Local Government Energy Audit:
Energy Audit Report

Abraham Clark High School

Roselle Borough Board of Education

122 East 6th Street
Roselle, New Jersey 07203

November 7, 2018

Final Report by:
TRC Energy Services

Disclaimer

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

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

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

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

Table of Contents

1 Executive Summary 1

1.1 Facility Summary 1
1.2 Your Cost Reduction Opportunities 1

Energy Conservation Measures 1
Energy Efficient Practices 3
Self-Generation Measures 3

1.3 Implementation Planning 4

2 Facility Information and Existing Conditions 5

2.1 Project Contacts 5
2.2 General Site Information 5
2.3 Building Occupancy 5
2.4 Building Envelope 5
2.5 On-site Generation 6
2.6 Energy-Using Systems 6

Lighting System 6
Steam System 6
Air Conditioning 7
Domestic Hot Water 7
Food Service & Refrigeration 7
Plug load & Vending Machines 7

2.7 Water-Using Systems 8

3 Site Energy Use and Costs 9

3.1 Total Cost of Energy 9
3.2 Electricity Usage 10
3.3 Natural Gas Usage 11
3.4 Benchmarking 12
3.5 Energy End-Use Breakdown 13

4 Energy Conservation Measures 14

4.1 Recommended ECMs 14
4.1.1 Lighting Upgrades 15

ECM 1: Install LED Fixtures 15
ECM 2: Retrofit Fluorescent Fixtures with LED Lamps and Drivers 16
ECM 3: Retrofit Fixtures with LED Lamps 17
ECM 4: Install LED Exit Signs 18

4.1.2 Lighting Control Measures 19

ECM 5: Install Occupancy Sensor Lighting Controls 19
ECM 6: Install High/Low Lighting Controls 20

4.1.3 Electric Unitary HVAC Measures 21

ECM 7: Install High Efficiency Electric AC 21

4.1.4 Domestic Water Heating Upgrade 22
ECM 8: Install Low-Flow DHW Devices 22
4.1.5 Plug Load Equipment Control - Vending Machine 23
ECM 9: Vending Machine Control 23
5 Energy Efficient Practices 24
Reduce Air Leakage 24
Close Doors and Windows 24
Perform Proper Lighting Maintenance 24
Develop a Lighting Maintenance Schedule 24
Ensure Lighting Controls Are Operating Properly 24
Turn Off Unneeded Motors 25
Perform Routine Motor Maintenance 25
Use Fans to Reduce Cooling Load 25
Practice Proper Use of Thermostat Schedules and Temperature Resets 25
Clean Evaporator/Condenser Coils on AC Systems 25
Clean and/or Replace HVAC Filters 25
Perform Proper Boiler Maintenance 26
Perform Proper Water Heater Maintenance 26
Plug Load Controls 26
Water Conservation 26
6 Self-Generation Measures 27
6.1 Photovoltaic 28
6.2 Combined Heat and Power 29
7 Demand Response 30
8 Project Funding / Incentives 31
8.1 SmartStart 32
8.2 SREC Registration Program 33
8.3 Energy Savings Improvement Program 34
9 Energy Purchasing and Procurement Strategies 35
9.1 Retail Electric Supply Options 35
9.2 Retail Natural Gas Supply Options 35

Appendix A: Equipment Inventory & Recommendations

Appendix B: ENERGY STAR® Statement of Energy Performance

Table of Figures

Figure 1 – Previous 12 Month Utility Costs 1
Figure 2 – Potential Post-Implementation Costs 1
Figure 3 – Summary of Energy Reduction Opportunities 2
Figure 4 – Photovoltaic Potential 3
Figure 5 – Project Contacts 5
Figure 6 - Building Schedule 5
Figure 7 - Utility Summary 9
Figure 8 - Energy Cost Breakdown 9
Figure 9 - Electric Usage & Demand 10
Figure 10 - Electric Usage & Demand 10
Figure 11 - Natural Gas Usage 11
Figure 12 - Natural Gas Usage 11
Figure 13 - Energy Use Intensity Comparison – Existing Conditions 12
Figure 14 - Energy Use Intensity Comparison – Following Installation of Recommended Measures 12
Figure 15 - Energy Balance (% and kBtu/SF) 13
Figure 16 – Summary of Recommended ECMs 14
Figure 17 – Summary of Lighting Upgrade ECMs 15
Figure 18 – Summary of Lighting Control ECMs 19
Figure 19 - Summary of Unitary HVAC ECMs 21
Figure 20 - Summary of Domestic Water Heating ECMs 22
Figure 21-Summary of Plug Load Equipment Control ECMs 23
Figure 22 - Photovoltaic Screening 28
Figure 23 - Combined Heat and Power Screening 29
Figure 24 - ECM Incentive Program Eligibility 31

1 EXECUTIVE SUMMARY

The New Jersey Board of Public Utilities (NJBPU) has sponsored this Local Government Energy Audit (LGEA) Report for Abraham Clark High 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 put you in a position to implement the ECMs. The LGEA also sets you on the path to receive financial incentives from New Jersey's Clean Energy Program (NJCEP) for implementing the ECMs.

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

1.1 Facility Summary

Abraham Clark High School is a two-story building totaling 133,210 square feet constructed in 1917. The building has a flat roof, and the exterior walls are finished with brick masonry. Interior lighting consists of a combination of fixtures with linear fluorescent lamps and fixtures with incandescent and compact fluorescent lamps. They are controlled mainly by manual wall switches. Heating is provided by two steam boilers and gas-fired furnaces. The cooling system consists of window air conditioners (AC), split system ACs, and packaged units.

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 projects which represent an opportunity for Abraham Clark High School to reduce annual energy costs by roughly $43,047 and annual greenhouse gas emissions by 466,641 lbs CO_2e. The measures would pay for themselves in roughly 2.90 years. The breakdown of existing and potential utility costs is illustrated in Figure 1 and Figure 2, respectively. These projects represent an opportunity to reduce Abraham Clark High School's annual energy use by 11.1%.

Figure 1 – Previous 12 Month Utility Costs

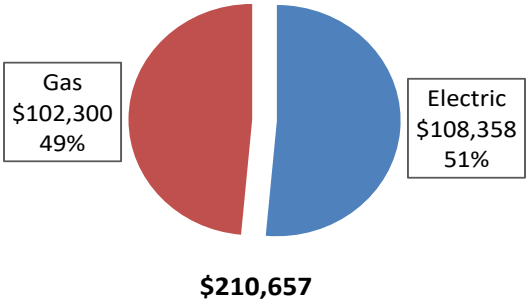
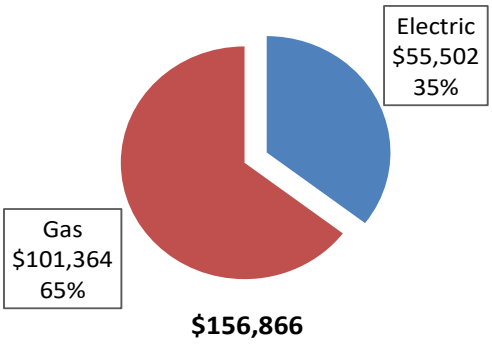


Figure 2 – Potential Post-Implementation Costs



A detailed description of Abraham Clark High School's existing energy use can be found in Section 3.

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

Figure 3 – Summary of Energy Reduction Opportunities

Energy Conservation Measure		Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**374,694**	**54.5**	**0.0**	**$34,954.07**	**$113,913.52**	**$19,310.00**	**$94,603.52**	**2.71**	**377,314**
ECM 1	Install LED Fixtures	Yes	23,392	3.0	0.0	$2,182.15	$6,641.51	$1,700.00	$4,941.51	2.26	23,555
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	21,529	3.1	0.0	$2,008.39	$9,877.00	$645.00	$9,232.00	4.60	21,680
ECM 3	Retrofit Fixtures with LED Lamps	Yes	327,839	48.2	0.0	$30,583.09	$94,813.69	$16,965.00	$77,848.69	2.55	330,131
ECM 4	Install LED Exit Signs	Yes	1,934	0.1	0.0	$180.44	$2,581.32	$0.00	$2,581.32	14.31	1,948
Lighting Control Measures			**61,984**	**9.0**	**0.0**	**$5,782.31**	**$17,684.00**	**$1,900.00**	**$15,784.00**	**2.73**	**62,417**
ECM 5	Install Occupancy Sensor Lighting Controls	Yes	54,060	7.8	0.0	$5,043.13	$14,536.00	$1,900.00	$12,636.00	2.51	54,438
ECM 6	Install High/Low Lighitng Controls	Yes	7,924	1.1	0.0	$739.18	$3,148.00	$0.00	$3,148.00	4.26	7,979
Electric Unitary HVAC Measures			**11,513**	**6.8**	**0.0**	**$1,074.04**	**$13,616.81**	**$547.50**	**$13,069.31**	**12.17**	**11,594**
ECM 7	Install High Efficiency Electric AC	Yes	11,513	6.8	0.0	$1,074.04	$13,616.81	$547.50	$13,069.31	12.17	11,594
Domestic Water Heating Upgrade			**0**	**0.0**	**103.1**	**$935.73**	**$136.23**	**$0.00**	**$136.23**	**0.15**	**12,070**
ECM 8	Install Low-Flow Domestic Hot Water Devices	Yes	0	0.0	103.1	$935.73	$136.23	$0.00	$136.23	0.15	12,070
Plug Load Equipment Control - Vending Machine			**3,224**	**0.0**	**0.0**	**$300.73**	**$1,437.60**	**$0.00**	**$1,437.60**	**4.78**	**3,246**
ECM 9	Vending Machine Control	Yes	3,224	0.0	0.0	$300.73	$1,437.60	$0.00	$1,437.60	4.78	3,246
TOTALS			**451,415**	**70.3**	**103.1**	**$43,046.88**	**$146,788.16**	**$21,757.50**	**$125,030.66**	**2.90**	**466,641**

* - 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 measure save energy by reducing the power used by the lighting components due to improved electrical efficiency.

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

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

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

Plug Load Equipment control measures generally involve installing automation that limits the power use or operation of equipment plugged into an electrical receptacle based on occupancy.

Energy Efficient Practices

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

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

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

Self-Generation Measures

TRC evaluated the potential for installing self-generation sources for Abraham Clark High 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	250	kW DC STC
Electric Generation	297,843	kWh/yr
Displaced Cost	$25,910	/yr
Installed Cost	$650,000	

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

1.3 Implementation Planning

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

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

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

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

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

For facilities without capital available to implement ECMs, project financing may be available through the Energy Savings Improvement Program (ESIP). Supported directly by the NJBPU, ESIP provides government agencies with external project development, design, and implementation services as well as financing for implementing ECMs. This LGEA report is the first step for participating in ESIP and should help you determine next steps. Refer to Section 8.3 for additional information on the ESIP Program.

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

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

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

2 FACILITY INFORMATION AND EXISTING CONDITIONS

2.1 Project Contacts

Figure 5 – Project Contacts

Name	Role	E-Mail	Phone #
Customer			
Rhonda Curry	Business Administrator/ Board Secretary	rcurry@roselleschools.org	908-298-2040 Ext.2111
Designated Representative			
Kelvin T. White	Facilty Manager	kwhite@roselleschools.org	908-298-2040 Ext. 2007
TRC Energy Services			
Moussa Traore	Auditor	mtraore@trcsolutions.com	732-855-0033

2.2 General Site Information

On September 14, 2016, TRC performed an energy audit at Abraham Clark High School located in Roselle, New Jersey. TRC's auditor met with Kelvin T. White to review the facility operations and focus the investigation on specific energy-using systems.

