Local Government Energy Audit:
Energy Audit Report

Marlboro Memorial Middle School

71 Nolan Rd

Morganville, New Jersey 07751

Marlboro Township BoE

October 23, 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 savings 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 Marlboro Memorial Middle School.

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

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

1.1 Facility Summary

Marlboro Memorial Middle School (MMMS) is a 154,373 square foot, single-story middle school (grades 6-8). The building was originally built in 2003, and is in good condition. The building consists mainly of classrooms but also has a gymnasium, cafeteria, kitchen, and offices.

This facility is 100% heated and cooled. Most of the building systems are just over 15 years old, and the mechanical equipment is in fair condition. The lighting primarily consists of fluorescent lamps. Many of the motors are standard efficiency and serve systems which have potential for energy savings through variable speed drive (VFD) control. Building heating is by five modular natural gas hot water boilers while an electric air-cooled chiller supplies building cooling. The heating and cooling are controlled using a building energy management system. A thorough description of the facility and our observations are located in Section 2.

1.2 Your Cost Reduction Opportunities

Energy Conservation Measures

TRC evaluated nine measures which together represent an opportunity for Marlboro Memorial Middle School to reduce annual energy costs by roughly $57,374 and annual greenhouse gas emissions by 438,199 lbs. CO_2e. We estimate that if all measures were implemented as recommended, the project would pay for itself in roughly 5.5 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 Marlboro Memorial Middle School's annual energy use by 12%.

Figure 1 – Previous 12 Month Utility Costs

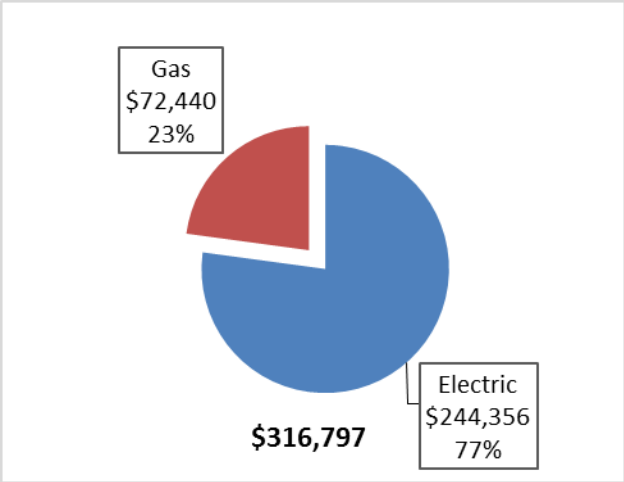
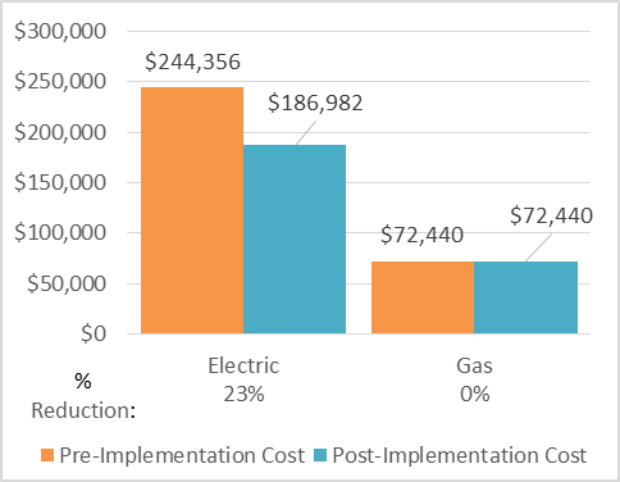


Figure 2 – Potential Post-Implementation Costs



A detailed description of Marlboro Memorial Middle School's existing energy use can be found in Section 3.

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**279,438**	**56.7**	**0.0**	**$36,843.16**	**$212,826.89**	**$36,640.00**	**$176,186.89**	**4.8**	**281,392**
ECM 1	Install LED Fixtures	Yes	61,091	8.2	0.0	$8,054.68	$48,930.03	$9,540.00	$39,390.03	4.9	61,518
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	35	0.1	0.0	$4.67	$234.00	$20.00	$214.00	45.9	36
ECM 3	Retrofit Fixtures with LED Lamps	Yes	212,005	48.0	0.0	$27,952.23	$155,918.90	$27,080.00	$128,838.90	4.6	213,487
ECM 4	Install LED Exit Signs	Yes	6,307	0.4	0.0	$831.59	$7,743.96	$0.00	$7,743.96	9.3	6,351
Lighting Control Measures			**59,729**	**13.2**	**0.0**	**$7,875.07**	**$82,350.00**	**$9,345.00**	**$73,005.00**	**9.3**	**60,146**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	53,848	11.9	0.0	$7,099.70	$72,090.00	$9,345.00	$62,745.00	8.8	54,224
ECM 6	Install High/Low Lighitng Controls	Yes	5,881	1.3	0.0	$775.37	$10,260.00	$0.00	$10,260.00	13.2	5,922
Variable Frequency Drive (VFD) Measures			**90,811**	**39.3**	**0.0**	**$11,973.22**	**$83,062.50**	**$16,500.00**	**$66,562.50**	**5.6**	**91,446**
ECM 7	Install VFDs on Chilled Water Pumps	Yes	70,212	30.4	0.0	$9,257.24	$64,330.40	$16,500.00	$47,830.40	5.2	70,703
ECM 8	Install VFDs on Hot Water Pumps	Yes	20,599	8.9	0.0	$2,715.98	$18,732.10	$0.00	$18,732.10	6.9	20,743
Plug Load Equipment Control - Vending Machine			**5,178**	**0.0**	**0.0**	**$682.71**	**$920.00**	**$0.00**	**$920.00**	**1.3**	**5,214**
ECM 9	Vending Machine Control	Yes	5,178	0.0	0.0	$682.71	$920.00	$0.00	$920.00	1.3	5,214
TOTALS			**435,157**	**109.3**	**0.0**	**$57,374.16**	**$379,159.39**	**$62,485.00**	**$316,674.39**	**5.5**	**438,199**

* - 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.

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.

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

Energy Efficient Practices

TRC also identified nine 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 Marlboro Memorial Middle School include:

- Close Doors and Windows
- Ensure Lighting Controls Are Operating Properly
- Ensure Economizers are Functioning Properly
- Assess Chillers & Request Tune-Ups
- Clean Evaporator/Condenser Coils on AC Systems
- Clean and/or Replace HVAC Filters
- Perform Proper Water Heater Maintenance
- Install Plug Load Controls
- Water Conservation

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

On-Site Generation Measures

TRC evaluated the potential for installing on-site generation for Marlboro Memorial Middle School. 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	268	kW DC STC
Electric Generation	319,287	kWh/yr
Displaced Cost	$27,780	/yr
Installed Cost	$905,800	

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

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

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

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Cindy Barr-Rague	Business Administration/Board Secretary	cbarr-rague@mtps.org	(732) 972-2000 Ext 2010
Michael Crivelli	Supervisor of Building & Grounds	mcrivelli@mtps.org	(732) 972-2122
TRC Energy Services			
Smruti Srinivasan	Auditor	Ssrinivasan@trcsolutions.com	(732) 855-0033

2.2 General Site Information

On March 14, 2018, TRC performed an energy audit at Marlboro Memorial Middle School located in Morganville, New Jersey. TRC's team met with Mike Risk to review the facility operations and help focus our investigation on specific energy-using systems.

Marlboro Memorial Middle School (MMMS) is a 154,373 square foot, single-story middle school (grades 6-8). The building was originally built in 2003, and is in good condition. The building consists mainly of classrooms but also has a gymnasium, cafeteria, kitchen, and offices.

This facility is 100% heated and cooled. A majority of the building systems are just over 15 years old, and the mechanical equipment is in fair condition. The lighting primarily consists of fluorescent lamps. Many of the motors are standard efficiency and serve systems which have potential for energy savings through variable speed drive (VFD) control. Building heating is supplied by five modular natural gas hot water boilers while an electric air-cooled chiller supplies building cooling. The heating and cooling are controlled using a building energy management system.

2.3 Building Occupancy

The school building is open Monday through Friday and closed on the weekends. The typical schedule is presented in the table below. The entire facility is used year-round. During a typical day, the facility is occupied by approximately 124 staff and 903 students.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Marlboro Memorial Middle School	Weekday	7am - 5pm
Marlboro Memorial Middle School	Weekend	closed

2.4 Building Envelope

The MMMS building is constructed of structural steel with a brick façade. The building has a pitched metal roof that is in good condition. The building has operable double paned windows which are in good condition and show little sign of excessive infiltration. The exterior doors are constructed of aluminum with metal framed glass and are in good condition.

