with a brick facade. The building has a flat roof covered with black 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 in good condition except that the door seals have worn out which increases the level of outside air infiltration.

Picture 1: Building Exterior

2.5 On-Site Generation

Margaret Mace School Building 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 is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as some incandescent lamps. Most of the fixtures are 2-lamp or 3-lamp, 4-foot long troffers with diffusers.

The annex section of the facility was recently upgraded to LED tubes along with occupancy sensors in the classes and bathrooms. This is currently the only section of the facility with lighting controls, the remainder of the facility is controlled via wall switches.

The hallways are controlled by wall switches but the stairwells are lit 24 hours per day for egress.

The building's exterior lighting is minimal and consists primarily of compact fluorescent lamps in downlights and wall packs that are controlled by photocells.

Picture 2: T8 Fixture

Picture 3: HID Fixture

Hot Water and Steam Heating System

The heating hot water system consists of two Weil MClain LGB-6 and LGB-7 atmospheric boilers of 541 kBtu/hr and 549 kBtu/hr respectively. The boilers have a nominal combustion efficiency of 80%. The boilers are configured in a constant flow primary distribution with two hot water pumps. Each boiler is supplied by a dedicated 10 HP pump. The boilers provide hot water to the newer 1999 construction section of the school through fan coil units and air handlers.

The boilers operate in a lead/lag configuration, however only one boiler is required to meet the load. The boilers are in good condition and well maintained.

The steam system consists of two Weil Mclain steam boilers model numbers 1188 and 1388 with output capacities of 2,115 kBtu/hr and 2,537 kBtu/hr, forced draft boilers (BR3 & 4). The boilers have a nominal combustion efficiency of 75%. Each boiler has a 1 hp forced draft fan with discharge dampers to control the volume of combustion air. These boilers serve the wings and 1957 section of the building.

The steam boilers operate in a lead/lag configuration. Only a single boiler is required to meet the facility heating demand. Boiler operation is rotated weekly. The boilers are in good condition.

Picture 4: Steam Boilers

Picture 5: Hot Water Boilers

Direct Expansion Air Conditioning System (DX)

The facility has 14 split systems and packaged AC's on the roof. The packaged AC's range from 3 to 10 tons and the split systems range from 2.5 to 4 tons. The split systems and packaged AC's provide cooling to the office areas, library, labs, and classrooms.

There are five Trane TSC packaged units that are approximately one year old and in excellent condition with energy efficiency ratios (EERs) over 11. There are also four 3-ton packaged Carrier 48ES air conditioners with SEER's of 13 and are approximately seven years old. These Carrier units also provide natural gas heat to four classrooms located in the annex. There were only three units that were in poor condition.

Two of the 4-ton Trane Odyssey units and one Trane TTA unit is 17 years old. While they are approaching the end of useful life they are still operational. The high cost of replacement combined with low hours of operation do not justify replacement at this time. The classrooms that do not have packaged units are cooled with window AC's, mostly in good condition.

Picture 6: Sample Packaged

Picture 2: Sample Split

Picture 8: Sample Window AC

Domestic Hot Water Heating System

The school has a 75-gallon gas fired domestic water heater with an input rating of 120 kbtu/hr and a nominal efficiency of 80%. A 50-Watt recirculation pump distributes 120°F hot water throughout the building continuously. Hot water in the school is used only in the restrooms.

Picture 3: DHW Heater

Food Service & Laundry Equipment

The facility has a full commercial kitchen that is never used. Food is prepared externally and brought into the school. The refrigeration is used to store some items, however, the majority of the appliances are not used on a regular basis.

Refrigeration

The kitchen has a walk-in refrigerator that is used to store food prepared for school lunches. The refrigerator has a single 1-ton, air-cooled scroll compressor. The walk-in space temperature is maintained at 34°F. The kitchen also has a free standing commercial size freezer.

Building Plug Load

There are roughly 250 laptops throughout the facility. The laptops are stored in a charging cabinet and located within each classroom. There are three server closets throughout the facility, individually cooled by portable AC units.

2.7 Water-Using Systems

There are 21 restrooms at this facility. A sampling of restrooms found that the faucets (except for the bathrooms in the annex) are rated for 2.0 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 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

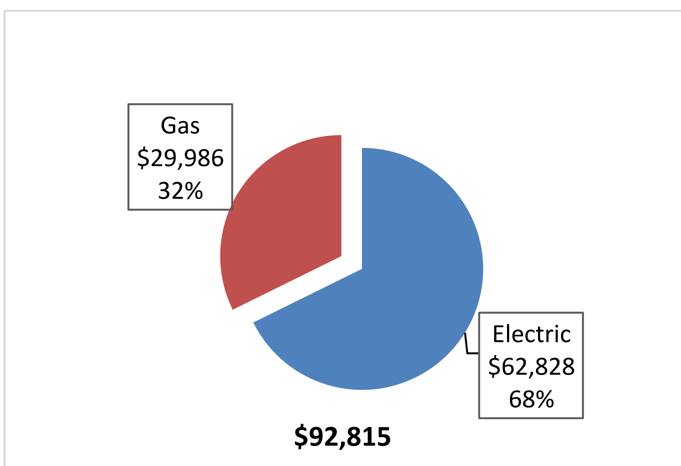
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Margaret Mace School Building		
Fuel	**Usage**	**Cost**
Electricity	386,450 kWh	$62,828
Natural Gas	33,255 Therms	$29,986
Total		**$92,815**

The current annual energy cost for this facility is $92,815 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by Atlantic City Electric. The average electric cost over the past 12 months was $0.163/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 facility is billed for demand. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