The 133,210 square foot high school building is a two-story facility and is comprised of classrooms, administrative offices, gymnasiums, locker rooms, auditorium, maintenance room, cafeteria, library, band room, kitchen, storage and mechanical rooms. The building was constructed in 1917. In addition to the school building, two small trailers are used to accommodate additional office spaces.

2.3 Building Occupancy

The school operates on an 11-month schedule and is open Monday through Friday. The gymnasium and auditorium are used after school hours and on weekends for sports and other events. The school is also used in the summer for various classes and events. The typical schedule is presented in the table below. During a typical day, the school is occupied by approximately 720 students and 85 staff.

Figure 6 - Building Schedule

Building Name	Weekday/Weekend	Operating Schedule
Abraham Clark High School	Weekday	7:00 AM - 9:00 PM
Abraham Clark High School	Weekend	8:30 AM - 5:30 PM

2.4 Building Envelope

The two-story building with a basement has a reinforced concrete foundation and a flat roof that is covered with back membrane. The exterior walls are finished with brick masonry. The windows throughout the facility are double-pane, operable with aluminum frames and are in good condition. No units show signs of outside air infiltration. Exterior doors are constructed of metal. Overall, the building's envelope is in good condition.

2.5 On-site Generation

Abraham Clark High School does not have any on-site electric generation capacity.

2.6 Energy-Using Systems

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

Lighting System

Interior lighting generally consists of a combination of linear fluorescent fixtures with some additional fixtures containing incandescent or compact fluorescent lamps. The band room, reception area and the main lobby are all illuminated with linear fluorescent T12 lamps while the hallways and stairwells are lit with a combination of 32-Watt linear fluorescent T8 and 40-Watt T12 lamps. The small gymnasium is illuminated with a combination of 75-Watt 8-foot long T12 lamps and 300-Watt incandescent lamps while the big gymnasium also uses 300-Watt incandescent lamps. The auditorium is lit with compact fluorescent lamps (CFL). Storage rooms and closet spaces are typically illuminated with incandescent lamps. The remaining building spaces and trailer offices are lit with 32-Watt linear fluorescent lamps. Lighting control is provided mainly by manual wall switches. Only the library, room 208 and laboratory classrooms have occupancy sensor controls. Exit signs contain either incandescent or LED lamps. The facility exterior lighting system consists of 250-Watt and 400-Watt metal halide which are controlled by photocells.

Steam System

The steam system consists of two 5,411 MBh steam boilers, each with a nominal combustion efficiency of 80%, plus the associated distribution system. Each boiler has a 7.5 hp combustion air fan. The boiler also has two 2 hp feed water pumps and a control valve that maintains the boiler water level. Steam is supplied to the radiators and heating unit ventilators at 15 psi. The unit ventilators appear to be in poor condition. The boilers operate in a lead/lag configuration. Local thermostats are used to control the temperatures in spaces. The boilers are 15 years old and are well maintained. In addition to the steam system, four rooftop units equipped with gas-fired furnace sections are used to provide supplemental heating to the library, auditorium and the trailer offices.

Air Conditioning

Cooling is provided by a combination of window air conditioners (AC), split system ACs, and rooftop packaged units. There are 25 window ACs ranging from 0.8 to 2 tons. They are in relatively good condition except six units which appear in poor condition. The split system ACs appear in good condition except for one 7.5-ton York unit that serves the main office. The library is served by one 12.5-ton Trane high efficiency packaged unit which is four year old while the auditorium is served by one 40 ton Carrier air cooled condensing unit associated with an Annex Air energy recovery unit. The unit is six year old and appears in good condition. There are two York rooftop packaged units serving the two trailer offices. The units were not accessible during the site visit but the site contact indicated that they are approximately 5 tons each and are relatively new. The split and the packaged units are controlled by programmable thermostats.

Domestic Hot Water

Domestic hot water for the school consists of two A.O Smith gas fired condensing water heaters with an input rating of 400 MBh each and a nominal efficiency of 93%. The water heaters are six years old and have 126-gallon storage tank each. One recirculation pump distribute 120°F water to the entire school including the kitchen and the cafeteria.

Food Service & Refrigeration

The facility has a full commercial kitchen that is used to prepare breakfast and lunches for the students, plus one small kitchen that is used for teaching proposes. The kitchens include gas and electric ovens, stand-up refrigerators. There are no walk-in refrigerators or freezers. The big gymnasium has one ice making machine. The kitchens are well maintained.

Plug load & Vending Machines

There are approximately 156 computer work stations throughout the facility and they are mostly desktop units with LCD monitors. There is no centralized PC power management software installed. There is one data room that cooling provided by two 2-ton split ACs. The facility has three vending machines located in the staff room and the big gymnasium.

2.7 Water-Using Systems

There are several restrooms at this facility. A sampling of restrooms found that the faucets are rated for 2.2 gallons per minute (gpm) or higher, the toilets are rated at 2.5 gallons per flush (gpf) and the urinals are rated at 2 gpf. There are no restrooms with showers. The school has a girls and boys locker room which have no showerheads.

3 SITE ENERGY USE AND COSTS

Utility data for electricity and natural gas was analyzed to identify opportunities for savings. In addition, data for electricity and natural gas was evaluated to determine the annual energy performance metrics for the building in energy cost/ft^2 and energy use/ft^2. These energy use indices are indicative of the relative energy effectiveness of this building. There are a number of factors that could cause the energy use of this building to vary from the "typical" energy use for other facilities identified as: "School (K-12)". Specific local climate conditions, daily occupancy hours of the facility, seasonal fluctuations in occupancy, daily operating hours of energy use systems, and the behavior of the occupants with regard to operating systems that impact energy use such as turning off appliances and leaving windows open. Please refer to the Benchmarking section within Section 3.4 for additional information.

3.1 Total Cost of Energy

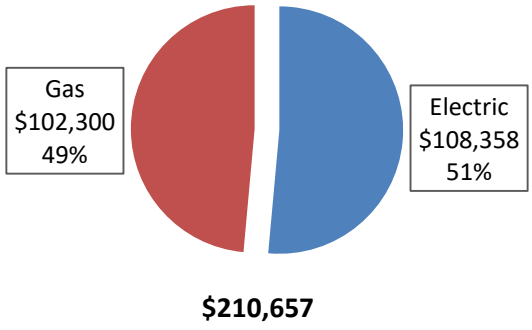
The following energy consumption and cost data is based on the last 12 month period of utility usage data that was provided for each utility. The annual consumption and cost was developed from this information.

Figure 7 - Utility Summary

Utility Summary for Abraham Clark High School		
Fuel	**Usage**	**Cost**
Electricity	1,037,473 kWh	$108,358
Natural Gas	112,697 Therms	$102,300
Total		**$210,657**

The current utility cost for this site is $210,657 as shown in the chart below.

Figure 8 - Energy Cost Breakdown



3.2 Electricity Usage

Electricity is provided by PSE&G. The average electric cost (combined for commodity, transmission and distribution) for the past 12 months is $0.123/kWh, which is the blended rate used throughout the analyses in this report. The monthly electricity consumption and peak demand is represented graphically in the chart below. The electricity use profile reflects high occupancy in the summer months.

Figure 9 - Electric Usage & Demand

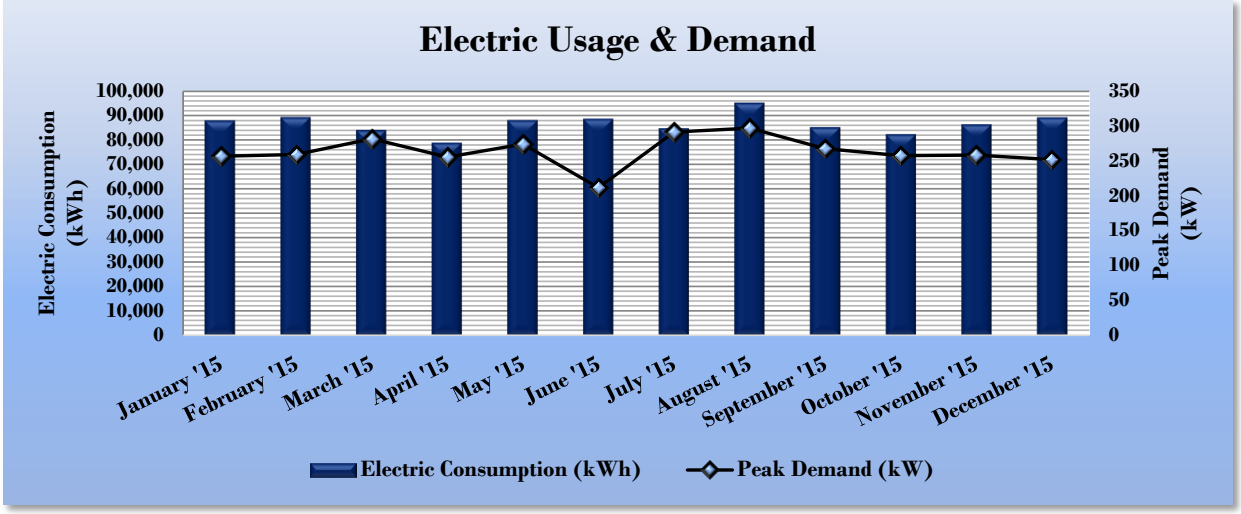


Figure 10 - Electric Usage & Demand

Electric Billing Data for Abraham Clark High School					
Period Ending	Days in Period	Electric Usage (kWh)	Demand (kW)	Demand Cost	Total Electric Cost
2/2/15	32	87,730	257	$942	$9,568
3/4/15	29	89,104	259	$949	$9,695
4/2/15	30	83,838	282	$1,026	$9,518
5/4/15	30	78,613	256	$929	$8,939
6/3/15	30	87,885	274	$994	$8,957
7/2/15	30	88,394	212	$770	$8,992
8/3/15	32	84,577	291	$1,061	$8,614
9/1/15	29	94,998	297	$1,091	$9,605
10/1/15	30	85,008	268	$986	$8,569
10/30/15	32	82,116	258	$948	$8,297
12/2/15	31	86,189	258	$953	$8,669
1/4/16	30	89,021	252	$926	$8,934
Totals	**365**	**1,037,473**	**297**	**$11,575**	**$108,358**
Annual	**365**	**1,037,473**	**297**	**$11,575**	**$108,358**

3.3 Natural Gas Usage

Natural gas is provided by Elizabethtown Gas. The average gas cost for the past 12 months is $0.908/therm, which is the blended rate used throughout the analyses in this report. The monthly gas consumption is represented graphically in the chart below. The gas use profile is typical for a facility with a significant heating load relative to other end uses.