Image 1: Building Envelope

2.5 On-Site Generation

Marlboro Memorial Middle School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Lighting is provided mostly by 32-Watt linear fluorescent T8 lamps with electronic ballasts as well as 26-Watt and 13-Watt compact fluorescent lamps (CFL) and a few incandescent lamps. Most of the linear fluorescent fixtures are 4-foot long luminaires. Exit signs are LED fixtures.

Lighting control in most spaces is provided by wall switches. There are only a few locations with occupancy sensors.

The building's exterior lighting consists primarily of metal halide (MH), mercury vapor and CFL fixtures that are controlled by timers.

Image 2: Lighting Systems

Chilled Water System

The facility is served by a single chilled water plant. The chiller plant consists of a two 350 ton Carrier air cooled screw chiller with two constant flow chilled water pumps. These chillers provide cooling to the entire building. The chillers stage based on the cooling demand. The chilled water is distributed to 18 air handler units (AHUs) and six roof-top units (RTUs) on a primary-secondary loop. The primary loop has three 40 hp pumps while the secondary loop has two 100 hp pumps that operate in lead/lag. There is an operation/rotation schedule in the building energy management system (BEMS) that determines which pump operates. The chillers operate when the outside air temperature (OAT) is greater than 60°F. The chillers are new and well maintained.

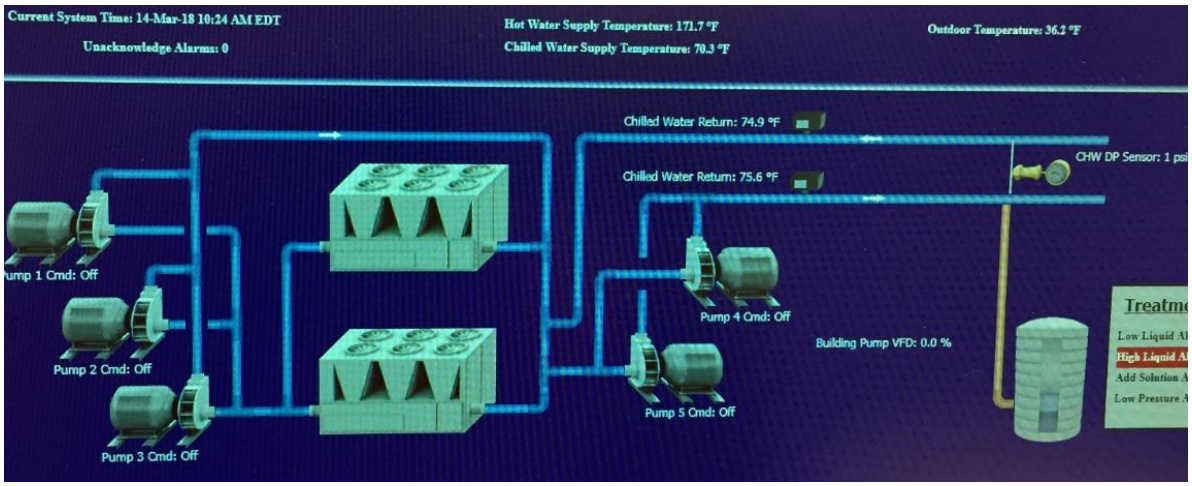


Image 3: Chiller System (Chiller, Pumps, BEMS)

Hot Water Heating (HHW) System

The hot water system consists of six Thermal Solutions EVH-2000 condensing boilers. Each boiler has an output capacity of 1,760 kBTU/hr and nominal combustion efficiency of 88%. The boilers operate when the OAT is lower than 55°F. The boilers are at least 15 years old but in good condition and are well maintained. Two constant flow hot water heating pumps operating in lead/lag on a rotating schedule that is controlled by BEMS which provides hot water to the AHUs and RTUs. The AHUs mainly serve the classrooms and offices while the RTUs serve the gym, cafeteria, kitchen, library and music rooms.

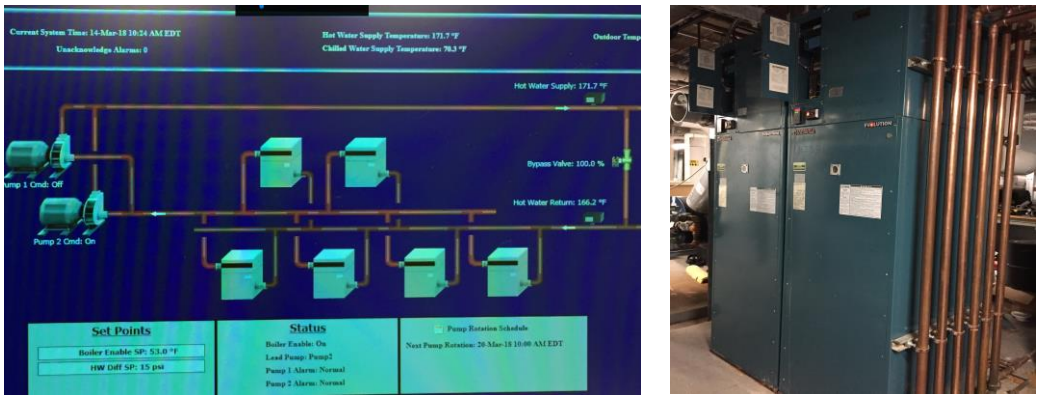


Image 4: HHW System (BEMS screenshot and boilers)

Chilled Water Air Conditioning System (CHW)

The chilled water produced by the chillers described in the chilled water system section above, serve the cooling coils for 18 air handling units (AHUs 1-18) and six roof-top units (RTUs1-6). The AHUs mainly serve the classrooms and offices while the RTUs serve the gym, cafeteria, kitchen, library and music rooms. The AHUs and RTUs are all constant air volume units serving single zones and are controlled by the Niagara BEMS system. Control is based on occupancy and the zone temperature set points. The systems have separate heating and cooling set points. Winter (heating) zone set points are globally set to 72-73^{o}F when occupied and set back to 65^{o}F when unoccupied. Summer (cooling) zone set points are globally set to 73-74^{o}F when occupied and set back to 80^{o}F when unoccupied. The AHUs and RTUs have outside air economizer to utilize free cooling when the outside air temperature is lower than the return air temperature. The outside air economizer is an electrical/mechanical system that requires periodic inspection and maintenance. We recommend that the economizers to the units be inspected for functionality as they could be wasting energy, decreasing comfort or impacting the air quality.

Image 5: Air Handler (AHU-1)

Image 6: Roof-top Units over Gym and Cafeteria

Direct Expansion Air Conditioning System (DX)

There are two 3-ton split system ACs used in the IT office. The units are manually controlled by a thermostat located in the zone. The unit operate on demand to maintain a space temperature set point (adjustable by staff).

Image 7: Split-System ACs

Image 8: Thermostat

Building Energy Management System (BEMS)

The majority of the facility is controlled with a Tridium Niagara building energy management system (BEMS). The BEMS aggregates the DDC points from throughout the building. The system controls the boiler and chiller plant as well as all the AHUs and RTUs. Operation schedules, set points, setbacks, etc. for the various mechanical equipment can be programmed on the BEMS.

Domestic Hot Water Heating System

The domestic hot water heating system for the facility consists of a single PVI-Turbopower water heater with an input rating of 1,600 MBh and a nominal efficiency of 83%. The water heater has a 900 gallon storage tank.

Food Service and Refrigeration

The school has a kitchen that is used to prepare approximately 1100 lunches per day for the students and staff. Most of the cooking is done using the gas ovens, steamers and a large stove.

The kitchen has several refrigerators and coolers as well as one walk-in freezer and a walk-in cooler. These appliances appear to be new.

Building Plug Load and Vending Machines

There are roughly 1,200 desktop and laptop computers throughout the facility. Roughly 86% of the computers are laptops while the remaining 14% are desktop units with LCD monitors. There is no centralized PC power management software installed. There are roughly 53 projectors and 49 Smartboards in the classrooms, as well as about 65 printers throughout the building.

The facility has four vending machines, three of which are refrigerated vending machines.