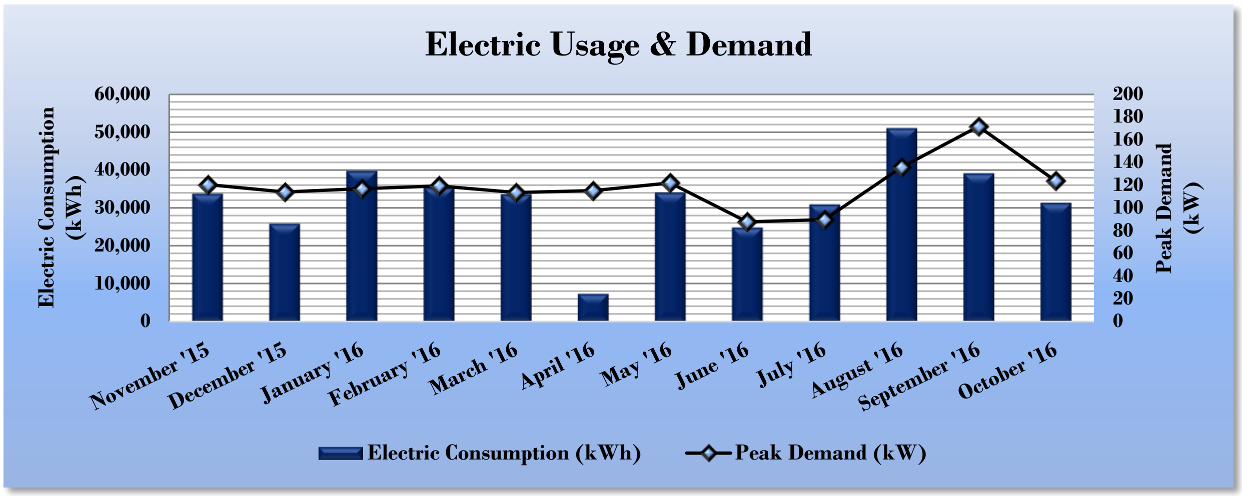


Figure 10 - Electric Usage & Demand

Electric Billing Data for Margaret Mace School Building					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
12/1/15	29	33,721	120	$887	$5,142
1/4/16	34	25,815	114	$873	$4,243
2/1/16	28	39,718	117	$644	$5,434
3/1/16	29	35,342	119	$778	$5,338
4/1/16	31	33,585	114	$797	$5,103
5/2/16	31	7,337	115	$751	$4,800
6/1/16	30	33,970	122	$944	$5,195
7/1/16	30	24,761	88	$787	$4,114
8/1/16	31	30,890	90	$656	$4,665
9/1/16	31	50,950	136	$989	$7,325
10/3/16	32	39,062	172	$1,547	$6,542
11/1/16	29	31,299	124	$18	$4,927
Totals	**365**	**386,450**	**171.6**	**$9,672**	**$62,828**
Annual	**365**	**386,450**	**171.6**	**$9,672**	**$62,828**

3.3 Natural Gas Usage

Natural gas is provided by South Jersey Gas. The average gas cost for the past 12 months is $0.902/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

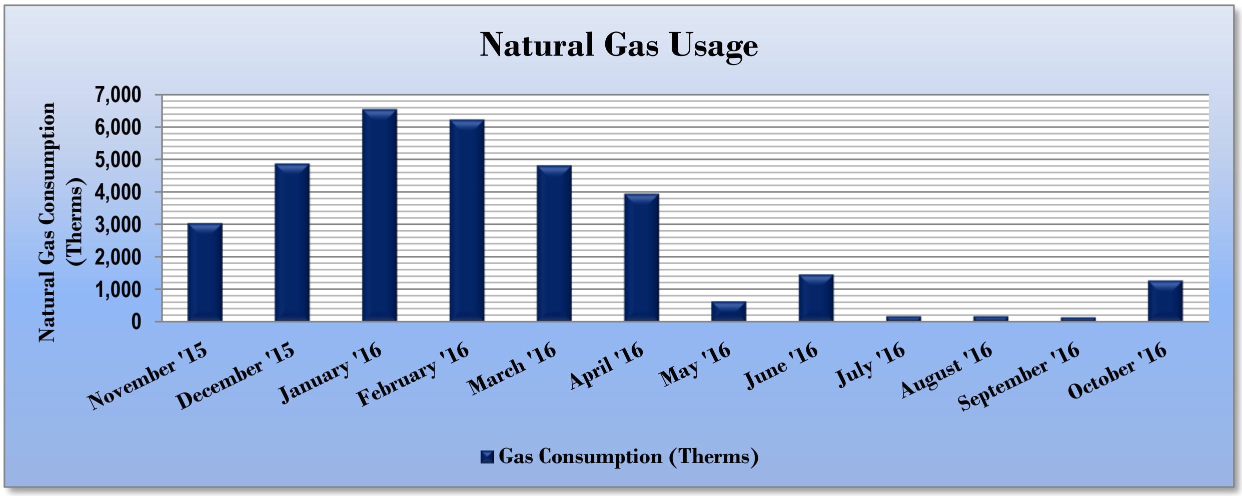


Figure 12 - Natural Gas Usage

Gas Billing Data for Margaret Mace School Building			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
12/1/15	29	3,037	$3,681
1/4/16	34	4,871	$5,332
2/1/16	28	6,539	$6,035
3/1/16	29	6,215	$5,275
4/1/16	31	4,810	$4,202
5/2/16	31	3,942	$2,294
6/1/16	30	626	$293
7/1/16	30	1,460	$1,340
8/1/16	31	175	$205
9/1/16	31	174	$145
10/3/16	32	139	-$165
11/1/16	29	1,267	$1,350
Totals	**365**	**33,255**	**$29,986**
Annual	**365**	**33,255**	**$29,986**

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		
	Margaret Mace School Building	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	116.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	70.7	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		
	Margaret Mace School Building	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	75.5	141.4
Site Energy Use Intensity (kBtu/ft^2)	55.1	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 percent of all similar buildings nationwide and may be eligible for ENERGY STAR® certification. This facility has a current score of 71.