Figure 11 - Natural Gas Usage

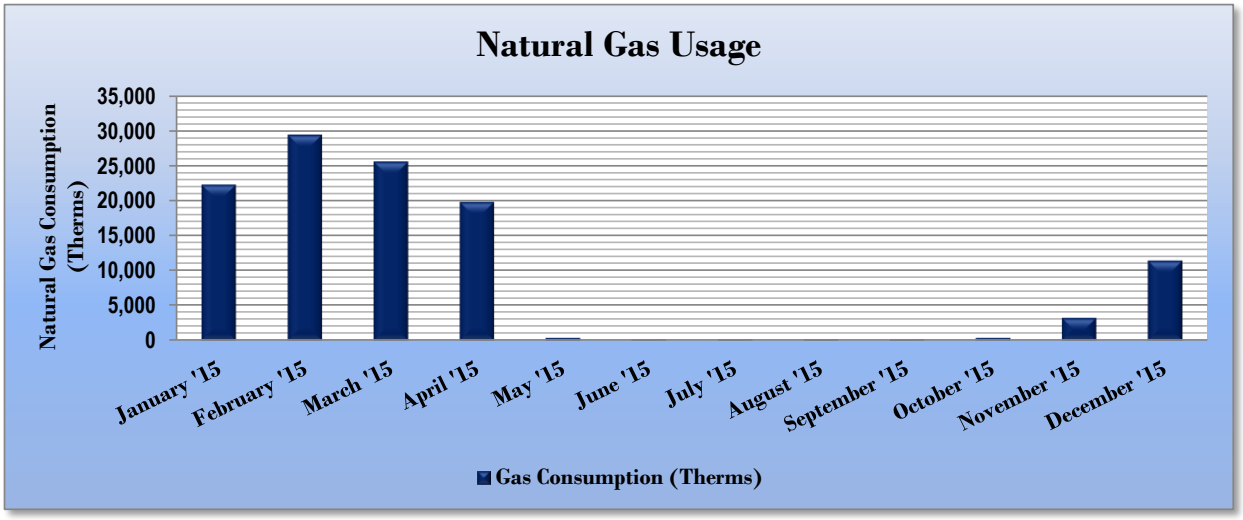


Figure 12 - Natural Gas Usage

Gas Billing Data for Abraham Clark High School			
Period Ending	Days in Period	Natural Gas Usage (Therms)	Natural Gas Cost
2/9/15	28	22,202	$21,913
3/11/15	31	29,332	$24,972
4/10/15	30	25,507	$20,614
5/12/15	31	19,775	$15,479
6/11/15	30	355	$1,294
7/13/15	31	145	$1,294
8/11/15	31	145	$1,137
9/10/15	30	155	$1,143
10/12/15	31	145	$1,135
11/10/15	30	341	$1,275
12/10/15	31	3,197	$3,290
1/11/16	31	11,398	$8,753
Totals	**365**	**112,697**	**$102,300**
Annual	**365**	**112,697**	**$102,300**

3.4 Benchmarking

This facility was benchmarked through Portfolio Manager®, an online tool created and managed by the United States Environmental Protection Agency (EPA) through the ENERGY STAR® program. Portfolio Manager® analyzes your building's consumption data, cost information, and operational use details and compares its performance against a yearly baseline, national medians, or similar buildings in your portfolio. Metrics used in this comparison are the Energy Use Intensity (EUI) and ENERGY STAR® score.

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

Figure 13 - Energy Use Intensity Comparison – Existing Conditions

Energy Use Intensity Comparison - Existing Conditions		
	Abraham Clark High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	172.3	141.4
Site Energy Use Intensity (kBtu/ft^2)	111.2	58.2

By implementing all recommended measures covered in this reporting, the project's estimated post-implementation EUI improves 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		
	Abraham Clark High School	National Median Building Type: School (K-12)
Source Energy Use Intensity (kBtu/ft^2)	135.2	141.4
Site Energy Use Intensity (kBtu/ft^2)	98.8	58.2

Many buildings can also receive a 1 – 100 ENERGY STAR® score. This score compares your building's energy performance to similar buildings nationwide. A score of 50 represents median energy performance, while a score of 75 means your building performs better than 75 percent of all similar buildings nationwide — and may be eligible for ENERGY STAR® certification. This facility has a current score of 12.

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

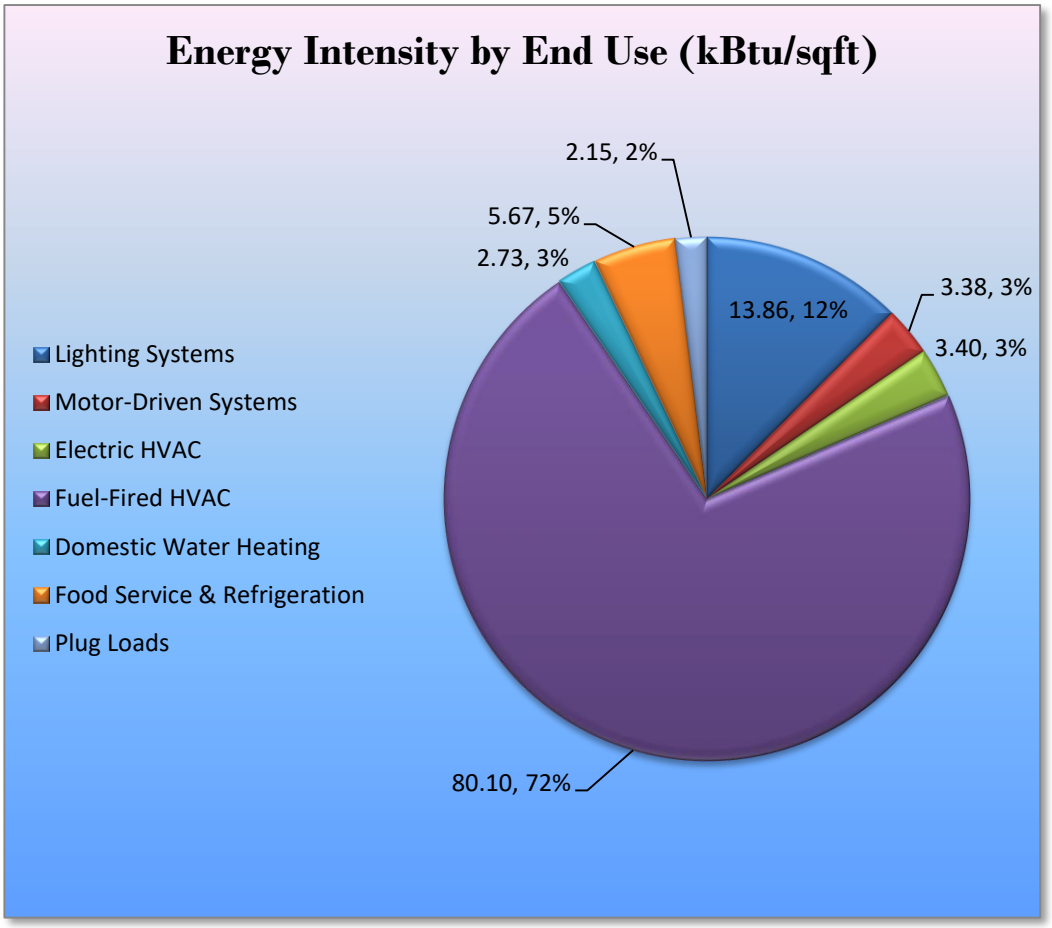
For more information on ENERGY STAR® certification go to: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/earn-recognition/energy-star-certification/how-app-1.

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 and determine their proportional contribution to overall building energy usage. This visual representation of energy end uses highlights systems that may benefit most from energy efficiency projects.

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



4 ENERGY CONSERVATION MEASURES

Level of Analysis

The goal of this audit report is to identify potential energy projects, help prioritize specific measures for implementation, and set Abraham Clark High School on the path to receive financial incentives. For this audit report, most measures have received only a preliminary analysis of feasibility which identifies expected ranges of savings and costs. This level of analysis is considered sufficient to make "Go/No-Go" decisions and to prioritize energy projects. Savings are based on the New Jersey Board of Public Utilities New Jersey Clean Energy Program Protocols to Measure Resource Savings dated June 29, 2016. Further analysis or investigation may be required to calculate more accurate savings to support any custom SmartStart, Pay for Performance, or Large Energy Users incentive applications. Financial incentives for the ECMs identified in this report have been calculated based the NJ prescriptive SmartStart program. Depending on your implementation strategy, the project may be eligible for more lucrative incentives through other programs as identified in Section 8.

The following sections describe the evaluated measures.

4.1 Recommended ECMs

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

Figure 16 – Summary of Recommended ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)*	Estimated Net Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades		**374,694**	**54.5**	**0.0**	**$34,954.07**	**$113,913.52**	**$19,310.00**	**$94,603.52**	**2.71**	**377,314**
ECM 1	Install LED Fixtures	23,392	3.0	0.0	$2,182.15	$6,641.51	$1,700.00	$4,941.51	2.26	23,555
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	21,529	3.1	0.0	$2,008.39	$9,877.00	$645.00	$9,232.00	4.60	21,680
ECM 3	Retrofit Fixtures with LED Lamps	327,839	48.2	0.0	$30,583.09	$94,813.69	$16,965.00	$77,848.69	2.55	330,131
ECM 4	Install LED Exit Signs	1,934	0.1	0.0	$180.44	$2,581.32	$0.00	$2,581.32	14.31	1,948
Lighting Control Measures		**61,984**	**9.0**	**0.0**	**$5,782.31**	**$17,684.00**	**$1,900.00**	**$15,784.00**	**2.73**	**62,417**
ECM 5	Install Occupancy Sensor Lighting Controls	54,060	7.8	0.0	$5,043.13	$14,536.00	$1,900.00	$12,636.00	2.51	54,438
ECM 6	Install High/Low Lighitng Controls	7,924	1.1	0.0	$739.18	$3,148.00	$0.00	$3,148.00	4.26	7,979
Electric Unitary HVAC Measures		**11,513**	**6.8**	**0.0**	**$1,074.04**	**$13,616.81**	**$547.50**	**$13,069.31**	**12.17**	**11,594**
ECM 7	Install High Efficiency Electric AC	11,513	6.8	0.0	$1,074.04	$13,616.81	$547.50	$13,069.31	12.17	11,594
Domestic Water Heating Upgrade		**0**	**0.0**	**103.1**	**$935.73**	**$136.23**	**$0.00**	**$136.23**	**0.15**	**12,070**
ECM 8	Install Low-Flow Domestic Hot Water Devices	0	0.0	103.1	$935.73	$136.23	$0.00	$136.23	0.15	12,070
Plug Load Equipment Control - Vending Machine		**3,224**	**0.0**	**0.0**	**$300.73**	**$1,437.60**	**$0.00**	**$1,437.60**	**4.78**	**3,246**
ECM 9	Vending Machine Control	3,224	0.0	0.0	$300.73	$1,437.60	$0.00	$1,437.60	4.78	3,246
TOTALS		**451,415**	**70.3**	**103.1**	**$43,046.88**	**$146,788.16**	**$21,757.50**	**$125,030.66**	**2.90**	**466,641**

* - 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 lighting upgrades 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		**374,694**	**54.5**	**0.0**	**$34,954.07**	**$113,913.52**	**$19,310.00**	**$94,603.52**	**2.71**	**377,314**
ECM 1	Install LED Fixtures	23,392	3.0	0.0	$2,182.15	$6,641.51	$1,700.00	$4,941.51	2.26	23,555
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	21,529	3.1	0.0	$2,008.39	$9,877.00	$645.00	$9,232.00	4.60	21,680
ECM 3	Retrofit Fixtures with LED Lamps	327,839	48.2	0.0	$30,583.09	$94,813.69	$16,965.00	$77,848.69	2.55	330,131
ECM 4	Install LED Exit Signs	1,934	0.1	0.0	$180.44	$2,581.32	$0.00	$2,581.32	14.31	1,948