2.7 Water-Using Systems

A sampling of restrooms found that the faucets are rated for 2.2 gallons per minute (gpm) and the urinals are rated at 1.0 gallons per flush (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

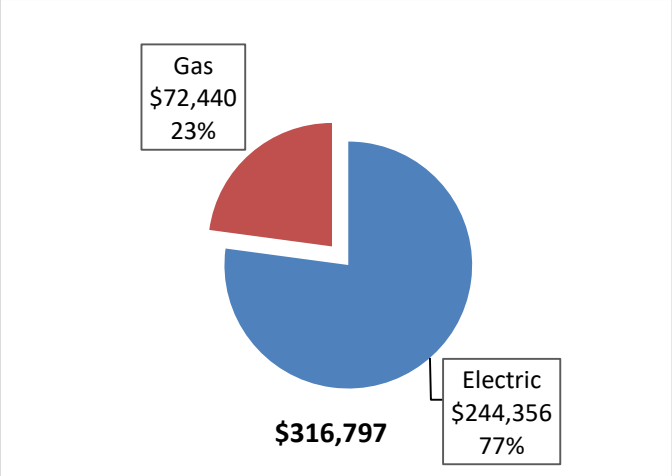
The following energy consumption and cost data is based on the last 12-month period of utility billing data that was provided for each utility. A profile of the annual energy consumption and energy cost of the facility was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Marlboro Memorial Middle School		
Fuel	**Usage**	**Cost**
Electricity	1,853,331 kWh	$244,356
Natural Gas	65,135 Therms	$72,440
Total		**$316,797**

The current annual energy cost for this facility is $316,797 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by JCP&L. The average electric cost over the past 12 months was $0.132/kWh, which is the blended rate that includes energy supply, distribution, and other charges. This rate is used throughout the analyses in this report to assess energy costs and savings. The monthly electricity consumption and peak demand are shown in the chart below.

Figure 9 - Electric Usage & Demand

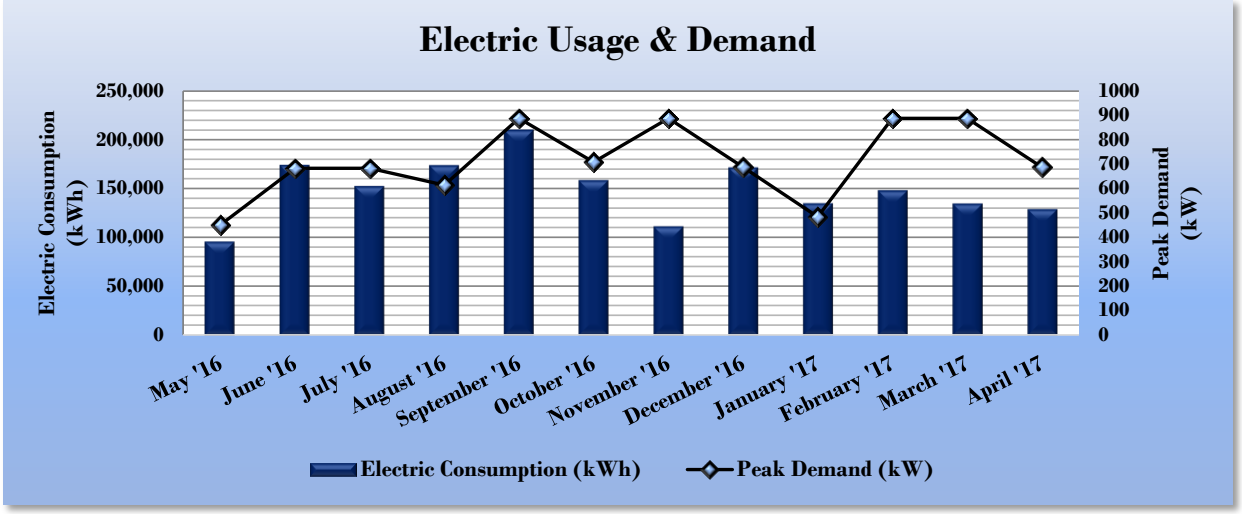


Figure 10 - Electric Usage & Demand

Electric Billing Data for Marlboro Memorial Middle School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
5/31/16	30	95,600	451	$0	$12,349
6/30/16	29	174,000	683	$0	$22,297
7/31/16	30	152,400	683	$0	$20,248
8/31/16	30	173,600	614	$0	$21,989
9/30/16	29	210,000	888	$0	$27,796
10/31/16	30	158,400	708	$0	$21,136
11/30/16	29	111,200	888	$0	$14,717
12/31/16	30	171,200	688	$0	$22,346
1/31/17	30	134,800	484	$0	$17,769
2/28/17	27	148,000	888	$0	$19,187
3/31/17	30	134,400	888	$0	$17,723
4/30/17	29	128,800	688	$0	$18,766
Totals	**353**	**1,792,400**	**888.4**	**$0**	**$236,323**
Annual	**365**	**1,853,331**	**888.4**	**$0**	**$244,356**

3.3 Natural Gas Usage

Natural gas is provided by NJ Natural Gas. The average gas cost for the past 12 months is $1.112/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

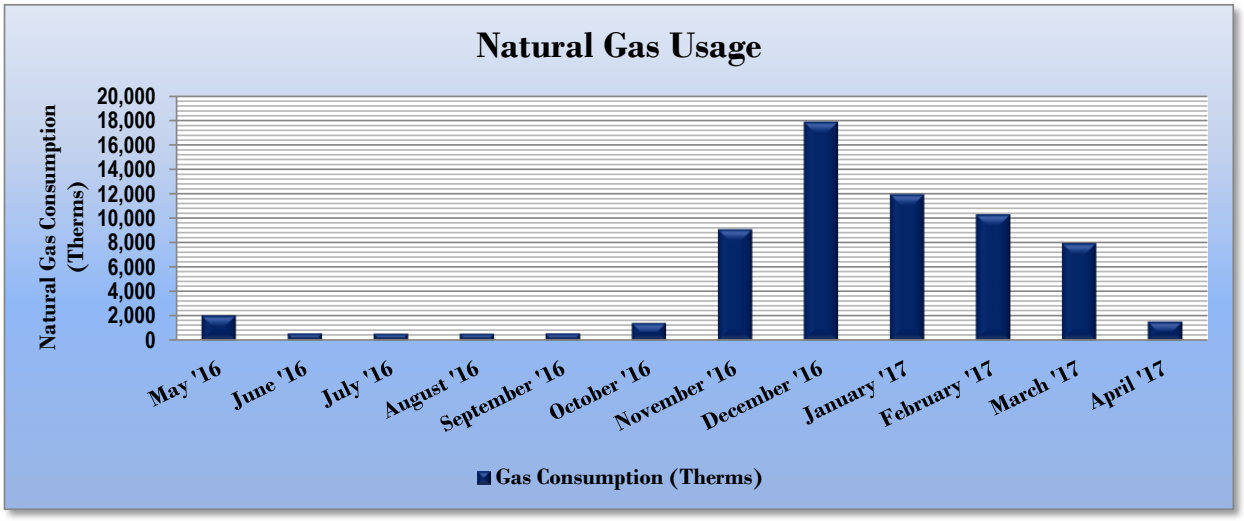


Figure 12 - Natural Gas Usage

Gas Billing Data for Marlboro Memorial Middle School				
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost	TRC Estimated Usage?
6/10/16	28	2,039	$3,587	No
7/13/16	32	572	$1,424	No
8/6/16	23	536	$1,333	Yes
9/9/16	33	549	$1,401	No
10/7/16	28	570	$1,476	No
11/8/16	32	1,418	$2,158	No
12/9/16	31	9,069	$9,195	No
1/11/17	33	17,833	$17,250	No
2/9/17	29	11,910	$12,146	No
3/13/17	32	10,281	$11,082	No
4/12/17	30	7,928	$8,191	No
5/12/17	29	1,539	$2,206	No
Totals	**360**	**64,243**	**$71,448**	
Annual	**365**	**65,135**	**$72,440**	

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		
	Marlboro Memorial Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	172.9	141.4
Site Energy Use Intensity (kBtu/ft^2)	83.2	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		
	Marlboro Memorial Middle School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	142.7	141.4
Site Energy Use Intensity (kBtu/ft^2)	73.5	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 21.