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

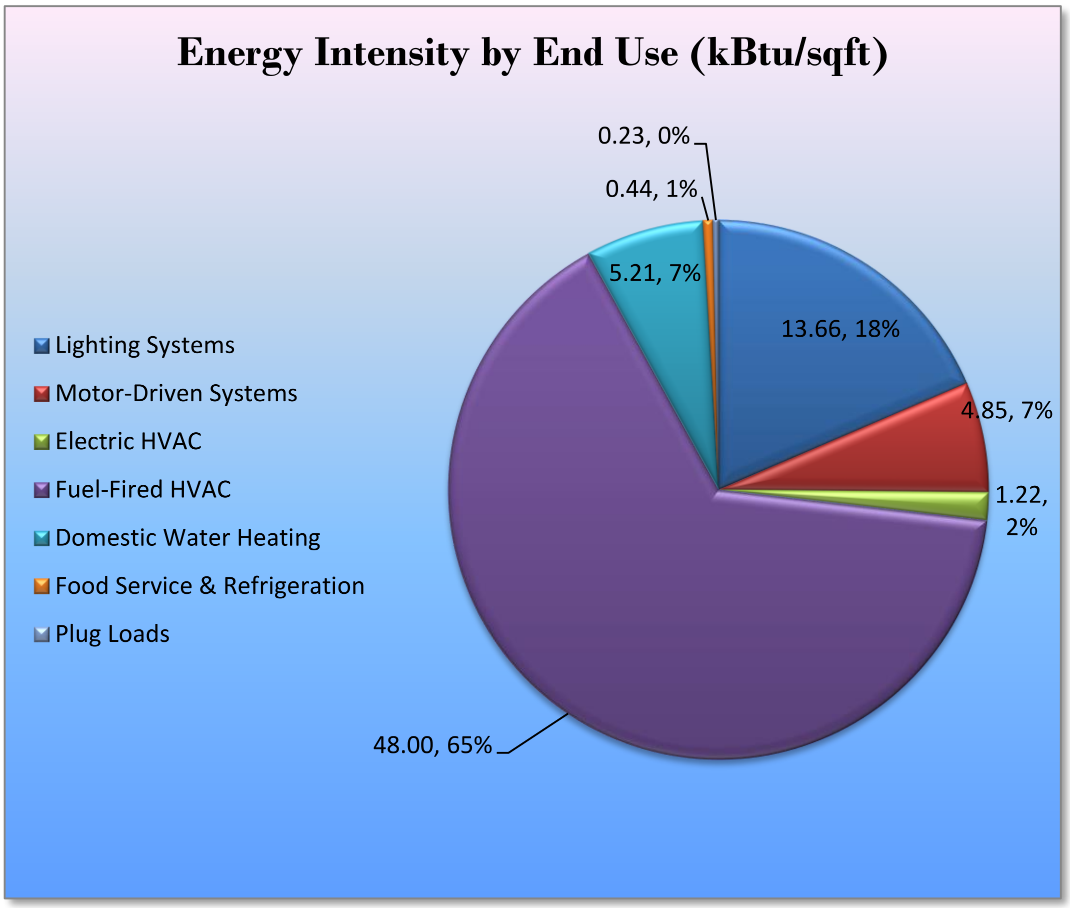
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 the Margaret Mace School Building 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		**188,142**	**27.0**	**0.0**	**$30,587.72**	**$133,768.84**	**$10,230.00**	**$123,538.84**	**4.0**	**189,457**
ECM 1	Install LED Fixtures	43,212	6.1	0.0	$7,025.33	$75,185.60	$4,200.00	$70,985.60	10.1	43,514
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	143,080	20.0	0.0	$23,261.59	$57,083.17	$5,880.00	$51,203.17	2.2	144,080
ECM 3	Retrofit Fixtures with LED Lamps	1,850	0.9	0.0	$300.80	$1,500.07	$150.00	$1,350.07	4.5	1,863
Lighting Control Measures		**19,394**	**2.7**	**0.0**	**$3,153.03**	**$20,520.00**	**$2,660.00**	**$17,860.00**	**5.7**	**19,530**
ECM 4	Install Occupancy Sensor Lighting Controls	19,394	2.7	0.0	$3,153.03	$20,520.00	$2,660.00	$17,860.00	5.7	19,530
Motor Upgrades		**12,052**	**3.2**	**0.0**	**$1,959.36**	**$14,611.69**	**$0.00**	**$14,611.69**	**7.5**	**12,136**
ECM 5	Premium Efficiency Motors	12,052	3.2	0.0	$1,959.36	$14,611.69	$0.00	$14,611.69	7.5	12,136
Variable Frequency Drive (VFD) Measures		**2,059**	**0.4**	**0.0**	**$334.75**	**$3,007.65**	**$0.00**	**$3,007.65**	**9.0**	**2,073**
ECM 6	Install Air Compressors with VFDs	2,059	0.4	0.0	$334.75	$3,007.65	$0.00	$3,007.65	9.0	2,073
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**215.7**	**$1,944.95**	**$24,450.00**	**$3,000.00**	**$21,450.00**	**11.0**	**25,255**
ECM 7	Install High Efficiency Hot Water Boilers	0	0.0	215.7	$1,944.95	$24,450.00	$3,000.00	$21,450.00	11.0	25,255
HVAC System Improvements		**1,096**	**0.0**	**18.4**	**$343.70**	**$4,618.18**	**$0.00**	**$4,618.18**	**13.4**	**3,253**
ECM 8	Install Programmable Thermostats	1,096	0.0	18.4	$343.70	$4,618.18	$0.00	$4,618.18	13.4	3,253
Domestic Water Heating Upgrade		**0**	**0.0**	**23.1**	**$208.72**	**$136.23**	**$0.00**	**$136.23**	**0.7**	**2,710**
ECM 9	Install Low-Flow Domestic Hot Water Devices	0	0.0	23.1	$208.72	$136.23	$0.00	$136.23	0.7	2,710
Food Service Equipment & Refrigeration Measures		**1,820**	**0.1**	**0.0**	**$295.87**	**$1,977.30**	**$75.00**	**$1,902.30**	**6.4**	**1,833**
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	873	0.1	0.0	$141.90	$303.30	$0.00	$303.30	2.1	879
ECM 11	Refrigeration Controls	947	0.0	0.0	$153.97	$1,674.00	$75.00	$1,599.00	10.4	954
TOTALS		**224,562**	**33.5**	**257.2**	**$38,828.10**	**$203,089.89**	**$15,965.00**	**$187,124.89**	**4.8**	**256,248**