ECM 1: Install LED Fixtures

Summary of Measure Economics

Interior/ Exterior	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Interior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0
Exterior	23,392	3.0	0.0	$2,182.15	$6,641.51	$1,700.00	$4,941.51	2.26	23,555

Measure Description

This measure evaluates replacing existing fixtures containing metal halide lamps with new high-performance LED light fixtures. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

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

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	21,529	3.1	0.0	$2,008.39	$9,877.00	$645.00	$9,232.00	4.60	21,680
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

This measure evaluates replacing linear fluorescent T12 lamps, ballasts, and reflectors with LED tube lamps, reflectors, and drivers specifically designed for existing linear fluorescent fixtures. The retrofit uses the existing fixture housing but replaces the rest of the components with an efficient source and reflectors designed for LEDs. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output and efficiently projects the light into the space.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

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

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	327,209	48.1	0.0	$30,524.35	$94,715.84	$16,955.00	$77,760.84	2.55	329,497
Exterior	630	0.1	0.0	$58.74	$97.85	$10.00	$87.85	1.50	634

Measure Description

This measure evaluates replacing linear fluorescent T8 lamps with LED tube lamps and replacing incandescent, halogen screw-in based lamps and compact fluorescent lamps with LED lamps. Many LED tube lamps are direct replacements for existing fluorescent lamps and can be installed although there is a fluorescent fixture ballast in place. Other tube lamps require that fluorescent fixture ballasts be removed or replaced with LED drivers. Screw-in LED lamps can be used as a direct replacement for most other screw-in/plug-in lamps. This measure saves energy by installing LED sources which use less power than other technologies with a comparable light output.

Maintenance savings are anticipated since LED sources have burn hours which are more than twice that of a fluorescent source and more than 10 times incandescent sources. LED lamps that use the existing fluorescent fixture ballast will be constrained by the remaining hours of the ballast. Maintenance savings may be partially offset by the higher material costs associated with LED sources.

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

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	1,934	0.1	0.0	$180.44	$2,581.32	$0.00	$2,581.32	14.31	1,948
Exterior	0	0.0	0.0	$0.00	$0.00	$0.00	$0.00	0.00	0

Measure Description

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

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

4.1.2 Lighting Control Measures

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		**61,984**	**9.0**	**0.0**	**$5,782.31**	**$17,684.00**	**$1,900.00**	**$15,784.00**	**2.73**	**62,417**
ECM 5	Install Occupancy Sensor Lighting Controls	54,060	7.8	0.0	$5,043.13	$14,536.00	$1,900.00	$12,636.00	2.51	54,438
ECM 6	Install High/Low Lighitng Controls	7,924	1.1	0.0	$739.18	$3,148.00	$0.00	$3,148.00	4.26	7,979

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)
54,060	7.8	0.0	$5,043.13	$14,536.00	$1,900.00	$12,636.00	2.51	54,438

Measure Description

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

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

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

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)
7,924	1.1	0.0	$739.18	$3,148.00	$0.00	$3,148.00	4.26	7,979

Measure Description

This measure evaluates installing occupancy sensors to provide dual level lighting control for light fixtures in spaces that are infrequently occupied but require continuous or night lighting for safety or security reasons. Typical areas for such lighting control are interior corridors.

The light fixtures 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 wave technologies. The lighting systems are switched to the high level setting when an occupant is detected. Fixtures are automatically switched back to low level after an area has been vacant for a preset period.

For this application the occupancy sensors will generally be ceiling or fixture mounted. Sufficient sensor coverage should be provided to turn lights on in an area as an occupant approaches the area.

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

4.1.3 Electric Unitary HVAC Measures

Our recommendations for unitary HVAC measures are summarized in Figure 19 below.

Figure 19 - Summary of Unitary HVAC ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Electric Unitary HVAC Measures		**11,513**	**6.8**	**0.0**	**$1,074.04**	**$13,616.81**	**$547.50**	**$13,069.31**	**12.17**	**11,594**
ECM 7	Install High Efficiency Electric AC	11,513	6.8	0.0	$1,074.04	$13,616.81	$547.50	$13,069.31	12.17	11,594

ECM 7: Install High Efficiency Electric AC

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
11,513	6.8	0.0	$1,074.04	$13,616.81	$547.50	$13,069.31	12.17	11,594

Measure Description

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

4.1.4 Domestic Water Heating Upgrade

Our recommendations for domestic water heating measures are summarized in Figure 20 below.

Figure 20 - Summary of Domestic Water Heating ECMs

Energy Conservation Measure		Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
Domestic Water Heating Upgrade		**0**	**0.0**	**103.1**	**$935.73**	**$136.23**	**$0.00**	**$136.23**	**0.15**	**12,070**
ECM 8	Install Low-Flow Domestic Hot Water Devices	0	0.0	103.1	$935.73	$136.23	$0.00	$136.23	0.15	12,070

ECM 8: Install Low-Flow DHW Devices

Summary of Measure Economics

Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated Install Cost ($)	Estimated Incentive ($)	Estimated Net Cost ($)	Simple Payback Period (yrs)	CO_2e Emissions Reduction (lbs)
0	0.0	103.1	$935.73	$136.23	$0.00	$136.23	0.15	12,070

Measure Description

This measure evaluates the savings from installing low flow domestic water devices to reduce overall water flow in general and hot water flow in particular. Low flow faucet aerators reduce the water flow, relative to standard aerators, from the fixture.

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

4.1.5 Plug Load Equipment Control - Vending Machine

Our recommendations for plug load equipment control measures are summarized in Figure 21 below.

Figure 21-Summary of Plug Load Equipment 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)
Plug Load Equipment Control - Vending Machine		**3,224**	**0.0**	**0.0**	**$300.73**	**$1,437.60**	**$0.00**	**$1,437.60**	**4.78**	**3,246**
ECM 9	Vending Machine Control	3,224	0.0	0.0	$300.73	$1,437.60	$0.00	$1,437.60	4.78	3,246

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)
3,224	0.0	0.0	$300.73	$1,437.60	$0.00	$1,437.60	4.78	3,246

Measure Description

Vending machines operate continuously, even during non-business hours. It is recommended to install occupancy sensor based controls to reduce the energy use. These controls power down the machine when the surrounding area is vacant, then monitor the surrounding temperature and power up the cooling system at regular intervals to keep the product cool. Savings are a function of the activity level around the vending machine.

5 ENERGY EFFICIENT PRACTICES

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

Reduce Air Leakage

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

Close Doors and Windows

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

Perform Proper Lighting Maintenance

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

Develop a Lighting Maintenance Schedule

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

Ensure Lighting Controls Are Operating Properly

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

Turn Off Unneeded Motors

Electric motors often run unnecessarily, and this is an overlooked opportunity to save energy. These motors should be identified and turned off when appropriate. For example, exhaust fans often run unnecessarily when ventilation requirements are already met. Reducing run hours for these motors can result in significant energy savings. Whenever possible, use automatic devices such as twist timers or occupancy sensors to ensure that motors are turned off when not needed.

Perform Routine Motor Maintenance

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

Use Fans to Reduce Cooling Load

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

Practice Proper Use of Thermostat Schedules and Temperature Resets

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

Clean Evaporator/Condenser Coils on AC Systems

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

Clean and/or Replace HVAC Filters

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

Perform Proper Boiler Maintenance

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

Perform Proper Water Heater Maintenance

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

Plug Load Controls

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

Water Conservation

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

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

Refer to Section 4.1.4 for low-flow ECM recommendations.

6 SELF-GENERATION MEASURES

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

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

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

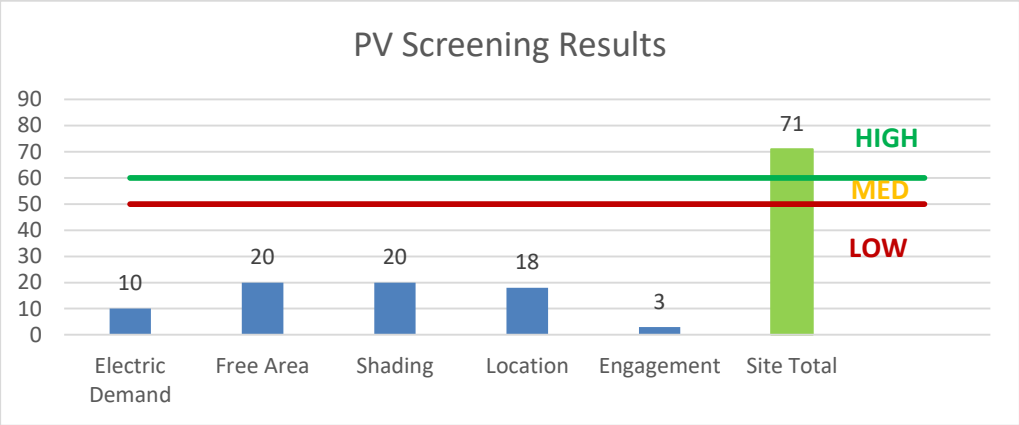
6.1 Photovoltaic

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

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

In order to be cost-effective, a solar PV array generally needs a minimum of 4,000 square feet of flat or south-facing rooftop, or other unshaded space, on which to place the PV panels. In our opinion, the facility does appear meet these minimum criteria for cost-effective PV installation.

Figure 22 - Photovoltaic Screening



Potential	High	
System Potential	250	kW DC STC
Electric Generation	297,843	kWh/yr
Displaced Cost	$25,910	/yr
Installed Cost	$650,000	

Rebates are not available for solar projects, but owners of solar projects MUST register their projects in the SREC (Solar Renewable Energy Certificate) Registration Program (SRP) prior to the start of construction in order to establish the project's eligibility to earn SRECs. Registration of the intent to participate in New Jersey's solar marketplace provides market participants with information about the pipeline of anticipated new solar capacity and insight into future SREC pricing. Refer to Section 8.2 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

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

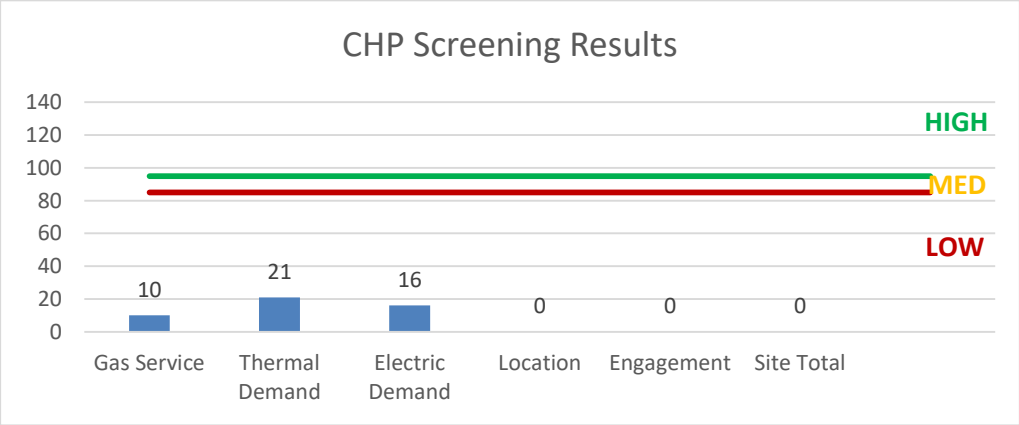
CHP systems are typically used to produce a portion of the electricity needed by a facility, with the balance of electric needs satisfied by purchase from the grid. The heat is used to supplement (or supplant) existing boilers for the purpose of space heating and/or domestic hot water heating. Waste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

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

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

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

Figure 23 - Combined Heat and Power Screening



7 DEMAND RESPONSE

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

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

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

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

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

The first step toward participation in a DR program is to contact a Curtailment Service Provider. 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 the program rules and requirements for metering and controls, a facility's ability to temporarily reduce electric load, as well as the payments involved in participating in the program. Also, these providers usually offer multiple options for DR to larger facilities and may also install controls or remote monitoring equipment to help ensure compliance of all terms and conditions of a DR contract.