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

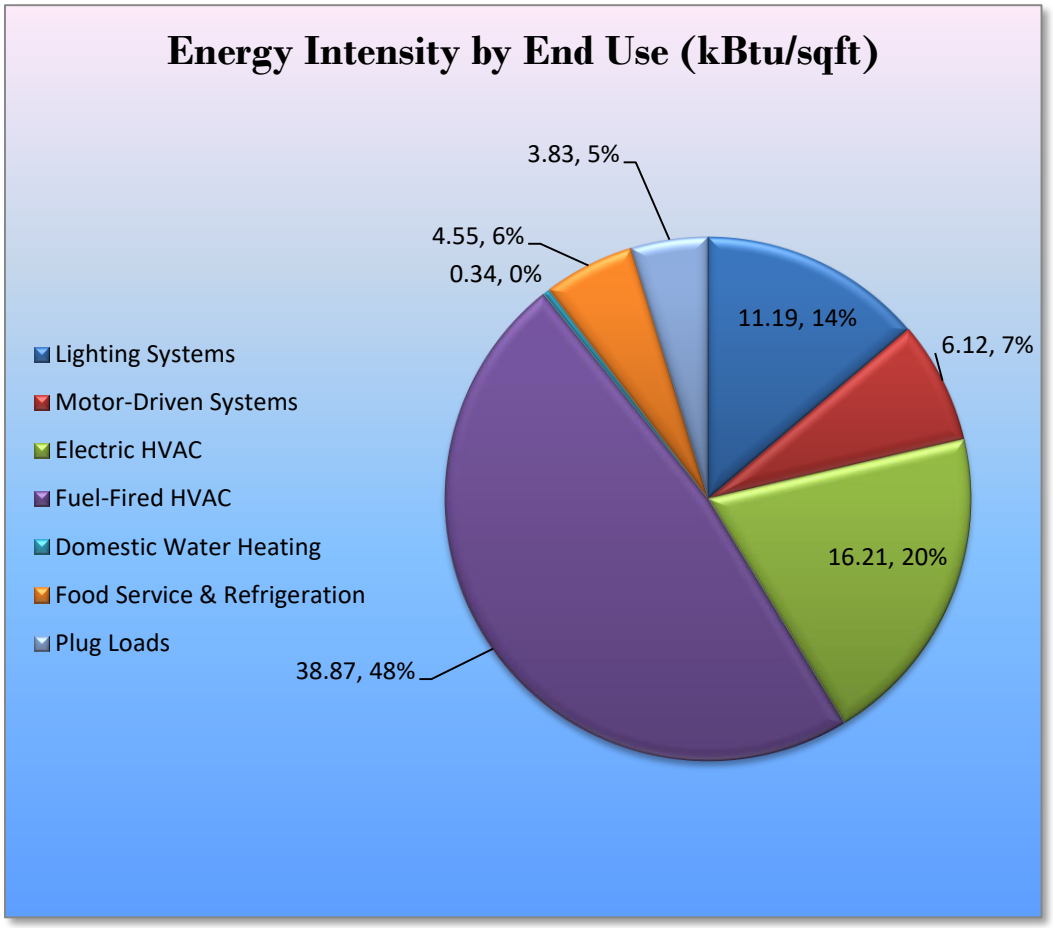
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		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			**279,438**	**56.7**	**0.0**	**$36,843.16**	**$212,826.89**	**$36,640.00**	**$176,186.89**	**4.8**	**281,392**
ECM 1	Install LED Fixtures	Yes	61,091	8.2	0.0	$8,054.68	$48,930.03	$9,540.00	$39,390.03	4.9	61,518
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	35	0.1	0.0	$4.67	$234.00	$20.00	$214.00	45.9	36
ECM 3	Retrofit Fixtures with LED Lamps	Yes	212,005	48.0	0.0	$27,952.23	$155,918.90	$27,080.00	$128,838.90	4.6	213,487
ECM 4	Install LED Exit Signs	Yes	6,307	0.4	0.0	$831.59	$7,743.96	$0.00	$7,743.96	9.3	6,351
Lighting Control Measures			**59,729**	**13.2**	**0.0**	**$7,875.07**	**$82,350.00**	**$9,345.00**	**$73,005.00**	**9.3**	**60,146**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	53,848	11.9	0.0	$7,099.70	$72,090.00	$9,345.00	$62,745.00	8.8	54,224
ECM 6	Install High/Low Lighitng Controls	Yes	5,881	1.3	0.0	$775.37	$10,260.00	$0.00	$10,260.00	13.2	5,922
Variable Frequency Drive (VFD) Measures			**90,811**	**39.3**	**0.0**	**$11,973.22**	**$83,062.50**	**$16,500.00**	**$66,562.50**	**5.6**	**91,446**
ECM 7	Install VFDs on Chilled Water Pumps	Yes	70,212	30.4	0.0	$9,257.24	$64,330.40	$16,500.00	$47,830.40	5.2	70,703
ECM 8	Install VFDs on Hot Water Pumps	Yes	20,599	8.9	0.0	$2,715.98	$18,732.10	$0.00	$18,732.10	6.9	20,743
Plug Load Equipment Control - Vending Machine			**5,178**	**0.0**	**0.0**	**$682.71**	**$920.00**	**$0.00**	**$920.00**	**1.3**	**5,214**
ECM 9	Vending Machine Control	Yes	5,178	0.0	0.0	$682.71	$920.00	$0.00	$920.00	1.3	5,214
TOTALS			**435,157**	**109.3**	**0.0**	**$57,374.16**	**$379,159.39**	**$62,485.00**	**$316,674.39**	**5.5**	**438,199**

* - 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		**279,438**	**56.7**	**0.0**	**$36,843.16**	**$212,826.89**	**$36,640.00**	**$176,186.89**	**4.8**	**281,392**
ECM 1	Install LED Fixtures	61,091	8.2	0.0	$8,054.68	$48,930.03	$9,540.00	$39,390.03	4.9	61,518
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	35	0.1	0.0	$4.67	$234.00	$20.00	$214.00	45.9	36
ECM 3	Retrofit Fixtures with LED Lamps	212,005	48.0	0.0	$27,952.23	$155,918.90	$27,080.00	$128,838.90	4.6	213,487
ECM 4	Install LED Exit Signs	6,307	0.4	0.0	$831.59	$7,743.96	$0.00	$7,743.96	9.3	6,351

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	2,890	0.6	0.0	$380.99	$3,155.60	$140.00	$3,015.60	7.9	2,910
Exterior	58,201	7.6	0.0	$7,673.69	$45,774.43	$9,400.00	$36,374.43	4.7	58,608

Measure Description

We recommend replacing interior HID fixtures, such as the high bay fixtures in the cafeteria and exterior metal halide and mercury vapor fixtures 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 fluorescent tubes 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	35	0.1	0.0	$4.67	$234.00	$20.00	$214.00	45.9	36
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

Additional savings from lighting maintenance can be anticipated since LEDs have lifetimes which are more than twice that of fluorescent tubes 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	211,348	47.9	0.0	$27,865.60	$155,273.86	$27,080.00	$128,193.86	4.6	212,826
Exterior	657	0.1	0.0	$86.62	$645.04	$0.00	$645.04	7.4	662

Measure Description

We recommend retrofitting existing incandescent, CFL, and linear 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 fluorescent tubes and more than 10 times longer than many incandescent lamps.

ECM 4: Install LED Exit Signs

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	6,307	0.4	0.0	$831.59	$7,743.96	$0.00	$7,743.96	9.3	6,351
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.0	0

Measure Description

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

4.1.2 Lighting Control Measures

Our recommendations for 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		**59,729**	**13.2**	**0.0**	**$7,875.07**	**$82,350.00**	**$9,345.00**	**$73,005.00**	**9.3**	**60,146**
ECM 5	Install Occupancy Sensor Lighting Controls	53,848	11.9	0.0	$7,099.70	$72,090.00	$9,345.00	$62,745.00	8.8	54,224
ECM 6	Install High/Low Lighitng Controls	5,881	1.3	0.0	$775.37	$10,260.00	$0.00	$10,260.00	13.2	5,922

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 5: 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)
53,848	11.9	0.0	$7,099.70	$72,090.00	$9,345.00	$62,745.00	8.8	54,224

Measure Description

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

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

ECM 6: Install High/Low Lighting Controls

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,881	1.3	0.0	$775.37	$10,260.00	$0.00	$10,260.00	13.2	5,922

Measure Description

We recommend installing occupancy sensors to provide dual level lighting control for lighting fixtures in hallways that are infrequently occupied but may require some level of continuous lighting for safety or security reasons. Typical areas for such lighting control are stairwells, interior corridors, parking lots, and parking garages.

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

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

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

4.1.3 Variable Frequency Drive Measures

Our recommendations for variable frequency drive (VFD) measures are summarized in Figure 19 below.

Figure 19 – Summary of Variable Frequency Drive ECMs

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)
Variable Frequency Drive (VFD) Measures			**90,811**	**39.3**	**0.0**	**$11,973.22**	**$83,062.50**	**$16,500.00**	**$66,562.50**	**5.6**	**91,446**
ECM 7	Install VFDs on Chilled Water Pumps	Yes	70,212	30.4	0.0	$9,257.24	$64,330.40	$16,500.00	$47,830.40	5.2	70,703
ECM 8	Install VFDs on Hot Water Pumps	Yes	20,599	8.9	0.0	$2,715.98	$18,732.10	$0.00	$18,732.10	6.9	20,743

ECM 7: Install VFDs on Chilled Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
70,212	30.4	0.0	$9,257.24	$64,330.40	$16,500.00	$47,830.40	5.2	70,703

Measure Description

We recommend installing a variable frequency drives (VFD) to control chilled water pumps. This measure requires that chilled water coils be served by 2-way valves and that a differential pressure sensor be installed in the chilled water loop. As the chilled water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure set point. Energy savings results from reducing pump motor speed (and power) as chilled water valves close. The magnitude of energy savings is based on the estimated amount of time that the system operates at reduced loads.