* - 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		**188,142**	**27.0**	**0.0**	**$30,587.72**	**$133,768.84**	**$10,230.00**	**$123,538.84**	**4.0**	**189,457**
ECM 1	Install LED Fixtures	43,212	6.1	0.0	$7,025.33	$75,185.60	$4,200.00	$70,985.60	10.1	43,514
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	143,080	20.0	0.0	$23,261.59	$57,083.17	$5,880.00	$51,203.17	2.2	144,080
ECM 3	Retrofit Fixtures with LED Lamps	1,850	0.9	0.0	$300.80	$1,500.07	$150.00	$1,350.07	4.5	1,863

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

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	43,212	6.1	0.0	$7,025.33	$75,185.60	$4,200.00	$70,985.60	10.1	43,514
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube and more than 10 times longer than many incandescent lamps.

ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	143,080	20.0	0.0	$23,261.59	$57,083.17	$5,880.00	$51,203.17	2.2	144,080
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube and more than 10 times longer than many incandescent lamps.

ECM 3: Retrofit Fixtures with LED Lamps

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	1,850	0.9	0.0	$300.80	$1,500.07	$150.00	$1,350.07	4.5	1,863
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of a fluorescent tube and more than 10 times longer than many incandescent lamps.

4.1.2 Lighting Control Measures

Our recommendations for lighting control measures 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		**19,394**	**2.7**	**0.0**	**$3,153.03**	**$20,520.00**	**$2,660.00**	**$17,860.00**	**5.7**	**19,530**
ECM 4	Install Occupancy Sensor Lighting Controls	19,394	2.7	0.0	$3,153.03	$20,520.00	$2,660.00	$17,860.00	5.7	19,530

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)
19,394	2.7	0.0	$3,153.03	$20,520.00	$2,660.00	$17,860.00	5.7	19,530

Measure Description

We recommend installing occupancy sensors to control lighting fixtures that are currently controlled by manual switches in all restrooms, 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.

4.1.3 Motor Upgrades

Our recommendations for motor upgrades are summarized in Figure 19 below.

Figure 19-Summary of Motor 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)
Motor Upgrades		**12,052**	**3.2**	**0.0**	**$1,959.36**	**$14,611.69**	**$0.00**	**$14,611.69**	**7.5**	**12,136**
ECM 5	Premium Efficiency Motors	12,052	3.2	0.0	$1,959.36	$14,611.69	$0.00	$14,611.69	7.5	12,136

ECM 5: Premium Efficiency Motors

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
12,052	3.2	0.0	$1,959.36	$14,611.69	$0.00	$14,611.69	7.5	12,136

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.

Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) 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		**2,059**	**0.4**	**0.0**	**$334.75**	**$3,007.65**	**$0.00**	**$3,007.65**	**9.0**	**2,073**
ECM 6	Install Air Compressors with VFDs	2,059	0.4	0.0	$334.75	$3,007.65	$0.00	$3,007.65	9.0	2,073

ECM 6: Install VFDs on Air Compressors

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)
2,059	0.4	0.0	$334.75	$3,007.65	$0.00	$3,007.65	9.0	2,073

Measure Description

We recommend installing variable frequency drives (VFD) on air compressors. The VFD will allow the air compressor to operate more efficiently at partial load conditions, modulating speed to match the demand for compressed air rather than mechanically unloading. Energy savings results from reducing compressor speed (and power) when there is a reduced load. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.4 Gas-Fired Heating System Replacements

Our recommendations for gas-fired heating system replacements are summarized in Figure 21 below.

Figure 21 - Summary of Gas-Fired Heating Replacement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Gas Heating (HVAC/Process) Replacement		**0**	**0.0**	**215.7**	**$1,944.95**	**$24,450.00**	**$3,000.00**	**$21,450.00**	**11.0**	**25,255**
ECM 7	Install High Efficiency Hot Water Boilers	0	0.0	215.7	$1,944.95	$24,450.00	$3,000.00	$21,450.00	11.0	25,255

ECM 7: 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	215.7	$1,944.95	$24,450.00	$3,000.00	$21,450.00	11.0	25,255

Measure Description

We recommend replacing 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. As a result condensing hydronic boilers are recommended for this site.

4.1.5 HVAC System Upgrades

Our recommendation for HVAC system improvement are summarized in Figure 22 below.

Figure 22 - Summary of HVAC System Improvement ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
HVAC System Improvements		**1,096**	**0.0**	**18.4**	**$343.70**	**$4,618.18**	**$0.00**	**$4,618.18**	**13.4**	**3,253**
ECM 8	Install Programmable Thermostats	1,096	0.0	18.4	$343.70	$4,618.18	$0.00	$4,618.18	13.4	3,253

ECM 8: Install Programmable Thermostats

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)
1,096	0.0	18.4	$343.70	$4,618.18	$0.00	$4,618.18	13.4	3,253

Measure Description

We recommend replacing manual thermostats with programmable thermostats. Manual thermostats are generally adjusted to a single heating and cooling setpoint and left at that setting regardless of occupancy in the area served by the HVAC equipment. As a result, the same level of heating and cooling is provided regardless of the occupancy in the space. Programmable thermostats can be set to maintain different temperature settings for different times of day and for different days of the week. By reducing heating temperature setpoints and raising cooling temperature setpoints when space are unoccupied, the operation of the HVAC equipment is reduced while still maintaining reasonable space temperatures for building usage at all times.