A preliminary screening based on the facility's equipment configuration, shows that the facility has a Low potential for participation in a DR program.

8 PROJECT FUNDING / INCENTIVES

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

Figure 24 - ECM Incentive Program Eligibility

Energy Conservation Measure		SmartStart Prescriptive	SmartStart Custom	Direct Install	Pay For Performance Existing Buildings	Large Energy Users Program	Combined Heat & Power and Fuel Cell
ECM 1	Install LED Fixtures	x					
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 High Efficiency Electric AC	x					
ECM 8	Install Low-Flow Domestic Hot Water Devices	x					
ECM 9	Vending Machine Control						

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

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

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

8.1 SmartStart

Overview

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

Prescriptive Equipment Incentives Available:

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

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

Incentives

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

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

How to Participate

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

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

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

9 ENERGY PURCHASING AND PROCUREMENT STRATEGIES

9.1 Retail Electric Supply Options

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

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

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

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

9.2 Retail Natural Gas Supply Options

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

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

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

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

Appendix A: Equipment Inventory & Recommendations

Lighting Inventory & Recommendations

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Basement	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	3,950	Relamp & Reballast	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,950	0.06	429	0.0	$40.04	$294.00	$15.00	6.97
Basement	2	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,950	Relamp	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,950	0.02	159	0.0	$14.83	$71.80	$10.00	4.17
Basement	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,120	Relamp	No	4	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,120	0.09	474	0.0	$44.18	$234.00	$40.00	4.39
Basement	1	Incandescent: 200W A Lamp	Wall Switch	200	3,120	Relamp	No	1	LED Screw-In Lamps: Screw-in lamp	Wall Switch	30	3,120	0.11	610	0.0	$56.90	$53.75	$10.00	0.77
Office1	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.38	2,667	0.0	$248.83	$877.07	$180.00	2.80
Office2	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.08	568	0.0	$53.01	$291.50	$50.00	4.56
Office3	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
Bathroom	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Storage	2	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	3,950	Relamp & Reballast	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.09	615	0.0	$57.38	$350.00	$20.00	5.75
Custodian Office	1	Linear Fluorescent - T12: 8' T12 (75W) - 1L	Wall Switch	92	3,950	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,950	0.05	352	0.0	$32.84	$98.00	$5.00	2.83
Boiler room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	8	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.17	1,199	0.0	$111.87	$468.00	$80.00	3.47
Maintenance room	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	3,950	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.08	586	0.0	$54.66	$117.00	$10.00	1.96
Maintenance room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.04	300	0.0	$27.97	$117.00	$20.00	3.47
Maintenance room	1	Incandescent: 150W Incandescent	Wall Switch	150	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	25	3,950	0.08	568	0.0	$52.97	$97.85	$10.00	1.66
Maintenance room	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	81	0.0	$7.52	$107.56	$0.00	14.31
Electrical room	1	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	3,950	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.08	586	0.0	$54.66	$117.00	$10.00	1.96
Basement South-Esat wing (Repair Shop)	11	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	11	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.30	2,084	0.0	$194.38	$759.50	$130.00	3.24
Basement Hallway	3	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	3,950	Relamp & Reballast	Yes	3	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,765	0.13	923	0.0	$86.06	$467.00	$30.00	5.08
Basement Hallway	3	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	242	0.0	$22.55	$322.67	$0.00	14.31
In School Supervision Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.29	1,989	0.0	$185.54	$642.40	$125.00	2.79
Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.04	300	0.0	$27.97	$117.00	$20.00	3.47
Women's bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.08	568	0.0	$53.01	$266.40	$50.00	4.08
Men's bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.08	568	0.0	$53.01	$266.40	$50.00	4.08
Band room	18	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	3,950	Relamp & Reballast	Yes	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.80	5,535	0.0	$516.39	$2,338.00	$220.00	4.10
Band room	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	161	0.0	$15.04	$215.11	$0.00	14.31
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
Basement (North wing) Room 35 -Kitchen	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	No	16	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,950	0.52	3,598	0.0	$335.61	$1,203.20	$240.00	2.87

	Existing Conditions					Proposed Conditions							Energy Impact & Financial Analysis						
Location	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Fixture Recommendation	Add Controls?	Fixture Quantity	Fixture Description	Control System	Watts per Fixture	Annual Operating Hours	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Room 35 - Cooking Classroom	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.27	1,894	0.0	$176.71	$701.00	$120.00	3.29
Room 36	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57
Room 32	10	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.48	3,334	0.0	$311.04	$1,067.33	$220.00	2.72
Room 4	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57
Room 31	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	8	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.38	2,667	0.0	$248.83	$877.07	$180.00	2.80
Room 3	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$180.00	2.64
Room 30	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.29	2,001	0.0	$186.62	$686.80	$140.00	2.93
Room 6	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.05	333	0.0	$31.10	$211.13	$20.00	6.15
Data room	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.04	300	0.0	$27.97	$117.00	$20.00	3.47
Data room	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,950	0.03	225	0.0	$20.98	$75.20	$15.00	2.87
Data room	3	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	3	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.14	1,000	0.0	$93.31	$401.40	$80.00	3.44
Teacher Office	14	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	14	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.57	3,978	0.0	$371.08	$1,168.80	$230.00	2.53
Teacher Office	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Basement main hallway	13	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	13	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,765	0.63	4,334	0.0	$404.35	$1,352.73	$260.00	2.70
1st Floor North wing satairway	3	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	3,950	Relamp & Reballast	No	3	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,950	0.06	429	0.0	$40.04	$294.00	$15.00	6.97
2nd Floor North wing Hallway	10	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	10	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,765	0.27	1,894	0.0	$176.71	$701.00	$100.00	3.40
Room 134	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 135	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Guidance Room	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,950	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,950	0.01	79	0.0	$7.42	$35.90	$5.00	4.17
Guidance Room	7	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	7	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.19	1,326	0.0	$123.69	$525.50	$90.00	3.52
Guidance Room	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	No	2	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,950	0.06	450	0.0	$41.95	$150.40	$30.00	2.87
Guidance meeting room	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.10	667	0.0	$62.21	$306.27	$60.00	3.96
Guidance Room1	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,184	0.04	224	0.0	$20.94	$191.20	$15.00	8.42
Guidance Room 2	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.05	333	0.0	$31.10	$211.13	$20.00	6.15
Guidance Room 3	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	1	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.04	284	0.0	$26.51	$191.20	$15.00	6.65
Guidance Room 4	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.05	333	0.0	$31.10	$211.13	$20.00	6.15

	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
Guidance Room 5	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	1	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.05	333	0.0	$31.10	$211.13	$20.00	6.15
Guidance Room hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.04	300	0.0	$27.97	$117.00	$20.00	3.47
Guidance Room hallway	1	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	No	1	LED - Linear Tubes: (3) 4' Lamps	Wall Switch	44	3,950	0.03	225	0.0	$20.98	$75.20	$15.00	2.87
Room 133	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Main Office-Principal	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.29	2,001	0.0	$186.62	$686.80	$140.00	2.93
Secretary Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
CTE Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.08	568	0.0	$53.01	$266.40	$50.00	4.08
Hub Office	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57
Copy Room	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.12	852	0.0	$79.52	$341.60	$65.00	3.48
Closet	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Boys Bathroom	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,765	0.05	353	0.0	$32.97	$242.40	$0.00	7.35
Room 131	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Small Gym Entrance	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Small Gymnasium	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	161	0.0	$15.04	$215.11	$0.00	14.31
Small Gymnasium	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	1	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Small Gymnasium	9	Linear Fluorescent - T12: 8' T12 (75W) - 2L	Wall Switch	158	3,950	Relamp & Reballast	No	9	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.76	5,274	0.0	$491.98	$1,053.00	$90.00	1.96
Small Gymnasium	20	Incandescent: 300W incandescent	Wall Switch	300	3,950	Relamp	Yes	20	LED Screw-In Lamps: Downlight Pendant	Occupancy Sensor	45	2,765	3.52	24,393	0.0	$2,275.57	$2,073.06	$200.00	0.82
Girls locker room	5	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	5	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.21	1,421	0.0	$132.53	$492.00	$95.00	3.00
Girls locker room	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	No	5	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,950	0.18	1,272	0.0	$118.65	$475.67	$100.00	3.17
Girls locker room	2	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.07	463	0.0	$43.22	$107.51	$20.00	2.02
East wing front entrance	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Reception Area (Security desk) Hallway	12	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	46	3,950	Relamp & Reballast	No	12	LED - Linear Tubes: (1) 4' Lamp	None	15	3,950	0.25	1,717	0.0	$160.18	$1,176.00	$60.00	6.97
1st Floor main Hallway	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	None	93	3,950	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	High/Low Control	44	2,765	0.45	3,125	0.0	$291.57	$1,027.20	$165.00	2.96
1st Floor main Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	None	62	3,950	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,765	0.38	2,652	0.0	$247.39	$1,019.00	$140.00	3.55
1st Floor main Hallway	12	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	3,950	Relamp	Yes	12	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,765	0.17	1,191	0.0	$111.11	$630.80	$60.00	5.14