For systems with variable chilled water flow through the chiller, the minimum flow to prevent the chiller from tripping off will have to be determined during the final project design. The control system should be programmed to maintain the minimum flow through the chiller and to prevent pump cavitation.

ECM 8: Install VFDs on Hot Water Pumps

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
20,599	8.9	0.0	$2,715.98	$18,732.10	$0.00	$18,732.10	6.9	20,743

Measure Description

We recommend installing a variable frequency drives (VFD) to control a hot water pumps. This measure requires that a majority of the hot water coils be served by 2-way valves and that a differential pressure sensor is installed in the hot water loop. As the hot water valves close, the differential pressure increases. The VFD modulates pump speed to maintain a differential pressure set point. Energy savings results from reducing pump motor speed (and power) as hot water valves close. The magnitude of energy savings is based on the estimated amount of time that the system will operate at reduced load.

4.1.4 Plug Load Equipment Control - Vending Machines

Our recommendations for plug load equipment controls are summarized in Figure 20 below.

Figure 20-Summary of Plug Load Equipment Control ECMs

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)
Plug Load Equipment Control - Vending Machine			**5,178**	**0.0**	**0.0**	**$682.71**	**$920.00**	**$0.00**	**$920.00**	**1.3**	**5,214**
ECM 9	Vending Machine Control	Yes	5,178	0.0	0.0	$682.71	$920.00	$0.00	$920.00	1.3	5,214

ECM 9: Vending Machine Control

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
5,178	0.0	0.0	$682.71	$920.00	$0.00	$920.00	1.3	5,214

Measure Description

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

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.

Close Doors and Windows

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

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 set points and sensitivity are appropriately configured.

Ensure Economizers are Functioning Properly

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

Assess Chillers & Request Tune-Ups

Chillers are responsible for a substantial portion of a commercial building's overall energy usage. When components of a chiller are not optimized, this can quickly result in a noticeable increase in energy bills. Chiller diagnostics can produce a 5% to 10% cost avoidance potential from discovery and implementation of low/no cost optimization strategies.

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Proper Water Heater Maintenance

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

Plug Load Controls

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

Water Conservation

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

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

6 On-Site Generation Measures

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

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

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

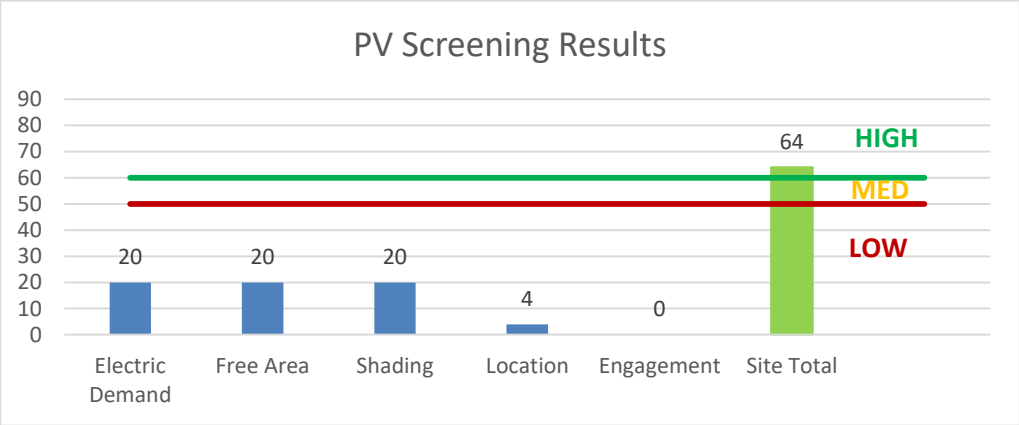
6.1 Photovoltaic

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

There appears to be a significant amount of free area in the parking lots with little shading that could provide a high potential for PV at the site. Solar carport PV arrays in the parking lots may be feasible. If Marlboro Memorial Middle School is interested in pursuing the installation of PV, we recommended a full feasibility study be conducted.

Figure 21 - Photovoltaic Screening



Potential	High	
System Potential	268	kW DC STC
Electric Generation	319,287	kWh/yr
Displaced Cost	$27,780	/yr
Installed Cost	$905,800	

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

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

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

6.2 Combined Heat and Power

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

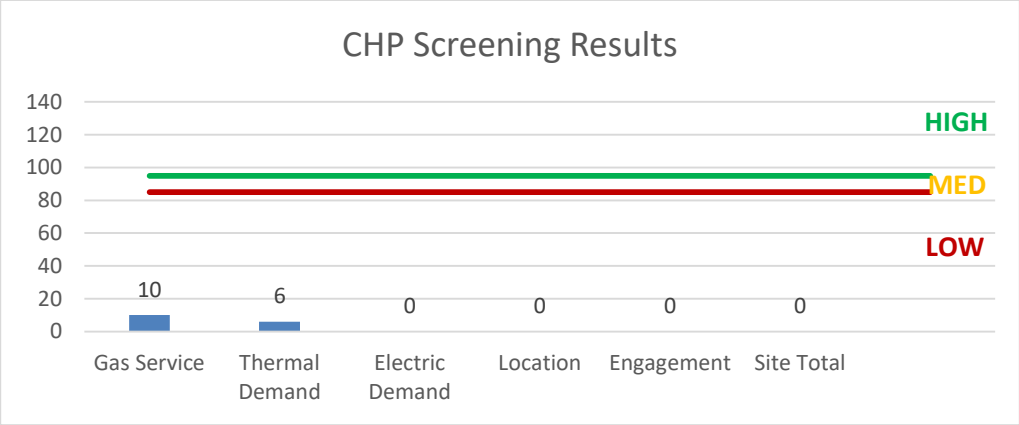
CHP systems are typically used to produce a portion of the electric power used onsite by a facility, with the balance of electric power needs supplied by grid purchases. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

Low and 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 22 - 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.

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

8 PROJECT FUNDING / INCENTIVES

The NJCEP is able to provide the incentive programs described below, and other benefits to ratepayers, because of the Societal Benefits Charge (SBC) Fund. The SBC was created by the State of New Jersey's Electricity Restructuring Law (1999), which requires all customers of investor-owned electric and gas utilities to pay a surcharge on their monthly energy bills. As a customer of a state-regulated electric or gas utility and therefore a contributor to the fund your organization is eligible to participate in the LGEA program and also eligible to receive incentive payment for qualifying energy efficiency measures. Also available through the NJBPU are some alternative financing programs described later in this section. Please refer to Figure 23 for a list of the eligible programs identified for each recommended ECM.

Figure 23 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive
ECM 1	Install LED Fixtures	x
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	x
ECM 3	Retrofit Fixtures with LED Lamps	x
ECM 4	Install LED Exit Signs	
ECM 5	Install Occupancy Sensor Lighting Controls	x
ECM 6	Install High/Low Lighitng Controls	
ECM 7	Install VFDs on Chilled Water Pumps	x
ECM 8	Install VFDs on Hot Water Pumps	
ECM 9	Vending Machine Control	

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

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

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

8.1 SmartStart

Overview

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

Equipment with Prescriptive Incentives Currently Available:

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

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

Incentives

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

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

How to Participate

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

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

8.2 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.