Programmable thermostats provide energy savings by reducing heating and cooling energy usage when a room is unoccupied.

4.1.6 Domestic Hot Water Heating System Upgrades

Our recommendations for domestic water heating system improvements are summarized in Figure 23 below.

Figure 23 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**23.1**	**$208.72**	**$136.23**	**$0.00**	**$136.23**	**0.7**	**2,710**
ECM 9	Install Low-Flow Domestic Hot Water Devices	0	0.0	23.1	$208.72	$136.23	$0.00	$136.23	0.7	2,710

ECM 9: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	23.1	$208.72	$136.23	$0.00	$136.23	0.7	2,710

Measure Description

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

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

4.1.7 Food Service Equipment & Refrigeration Measures

Food service and refrigeration measures recommendations are summarized in Figure 24 below.

Figure 24 - Summary of Food Service Equipment & Refrigeration 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)
Food Service Equipment & Refrigeration Measures		**1,820**	**0.1**	**0.0**	**$295.87**	**$1,977.30**	**$75.00**	**$1,902.30**	**6.4**	**1,833**
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	873	0.1	0.0	$141.90	$303.30	$0.00	$303.30	2.1	879
ECM 11	Refrigeration Controls	947	0.0	0.0	$153.97	$1,674.00	$75.00	$1,599.00	10.4	954

ECM 10: Refrigerator/Freezer Case Electrically Commutated 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)
873	0.1	0.0	$141.90	$303.30	$0.00	$303.30	2.1	879

Measure Description

We recommend replacing shaded pole or permanent split capacitor (PSC) motors with electronically commutated (EC) motors in the existing walk-in. These fractional horsepower EC motors are significantly more efficient than mechanically commutated, brushed motors, particularly at low speeds or partial load. By employing variable-speed technology, EC motors are able to optimize fan usage. Because these motors are brushless and utilize DC power, losses due to friction and phase shifting are eliminated. Savings for this measure take into account both the increased efficiency of the motor as well as the reduction in refrigeration load due to motor heat loss.

ECM 11: Walk-In Cooler 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)
947	0.0	0.0	$153.97	$1,674.00	$75.00	$1,599.00	10.4	954

Measure Description

We recommend the installation of additional controls to optimize the operation of walk-in coolers.

Many walk-in coolers and freezers have evaporator fans which run continuously. The measure adds a control system feature to automatically shut off evaporator fans when the cooler's thermostat is not calling for cooling.

Energy savings for each of the control measures account for reduction in compressor and fan operating hours as well as reduction in the refrigeration heat load as appropriate.

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.

Perform 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.

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Check for and Seal Duct Leakage

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

Perform 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 Furnace Maintenance

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

Perform Maintenance on Compressed Air Systems

Like all electro-mechanical equipment, compressed air systems require periodic maintenance to operate at peak efficiency. A maintenance plan should be developed for process related compressed air systems to include inspection, cleaning, and replacement of inlet filter cartridges, cleaning of drain traps, daily inspection of lubricant levels to reduce unwanted friction, inspection of belt condition and tension, checking for system leaks and adjustment of loose connections, and overall system cleaning. Contact a qualified technician for help with setting up periodic maintenance schedule.

Water Conservation

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

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

Refer to Section 4.1.6 for any low-flow ECM recommendations.

6 On-Site Generation Measures

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

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

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

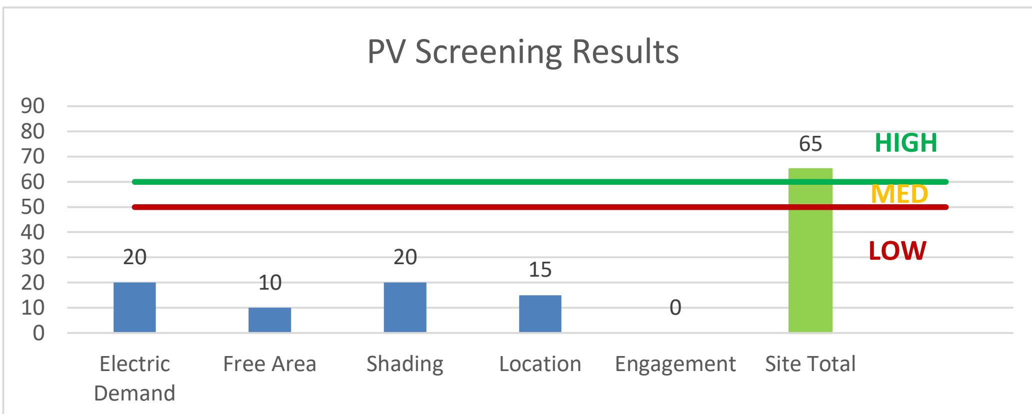
6.1 Photovoltaic

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

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

The amount of free area, ease of installation (location), and the lack of shading elements contribute to the high potential for PV at the site. A PV array located on the roof of the main building may be feasible. If Margaret Mace School Building is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 25 - Photovoltaic Screening



Potential	High	
System Potential	54	kW DC STC
Electric Generation	64,334	kWh/yr
Displaced Cost	$5,600	/yr
Installed Cost	$154,400	

Solar projects must register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about developed new solar projects and insight into future SREC pricing. Refer to Section 8.4 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.