	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
1st Floor main Hallway	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	4	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 128	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 126	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 124	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Auditorium	28	Compact Fluorescent: 32W Spiral CFL	Wall Switch	32	3,950	Relamp	Yes	28	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	21	2,765	0.32	2,200	0.0	$205.27	$1,898.20	$20.00	9.15
Auditorium	3	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	242	0.0	$22.55	$322.67	$0.00	14.31
Auditorium Stage	12	Compact Fluorescent: 2x54W CFL (4-PIN)	Wall Switch	108	3,950	Relamp	Yes	12	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	70	2,765	0.46	3,216	0.0	$300.02	$879.80	$20.00	2.87
Auditorium Stage	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	161	0.0	$15.04	$215.11	$0.00	14.31
Auditorium Stage Storage	1	Linear Fluorescent - T12: 4' T12 (40W) - 2L	Wall Switch	88	3,950	Relamp & Reballast	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.04	268	0.0	$25.00	$117.00	$10.00	4.28
Auditorium Stage Storage	1	Incandescent: 60W Incandescent	Wall Switch	60	3,120	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,120	0.03	183	0.0	$17.07	$53.75	$10.00	2.56
Auditorium Stage Closet	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Girls Bathroom	2	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) U-Lamp	Occupancy Sensor	33	2,765	0.05	353	0.0	$32.97	$242.40	$0.00	7.35
Attendance Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.16	1,137	0.0	$106.02	$416.80	$80.00	3.18
Room 123	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.33	2,273	0.0	$212.05	$717.60	$140.00	2.72
Room 121	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 120	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.33	2,273	0.0	$212.05	$717.60	$140.00	2.72
Room 119	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.33	2,273	0.0	$212.05	$717.60	$140.00	2.72
Staff Room	8	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	8	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.22	1,515	0.0	$141.37	$584.00	$100.00	3.42
Restroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.02	150	0.0	$13.98	$58.50	$10.00	3.47
Room 116	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.08	568	0.0	$53.01	$291.50	$50.00	4.56
Room 116	7	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,120	Relamp	Yes	7	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	0	2,184	0.43	2,336	0.0	$217.90	$642.40	$125.00	2.37
Room 116	10	Compact Fluorescent: 32W Spiral CFL (Table Light)	Wall Switch	32	3,950	Relamp	Yes	10	LED - Fixtures: Downlight Solid State Retrofit	Occupancy Sensor	21	2,765	0.11	786	0.0	$73.31	$752.50	$20.00	9.99
Room 117	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.11	758	0.0	$70.68	$350.00	$60.00	4.10
South-West Hallway	18	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	46	3,950	Relamp & Reballast	Yes	18	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,765	0.42	2,931	0.0	$273.45	$1,964.00	$90.00	6.85
South-West Hallway	19	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	3,950	Relamp	Yes	19	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,765	0.27	1,886	0.0	$175.92	$882.10	$95.00	4.47
South-West Hallway	1	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	1	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	81	0.0	$7.52	$107.56	$0.00	14.31
Room 115	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57

	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 Bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
Men Bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
Closet	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Room 113	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57
Room 112	11	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	11	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.45	3,125	0.0	$291.57	$943.20	$185.00	2.60
Room 111	13	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	13	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.53	3,694	0.0	$344.58	$1,093.60	$215.00	2.55
Room 110	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Copy Room	19	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	19	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.78	5,399	0.0	$503.61	$1,544.80	$305.00	2.46
Nurse Office	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.16	1,137	0.0	$106.02	$416.80	$80.00	3.18
Nurse Office	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Room 109	1	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	No	1	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,950	0.04	254	0.0	$23.73	$95.13	$20.00	3.17
Room 109	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.08	568	0.0	$53.01	$266.40	$50.00	4.08
Room 107	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
1st floor west wing hallway	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	None	62	3,950	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	None	33	3,950	0.02	132	0.0	$12.29	$63.20	$0.00	5.14
1st floor west wing hallway	14	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	46	3,950	Relamp & Reballast	Yes	14	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,765	0.33	2,280	0.0	$212.68	$1,772.00	$70.00	8.00
1st floor west wing hallway	8	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	3,950	Relamp	No	8	LED - Linear Tubes: (1) 4' Lamp	None	15	3,950	0.09	636	0.0	$59.33	$287.20	$40.00	4.17
1st floor west wing hallway	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Storage	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Cafeteria	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	161	0.0	$15.04	$215.11	$0.00	14.31
Cafeteria	32	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	32	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.87	6,062	0.0	$565.46	$1,988.00	$340.00	2.91
Kitchen	3	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	242	0.0	$22.55	$322.67	$0.00	14.31
Kitchen	6	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	6	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.13	899	0.0	$83.90	$351.00	$60.00	3.47
Kitchen	8	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	No	8	LED - Linear Tubes: (4) 4' Lamps	Wall Switch	58	3,950	0.29	2,035	0.0	$189.84	$761.07	$160.00	3.17
Storage	3	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	Yes	3	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	2,765	0.11	732	0.0	$68.27	$277.26	$30.00	3.62
Kitchen-Shop Room	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.11	758	0.0	$70.68	$350.00	$60.00	4.10

	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
Big Gymnasium	60	Incandescent: 300W incandescent	Wall Switch	300	3,950	Relamp	Yes	60	LED Screw-In Lamps: Downlight Pendant	Occupancy Sensor	45	2,765	10.56	73,180	0.0	$6,826.71	$6,951.18	$740.00	0.91
Big Gymnasium	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	5	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Men Locker Room	3	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	3	LED Exit Signs: 2 W Lamp	None	6	8,760	0.02	242	0.0	$22.55	$322.67	$0.00	14.31
Men Locker Room	4	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	4	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.13	927	0.0	$86.45	$215.01	$40.00	2.02
Men Locker Room	14	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	14	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.38	2,652	0.0	$247.39	$935.00	$160.00	3.13
Men Locker Room	9	Linear Fluorescent - T8: 4' T8 (32W) - 1L	Wall Switch	32	3,950	Relamp	Yes	9	LED - Linear Tubes: (1) 4' Lamp	Occupancy Sensor	15	2,765	0.13	893	0.0	$83.33	$439.10	$65.00	4.49
Bathroom	2	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	Yes	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	2,765	0.07	488	0.0	$45.51	$223.51	$20.00	4.47
Closet	2	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	Yes	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	2,765	0.07	488	0.0	$45.51	$223.51	$20.00	4.47
Gym Office1	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
Bathroom	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.04	300	0.0	$27.97	$117.00	$20.00	3.47
Gym Office 2	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
Men Bathroom	2	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	Yes	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	2,765	0.07	488	0.0	$45.51	$223.51	$20.00	4.47
Lobby Area	2	Compact Fluorescent: 32W Spiral	Wall Switch	32	3,950	Relamp	No	2	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	21	3,950	0.01	100	0.0	$9.32	$127.30	$0.00	13.65
Lobby Area	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Lobby Area	2	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	3,950	Relamp & Reballast	No	2	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,950	0.04	286	0.0	$26.70	$196.00	$10.00	6.97
Lobby Area	2	Halogen Incandescent: PAR30 70W	Wall Switch	70	3,950	Relamp	No	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.08	554	0.0	$51.70	$107.51	$20.00	1.69
Girls Bathroom	2	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	Yes	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	2,765	0.07	488	0.0	$45.51	$223.51	$20.00	4.47
Athletic Directopr Office	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.10	667	0.0	$62.21	$306.27	$60.00	3.96
2nd Floor west wing Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	5	LED - Linear Tubes: (2) 4' Lamps	High/Low Control	29	2,765	0.14	947	0.0	$88.35	$492.50	$50.00	5.01
2nd Floor west wing Hallway	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,950	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,950	0.04	291	0.0	$27.12	$192.80	$40.00	5.63
2nd Floor west wing Hallway	1	Compact Fluorescent: 2x26W CFL 4-PIN	Wall Switch	32	3,950	Relamp	No	1	LED - Fixtures: Downlight Solid State Retrofit	Wall Switch	21	3,950	0.01	50	0.0	$4.66	$63.65	$0.00	13.65
Book Store	2	Incandescent: 300W incandescent	Wall Switch	300	3,950	Relamp	No	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	45	3,950	0.33	2,317	0.0	$216.12	$107.51	$20.00	0.40
2nd Floor South west wing Hallway	2	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,950	Relamp	No	2	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,950	0.02	145	0.0	$13.56	$96.40	$20.00	5.63
2nd Floor South west wing Hallway	5	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	5	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,765	0.24	1,667	0.0	$155.52	$675.67	$100.00	3.70

	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
2nd Floor South west wing Hallway	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 200	16	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	16	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.66	4,546	0.0	$424.10	$1,319.20	$260.00	2.50
Room 202	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 204	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 206-Library	38	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,765	Relamp	No	38	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.82	3,987	0.0	$371.97	$2,223.00	$380.00	4.95
Room 206-Library	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 206-Library	5	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	2,765	Relamp	No	5	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,765	0.05	254	0.0	$23.73	$241.00	$50.00	8.05
Room 206-Library Office	4	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Occupancy Sensor	33	2,765	Relamp	No	4	LED - Linear Tubes: (2) 2' Lamps	Occupancy Sensor	17	2,765	0.04	204	0.0	$18.98	$192.80	$40.00	8.05
Storage	2	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	2	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.08	568	0.0	$53.01	$266.40	$30.00	4.46
Bathroom	1	Linear Fluorescent - T8: 2' T8 (17W) - 2L	Wall Switch	33	3,950	Relamp	No	1	LED - Linear Tubes: (2) 2' Lamps	Wall Switch	17	3,950	0.01	73	0.0	$6.78	$48.20	$10.00	5.63
2nd Floor South East wing Hallway	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	2	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Floor South East wing Hallway	14	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	14	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,765	0.67	4,668	0.0	$435.45	$1,531.87	$280.00	2.87
2nd Floor South East wing Hallway	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,950	0.02	132	0.0	$12.29	$63.20	$0.00	5.14
Room 207	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.58	4,001	0.0	$373.24	$1,257.60	$260.00	2.67
Room 208	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,765	Relamp	No	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.32	1,574	0.0	$146.83	$877.50	$150.00	4.95
Closet	1	Halogen Incandescent: PAR38 60W	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Room 209	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.58	4,001	0.0	$373.24	$1,257.60	$260.00	2.67
Room 210	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.58	4,001	0.0	$373.24	$1,257.60	$260.00	2.67
Room 211	16	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	16	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.77	5,335	0.0	$497.66	$1,638.13	$340.00	2.61
Room 212	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.58	4,001	0.0	$373.24	$1,257.60	$260.00	2.67
Room 213	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.58	4,001	0.0	$373.24	$1,257.60	$260.00	2.67
Boys Bathroom	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	2	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.05	379	0.0	$35.34	$233.00	$20.00	6.03
Custodian	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Room 215	12	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	12	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.58	4,001	0.0	$373.24	$1,257.60	$260.00	2.67
Girls Bathroom	1	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	1	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.02	150	0.0	$13.98	$58.50	$10.00	3.47

	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
2nd Floor North East wing Hallway	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	None	62	3,950	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	None	33	3,950	0.02	132	0.0	$12.29	$63.20	$0.00	5.14
2nd Floor North East wing Hallway	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
2nd Floor North East wing Hallway	9	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	9	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,765	0.43	3,001	0.0	$279.93	$1,056.20	$180.00	3.13
Main Hallway	18	Linear Fluorescent - T8: 4' T8 (32W) - 4L	None	114	3,950	Relamp	Yes	18	LED - Linear Tubes: (4) 4' Lamps	High/Low Control	58	2,765	0.87	6,002	0.0	$559.87	$2,112.40	$360.00	3.13
Main Hallway	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	None	No	3	Exit Signs: LED - 2 W Lamp	None	6	8,760	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 217A	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.16	1,137	0.0	$106.02	$416.80	$80.00	3.18
Room 217B	3	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	3	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.12	852	0.0	$79.52	$341.60	$65.00	3.48
Room 217	6	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	6	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.29	2,001	0.0	$186.62	$686.80	$140.00	2.93
Room 218	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.33	2,273	0.0	$212.05	$717.60	$140.00	2.72
Restroom	1	Linear Fluorescent - T12: 4' T12 (40W) - 1L	Wall Switch	46	3,950	Relamp & Reballast	No	1	LED - Linear Tubes: (1) 4' Lamp	Wall Switch	15	3,950	0.02	143	0.0	$13.35	$98.00	$5.00	6.97
Room 219	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57
Room 221	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.33	2,273	0.0	$212.05	$717.60	$140.00	2.72
Room 223	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.33	2,273	0.0	$212.05	$717.60	$140.00	2.72
Room 220	8	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	8	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.33	2,273	0.0	$212.05	$717.60	$140.00	2.72
Room 223 1/5	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.16	1,137	0.0	$106.02	$416.80	$80.00	3.18
Storage1	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Storage2	1	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.03	232	0.0	$21.61	$53.75	$10.00	2.02
Auditorium Hallway	2	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	2	LED - Linear Tubes: (2) 4' Lamps	Wall Switch	29	3,950	0.04	300	0.0	$27.97	$117.00	$20.00	3.47
Auditorium Hallway	1	U-Bend Fluorescent - T8: U T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	No	1	LED - Linear Tubes: (2) U-Lamp	Wall Switch	33	3,950	0.02	132	0.0	$12.29	$63.20	$0.00	5.14
Room 222 1/5	4	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	4	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.16	1,137	0.0	$106.02	$416.80	$80.00	3.18
Room 224	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 226	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 228	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Security Office	1	Incandescent: 150W Incandescent	Wall Switch	150	3,950	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Wall Switch	9	3,950	0.09	640	0.0	$59.75	$53.75	$10.00	0.73
Top Floor Auditorium	4	Incandescent: 60W Incandescent	Wall Switch	60	3,950	Relamp	Yes	4	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	2,765	0.14	976	0.0	$91.02	$331.01	$60.00	2.98