8.3 Energy Savings Improvement Program

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

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

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

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.38	1,703	0.0	$224.51	$1,170.00	$200.00	4.32
Boiler Room	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$39.85	$322.67	$0.00	8.10
Fire Sprinkler Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Fire Sprinkler Room	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Storage Outside Boiler	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.22	114	0.0	$15.01	$585.00	$100.00	32.31
Storage Outside Boiler	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Storage Outside Boiler	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	300	Relamp & Reballast	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.08	41	0.0	$5.37	$234.00	$20.00	39.87
Gym-Main	42	Compact Fluorescent: pin based	Wall Switch	13	2,580	Relamp	Yes	42	LED Screw-In Lamps: pin-based replacement	Occupancy Sensor	10	1,806	0.17	748	0.0	$98.58	$3,337.63	$140.00	32.44
Gym-Main	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$39.85	$322.67	$0.00	8.10
Auxillary Gym	14	Compact Fluorescent: pin based	Wall Switch	13	2,580	Relamp	Yes	14	LED Screw-In Lamps: pin-based replacement	Occupancy Sensor	10	1,806	0.06	249	0.0	$32.86	$1,292.54	$70.00	37.20
Outside Hall	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,806	0.38	1,742	0.0	$229.71	$1,031.07	$160.00	3.79
Outside Hall	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Boys Locker Rm	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,580	0.04	166	0.0	$21.91	$95.13	$20.00	3.43
Boys Locker Rm	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Boys Locker Rm	11	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	11	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.53	2,396	0.0	$315.85	$1,316.47	$255.00	3.36
Boys Locker Rm_RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.10	436	0.0	$57.43	$460.27	$75.00	6.71
Boys Locker Rm_Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Boys Locker Rm_Office RR	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Boys Locker Rm_Office RR	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Gym Entrance	6	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,580	Relamp	Yes	6	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,806	0.14	626	0.0	$82.50	$640.20	$125.00	6.24
Gym Entrance	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Gym Hall on Girl LR side	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	10	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.22	979	0.0	$129.09	$585.00	$100.00	3.76
Gym Main Ent	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.16	742	0.0	$97.88	$621.00	$60.00	5.73
Custodial Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.04	23	0.0	$3.00	$117.00	$20.00	32.31
Custodial Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.04	23	0.0	$3.00	$117.00	$20.00	32.31

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Girls RR	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.16	742	0.0	$97.88	$621.00	$95.00	5.37
Girls RR	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Boys RR	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.16	742	0.0	$97.88	$621.00	$95.00	5.37
Boys RR	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Cafeteria	50	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	50	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,806	1.27	5,771	0.0	$760.87	$5,320.00	$280.00	6.62
Cafeteria	7	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	7	LED Exit Signs: 2 W Lamp	None	6	8,760	0.05	705	0.0	$92.98	$752.89	$0.00	8.10
Cafeteria	12	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	12	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	1,806	0.31	1,385	0.0	$182.61	$1,298.40	$70.00	6.73
Cafeteria	18	Compact Fluorescent: pin based, 2 Lamp	Wall Switch	26	2,580	Relamp	Yes	18	LED Screw-In Lamps: pin-based replacement	Occupancy Sensor	19	1,806	0.15	678	0.0	$89.43	$2,475.11	$70.00	26.89
Kitchen	19	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	No	19	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,580	0.70	3,157	0.0	$416.23	$1,807.53	$380.00	3.43
Kitchen	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Kitchen_Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	300	Relamp	No	4	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	300	0.15	77	0.0	$10.19	$380.53	$80.00	29.50
Kitchen_Sink area	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	No	5	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,580	0.18	831	0.0	$109.53	$475.67	$100.00	3.43
Kitchen_Sink area	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.06	294	0.0	$38.73	$175.50	$30.00	3.76
Kitchen_custodial closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Kitchen_Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.04	23	0.0	$3.00	$117.00	$20.00	32.31
Kitchen_locker area	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	No	2	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,580	0.07	332	0.0	$43.81	$190.27	$40.00	3.43
Kitchen_RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Cust. Office Hall	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.08	371	0.0	$48.94	$445.50	$30.00	8.49
Cust. Office Hall	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	1,806	0.19	871	0.0	$114.85	$650.53	$80.00	4.97
Cust. Office Hall_RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Kitchen_Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Kitchen_Office-WalkInArea	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	No	3	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,580	0.11	498	0.0	$65.72	$285.40	$60.00	3.43
Kitchen_Office-WalkInArea	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Cafeteria Support Closet	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.13	68	0.0	$9.01	$351.00	$60.00	32.31
Stage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76

	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
Cafeteria Exits	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Cafeteria Exits	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Cafeteria Exits	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Cafeteria Exits	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Music Hallway	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.46	2,103	0.0	$277.31	$1,534.50	$170.00	4.92
Boys RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Girls RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Vocal Music	22	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	22	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	1.06	4,791	0.0	$631.69	$2,902.93	$545.00	3.73
Vocal Music _Office	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.14	619	0.0	$81.56	$562.50	$85.00	5.85
Rm 164	40	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	40	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	1.09	4,949	0.0	$652.51	$3,960.00	$610.00	5.13
Rm 164	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$39.85	$322.67	$0.00	8.10
Rm 164_Storage	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	3	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.06	34	0.0	$4.50	$175.50	$30.00	32.31
Rm 164_Practice Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.14	653	0.0	$86.14	$555.40	$95.00	5.34
Rm 162_Music Appreciation	17	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	17	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.46	2,103	0.0	$277.31	$1,534.50	$240.00	4.67
Rm 162	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Main Entrance	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	20	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.55	2,474	0.0	$326.25	$1,980.00	$200.00	5.46
Main Entrance	24	Compact Fluorescent: pin based, 2 Lamp	Wall Switch	26	2,580	Relamp	Yes	24	LED Screw-In Lamps: pin-based replacement	Occupancy Sensor	19	1,806	0.20	904	0.0	$119.23	$3,120.14	$70.00	25.58
Main Entrance	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Main Entrance_Vestibule	6	Compact Fluorescent: pin based, 2 Lamp	Wall Switch	26	2,580	Relamp	No	6	LED Screw-In Lamps: pin-based replacement	Wall Switch	19	2,580	0.03	125	0.0	$16.43	$645.04	$0.00	39.26
Media Cntr & Cafet. Hall	29	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	29	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.79	3,588	0.0	$473.07	$2,776.50	$290.00	5.26
Media Cntr & Cafet. Hall	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Computer Lab	26	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	26	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	1.07	4,825	0.0	$636.19	$3,035.20	$530.00	3.94
Computer Lab	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Media Center	23	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	23	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	0.94	4,268	0.0	$562.79	$2,539.60	$450.00	3.71
Media Center	22	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	22	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	0.90	4,083	0.0	$538.32	$2,464.40	$435.00	3.77

	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
Media Center	3	Compact Fluorescent: pin based, 3 Lamp	Wall Switch	126	2,580	Relamp	Yes	3	LED Screw-In Lamps: pin-based replacement	Occupancy Sensor	89	1,806	0.13	567	0.0	$74.76	$753.78	$35.00	9.61
Media Center	4	Compact Fluorescent: pin based, 6 Lamp	Wall Switch	252	2,580	Relamp	Yes	4	LED Screw-In Lamps: pin-based replacement	Occupancy Sensor	177	1,806	0.34	1,520	0.0	$200.45	$1,830.07	$70.00	8.78
Media Center	5	Compact Fluorescent: pin based, 6 Lamp	Wall Switch	252	2,580	Relamp	Yes	5	LED Screw-In Lamps: pin-based replacement	Occupancy Sensor	177	1,806	0.42	1,900	0.0	$250.56	$2,422.59	$105.00	9.25
Media Center_Sidewall Mt	32	Linear Fluorescent - T5: 4' T5 (28W) - 1L	Wall Switch	30	2,580	Relamp	Yes	32	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	1,806	0.42	1,885	0.0	$248.48	$2,498.80	$335.00	8.71
Media Center	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Media Center_Workroom	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.11	495	0.0	$65.25	$504.00	$75.00	6.57
Media Center_Bookroom	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.08	371	0.0	$48.94	$445.50	$65.00	7.78
Computer Lab 157	26	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	26	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	1.07	4,825	0.0	$636.19	$3,035.20	$530.00	3.94
Elec Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
Rec Lounge	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.43	1,960	0.0	$258.42	$1,126.20	$215.00	3.53
Fac. RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Fac. RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
CR 154	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 152	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 153	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 155	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 154_Hall	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.36	1,608	0.0	$212.06	$1,300.50	$130.00	5.52
CR 150	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 148	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 151	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 149	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
Art- Hallway	33	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	33	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.90	4,083	0.0	$538.32	$3,280.50	$330.00	5.48
Art- Hallway_Vestibule	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
IDF Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Elec.Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31