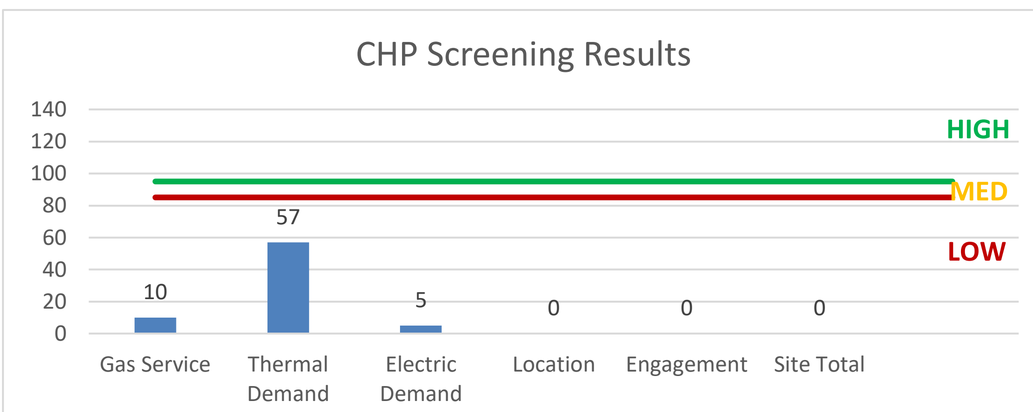
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste 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.

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 26 - 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.

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

Figure 27 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x		x	x		
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x		x	x		
ECM 3	Retrofit Fixtures with LED Lamps	x		x	x		
ECM 4	Install Occupancy Sensor Lighting Controls	x		x	x		
ECM 5	Premium Efficiency Motors		x	x	x		
ECM 6	Install Air Compressors with VFDs	x			x		
ECM 7	Install High Efficiency Hot Water Boilers	x		x	x		
ECM 8	Install Programmable Thermostats			x	x		
ECM 9	Install Low-Flow Domestic Hot Water Devices	x			x		
ECM 10	Refrigerator/Freezer Case Electrically Commutated Motors	x		x	x		
ECM 11	Refrigeration Controls	x		x	x		

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 Direct Install

Overview

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

Incentives

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

How to Participate

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

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

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

8.3 Pay for Performance - Existing Buildings

Overview

The Pay for Performance – Existing Buildings (P4P EB) program is designed for larger customers with a peak demand over 200 kW in any of the preceding 12 months. Under this program the minimum installed scope of work must include at least two unique measures resulting in at least 15% energy savings, where lighting cannot make up the majority of the savings. P4P is a generally a good option for medium to large sized facilities looking to implement as many measures as possible under a single project in order to achieve deep energy savings. This program has an added benefit of evaluating a broad spectrum of measures that may not otherwise qualify under other programs. Many facilities pursuing an Energy Savings Improvement Program (ESIP) loan also utilize the P4P program.

Incentives

Incentives are calculated based on estimated and achieved energy savings ranging from $0.18-$0.22/kWh and $1.80-$2.50/therm, capped at the lesser of 50% total project cost, or $1 million per electric account and $1 million per natural gas account, per fiscal year, not to exceed $2 million per project. An incentive of $0.15/square foot is also available to offset the cost of developing the Energy Reduction Plan (see below) contingent on the project moving forward with measure installation.

How to Participate

To participate in the P4B EB program you will need to contact one of the pre-approved consultants and contractors (“Partners”). Under direct contract to you, the Partner will help further evaluate the measures identified in this report through development of the Energy Reduction Plan (ERP), assist you in implementing selected measures, and verify actual savings one year after the installation. At each of these three milestones your Partner will also facilitate securing program incentives.

Approval of the final scope of work is required by the program prior to installation completion. Although installation can be accomplished by a contractor of your choice (some P4P Partners are also contractors) or by internal personnel, the Partner must remain involved to ensure compliance with the program guidelines and requirements.

Detailed program descriptions, instructions for applying, applications and list of Partners can be found at: www.njcleanenergy.com/P4P.

8.4 SREC Registration Program

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

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

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

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

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

8.5 Energy Savings Improvement Program

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

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

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

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

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

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

8.6 Demand Response Energy Aggregator

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

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

See Section 7 for additional information.

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility is purchasing electricity from a third-party supplier, review and compare prices at the end of the current contract or every couple 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
301	15	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	15	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.62	4,348	0.0	$706.94	$2,242.50	$260.00	2.80
hallway	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	No	16	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,030	0.52	3,671	0.0	$596.75	$2,104.00	$240.00	3.12
301A	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
302	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.12	870	0.0	$141.39	$664.50	$80.00	4.13
bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
custodial	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
bathroom staff	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
womens	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.12	870	0.0	$141.39	$664.50	$80.00	4.13
womens staff	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
303	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.45	3,189	0.0	$518.42	$1,716.50	$200.00	2.93
304	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.49	3,479	0.0	$565.55	$1,848.00	$215.00	2.89
305	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.12	870	0.0	$141.39	$664.50	$80.00	4.13
306	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.49	3,479	0.0	$565.55	$1,848.00	$215.00	2.89
stairwells (2)	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,760	Relamp & Reballast	No	13	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	8,760	0.16	2,423	0.0	$393.89	$1,709.50	$195.00	3.84
2nd floor hall	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	No	16	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,030	0.52	3,671	0.0	$596.75	$2,104.00	$240.00	3.12
206	21	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	21	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.86	6,088	0.0	$989.72	$3,031.50	$350.00	2.71
205	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.66	4,638	0.0	$754.07	$2,374.00	$275.00	2.78
girls bath	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
bathrooom women	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
dataroom	2	Linear Fluorescent - T8: 2' T8 (17W) - 1L	Wall Switch	22	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	-0.01	-78	0.0	-$12.73	$533.00	$65.00	-36.75
mens	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
mens staff	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
204	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.12	870	0.0	$141.39	$664.50	$80.00	4.13
203	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
202	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97