	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
Room 230	15	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	15	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.41	2,841	0.0	$265.06	$993.50	$170.00	3.11
Closet	3	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Wall Switch	62	3,950	Relamp	Yes	3	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.08	568	0.0	$53.01	$291.50	$30.00	4.93
Room 232	19	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,765	Relamp	No	19	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.41	1,994	0.0	$185.99	$1,111.50	$190.00	4.95
Room 234 A	18	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,765	Relamp	No	18	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.39	1,889	0.0	$176.20	$1,053.00	$180.00	4.95
Storage	2	Incandescent: 100W A Lamp	Wall Switch	100	3,950	Relamp	Yes	2	LED Screw-In Lamps: Downlight Solid State Retrofit	Occupancy Sensor	9	2,765	0.12	851	0.0	$79.41	$223.51	$20.00	2.56
Classroom Lab	20	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,765	Relamp	No	20	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	2,765	0.43	2,099	0.0	$195.78	$1,170.00	$200.00	4.95
Storage	4	Linear Fluorescent - T8: 4' T8 (32W) - 2L	Occupancy Sensor	62	2,765	Relamp	Yes	4	LED - Linear Tubes: (2) 4' Lamps	Occupancy Sensor	29	1,936	0.11	530	0.0	$49.48	$350.00	$40.00	6.27
Room 229 1/5	2	Linear Fluorescent - T8: 4' T8 (32W) - 4L	Wall Switch	114	3,950	Relamp	Yes	2	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.10	667	0.0	$62.21	$306.27	$60.00	3.96
Room 231	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.41	2,841	0.0	$265.06	$868.00	$170.00	2.63
Room 233	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.34	2,380	0.0	$222.05	$1,067.33	$220.00	3.82
Room 235	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.34	2,380	0.0	$222.05	$1,067.33	$220.00	3.82
Room 237	10	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	10	LED - Linear Tubes: (4) 4' Lamps	Occupancy Sensor	58	2,765	0.34	2,380	0.0	$222.05	$1,067.33	$220.00	3.82
Stairway	1	Linear Fluorescent - T8: 4' T8 (32W) - 1L	None	32	3,950	Relamp	No	1	LED - Linear Tubes: (1) 4' Lamp	None	15	3,950	0.01	79	0.0	$7.42	$35.90	$5.00	4.17
Stairway	5	Linear Fluorescent - T12: 4' T12 (40W) - 1L	None	46	3,950	Relamp & Reballast	Yes	5	LED - Linear Tubes: (1) 4' Lamp	High/Low Control	15	2,765	0.12	814	0.0	$75.96	$690.00	$25.00	8.75
Exterior Perimeter Light (Front Entrance)	1	Halogen Incandescent: 150W Incandescent	Daylight Dimming	150	4,380	Relamp	No	1	LED Screw-In Lamps: Downlight Solid State Retrofit	Daylight Dimming	25	4,380	0.08	630	0.0	$58.74	$97.85	$10.00	1.50
Exterior Perimeter Light (Front Entrance)	8	Metal Halide: (1) 400W Lamp	Daylight Dimming	458	4,380	Fixture Replacement	No	8	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	125	4,380	1.75	13,419	0.0	$1,251.78	$3,125.42	$800.00	1.86
Exterior Perimeter Light (Front Entrance)	2	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,380	Fixture Replacement	No	2	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	75	4,380	0.29	2,216	0.0	$206.75	$781.35	$200.00	2.81
Trailer Office 1	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57
Trailer Office 1	2	Exit Signs: Incandescent	None	14	8,760	Fixture Replacement	No	2	LED Exit Signs: 2 W Lamp	None	6	8,760	0.01	161	0.0	$15.04	$215.11	$0.00	14.31
Trailer Office 2	12	Linear Fluorescent - T8: 4' T8 (32W) - 3L	Wall Switch	93	3,950	Relamp	Yes	12	LED - Linear Tubes: (3) 4' Lamps	Occupancy Sensor	44	2,765	0.49	3,410	0.0	$318.07	$1,018.40	$200.00	2.57
Exterior Perimeter Light (Back Entrance)	7	Metal Halide: (1) 250W Lamp	Daylight Dimming	295	4,380	Fixture Replacement	No	7	LED - Fixtures: Outdoor Wall-Mounted Area Fixture	Daylight Dimming	75	4,380	1.01	7,757	0.0	$723.63	$2,734.74	$700.00	2.81

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	Boiler Burner	2	Other	7.5	87.0%	No	2,184	No	87.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler	2	Boiler Feed Water Pump	2.0	80.0%	No	2,745	No	80.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	DHW circulator pump motor	1	Other	0.3	68.0%	No	2,745	No	68.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	Kitchen	1	Exhaust Fan	0.2	68.0%	No	2,745	No	68.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Auditorium RTU	2	Supply Fan	10.0	89.5%	No	3,370	No	89.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Auditorium RTU	2	Exhaust Fan	5.0	87.5%	No	2,745	No	87.5%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Auditorium RTU	1	Other	0.5	85.0%	No	2,745	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Bathrooms	2	Exhaust Fan	0.5	86.0%	No	2,745	No	86.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Bathrooms	1	Exhaust Fan	0.3	82.0%	No	2,745	No	82.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Bathrooms	2	Exhaust Fan	0.3	83.0%	No	2,745	No	83.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Bathrooms	1	Exhaust Fan	0.5	84.0%	No	2,745	No	84.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Boiler Room	Boiler Room	1	Air Compressor	1.0	85.0%	No	4,957	No	85.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00
School	Unit Ventilators	53	Other	0.3	71.0%	No	2,745	No	71.0%	No		0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Electric HVAC Inventory & Recommendations

		Existing Conditions				Proposed Conditions								Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Install High Efficiency System?	System Quantity	System Type	Cooling Capacity per Unit (Tons)	Heating Capacity per Unit (kBtu/hr)	Cooling Mode Efficiency (SEER/EER)	Heating Mode Efficiency (COP)	Install Dual Enthalpy Economizer?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Basement Office 1	Basement Office 1	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Basement Office 2	Basement Office 2	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Mainteance Repair Shop	Mainteance Repair Shop	1	Window AC	0.83		Yes	1	Window AC	0.83		12.00		No	0.47	794	0.0	$74.10	$903.67	$0.00	12.20
Kitchen	Kitchen	1	Window AC	1.10		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Data Room	Data Room	1	Ductless Mini-Split AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Data Room	Data Room	1	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hub Office	Hub Office	1	Window AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Hub Office	Hub Office	1	Window AC	1.00		Yes	1	Window AC	1.00		12.00		No	0.57	957	0.0	$89.28	$1,088.76	$0.00	12.20
Room 128	Room 126	1	Window AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Staff Room	Staff Room	1	Window AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 116	Room 116	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 117	Room 117	1	Window AC	0.83		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 110	Room 110	1	Window AC	1.16		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Print Shop Room	Print Shop Room	1	Window AC	0.66		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 109	Room 109	1	Window AC	1.25		Yes	1	Window AC	1.00		12.00		No	0.39	655	0.0	$61.08	$1,088.76	$0.00	17.82
Roof Top	Library	1	Packaged AC	12.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Athletic Director Office/ Rooms 210/Cafeteria	Athletic Director Office/ Rooms 210/Cafeteria	4	Window AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop - Trailer	Trailer Offices	2	Packaged AC	5.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 217B	Room 217B	1	Window AC	1.00		Yes	1	Window AC	0.83		12.00		No	0.68	1,149	0.0	$107.21	$903.67	$0.00	8.43
Room 217	Room 217	1	Window AC	1.25		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 218	Room 218	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 222	Room 222	1	Window AC	0.43		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 22 1/2	Room 22 1/2	1	Window AC	1.00		Yes	1	Window AC	0.83		12.00		No	0.68	1,149	0.0	$107.21	$903.67	$0.00	8.43
Lab Class	Lab Class	2	Window AC	1.50		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Room 229 1/2	Room 229 1/2	1	Window AC	1.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Main Office	1	Split-System AC	7.50		Yes	1	Split-System AC	7.50		11.50		No	4.03	6,809	0.0	$635.16	$8,728.28	$547.50	12.88
Roof Top	Room 126	1	Split-System AC	0.75		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Front Wall	School Building	2	Split-System AC	2.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop	Auditorium	1	Split-System AC	40.00		No							No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Fuel Heating Inventory & Recommendations

		Existing Conditions			Proposed Conditions						Energy Impact & Financial Analysis						
Location	Area(s)/System(s) Served	System Quantity	System Type	Output Capacity per Unit (MBh)	Install High Efficiency System?	System Quantity	System Type	Output Capacity per Unit (MBh)	Heating Efficiency	Heating Efficiency Units	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Boiler Room	School Building	2	Forced Draft Steam Boiler	5,411.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Library	1	Furnace	150.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Roof Top	Auditoriun	1	Furnace	287.00	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Rooftop - Trailer	Trailer Offices	2	Furnace	64.00	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	School Building	2	Storage Tank Water Heater (> 50 Gal)	No						0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Low-Flow Device Recommendations

	Recommedation Inputs				Energy Impact & Financial Analysis						
Location	Device Quantity	Device Type	Existing Flow Rate (gpm)	Proposed Flow Rate (gpm)	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Basement Office 3	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	5.6	$51.04	$7.17	$0.00	0.14
Maintenance Repair Shop	1	Faucet Aerator (Lavatory)	3.00	1.00	0.00	0	9.4	$85.07	$7.17	$0.00	0.08
Basement Women Bathroom	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	11.2	$102.08	$14.34	$0.00	0.14
Basement Men Bathroom	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	11.2	$102.08	$14.34	$0.00	0.14
Room 6	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	11.2	$102.08	$14.34	$0.00	0.14
Small Gym -Girls Locker Room	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	5.6	$51.04	$7.17	$0.00	0.14
Kitchen	4	Faucet Aerator (Kitchen)	3.00	2.20	0.00	0	15.0	$136.11	$28.68	$0.00	0.21
1st floor hallway bathroom	3	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	16.9	$153.12	$21.51	$0.00	0.14
Men's Locker Room	2	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	11.2	$102.08	$14.34	$0.00	0.14
Gym Office	1	Faucet Aerator (Lavatory)	2.20	1.00	0.00	0	5.6	$51.04	$7.17	$0.00	0.14