	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
Art Room 158	40	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	40	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	1.09	4,949	0.0	$652.51	$3,960.00	$610.00	5.13
Art Room 158	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Art Room 158_Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.09	46	0.0	$6.00	$234.00	$40.00	32.31
Art Room 158	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.11	495	0.0	$65.25	$504.00	$75.00	6.57
CR 156	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 159	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 147	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
Elec Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
IDF Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
8th Grade Hall	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.36	1,608	0.0	$212.06	$1,300.50	$130.00	5.52
Boys RR	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.14	619	0.0	$81.56	$562.50	$85.00	5.85
Girls RR	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.14	619	0.0	$81.56	$562.50	$85.00	5.85
Sprinkler	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
CR 186 Copy Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.29	1,307	0.0	$172.28	$840.80	$155.00	3.98
CR 187	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.77	3,484	0.0	$459.41	$2,062.13	$390.00	3.64
Fac RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.10	436	0.0	$57.43	$460.27	$75.00	6.71
Phone Room 189	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.10	436	0.0	$57.43	$460.27	$75.00	6.71
Phone Room 188	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.10	436	0.0	$57.43	$460.27	$75.00	6.71
CR 146	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.38	1,742	0.0	$229.71	$1,031.07	$195.00	3.64
CR 145	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.38	1,742	0.0	$229.71	$1,031.07	$195.00	3.64
CR 142	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 142	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
CR 144	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 144	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
CR 143	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
CR 143	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Exit Vestibules	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Exit Vestibules	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Exit Vestibules	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
CR 141	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 140	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 138	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 139	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.38	1,742	0.0	$229.71	$1,031.07	$195.00	3.64
CR 137	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.38	1,742	0.0	$229.71	$1,031.07	$195.00	3.64
CR 139 Hallway	29	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	29	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.79	3,588	0.0	$473.07	$2,776.50	$290.00	5.26
CR 139 Hallway	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
CR 135	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
Science Lab 136	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.77	3,464	0.0	$456.75	$2,718.00	$420.00	5.03
Science Lab 136_Prep	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	0.08	371	0.0	$48.94	$420.40	$65.00	7.26
Science Lab 136_Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Science Lab 136	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Science Lab 134	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.77	3,464	0.0	$456.75	$2,718.00	$420.00	5.03
Science Lab 134_Prep	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	0.08	371	0.0	$48.94	$420.40	$65.00	7.26
Science Lab 134_Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Science Lab 134	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Science Lab 133	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.77	3,464	0.0	$456.75	$2,718.00	$420.00	5.03
Science Lab 133_Prep	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	0.08	371	0.0	$48.94	$420.40	$65.00	7.26
Science Lab 133_Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Science Lab 133	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Science Lab 132	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.77	3,464	0.0	$456.75	$2,718.00	$420.00	5.03

	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
Science Lab 132_Prep	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	0.08	371	0.0	$48.94	$420.40	$65.00	7.26
Science Lab 132_Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Science Lab 132	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Science Lab 131	28	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	28	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.77	3,464	0.0	$456.75	$2,718.00	$420.00	5.03
Science Lab 131_Prep	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	2,580	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	1,806	0.08	371	0.0	$48.94	$420.40	$65.00	7.26
Science Lab 131_Storage	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Science Lab 131	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Athletic 193	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.14	653	0.0	$86.14	$555.40	$95.00	5.34
Athletic 193_RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
IDF Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Science Lab_127	21	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	21	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	1.01	4,573	0.0	$602.98	$2,807.80	$525.00	3.79
Science Lab_127	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Science Lab_128	21	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	21	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	1.01	4,573	0.0	$602.98	$2,807.80	$525.00	3.79
Science Lab_128	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Applied Tec 129	43	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	43	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	1.18	5,320	0.0	$701.44	$4,405.50	$675.00	5.32
Applied Tec 129	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Office 191	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.14	653	0.0	$86.14	$555.40	$95.00	5.34
CR 130	36	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	36	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.98	4,454	0.0	$587.26	$3,726.00	$570.00	5.37
CR 130	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Entry 36 Vestibule	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Entry 36 Vestibule	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Girls RR	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.16	742	0.0	$97.88	$621.00	$95.00	5.37
Boys RR	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.16	742	0.0	$97.88	$621.00	$95.00	5.37
Custodial Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
Electrical Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.04	23	0.0	$3.00	$117.00	$20.00	32.31

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
CR 123	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 125	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 126	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 120	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 121	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 122	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 123 _Hallway	30	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	30	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.82	3,712	0.0	$489.38	$3,105.00	$300.00	5.73
Art Room 121	40	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	40	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	1.09	4,949	0.0	$652.51	$3,960.00	$610.00	5.13
Art Room 121_Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.09	46	0.0	$6.00	$234.00	$40.00	32.31
Art Room 121_Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.09	46	0.0	$6.00	$234.00	$40.00	32.31
Faculty Lounge	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.30	1,361	0.0	$179.44	$913.50	$145.00	4.28
CR 119	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.22	990	0.0	$130.50	$738.00	$115.00	4.77
CR 117	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.22	990	0.0	$130.50	$738.00	$115.00	4.77
Faculty RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
Girls RR	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.16	742	0.0	$97.88	$621.00	$95.00	5.37
Boys RR	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.16	742	0.0	$97.88	$621.00	$95.00	5.37
Electrical Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
RT Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
CR 118	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 116	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 115	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 114	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
Science 113 Hall	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.38	1,732	0.0	$228.38	$1,359.00	$140.00	5.34
Science 113 Hall	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
ScienceLab 113	31	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	31	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.85	3,835	0.0	$505.69	$3,163.50	$485.00	5.30

	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
ScienceLab 113	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
ScienceLab 112	31	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	31	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.85	3,835	0.0	$505.69	$3,163.50	$485.00	5.30
ScienceLab 112	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
CR 111	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 108	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 110	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 109	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 101	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 107	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 103	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 104	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 105	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 106	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
CR 100	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
Exit Vestibules	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	6	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.16	742	0.0	$97.88	$621.00	$60.00	5.73
Exit Vestibules	3	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	302	0.0	$39.85	$322.67	$0.00	8.10
CR 104_Hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	13	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.36	1,608	0.0	$212.06	$1,300.50	$130.00	5.52
CR 104_Hallway	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Computer Lab 102	32	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	32	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.87	3,959	0.0	$522.00	$3,222.00	$495.00	5.22
Computer Lab 102	2	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	201	0.0	$26.56	$215.11	$0.00	8.10
Custodial Closet	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.04	23	0.0	$3.00	$117.00	$20.00	32.31
NursesOffice 210	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
NursesOffice 210	7	Linear Fluorescent - T8: 2' T8 (17W) - 3L	Wall Switch	53	2,580	Relamp	Yes	7	LED - Linear Tubes: (3) 2' Lamps	Occupancy Sensor	26	1,806	0.16	730	0.0	$96.25	$701.90	$140.00	5.84
NursesOffice 210_Office RR	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.10	436	0.0	$57.43	$460.27	$75.00	6.71
NursesOffice 210_RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	2,580	0.04	166	0.0	$21.91	$95.13	$20.00	3.43

	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
NursesOffice 210_Closet	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.02	11	0.0	$1.50	$58.50	$10.00	32.31
NursesOffice_Hallway	12	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	12	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	1,806	0.33	1,485	0.0	$195.75	$1,242.00	$120.00	5.73
NursesOffice_Hallway	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
StudentServicesSuite	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.43	1,960	0.0	$258.42	$1,126.20	$215.00	3.53
StudentServicesSuite	9	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,580	Relamp	Yes	9	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,806	0.12	563	0.0	$74.29	$703.80	$125.00	7.79
Record Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	300	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	210	0.19	101	0.0	$13.36	$650.53	$115.00	40.10
Record Storage	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	300	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	300	0.01	6	0.0	$0.73	$48.20	$0.00	66.23
Conference	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.43	1,960	0.0	$258.42	$1,126.20	$215.00	3.53
Office 223	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Office 222	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Office 221	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Office 220	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Office 217	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Testing Room 216	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.10	436	0.0	$57.43	$460.27	$75.00	6.71
ChildStudy Room 219	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.58	2,613	0.0	$344.56	$1,681.60	$310.00	3.98
Conf Room 218	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.29	1,307	0.0	$172.28	$840.80	$155.00	3.98
Admin Office Suite	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.38	1,742	0.0	$229.71	$1,031.07	$195.00	3.64
Admin Office Suite	7	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	2,580	Relamp	Yes	7	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	1,806	0.10	438	0.0	$57.78	$607.40	$105.00	8.70
Admin Office Suite	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Principals Secr	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.10	436	0.0	$57.43	$460.27	$75.00	6.71
VP Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Principal'sOffice	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.43	1,960	0.0	$258.42	$1,126.20	$215.00	3.53
Conf Room	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.29	1,307	0.0	$172.28	$840.80	$155.00	3.98
Main Office RR	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
Work Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.08	371	0.0	$48.94	$445.50	$65.00	7.78