	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
201	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.12	870	0.0	$141.39	$664.50	$80.00	4.13
201a	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
301b	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	292	0.0	$47.54	$533.00	$65.00	9.84
main office	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.33	2,319	0.0	$377.03	$1,322.00	$155.00	3.10
vault front	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
vault rear	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.12	870	0.0	$141.39	$664.50	$80.00	4.13
guidance	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
guidance rear	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
hallway 1st fl	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	No	12	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,030	0.39	2,753	0.0	$447.56	$1,578.00	$180.00	3.12
103	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.21	1,449	0.0	$235.65	$927.50	$110.00	3.47
bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
bathroom boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
bathroom men	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
bathroom girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
bathroom women	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.04	290	0.0	$47.13	$401.50	$50.00	7.46
entrance	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.08	580	0.0	$94.26	$533.00	$65.00	4.97
library	35	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	4,030	Relamp & Reballast	Yes	35	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.68	4,793	0.0	$779.27	$4,872.50	$560.00	5.53
library office	3	Linear Fluorescent - T5: 4' T5 (28W) - 2L	Wall Switch	60	4,030	Relamp & Reballast	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.06	411	0.0	$66.79	$664.50	$80.00	8.75
gym	16	Metal Halide: (1) 400W Lamp	Wall Switch	458	4,030	Fixture Replacement	No	16	LED - Fixtures: High-Bay	Wall Switch	125	4,030	3.49	24,693	0.0	$4,014.47	$42,963.20	$2,400.00	10.10
gym partition	12	Metal Halide: (1) 400W Lamp	Wall Switch	458	4,030	Fixture Replacement	No	12	LED - Fixtures: High-Bay	Wall Switch	125	4,030	2.62	18,519	0.0	$3,010.85	$32,222.40	$1,800.00	10.10
kitchen	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,030	0.06	459	0.0	$74.59	$351.00	$30.00	4.30
boiler room	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,821	0.24	1,701	0.0	$276.52	$1,079.17	$135.00	3.41
27	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.14	966	0.0	$157.10	$855.00	$85.00	4.90
boys locker	6	Incandescent: 100 W screw in	Wall Switch	100	200	Relamp	No	6	LED Screw-In Lamps: 14W LED	Wall Switch	14	200	0.34	119	0.0	$19.29	$210.00	$30.00	9.33
girls locker	6	Incandescent: 100 W screw in	Wall Switch	100	200	Relamp	No	6	LED Screw-In Lamps: 14W LED	Wall Switch	14	200	0.34	119	0.0	$19.29	$322.52	$30.00	15.16

	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
annex hallway	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	No	7	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	4,030	0.23	1,606	0.0	$261.08	$920.50	$105.00	3.12
mens	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
mens	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,821	None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
womens	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	None	No	1	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
womens	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,821	None	No	1	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
annex class 1	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	None	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
annex class 2	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	None	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
annex class 3	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	None	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
annex class 4	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	None	No	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,821	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
1960's area Class 5	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	None	No	24	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
stairs	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	8,760	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	8,760	0.04	665	0.0	$108.10	$234.00	$20.00	1.98
6	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.54	3,840	0.0	$624.25	$855.00	$85.00	1.23
bathroom	2	Incandescent: 100 W screw in	Wall Switch	100	4,030	Relamp	No	6	LED Screw-In Lamps: 14W LED	Wall Switch	14	4,030	0.08	538	0.0	$87.40	$322.52	$30.00	3.35
custodial	1	Incandescent: 100 W screw in	Wall Switch	100	4,030	Relamp	No	6	LED Screw-In Lamps: 14W LED	Wall Switch	14	4,030	0.01	74	0.0	$12.06	$322.52	$30.00	24.26
7	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.54	3,840	0.0	$624.25	$855.00	$85.00	1.23
8	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.54	3,840	0.0	$624.25	$855.00	$85.00	1.23
9	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.54	3,840	0.0	$624.25	$855.00	$85.00	1.23
10	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.18	1,254	0.0	$203.81	$855.00	$85.00	3.78
hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.46	3,265	0.0	$530.82	$855.00	$85.00	1.45
17	3	Incandescent: 100 W screw in	Wall Switch	100	4,030	Relamp	No	6	LED Screw-In Lamps: 14W LED	Wall Switch	14	4,030	0.14	1,001	0.0	$162.75	$322.52	$30.00	1.80
faclities	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.10	679	0.0	$110.38	$855.00	$85.00	6.98
shop class	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	1.07	7,575	0.0	$1,231.54	$855.00	$85.00	0.63
16	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.67	4,702	0.0	$764.39	$855.00	$85.00	1.01
15	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.18	1,254	0.0	$203.81	$855.00	$85.00	3.78
shipping	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.01	104	0.0	$16.95	$855.00	$85.00	45.42

	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
teachers loung	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.10	679	0.0	$110.38	$855.00	$85.00	6.98
hallway 56'	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,030	0.29	2,030	0.0	$330.02	$234.00	$20.00	0.65
14	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.67	4,702	0.0	$764.39	$855.00	$85.00	1.01
13	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.67	4,702	0.0	$764.39	$855.00	$85.00	1.01
12	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.67	4,702	0.0	$764.39	$855.00	$85.00	1.01
11	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.67	4,702	0.0	$764.39	$855.00	$85.00	1.01
supply	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	-0.03	-183	0.0	-$29.76	$855.00	$85.00	-25.87
rm1	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.18	1,254	0.0	$203.81	$855.00	$85.00	3.78
rm2	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.46	3,265	0.0	$530.82	$855.00	$85.00	1.45
rm3	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.46	3,265	0.0	$530.82	$855.00	$85.00	1.45
boys	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.01	104	0.0	$16.95	$855.00	$85.00	45.42
girls	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.01	104	0.0	$16.95	$855.00	$85.00	45.42
21	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.34	2,403	0.0	$390.67	$855.00	$85.00	1.97
hallway 2nd floor	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,030	0.41	2,892	0.0	$470.16	$234.00	$20.00	0.46
22	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.38	2,690	0.0	$437.39	$855.00	$85.00	1.76
child study	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.50	3,552	0.0	$577.53	$855.00	$85.00	1.33
bathrm	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	-0.03	-183	0.0	-$29.76	$855.00	$85.00	-25.87
24	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.34	2,403	0.0	$390.67	$855.00	$85.00	1.97
25	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.34	2,403	0.0	$390.67	$855.00	$85.00	1.97
3rd fl hallway	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	4,030	0.29	2,030	0.0	$330.02	$234.00	$20.00	0.65
35	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.38	2,690	0.0	$437.39	$855.00	$85.00	1.76
34	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.30	2,116	0.0	$343.96	$855.00	$85.00	2.24
33	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.42	2,978	0.0	$484.10	$855.00	$85.00	1.59
32	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.30	2,116	0.0	$343.96	$855.00	$85.00	2.24
31	9	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.30	2,116	0.0	$343.96	$855.00	$85.00	2.24