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
Cafeteria	2	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (>50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	2	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	3	Stand-Up Refrigerator, Solid Door (16 - 30 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (≤15 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00
Kitchen	1	Stand-Up Refrigerator, Solid Door (31 - 50 cu. ft.)	Yes	No	0.00	0	0.0	$0.00	$0.00	$0.00	0.00

Commercial Ice Maker Inventory & Recommendations

	Existing Conditions			Proposed Condi	Energy Impact & Financial Analysis						
Location	Quantity	Ice Maker Type	ENERGY STAR Qualified?	Install ENERGY STAR Equipment?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Bib Gymnasium	1	Ice Making Head (<450 lbs/day), Batch	Yes	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	5	Electric Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$78,946.52	$5,000.00	0.00
Kitchen	1	Gas Combination Oven/Steam Cooker (<15 Pans)	Yes	No	0.00	0	0.0	$0.00	$16,598.81	$750.00	0.00
Kitchen	1	Gas Convection Oven (Full Size)	Yes	No	0.00	0	0.0	$0.00	$9,290.04	$500.00	0.00

Plug Load Inventory

	Existing Conditions			
Location	Quantity	Equipment Description	Energy Rate (W)	ENERGY STAR Qualified?
Basement Office 1	1	Printer	42.0	Yes
Basement Office 1	1	Desktop with LCD Monitor	205.0	Yes
Basement Office 2	1	Printer	716.0	Yes
Basement Office 2	1	Desktop with LCD Monitor	205.0	Yes
Basement Office 3	1	Desktop with LCD Monitor	205.0	Yes
Custodian Office	1	Microwave	1,000.0	No
Custodian Office	1	Water Fountain	270.0	No
Band Room	3	Desktop with LCD Monitor	205.0	Yes
Room 35 - Kitchen	1	Microwave	900.0	No
Room 35 - Kitchen	1	Microwave	1,000.0	No
Room 35 - Kitchen	1	Washing Machine	1,350.0	No
Room 35 - Kitchen	1	Washing Machine	1,350.0	No
Room 35 - Cooking Class	1	Copy Machine	895.0	Yes
Room 35 - Cooking Class	1	Desktop with LCD Monitor	205.0	Yes
Room 36	1	Printer	665.0	Yes
Room 32	1	Copy Machine	895.0	Yes
Room 32	1	Desktop with LCD Monitor	205.0	Yes
Room 4	23	Desktop with LCD Monitor	205.0	Yes
Room 4	1	Printer	410.0	Yes
Room 31	18	Desktop with LCD Monitor	205.0	Yes
Room 31	1	Printer	716.0	Yes
Room 3	23	Desktop with LCD Monitor	205.0	Yes
Room 3	1	Printer	570.0	Yes
Room 30	1	Printer	716.0	Yes
Guidance Room	2	Desktop with LCD Monitor	205.0	Yes
Guidance Room	1	Copy Machine	1,410.0	Yes
Room 1	1	Desktop with LCD Monitor	205.0	Yes
Room 1	1	Printer	450.0	Yes
Room 3	1	Desktop with LCD Monitor	205.0	Yes

Room 4	1	Desktop with LCD Monitor	205.0	Yes
Room 5	1	Desktop with LCD Monitor	205.0	Yes
Principal Office	1	Desktop with LCD Monitor	205.0	Yes
Principal Office	1	Printer	716.0	Yes
Secretaria	1	Desktop with LCD Monitor	205.0	Yes
CTE Office	1	Printer	675.0	Yes
CTE Office	1	Desktop with LCD Monitor	205.0	Yes
CTE Office	1	Microwave	1,000.0	No
Hub Office	2	Desktop with LCD Monitor	205.0	Yes
Hub Office	1	Printer	716.0	Yes
Hub Office	1	Printer	42.0	Yes
Copy Room	1	Water Fountain	270.0	No
Copy Room	1	Copy Machine	780.0	Yes
Room 126	5	Desktop with LCD Monitor	205.0	Yes
Room 126	2	Flat Screen TV	154.0	Yes
Room 126	1	Copy Machine	710.0	Yes
Room 124	1	Printer	368.0	Yes
Attendance Office	1	Copy Machine	684.0	Yes
Attendance Office	3	Desktop with LCD Monitor	205.0	Yes
Attendance Office	1	Printer	467.0	Yes
Room 119	1	Microwave	1,000.0	No
Room 119	3	Desktop with LCD Monitor	205.0	Yes
Staff Room	2	Desktop with LCD Monitor	205.0	Yes
Staff Room	1	Copy Machine	1,410.0	Yes
Staff Room	1	Microwave	900.0	No
Staff Room	1	Water Fountain	270.0	No
Room 116	3	Printer	450.0	Yes
Room 116	6	Desktop with LCD Monitor	205.0	Yes
Room 116	1	Water Fountain	270.0	No
Room 116	1	Copy Machine	1,440.0	Yes
Room 116	1	Microwave	900.0	No
Room 117	1	Desktop with LCD Monitor	205.0	Yes
Room 117	1	Printer	845.0	Yes
Room 117	1	Printer	384.0	Yes
Room 111	1	Desktop with LCD Monitor	205.0	Yes

Print Shop Room	11	Desktop with LCD Monitor	205.0	Yes
Print Shop Room	1	Printer	720.0	Yes
Print Shop Room	2	Copy Machine	510.0	Yes
Nurse Office	1	Microwave	1,000.0	No
Nurse Office	1	Printer	632.0	Yes
Nurse Office	1	Desktop with LCD Monitor	205.0	Yes
Room 109	2	Desktop with LCD Monitor	205.0	Yes
Room 109	1	Printer	560.0	Yes
Room 109	1	Printer	562.0	Yes
Gym Office	1	Desktop with LCD Monitor	205.0	Yes
Gym Office	1	Printer	495.0	Yes
Athletic Director Office	1	Microwave	700.0	No
Athletic Director Office	1	Printer	462.0	Yes
Room 200	1	Desktop with LCD Monitor	205.0	Yes
Room 204	1	Desktop with LCD Monitor	205.0	Yes
Room 206	1	Desktop with LCD Monitor	205.0	Yes
Room 206	1	Copy Machine	684.0	Yes
Library Office	1	Desktop with LCD Monitor	205.0	Yes
Library Office	1	Printer	430.0	Yes
Library Office	1	Microwave	700.0	No
Room 207	1	Desktop with LCD Monitor	205.0	Yes
Room 208	1	Desktop with LCD Monitor	205.0	Yes
Room 209	1	Desktop with LCD Monitor	205.0	Yes
Room 210	1	Desktop with LCD Monitor	205.0	Yes
Room 211	1	Desktop with LCD Monitor	205.0	Yes
Room 212	1	Desktop with LCD Monitor	205.0	Yes
Room 215	1	Desktop with LCD Monitor	205.0	Yes
Room 217A	1	Desktop with LCD Monitor	205.0	Yes
Room 217A	1	Desktop with LCD Monitor	205.0	Yes
Room 217B	1	Desktop with LCD Monitor	205.0	Yes
Room 217B	1	Printer	705.0	Yes
Room 217	1	Printer	375.0	Yes
Room 217	1	Microwave	1,000.0	No
Room 218	1	Printer	716.0	Yes
Room 218	2	Desktop with LCD Monitor	205.0	Yes

Room 219	1	Desktop with LCD Monitor	205.0	Yes
Room 223	1	Desktop with LCD Monitor	205.0	Yes
Room 223	1	Printer	716.0	Yes
Room 220	1	Desktop with LCD Monitor	205.0	Yes
Room 222	1	Desktop with LCD Monitor	205.0	Yes
Room 222	1	Printer	635.0	Yes
Room 222 1/2	1	Microwave	1,000.0	No
Room 222 1/2	3	Desktop with LCD Monitor	205.0	Yes
Room 222 1/2	1	Printer	510.0	Yes
Room 222 1/2	1	Printer	560.0	Yes
Room 224	1	Desktop with LCD Monitor	205.0	Yes
Security Office	1	Desktop with LCD Monitor	205.0	Yes
Security Office	1	Printer	480.0	Yes
Lab Class Room	1	Printer	435.0	Yes
Lab Class Room	1	Printer	564.0	Yes
Lab Class Room	2	Flat Screen TV	128.0	Yes
Lab Class Room	1	Water Fountain	270.0	No
Lab Class Room	14	Desktop with LCD Monitor	205.0	Yes
Lab Class Room	2	Printer	675.0	Yes
Lab Class Room	1	Printer	468.0	Yes
Room 229 1/2	2	Printer	468.0	Yes
Room 229 1/2	1	Printer	468.0	Yes
Room 229 1/2	1	Printer	575.0	Yes
Room 229 1/2	1	Water Fountain	270.0	No
Room 229 1/2	1	Microwave	1,000.0	No
Staff Room	1	Refrigerator	250.0	No
Nurse Room	1	Refrigerator	250.0	No
Kitchen	2	Refrigerator	250.0	No

Vending Machine Inventory & Recommendations

	Existing Conditions		Proposed Conditions	Energy Impact & Financial Analysis						
Location	Quantity	Vending Machine Type	Install Controls?	Total Peak kW Savings	Total Annual kWh Savings	Total Annual MMBtu Savings	Total Annual Energy Cost Savings	Total Installation Cost	Total Incentives	Simple Payback w/ Incentives in Years
Staff Room	1	Refrigerated	Yes	0.00	1,612	0.0	$150.36	$718.80	$0.00	4.78
Staff Room	1	Non-Refrigerated	No	0.00	0	0.0	$0.00	$718.80	$0.00	0.00
Big Gymnasium	1	Refrigerated	Yes	0.00	1,612	0.0	$150.36	$718.80	$0.00	4.78

Appendix B: ENERGY STAR® Statement of Energy Performance

ENERGY STAR® Statement of Energy Performance

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12

ENERGY STAR® Score[1]

Abraham Clark High School

Primary Property Type: K-12 School
Gross Floor Area (ft²): 133,210
Built: 1917

For Year Ending: January 31, 2016
Date Generated: November 02, 2017

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

Property & Contact Information

Property Address	Property Owner	Primary Contact
Abraham Clark High School 122 East 6th Street Roselle, New Jersey 07203	_____ , (___)___-_____	____ _____ , (___)___-_____ _____

Property ID: 5691905

Energy Consumption and Energy Use Intensity (EUI)

Site EUI
108.3 kBtu/ft²

Source EUI
169.2 kBtu/ft²

Annual Energy by Fuel		
Electric - Grid (kBtu)	3,537,292 (24%)	
Natural Gas (kBtu)	10,891,011 (76%)	

National Median Comparison	
National Median Site EUI (kBtu/ft²)	73.8
National Median Source EUI (kBtu/ft²)	115.2
% Diff from National Median Source EUI	47%
Annual Emissions	
Greenhouse Gas Emissions (Metric Tons CO2e/year)	971

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)