	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
VP Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	2,580	Relamp	Yes	4	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	1,806	0.19	871	0.0	$114.85	$650.53	$115.00	4.66
Student Waiting	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.02	98	0.0	$12.91	$58.50	$10.00	3.76
Security Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Storage Vestibule	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	300	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	300	0.09	46	0.0	$6.00	$234.00	$40.00	32.31
Storage Vestibule	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Secure Waiting Area	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,806	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.04	137	0.0	$18.07	$117.00	$20.00	5.37
Secure Waiting Area	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Secure Vestibule	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	1,806	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.04	137	0.0	$18.07	$117.00	$20.00	5.37
Secure Vestibule	1	Exit Signs: Fluorescent	None	16	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	101	0.0	$13.28	$107.56	$0.00	8.10
Cafeteria	14	Metal Halide: (1) 70W Lamp	Wall Switch	95	2,580	Fixture Replacement	Yes	14	LED - Fixtures: Ceiling Mount	Occupancy Sensor	15	1,806	0.78	3,510	0.0	$462.78	$3,695.60	$210.00	7.53
IT Office	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,806	0.38	1,732	0.0	$228.38	$1,359.00	$210.00	5.03
IT Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Locker Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	2,580	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	2,580	0.04	196	0.0	$25.82	$117.00	$20.00	3.76
Wallpacks _Courtyard	12	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,380	Fixture Replacement	No	12	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	20	4,380	0.85	6,528	0.0	$860.69	$4,688.12	$1,200.00	4.05
ParkingLotPoles	43	Mercury Vapor: (1) 100W Lamp	Daylight Dimming	125	4,380	Fixture Replacement	No	43	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Daylight Dimming	19	4,380	2.99	22,959	0.0	$3,027.03	$14,885.96	$2,150.00	4.21
Doorway Canopy	6	Compact Fluorescent: 2 lamp, type 42W/Lamp	Daylight Dimming	84	4,380	Relamp	No	6	LED Screw-In Lamps: pin-based replacement	Daylight Dimming	59	4,380	0.10	756	0.0	$99.62	$645.04	$0.00	6.48
Wallpacks Outside Bldg	31	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,380	Fixture Replacement	No	31	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	20	4,380	2.19	16,864	0.0	$2,223.45	$12,110.99	$3,100.00	4.05
Parking Lot Poles	9	Mercury Vapor: (1) 100W Lamp	Daylight Dimming	125	4,380	Fixture Replacement	No	9	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Daylight Dimming	19	4,380	0.63	4,805	0.0	$633.56	$3,115.67	$450.00	4.21
Garden Poles	8	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,380	Fixture Replacement	No	8	LED - Fixtures: Outdoor Pole/Arm-Mounted Decorative Fixture	Daylight Dimming	20	4,380	0.57	4,352	0.0	$573.79	$2,769.48	$400.00	4.13
Main Entrance	21	Metal Halide: (1) 100W Lamp	Daylight Dimming	128	4,380	Fixture Replacement	No	21	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	20	4,380	1.49	11,424	0.0	$1,506.21	$8,204.22	$2,100.00	4.05

Motor Inventory & Recommendations

		Existing Conditions						Proposed Conditions				Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Motor Quantity	Motor Application	HP Per Motor	Full Load Efficiency	VFD Control?	Annual Operating Hours	Install High Efficiency Motors?	Full Load Efficiency	Install VFDs?	Number of VFDs	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Boilers	2	Heating Hot Water Pump	40.0	94.1%	No	800	No	94.1%	Yes	2	8.92	20,599	0.0	$2,715.98	$18,732.10	$0.00	6.90
Boiler Room	Chillers	2	Chilled Water Pump	100.0	95.4%	No	800	No	95.4%	Yes	2	22.00	50,797	0.0	$6,697.42	$40,322.30	$12,000.00	4.23
Boiler Room	Chillers	3	Chilled Water Pump	25.0	93.6%	No	800	No	93.6%	Yes	3	8.41	19,415	0.0	$2,559.83	$24,008.10	$4,500.00	7.62
Attic	AHU 5	1	Supply Fan	5.0	89.5%	No	1,400	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU 3, 4	2	Supply Fan	5.0	89.5%	No	1,400	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU 3, 4	2	Return Fan	3.0	89.5%	No	1,400	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU2	1	Supply Fan	2.0	86.5%	No	1,400	No	86.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU1	1	Supply Fan	3.0	89.5%	No	1,400	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU 6,7,8,9,10,11,12,13	8	Supply Fan	3.0	89.5%	No	1,400	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Attic	AHU 14,15,16,17,18	5	Supply Fan	3.0	89.5%	No	1,400	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Bathrooms	8	Exhaust Fan	0.5	89.0%	No	2,745	No	89.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Kitchen	1	Kitchen Hood Exhaust Fan	1.0	85.5%	No	2,000	No	85.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Gym - RTU1	1	Supply Fan	20.0	93.0%	No	1,400	No	93.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Aux Gym - RTU2	1	Supply Fan	10.0	91.7%	No	1,400	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Café - RTU3	1	Supply Fan	10.0	91.7%	No	1,400	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Library - RTU4	1	Supply Fan	10.0	91.7%	No	1,400	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Music - RTU5	1	Supply Fan	10.0	91.7%	No	1,400	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Music - RTU5	1	Return Fan	5.0	89.5%	No	1,400	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof	Kitchen - RTU6	1	Supply Fan	10.0	91.7%	No	1,400	No	91.7%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
IT Office	IT Office	2	Split-System AC	3.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric Chiller Inventory & Recommendations

		Existing Conditions			Proposed Conditions							Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	Chiller Quantity	System Type	Cooling Capacity per Unit (Tons)	Install High Efficiency Chillers?	Chiller Quantity	System Type	Constant/ Variable Speed	Cooling Capacity (Tons)	Full Load Efficiency (kW/Ton)	IPLV Efficiency (kW/Ton)	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
Outside Grounds	All school	2	Air-Cooled Screw Chiller	350.00	No							0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	Whole Bldg (AHUs, RTUs, and UVs)	6	Non-Condensing Hot Water Boiler	1,760.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

DHW Inventory & Recommendations

		Existing Conditions		Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Replace?	System Quantity	System Type	Fuel Type	System Efficiency	Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	All School	1	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

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)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Medium Temp Freezer (0F to 30F)	No	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Refrigerator/Freezer Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Refrigerator/ Freezer Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Refrigerator Chest	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	5	Stand-Up Refrigerator, Glass Door (16 - 30 cu. ft.)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Cooking Equipment Inventory & Recommendations

	Existing Conditions			Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Equipment Type	High Efficiency Equipement?	Install High Efficiency Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Kitchen	1	Electric Steamer	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	4	Gas Combination Oven/Steam Cooker (15 - 28 Pans)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Insulated Food Holding Cabinet (Full Size)	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Dishwasher Inventory & Recommendations

	Existing Conditions					Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Dishwasher Type	Water Heater Fuel Type	Booster Heater Fuel Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Payback w/ Incentives in Years
Kitchen	1	Door Type (Low Temp)	Electric	N/A	No	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Various	163	Desktop Computer	270.0	
Various	1,003	Laptops	75.0	
Various	59	Small Printer	60.0	
Various	4	Medium Printer	120.0	
Various	2	Large Printer	180.0	
Various	53	Projectors	400.0	
Various	13	Microwaves	1,500.0	
Various	2	Sm.Refrigerators	200.0	
Various	3	Md.Refrigerators	400.0	
Various	6	Lg.Refrigerators	700.0	
Various	10	Coffee Machine	999.0	
Various	3	Toaster Oven	1,500.0	
Various	3	Standing Fans	200.0	
Various	49	Smart Board	300.0	
Various	1	Cold/Hot Water Dispenser	300.0	

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Snack Area	3	Refrigerated	Yes	0.00	4,836	0.0	$637.55	$690.00	$0.00	1.08
Snack Area	1	Non-Refrigerated	Yes	0.00	343	0.0	$45.16	$230.00	$0.00	5.09

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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ENERGY STAR® Score[1]

Marlboro Memorial Middle School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 154,373
Built: 2003

For Year Ending: April 30, 2017
Date Generated: April 06, 2018

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Marlboro Memorial Middle School 71 Nolan Road Morganville, New Jersey 07751	Marlboro Township Board of Education 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000	Cindy Barr-Rague 1980 Township Drive Marlboro, NJ 07746 (732) 972-2000 Ext. 2010 cbarr-rague@mtps.org

Property ID: 6277890

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
81.5 kBtu/ft²

Source EUI
168.4 kBtu/ft²

Annual Energy by Fuel

Natural Gas (kBtu)	6,466,704 (51%)
Electric - Grid (kBtu)	6,115,669 (49%)

National Median Comparison

National Median Site EUI (kBtu/ft²)	63
National Median Source EUI (kBtu/ft²)	130.1
% Diff from National Median Source EUI	29%

Annual Emissions

Greenhouse Gas Emissions (Metric Tons CO2e/year)	1,022

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)