	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
20	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.10	679	0.0	$110.38	$855.00	$85.00	6.98
19	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	4,030	Relamp & Reballast	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,821	0.10	679	0.0	$110.38	$855.00	$85.00	6.98
exterior	8	Compact Fluorescent: downlights	None	25	4,030	None	No	8	Compact Fluorescent: downlights	None	25	4,030	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
exterior	2	Compact Fluorescent: wallmount	None	25	4,030	None	No	2	Compact Fluorescent: wallmount	None	25	4,030	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Roof	exhaust fan	3	Exhaust Fan	0.3	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	exhaust fan	3	Exhaust Fan	1.0	65.0%	No	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	exhaust fan	1	Exhaust Fan	0.5	65.0%	no	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	exhaust fan	2	Exhaust Fan	0.1	65.0%	no	2,745	No	65.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Classrooms	Classrooms	5	Supply Fan	1.0	65.0%	no	2,745	Yes	82.5%	No		0.68	2,506	0.0	$407.42	$3,443.10	$0.00	8.45
Classrooms	Classrooms	7	Supply Fan	1.5	65.0%	no	2,745	Yes	87.5%	No		1.72	6,380	0.0	$1,037.18	$5,309.81	$0.00	5.12
Classrooms	Classrooms	7	Supply Fan	0.8	65.0%	no	2,745	Yes	81.1%	No		0.66	2,463	0.0	$400.36	$4,556.83	$0.00	11.38
Classrooms	Classrooms	2	Supply Fan	0.8	65.0%	no	2,745	Yes	81.1%	No		0.19	704	0.0	$114.39	$1,301.95	$0.00	11.38
roof mechanical	Classrooms	2	Heating Hot Water Pump	3.0	86.5%	No	2,745	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof mechanical	Classrooms	2	Heating Hot Water Pump	10.0	91.7%	No	3,391	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Pneumatic controls	1	Air Compressor	3.0	88.9%	No	4,957	No	88.9%	Yes	1	0.36	2,059	0.0	$334.75	$3,007.65	$0.00	8.98

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	classrooms	2	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof	classrooms	1	Packaged AC	10.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof	classrooms	2	Packaged AC	6.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof	classrooms	1	Split-System AC	2.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof	classrooms	1	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	classrooms	2	Split-System AC	4.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof	classrooms	1	Split-System AC	2.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
annex roof	classrooms	4	Packaged AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
annex roof	annex	4	Furnace	48.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
roof mechanical	classrooms	1	Non-Condensing Hot Water Boiler	541.00	Yes	2	Condensing Hot Water Boiler	270.00	93.00%	AFUE	0.00	0	48.8	$439.86	$16,200.00	$2,000.00	32.28
roof mechanical	classrooms	1	Non-Condensing Hot Water Boiler	549.00	Yes	1	Condensing Hot Water Boiler	275.00	93.00%	AFUE	0.00	0	166.9	$1,505.09	$8,250.00	$1,000.00	4.82
boiler room	classrooms	1	Forced Draft Steam Boiler	2,115.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
boiler room	classrooms	1	Forced Draft Steam Boiler	2,537.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Programmable Thermostat Recommendations

		Recommendation Inputs				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Affected	Thermostat Quantity	Cooling Capacity of Controlled System (Tons)	Electric Heating Capacity of Controlled System (kBtu/hr)	Output Heating Capacity of Controlled System (MBh)	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
classrooms	99 and annex	14	38.50		240.00	0.00	1,096	18.4	$343.70	$4,618.18	$0.00	13.44

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
roof mechanical	school	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
bathrooms	19	Faucet Aerator (Lavatory)	2.00	1.00	0.00	0	23.1	$208.72	$136.23	$0.00	0.65

Walk-In Cooler/Freezer Inventory & Recommendations

	Existing Conditions		Proposed Conditions			Energy Impact & Financial Analysis						
Location	Cooler/ Freezer Quantity	Case Type/Temperature	Install EC Evaporator Fan Motors?	Install Electric Defrost Control?	Install Evaporator Fan Control?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
kitchen	1	Cooler (35F to 55F)	Yes	No	Yes	0.15	1,820	0.0	$295.87	$1,977.30	$75.00	6.43

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
classrooms/library/offices	255	laptops	25.0	Yes
offices	5	copier	250.0	yes

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Margaret Mace School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 65,687
Built: 1925

For Year Ending: October 31, 2016
Date Generated: April 12, 2017

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
Margaret Mace School 1201 Atlantic Avenue North Wildwood, New Jersey 08260	_______________ , (___)___-_____	____ _______ , (___)___-_____ _______________

Property ID: 5848948

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
70.7 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	3,325,512 (72%)
Electric - Grid (kBtu)	1,318,567 (28%)

Source EUI
116.2 kBtu/ft²

National Median Comparison

National Median Site EUI (kBtu/ft²)	86.8
National Median Source EUI (kBtu/ft²)	142.7
% Diff from National Median Source EUI	-19%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	328

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)